ESCULAPIO

JOURNAL OF SERVICES INSTITUTE OF MEDICAL SCIENCES, LAHORE.

VOLUME 20 JANUARY - MARCH 2024 ISSUE 01

PUBLISHED BY

ESCULAPIO OFFICE, GYNAE UNIT - I, SERVICES HOSPITAL LAHORE
PHONE: 042-99204879, WWW.ESCULAPIO.PK

ONLINE EDITION
VISIT THE WEBSITE FOR ONLINE: WWW.ESCULAPIO.PK
FOR SUBMISSION: PUBLICATIONS@ESCULAPIO.PK

COMPOSED BY
AMEER ALI

PRINTED BY
TALAL PUBLISHERS
9- ROSE CENTRE, KABIR STREET, URDU BAZAR LAHORE
0300-4327951
HEC RECOGNISED: "Y" CATAGORY

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Reducing the Burden of Neonatal Mortality in Pakistan

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Services Institute of Medical Sciences.
https://doi.org/10.51273/esc24.25201.32

The chances of dying on the first day of life are second only to the last day of life. Newborns, thus, represent a very vulnerable subset of population. This is especially the case in low- and middle-income countries like Pakistan. Although our Neonatal Mortality Rate has declined during the last few decades, it failed to keep pace with the targets set in the Millennium Development Goals (MDGs). Pakistan continues to have one of the highest neonatal Mortality Rates in the world. As we enter the era of Sustainable Development Goals, every effort should be made to meet the new targets set in the SDGs.

With the ever-increasing financial burden of healthcare (especially in a struggling economy like ours), careful thought should be given to adopting measures to save newborn lives and improve their health status. These measures should not only be efficacious but also cost effective and sustainable. Keeping in mind the mother newborn dyad, measures to improve neonatal outcome must address maternal health simultaneously.

Reducing neonatal mortality in low- and middle-income countries (LMICs) is thus a multifaceted challenge that requires a combination of strategies addressing various factors contributing to newborn deaths. Here are some effective approaches:

1. **Access to Skilled Healthcare Providers:** Ensuring that mothers have access to skilled birth attendants and quality obstetric care during pregnancy, delivery, and postpartum periods can significantly reduce neonatal mortality. This includes trained midwives/ LHVs, nurses, and doctors. The role of LHVs is paramount because of their close links with the community they serve.[1]

2**. Antenatal Care:** Early and regular antenatal care visits are crucial for identifying and managing high-risk pregnancies, preventing complications, and promoting healthy behaviors such as proper nutrition and hygiene. A mechanism of effective, timely referral needs to be developed with clearly defined pathways between primary/secondary and tertiary health care facilities.[2] Vaccinating pregnant mothers against tetanus is proven to reduce neonatal mortality.[3]

3. **Quality Obstetric and Neonatal Care**: Strengthening health systems to provide essential obstetric and neonatal care, including emergency obstetric services, neonatal resuscitation, and management of neonatal infections, can save countless lives.

4**. Essential Newborn Care**: Promoting immediate and exclusive breastfeeding, thermal care (skin-to-skin contact/ Kangaroo Mother Care and appropriate clothing), and hygienic cord care can prevent common causes of neonatal mortality, such as infections and hypothermia.[4]

5. **Community-Based Interventions**: Engaging communities through education, outreach programs, and community health workers can improve knowledge and practices related to maternal and newborn health, facilitate early detection of danger signs, and encourage timely referrals to health facilities.

6**. Access to Essential Medicines and Equipment**: Ensuring availability of essential medicines, such as antibiotics for treating neonatal infections and medications for preventing and managing complications like preterm birth, is critical. Additionally, access to essential equipment like newborn resuscitation devices for neonatal care. It is also important to develop evidence base guidelines for antibiotic use to prevent emergence of resistant strains of bacteria.

7**. Improving Nutrition**: Addressing maternal malnutrition through supplementation and dietary diversification can positively impact fetal growth and development, reducing the risk of neonatal complications.

8. **Water, Sanitation, and Hygiene (WASH)**: Improving access to clean water, sanitation facilities, and hygiene practices at the household and community levels is proven to reduce the risk of

neonatal infections, such as sepsis and diarrhea [5].

9. **Empowering Women**: Promoting women's education, autonomy, and decision-making power regarding their reproductive health can lead to better maternal and neonatal outcomes [6,7]. This infromation should be part of the curriculum for adolescent girls in schools and colleges.

10. **Addressing Socioeconomic Determinants**: Tackling poverty, improving access to education, and addressing gender inequalities can indirectly contribute to reducing neonatal mortality by improving overall maternal health and socioeconomic status.

11. **Data Collection and Monitoring**: Strengthening health information systems for routine monitoring and evaluation of maternal and neonatal health indicators is essential for tracking progress, identifying gaps, and guiding targeted interventions.

12**. Policy and Advocacy**: Governments and stakeholders should prioritize maternal and newborn health on the policy agenda, allocate adequate resources, and advocate for sustainable interventions at local, national, and global levels.

By implementing these comprehensive, cost-effective strategies, significant strides can be made in reducing neonatal mortality and improving the health and well-being of mothers and newborns in LMICs like Pakistan.

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Trends and Patterns of Cancer Incidence in Women - A Single Center Experience

Afia Sarwar,[1] Atiya Begum,[2] Rozina Jaffar,[3] Zonaira Rathore,[4] Fatimah,[5] Sonia Zafar[6]

Abstract

Objective: To determining the common malignancies affecting our female population.

Materials & Methods: The Study design was descriptive and cross-sectional. Study was conducted over a period of one year (January 2022 to December 2022) Citilab and Research Center, Lahore. The study was approved by the ethical committee of the organization (Letter No. CRC/MISC/958) and was based upon malignancies diagnosed in female patient population during the year 2022. All specimen(s) from female patients above 16 years of age were included. All the patients being diagnosed with a malignant tumor for the first time were included in this study. Patients who have already been receiving some therapy for previously diagnosed malignancies were excluded. Histological diagnosis by a competent Histopathologist and verified by another consultant Histopathologist was taken as confirmatory diagnosis. The collected data was analyzed with SPSS version 25.

Results: During a period of twelve months, a total of 264 cases of malignant tumors from female patients were studied. Maximum number of cases (75) 28.4% belonged to the age group of 51 to 60 years followed by 41 to 50 years of age that constituted 23.8%. Most frequent tumor found in the study group was Breast carcinoma (112.) It constituted 42.4% of total cases, followed uterine carcinoma (28) that constituted 10.6 %. Cervical (15) and Ovarian (15) cancers contributed equally to cancer burden in this study population each constituting 5.7% of total.

Screening and early diagnosis can help precancerous lesions and reducing the burden of invasive malignancies.

Conclusion: Breast carcinoma is the most common malignancy diagnosed in our female population followed by gynecological malignancies. Most of the patients belong to 51-60 years of age. Media campaigns regarding the risk of malignancy, its early diagnosis and high possibility of treatment, importance of self-examination and easy availability of screening programs can contribute to decreasing the incidence and improving life expectancy in our female population.

Key words: Female, Malignancies, Cancer burden, Pakistani population, Breast, Gynecological

How to cite: *Sarwar A, Begum A, Jaffar R, Rathore Z, Fatimah, Zafar S. Trends and Patterns of Cancer Incidence in Women - A Single Center Experience. Esculapio - JSIMS 2023;20(01):3-7.*

DOI: https://doi.org/10.51273/esc24.25132011

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Submission Date:	23-11-2023
1st Revision Date:	13-12-2023
Acceptance Date:	03-03-2024

Introduction

Cancer has become a leading cause of death during last two decades, in both the advanced world as well as underdeveloped and developing countries. According to the International Agency for Research on Cancer (IARC) 1 in 5 people develop cancer during their lifetime.[1] Although there is demographic variation in cancer distribution, it affects both sexes. The 2020 Global Cancer Observatory has reported that one out of every six women develops cancer during their lifetime, and one out of every 11 women succumbs to the disease.[1]

Additionally, females constitute approximately 47.8% of the total global cancer incidence rate, as breast cancer presents world's most prevalent cancer. Although cancer incidence is increasingly growing in developed countries, cancer related deaths are much higher in low- and middle-income countries.[2]

Cancer burden of different malignancies is variable worldwide. A study about cancer burden among Arab world females have determined following cancers in descending order, breast, lung, cervix and thyroid[3]. Countries with Low Human Development index (HDI) had triple the incidence of cervical cancer compared to those with very high HDI, while mortality rates were six times higher in low HDI countries compared to very high HDI countries.[4]

Cancer incidence and its outcome show a complex interaction between inherited factors, lifestyle, and genetics difference in tumor biology, socioeconomic and environmental factors.[5] Among modifiable factors, education of female population helps in creating awareness about health care and decreasing invasive cancer load. In rural areas of developing countries, women are not getting formal education and they lack access to diagnostic and health care facilities.[6]

Among other factors contributing to the increase in cancer prevalence worldwide, obesity is another one.[7] The rapid global increase in obesity prevalence is alarming. Around 51% of newly diagnosed cancers in women are related to obesity, including endometrial, breast, ovarian, and cervical cancers.[8] Prolonged exposure to high blood concentrations of estrogens, insulin, and insulin-like growth factor 1 has been connected to these female malignancies. Obesity also complicates the screening, diagnosis, and treatment of these cancers. Further investigation is necessary to develop new preventive and therapeutic approaches, such as the potential role of bariatric surgery.[8]

Material & Methods

The cross-sectional study was conducted over a period of one year (January 2022 to December 2022) at Citilab and Research Center, Lahore., Pakistan after approval from the Institutional Review Board (Approval No. CRC/MISC/958).

Sampling: Non-probability convenient sampling was employed. Sample size was calculated using the formula n= (Z2P (1-P)/e2.

Inclusion Criteria: All specimen(s) from female patients above 16 years of age received in the Laboratory during the year 2022 from different cities in Pakistan were included. All those patients who were being diagnosed with a malignant tumor for the first time were included.

Histological diagnosis made by a competent Histopathologist and verified by another consultant Histopathologist was taken as confirmatory diagnosis.

Data Analysis: Collected data was entered and analyzed through the utilization of the Statistical Packages for Social Sciences (SPSS) software version 25. The results were compiled and tabulated. Qualitative variables were expressed as frequencies and percentages.

Results

Our study included a total of 264 cases (histological specimen) all belonging to female patients of variable ages, ranging from 18 years to 76 years. The largest percentage of cases (28.4%) belonged to the 51-60 age group, with 75 cases, followed by the 41-50 age group, which constituted 23.8%. Frequency distribution of different age groups is shown in figure I. Percentages of various cancers were variable in different age groups; however, breast carcinoma was the commonest among each group as shown in Figure II. Maximum number of breast carcinoma were diagnosed in the age group of 51-60 years.

Most frequent tumor found in the study group was breast carcinoma (112.) It constituted 42.4% of total cases, followed uterine carcinoma (28) that constituted 10.6 %. Cervical (15) and ovarian (15) cancer contributed equally to cancer burden in this study population each constituting 5.7% of total. The subtypes and differentiation of these tumors are summarized in Table I. Carcinomas of female genital tract constituted the largest group. Head and neck carcinomas also made up a large group constituting 27 (10.2%). Amongst these, Squamous cell carcinoma was the commonest subgroup constituting 42%.

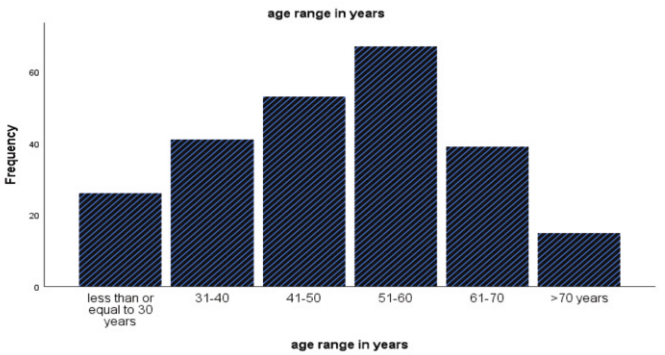

Figure-1: *Frequency distribution of affected age groups*

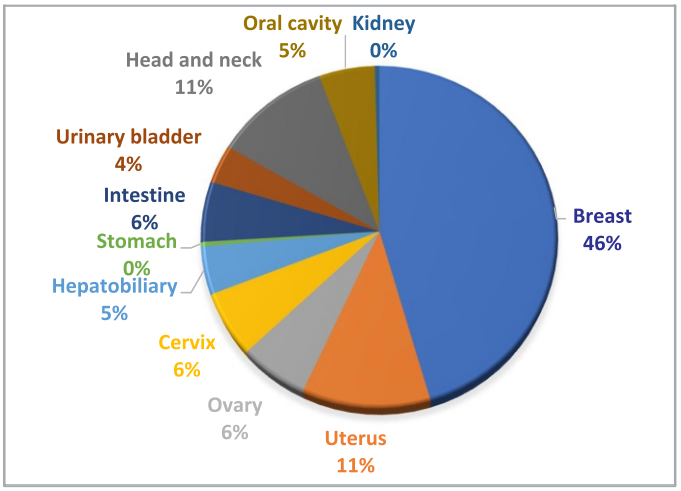

Figure-2: *Frequency Distribution of Malignancies*

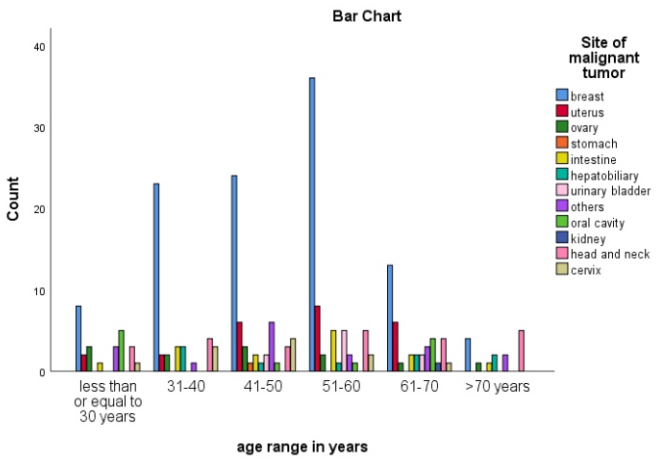

Figure-3: *Age Wise Distribution of Various Malignancies*

Discussion

Breast carcinoma accounts for 23% of all cancer cases diagnosed in women[9]. It is followed by colorectal, liver, thyroid, cervical and others in different percentages among different populations. Survival of breast cancer for at least 5 years after diagnosis ranges from more than 90% in high-income countries, to 66% in India and 40% in South Africa (WHO). This is explainable with the factors including late diagnosis, inaccessibility to screening programs and advanced treatments. Mass screening programs in western world have indeed been helpful in reducing the incidence of certain malignancies like cervical cancer and breast cancer, however due to financial restraints these screening programs cannot be utilized in low economic countries. Socioeconomic factors are of prime importance in many female cancers including cervical cancer, as the incidence decreases with improving socioeconomic status. Decline in fertility rates and lower parity have also contributed to decreasing cervical cancer incidence in some developed countries[4]. Education of female population helps in creating awareness about health care. A study conducted in Bangladesh also highlighted the same[6]. Though this study didn't cover the whole country, it represents the exact scenario of developing country women. It is evident that some factors such as education, residential area, and socio-economic status are the main obstacles to being aware about cancer. In rural areas, women are not getting formal education and diagnostic or health care facilities are out of their reach. The results of our study showed that among our female patient population suffering from cancer, breast cancer remains on the top constituting nearly half of total female malignancies 42.4%. This finding is like the data received and witnessed in multiple studies conducted worldwide[2,5,7]. The incidence of breast carcinoma is increasing in Pakistan, with an estimated probability of one in nine women being susceptible to its development[10]. We found maximum number of breast cancer in 51-60 years; however, this result is different from the one in a study that highlighted the increase in breast cancer incidence in

Table 1: *Commonest Carcinomas & their subtypes with frequencies*

Tumor site	Frequency	Subtype with percentage	Differentiation
Breast	112	Infiltrating Ductal carcinoma (63%) Invasive lobular carcinoma (23.8%) Others (13.2%)	Well differentiated (23%) Moderate - poorly differentiated (77%)
Uterus	28	Endometrioid Carcinoma (91%) Serous carcinoma (6.2%) Others (3.8%)	Well differentiated (12%) Moderate - poorly differentiated (88%)
Cervix	15	Squamous cell carcinoma (91%) Adenocarcinoma (9%)	Well differentiated (34%) Moderate - poorly differentiated (66%)
Ovary	15	Serous carcinoma (84%) Others (16%)	Well differentiated (9%) Moderate - poorly differentiated (81%)

less than 50 years in many countries[2].

Fortunately, the most common female malignancy can be picked up very early in ideal scenarios. However, lacking knowledge and awareness about breast cancer along with unavailable diagnostic and treatment facilities are the major reason for cancer-related deaths in less developed countries like Pakistan. Much is needed to be done for female health.

Frequently organizing public educational programs on cancer awareness throughout rural and urban areas would surely lead to early detection and diagnosis, therefore, will improve the odds of survival and cure with simpler and more cost-effective treatment.

After breast cancer, the prevalence of other cancers affecting the female population is variable among various ethnic groups. In our study, it is followed by carcinomas of uterus, head and neck malignancies, ovarian and cervical cancers. It reflects that ovarian cancer is the third most common gynecological malignancy and this finding is similar to the study which concluded Ovarian cancer as the third most common gynecological cancer globally in 20208. However, results from data compiled in a study Cancer burden among Arab females in 2020, concluded colorectal carcinoma being commonest after breast cancer followed by uterine cancer and cervix[3] and another study reported cervical cancer has second most common cancer among females in developing countries[5,11]. The age ranges for cervical cancer varies from 18 years to 76 years in our study population that is very close to the findings conducted on Bangladeshi females[6]. However, the maximum numbers of patients in their study were between 26–35 years while we found maximum number among 51-60 years.

Percentages of various cancers were variable in different age groups; however, breast carcinoma was the commonest among each group like other national and international studies. As, outcome of disease is strongly linked to early detection and timely treatment, this demands extensive focus on media campaigns related to screening programs, early detection of malignancies and up-to-date modern therapies. Different diagnostic modalities can be helpful in this regard like Magnetic Resonance Spectroscopy (MRS) radiological technique that can be used to detect early-stage breast cancer[12].

Conclusion

Breast carcinoma is the commonest malignancy in our female population followed by gynecological malignancies. Most of these tumors are diagnosed at a late stage leading to poor prognosis. Creating awareness about these malignancies, better chances of treatment and survival if diagnosed at an early stage, importance of self-examination and easy availability of screening methods are warranted to improve the life expectancy of our patients.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

AB, AS: Conceptualization of Project
AB, F, ZS: Data Collection
AS, AB: Literature Search
RJ, ZR: Statistical Analysis
F, SZ: Drafting, Revision
AS, RJ, ZR: Writing of Manuscript

Harmonizing Teaching Pedagogy: Advancing Best Practices in Forensic Medicine & Toxicology Education amidst Academic Challenges

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Abstract

Objectives: The study focuses to examine the challenges and tensions encountered in teaching Forensic Medicine & Toxicology while exploring strategies to enhance teaching practices in this specialized subject.

Materials and Methods: The article utilizes a diverse range of sources ensured a thorough exploration of teaching practices in Forensic Medicine & Toxicology extracted though renowned sources such as PubMed, Elsevier, SpringerLink, Wiley Online Library, and other reputable databases. Additionally, textbooks and reference materials in the fields of Forensic Medicine, Legal Medicine, and clinical forensic medicine were consulted to gather comprehensive insights into teaching practices within these disciplines.

Keywords: Forensic Medicine, Toxicology, Medical Education, Teaching Practices, Pedagogical Strategies

How to cite: *Buzdar ZA, Munir F, Serwer A, Fazli MAS, Mirza M. Harmonizing Teaching Pedagogy: Advancing Best Practices in Forensic Medicine & Toxicology Education amidst Academic Challenges. Esculapio - JSIMS 2023;20(01):8-11.*

DOI: https://doi.org/10.51273/esc24.25132012

Introduction

The Subject of Forensic Medicine & Toxicology:

While the pursuit of best teaching practices in Forensic Medicine & Toxicology remains a critical endeavor globally, a notable research gap persists, particularly in regions such as Pakistan. Despite the significance of forensic medicine and toxicology in the healthcare and legal sectors, there has been limited exploration into optimizing pedagogical approaches tailored to the specific context of educational landscape of Pakistan. The intricacies of local challenges, cultural nuances, and resource constraints present unique hurdles that necessitate tailored teaching methodologies. By addressing this research gap medical teachers can greatly contribute to the advancement of education in forensic medicine and toxicology. The professional responsibility in teaching Forensic Medicine & Toxicology emphasizes the intricate landscape on the horizon of medical education focusing on the tensions and challenges faced in teaching and learning[1]. The modern medical education dilemma demand novel approaches to ensure and entrust optimal and comprehensive application of the knowledge in the subject. The article highlights the problems towards teaching the subject on one hand while amid the prevailing tensions it also suggest best teaching practices to enhance the quality of teaching the specialized subject of Forensic Medicine & Toxicology on the other hand. Nonetheless the subject is deprived of due importance from all spheres of stake holders[2].

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Submission Date: 12-10-2023
1st Revision Date: 04-01-2024
Acceptance Date: 13-03-2024

Reasons behind Tensions in Teaching Forensic Medicine & Toxicology

Tutors in Forensic Medicine and Toxicology face challenges in adapting teaching methods to engage students effectively and in navigating the interdisciplinary nature of the subject matter amidst evolving legal and medical landscapes.

Sensitivity and Ethical Dilemmas:

The fresh graduates in Pakistan and the professionals working in the environment of Medicolegal and

Postmortem spheres are the actual respondents of the core knowledge of the subject delivered to them during their academic career in the medical school[3].

Teaching Forensic Medicine & Toxicology often involves sensitive topics such as ethical issues regarding medical practices in field of clinical medicine. The sensitive issues like that of autopsy procedures, medicolegal examination of violent criminals, and ethical considerations for the victims of gender based violence. Balancing the need for imparting critical knowledge with sensitivity and respect for the deceased and their families presents a significant challenge[2].

Interdisciplinary Nature:

Forensic Medicine & Toxicology hinges the principles from three mainstream disciplines like those of medicine, law and justice, requiring the professionals to bridge gaps between the said disciplines while ensuring a comprehensive understanding among students. That is why the subject encompasses the concept of ***justice-through-medicine*** where judge, prosecutor and jury without forensic specialist cannot serve the purpose of serving justice.[4]

Technological Advancements:

In the world of today the forensic specialists need to be equally trained, equipped and knowledgeable as that of any other specialist like cardiologist or neurosurgeon etc. Only then the core concept of fair and impartial justice can be delivered in time and on state-of-art standards. To cut short the job of forensic expert is more technical than any other expert of any other specialty as the same has to be very keenly judge by two other disciplines and on very meticulous manner.

Rapid advancements in forensic technologies necessitate keeping educational materials and approaches up-to-date, challenging educators to integrate the latest developments into the curriculum effectively.[5]

Limited Practical Exposure:

Due to the nature of the subject and ethical considerations, providing students with adequate practical exposure to forensic procedures and toxicological services can be challenging, affecting their ability to apply theoretical knowledge.[6]

Best Teaching Practices

Case-Based Learning (CBL):

Utilizing real-life events, cases and scenarios to engage aspirants in active learning and critical thinking, encouraging them to utilize theoretical knowledge to the practical situations[7].

Constructivism Theory:

Incorporating constructivist principles into teaching methodology enables students to construct their own knowledge actively, making that learning meaningful, relevant, and enduring. It cultivates an enthusiasm for learning and equips learners with the skills needed to excel in an ever-changing, complex world[8].

Simulated Postmortem and Crime Scene Analysis:

Introducing a virtual or simulated postmortem examination and students access to crime scene analysis through the advanced and cutting-edge educational technologies, helping students with hands-on experiences in a controlled environment[9].

Interdisciplinary Collaborations:

Encouraging the interdisciplinary collaboration among medical, legal, justice and scientific professionals to conduct joint avenues for seminars, workshops and lectures, fostering a holistic understanding of the subject.[10]

Ethics and Professionalism Workshops:

Implementing workshops and introducing platforms opportunity for focusing on ethical considerations and professionalism in forensic practice, facilitating ethical decision-making and sensitivity in handling sensitive topics.[3]

Regular Curriculum Review and Update:

Establishing a schematic and systematic process for periodic curriculum review to assure alignment with the latest advancements in forensic medicine, technologies and legal regulations.[11]

Materials And Methods

The inclusion of diverse sources such as search engines, scholarly articles sources, books on Forensic Medicine, Legal Medicine, or clinical forensic medicine, as well as expert views and reviews, demonstrates a comprehensive approach to data

collection and literature review. This multifaceted strategy likely facilitated the extraction of relevant information and insights pertinent to the study's objectives. By drawing from various sources, the study could capture a wide range of perspectives and experiences related to teaching practices in Forensic Medicine & Toxicology.

A rigorous efforts were employed to extract the information well reputed sources such as PubMed, Elsevier, SpringerLink, Wiley Online Library, and other reputable databases. Besides, textbooks and defined reference materials in the fields of Forensic Medicine, Legal Medicine, and clinical forensic medicine were consulted to gather comprehensive insights into teaching practices within these disciplines.

Discussion

Educational theories could be of variety uncountable, each suitable to one in certain environment and not to another for same circumstances. Still to name a few most common and well recognized theories are as follows.

Behaviorism: The theory believes in punishment for low performance and reward for profound work. In academic environment where grading and scaling is prevalent the theory for teaching purposes works very well[6].

Constructivism: The concept emphasizes the degree of encouragement to construct ones own knowledge to understand the subject, cases, situation or the world around. The constructivists are of the opinion that theory works best through exploration, problem solving and inquiry[8,12].

Cognitivism: The principle of cognitivism works on the concept of focusing on mental processes required for learning as in memory recall, attention to a given task and perception. Cognitivists are of the firm belief that processes involving strategies of repetition, elaboration and organization works best to achieve objectives[13].

Humanism: The theory revolves around the belief that learning should be focused on individual learner and help individual to utilize their potential in a self-directed learning and intellectual growth[14].

Social Constructivism: This theory builds on the constructivist approach, but emphasizes the importance of social interaction and collaboration in the learning process. Social constructivists believe that learning is best achieved through participation in group activities and discussions[14].

Multiple Intelligences Theory: This theory proposes that there are many different types of intelligence, and that individuals may have strengths in different areas. The theory suggests that educators should take into account these differences when designing instruction and assessment[15].

Situated Learning: This theory emphasizes the importance of context in the learning process. Situated learning suggests that learning is best achieved when learners are actively engaged in meaningful, real-world activities that are relevant to their lives and experiences[16].

Conclusion

Forensic Medicine & Toxicology play a vital role in the medical curriculum, providing students with essential knowledge and skills necessary to understand the medicolegal aspects of healthcare, law enforcement agencies and the justice system. However, teaching Forensic Medicine & Toxicology poses unique challenges due to its sensitive nature, interdisciplinary scope, and evolving legal and scientific landscape. This article aims to critically analyze the tensions faced by educators in teaching this subject and suggests innovative teaching practices to enhance educational outcomes. By and far it was observed that Case Based Learning and Constructivism theory serves the teaching purpose in the subject of Forensic Medicine and Toxicology the best.

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Authors Contribution

ZAB: Conceptualization of Project
ZAB, MM: Data Collection
ZAB: Literature Search
FM: Statistical Analysis
AS: Drafting, Revision
MASF: Writing of Manuscript

Comparison of Outcome in Patients Undergoing Cesarean Section with Wound infiltration with Local Anesthetic Versus Narcotic Analgesia

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Abstract

Objective: To compare the outcome of wound infiltration plus local anesthetic agent versus narcotic analgesia in females undergoing cesarean section

Material & Methods: This was a comparative study and study place and period was Unit 3, Department of Obstetrics & Gynecology, Services hospital, Lahore from july 2016 to January 2017. Patients were segregated into two groups. Group A was bupivacaine group. Group B was control group. During the immediate postpartum period, a 100mg dose of intravenous tramadol was administered. Patients were transferred to the postoperative wards and were monitored there for duration of 24 hours. During the next 24 hours patients were asked for pain >4 on VAS and tramadol was given. After 24 hours, pain score was measured.

Results: The average age of patients was 26.98±4.87 years, with the mean gestational age in group A being 39.52±1.14 weeks and in group B being 39.62±1.14 weeks. The mean tramadol consumption was 74.53±13.21mg. A significant difference was observed between the study groups in terms of tramadol consumption, with a p-value of 0.000.

Conclusion: The patients undergoing caesarean section with wound infiltration with local anesthetic agent showed significantly less tramadol consumption as compared to narcotic analgesia

Keywords: Tramadol, Cesarean, Infiltration, Narcotic

How to cite: *Ain QT, Munir SI, Batool U. Comparison of Outcome in Patients Undergoing Cesarean Section with Wound infiltration with Local Anesthetic Versus Narcotic Analgesia. Esculapio - JSIMS 2023;20(01):12-16.*

DOI: https://doi.org/10.51273/esc24.25132013

Introduction

In today's world, there is marked increase in the percentage of cesarean section which has resulted in different complications and management. After C-section, pain is the major complaint of the patient. The term "pain" denotes an uncomfortable sensory and emotional experience associated with actual or potential tissue damage.[1]

Numerous studies have demonstrated the significance of providing postoperative patients with appropriate analgesia, which enables early mobilisation, rehabilitation, and shorter hospital stays.[2] In routine post-cesarean patients are receiving narcotic analgesia more frequently which although relieves pain but there are other side effects which don't let the patient have the desired outcome. Side effect of narcotics like nausea and vomiting requires extra medication like anti-emetics. The sedative effect weakens the bonding between mother and the baby. Its not only the mother who suffers, the nutritional demand of the baby is also compromised as breast feeding cannot be establish early. In such condition there is need for an alternative and effective analgesia which can cut down the need of narcotic analgesia and provide adequate pain relief.[3] Wound infiltration with local anesthetic agent results in better pain relief and decrease the demand for additional narcotic analgesia.[4,5] Therefore improving the physical and social maternal wellbeing and also improving the bonding between baby and its mother, thus relieving the psychological stress of the mother.[2] According to Cochrane

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Submission Date: 01-12-2023
1st Revision Date: 21-12-2023
Acceptance Date: 01-03-2024

Pregnancy and child birth Group trial, local anesthetic agents are part of pain management in cesarean section. Local anesthesia tends to decrease pain in addition to general anesthesia or spinal anesthesia, when given directly to wound site.[2,6] There is review of 20 studies including 1150 females who receive local anesthetic infiltration in wound site. Later it was observed that they did not require much narcotic analgesia. NSAIDs add further relief as they are the routine part of treatment regime. Thus, improving the maternal activity post-operatively.[2] Study conducted in 2010 showed that narcotic analgesia required after 24hrs was 98.00± 26.65 mg with wound infiltration (n=50) while 225.00± 46.57 mg in control group (n=50, P<0.001). Pain score after 24 hours was 2.06±0.98 with wound infiltration and 2.38±0.75 in control group (p=0.070).[1] One more study has showed that with wound infiltration (n=40), mean tramadol consumption was 109.98+5.96mg which was significantly higher as compared to control (n=40) 236.3 + 11.14mg (P=0.000).7 Caulry et al., has reported that the mean pain score was 2±2 with wound infiltration (n=10) and 3±2.8 in control group (n=10, p>0.05) however, mean tramadol consumption was 13±5mg with wound infiltration which was notably less when compared to control group 27±10mg (P<0.05).[8] Givens et al., also supported the evidence that the mean pain score was 4.1±2.7 with wound infiltration (n=20) and 4.1±2.5 in control group (n=16, p>0.05) however, mean tramadol consumption was 46.8±23.6mg with wound infiltration which was notably less when compared to control group 78.9±28.5mg (P<0.05).[9] The goal of the study is to compare the patient's outcome after caesarean section who received local anaesthetic agent wound infiltration versus narcotic analgesia. It has been observed through literature that wound infiltration can help to reduce pain in post cesarean cases by introducing a simple, low cost, safe and effective method thus improving maternal and fetal wellbeing. But controversies are present regarding the effectiveness of wound infiltration method. Therefore, we intend to carry out this study to verify the efficacy of this approach. Additionally, prior research used small sample sizes, whereas we will use a high sample size for this study in order to obtain more accurate and future-relevant results.

Material & Methods

This was a comparative study and study place and period was Unit 3, Department of Obstetrics & Gynecology, Services hospital, Lahore from july 2016 to January 2017. A sample size of 240 cases, with a total of 120 cases in each group, was determined using statistical considerations. The selected parameters included a 95% confidence level and 80% power of the study, with mean pain scores of 2.06±0.98 for wound infiltration and 2.38±0.751 for narcotic analgesia in patients undergoing cesarean section. Sampling technique was non-probability consecutive sampling. Patient age 20yrs-35yrs, parity <5 Patients undergoing cesarean section at term (gestational age >37 weeks on antenatal record) under spinal anesthesia were included in the study. Cardiac patients, anemia, chronic or pregnancy related medical disorders like diabetes, hypertension, proteinuria (>300mg/dl), liver and renal dysfunction. After approval from the ethical committee, patients meeting the inclusion criteria were chosen from the operation theatre. After obtaining informed consent, demographic details were recorded. Patients were randomly assigned to two groups using a lottery method. In Group A, patients received 20ml of 0.5% bupivacaine, which was infiltrated into the peritoneum, muscles, subcutaneous tissues, and the skin under direct vision before the closure of the abdominal wall. Group B was the control group, no wound infiltration was done in this group. Following the healing of the wound, a 100 mg dosage of intravenous tramadol was administered. Gynecology wards were the new location for the patients, who were monitored there for a full day. Patients were questioned every hour for pain levels more than 4 on a VAS scale, and extra 50-100 mg of tramadol was given, if needed, every 6 to 8 hours. The pain score was assessed 24 hours later. This entire data was entered into a proforma. The data were analyzed utilizing SPSS version 20. An independent sample t-test was employed to compare the outcomes in both groups, with a significance level set at $p \leq 0.05$.

Results

The mean value of age in group A was 27.07±5.15 years whereas its mean age in group B was 26.89±4.60 years. Results showed that the patients with no parity were 35 [group A=18, group B=17], the patients with parity one were 57 [group A=34, group B=23], the patients with parity two were 76 [group A=40, group B=36], the patients with parity three were 47 [group A=16, group B=31], similarly the patients with parity four were 25 [group A=12, group B=13]. The mean value of gestational age in group A was 39.52±1.14 weeks whereas its mean value in group B was 39.62±1.14

weeks. The mean value of height in group A patients was 1.601±0.049 m whereas its mean value in group B was 1.59±0.049 m. The mean value of weight in group A patients was 67.97±5.18 kg whereas its mean value in group B was 67.29±5.752 kg. The results showed that the mean value of BMI in group A patients was 26.56±2.15 kg/m^2 whereas its mean value in group B was 26.38±2.32 kg/m^2. It also showed that the illiterate patients were 54(22.50%), the patients with primary education were 67(27.92%), the patients with secondary education were 57(23.75%) and the patients with matric or above education were 62(25.83%). Among the 240 patients, there were 54 illiterate individuals, with 24 in Group A and 30 in Group B. Patients with primary education numbered 67, including 32 in Group A and 35 in Group B. Those with secondary education were 57, with 31 in Group A and 26 in Group B. Similarly, patients with a matric and above education status totaled 62, with 33 in Group A and 29 in Group B. (Table 1)

The mean value of tramadol consumption in group A was 64.89±9.18 mg and its mean value in group B was 84.16±8.91 mg. Statistically highly significant difference was found between the study groups with tramadol consumptions i.e. p-value=0.000. Results showed that in patients with age up to 30 years, the mean value of tramadol consumption in group A was 65.30±9.05 mg and its mean value in group B was 84.99±8.79 mg, similarly in patients with age below 30 years, the mean value of tramadol consumption in group A was 63.97± 9.52 and its mean value in group B was 81.77±8.94 mg. A statistically highly significant difference in tramadol consumption stratified by age was observed between the study groups, with p-values of 0.000 and 0.000, respectively. It also showed that in primary parity patients, the mean value of tramadol consumption in group A was 63.37±9.18 mg and its mean value in group B was 85.00±8.16 mg, similarly in multiparity parity patients, the mean value of tramadol consumption in group A was 66.06±9.07 mg and its mean value in group B was 83.74±9.28 mg. A statistically highly significant distinction was identified. between the study groups with tramadol consumption stratified by parity i.e. p-value = 0.000 & 0.000 respectively. And it showed that in illiterate patients, the mean value of tramadol consumption in group A was 65.71±8.24 and its mean value in group B was 87.73±7.87, similarly in literate patients, the mean value of tramadol consumption in group A was 64.69±9.43 and its mean value in group B was 82.97 ± 8.95. Statistically highly significant difference was found between the study groups with tramadol consumption stratified by education i.e. p-value=0.000 & 0.000 respectively. (Table 2)

Table 1: *Baseline characteristics of patients*

	Study Groups	
	Group A	**Group B**
n	120	120
Age (years)	27.07 ± 5.15	26.89 ± 4.60
Parity		
No Parity	18	17
One	34	23
Two	40	36
Three	16	31
four	12	13
Gestational Age (weeks)	39.52 ± 1.14	39.69 ± 1.14
Height (m)	1.60 ± 0.05	1.59 ± 0.05
Weight (Kg)	67.97 ± 5.18	67.29 ± 5.75
BMI (Kg/m^2)	26.56 ± 2.15	26.38 ± 2.32
Education		
Illiterate	24	30
Primary	32	35
Secondary	31	26
Matric or above	33	29
Tramadol consumed	64.89 ± 9.18	84.16 ± 8.91*

** Independent samples t-test = 16.501, p-value <0.0000001 (Highly significant)*

Table 2: *Comparison of tramadol consumption with study groups stratified for effect modifiers*

Tramadol consumption	Study Groups		p-value
	Group A	**Group B**	
Age			
≤30	65.30 ± 9.05	84.99 ± 8.79	0.000*
> 30	63.97 ± 9.52	81.77 ± 8.94	0.000*
Parity			
Primary	63.37 ± 9.18	85.00 ± 8.16	0.000*
Multiple	66.06 ± 9.07	83.74 ± 9.28	0.000*
Education			
Illiterate	65.71 ± 8.24	87.73 ± 7.87	0.000*
Literate	64.69 ± 9.43	82.97 ± 8.95	0.000*

** Statistically significant difference in both groups*

Discussion

Caesarean deliveries are routine surgical procedures that are becoming more common.[10] A tertiary care hospital in Pakistan recorded a caesarean section rate of 64.7%. A caesarean section was performed in 59.3% of cases for emergencies and in 40.7% for elective cases.[11]

Usually, a Caesarean section causes moderate to severe discomfort that lasts about 48 hours.[12] Given that Tramadol is a narcotic derivative analgesic and that a significant dose is needed to relieve pain following surgery, After a caesarean delivery, direct local tramadol wound infiltration effectively minimises the need for parenteral opioid analgesia and relieves pain with no significant side effects.[13]

In our study the mean value of tramadol consumption of the patients was 74.53 ± 13.21 mg. the mean value of tramadol consumption in Wound infiltration group was 64.89 ± 9.18 mg and its mean value in Narcotic analgesia group was 84.16 ± 8.91 mg. Statistically less tramadol consumption was observed in Wound infiltration group patients as compared to Narcotic analgesia group patients i.e. p-value=0.000. Caulry et al., has reported that the mean pain score was 2 ± 2 with wound infiltration (n=10) and 3 ± 2.8 in control group (n=10, p>0.05) however, mean tramadol consumption was 13±5mg with wound infiltration which was significantly lower as compared to control group 27±10mg (P<0.05).[8] A study by Akhter et al., showed that the comparison of the average amount of tramadol needed after surgery in patients having caesarean sections with and without the infiltration of bupivacaine produced the following results: 109.98+5.96 mg in cases and 236.3+11.14 mg in controls were recorded, indicating a significant difference between the two groups; the p value was set at 0.000.14 In a study conducted by Samreen et al., the mean pain score at 12 hours was 3.48 ± 0.93 for the study group and 3.84 ± 0.55 for the control group. Similarly, intravenous tramadol consumption was 95.00 ± 27.20 for the study group and 151.00 ± 29.43 for the control group. Givens et al. also supported this evidence, reporting a mean pain score of 4.1 ± 2.7 with wound infiltration (n=20) and 4.1 ± 2.5 in the control group (n=16, p>0.05). However, the mean tramadol consumption with wound infiltration was 46.8 ± 23.6mg, significantly lower compared to the control group's 78.9 ± 28.5mg (P<0.05).

Another study demonstrated that with wound infiltration (n=40), the mean tramadol consumption was 109.98 +5.96mg, significantly higher compared to the control (n=40) with 236.3+11.14mg (P=0.000).[7] Anthony Akinloye Bamigboye and colleagues conducted a study [16] indicating that local anaesthetic infiltration and abdominal nerve blocks, as adjuncts to regional analgesia and general anaesthesia, provide benefits in caesarean sections by reducing opioid consumption. The research explored the effects of local anaesthetic agent wound infiltration and/or abdominal nerve blocks on pain after caesarean section, as well as the mother's well-being and interaction with her baby.

A study illustrated that wound infiltration with tramadol and levobupivacaine in patients undergoing Cesarean section under general anesthesia may constitute a favorable option for postoperative analgesia[17]. The infiltration of tramadol into the wound alone has proven effective as an analgesic without adversely impacting wound healing, as demonstrated in a rat study[18]. In a 2010 study, it was revealed that the narcotic analgesia required after 24 hours was 98.00±26.65mg with wound infiltration (n=50), compared to 225.00 ± 46.57mg in the control group (n=50, P<0.001). The pain score after 24 hours was 2.06 ± 0.98 with wound infiltration and 2.38 ± 0.75 in the control group (p=0.070)

Conclusion

It has been proved in our study that the patients undergoing caesarean section with wound infiltration with local anesthetic agent showed significantly less tramadol consumption as compared to narcotic analgesia.

Conflict of interest *None*

Funding source *None*

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Authors Contribution

QTA: Conceptualization of Project
QTA, U: Data Collection
QTA: Literature Search
SIM: Statistical Analysis
UB: Drafting, Revision
QTA: Writing of Manuscript

Insights into Wisdom Tooth Eruption Patterns Among the Student of Sahara Medical College Narowal: A Comprehensive Comparative Analysis

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Abstract

Objective: The time of eruption of wisdom tooth predicts the age of the person.

Material and Methods: Study holds a comparative analysis of 293 students regarding wisdom tooth eruption status was categorized into fully erupted, partially erupted, un-erupted or surgically maneuvered. Statistical analysis, including descriptive statistics and correlation analysis, was performed to establish relationships between age and eruption status.

Results: Preliminary findings suggest a statistically insignificant relationship between the age of the students and the eruption status of their wisdom teeth. The majority of students aged 19-23 years exhibited various stages of wisdom tooth eruption.

Discussion: The results suggestion indicate that there is a discernible correlation between the age of individuals (within the age group of 19-23 years) and the eruption status of their wisdom teeth.

Conclusion: Estimation of age based on the eruption time of wisdom teeth holds promise as a non-invasive and easily accessible method. Within the specific age range of 19-23 years the wisdom tooth is inconclusive.

Keywords: Wisdom teeth, age estimation, eruption time, medical students, forensic odontology, dental anthropology.

How to cite: *Munir F, Buzdar ZA, Serwer A, Fazli MAS, Mirz M. Insights into Wisdom Tooth Eruption Patterns Among the Student of Sahara Medical College Narowal: A Comprehensive Comparative Analysis. Esculapio - JSIMS 2023;20(01):17-20.*

DOI: https://doi.org/10.51273/esc24.25132014

Introduction

Age is a continuous process and certain changes are accompanied with it. The molar teeth also referred as third molars are the least among the teeth that erupt in the back corner of an individual. The expected age is adolescence or within the onset of adulthood typically between 17 to 25 years of age.[1] Every human being is blessed with a set of four individual teeth on back ends of all the four rows of the mouth with two in upper and two in lower region. Wisdom teeth are well narrated as third molars because these represent the third set of the group to erupt following the first set and second set. The usual age of eruption is adolescence or early adulthood. It is absolutely not necessary to have all or some of the wisdom teeth to erupt. Some may never have any wisdom tooth at all.[2]

The eruption of wisdom teeth are subject to several factors like that of space issues on the jaw at the site where it has to erupt. The improper alignment or partial eruption are the other issues. The common problems can be impaction blocking the tooth from fully being erupted, teeth crowding, hygiene and infections, diseases of gums associated pain and damage by and to the neighboring teeth.[3] Subject to the issues described above wisdom teeth frequently need assessment for complications and oral hygiene. Sometime the same may need surgical removal. The term "wisdom" is associated with these teeth as in general consideration they appear or erupt in the part of an individual's age where he or she is relatively mature being in late teens or in early twenties.[4] The association between age and wisdom tooth eruption

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Submission Date: 13-10-2023
1st Revision Date: 12-01-2024
Acceptance Date: 02-03-2024

always remained under debate for different reasons like that of genetic, environmental and nutritional variations.[5] This in line with contemporary dental data research emphasizing a multifactorial nature of wisdom teeth, their time of eruption and the need for a comprehensive evaluation that cover various factors beyond age.[6] The observation highlights the need for a personalized comprehensive approach to wisdom tooth assessment, integrating diverse parameters of diverse nature and latest imaging techniques to corroborate the parameters of age assessment.[7] Further research encompassing a broader age spectrum and incorporating advanced diagnostic methodologies is advocated to refine our understanding of the intricate factors influencing wisdom tooth eruption and age correlation[8]. The study aims to provide valuable insights into the potential utility of wisdom tooth eruption as an indicator for estimating age within this specific age.

Materials and Methods

Data for this study were collected from a targeted population of students within the age range of 19-23 years Sahara Medical College. The research involved administering a structured questionnaire to gather information regarding the eruption status of wisdom teeth. Prior to data collection, informed consent was obtained from each participant, explaining the nature and purpose of the study, the voluntary nature of participation, and the assurance of data confidentiality. Furthermore, this study received approval from the Institutional Review Board (IRB) of the institute, ensuring ethical adherence and compliance with established research protocols. The questionnaire specifically inquired about the presence or absence of erupted wisdom teeth, categorizing individuals into those with fully erupted, partially erupted, unerupted, or surgically removed wisdom teeth. Eruption of any part of the wisdom tooth was considered as evidence of wisdom tooth eruption.

The study utilized a cross-sectional study design, which allowed for the collection of data at a single point in time, providing a snapshot of the eruption status of wisdom teeth within the targeted age range. The sample size for this research comprised 293 participants, representing the population of medical school students aged 19-23 years during third year of their academic session during 2021 to 2023. A purposive convenient sampling technique was employed, targeting students within the specified age range who were willing to participate. This method was chosen to ensure the inclusion of individuals within the relevant age group and to obtain data that accurately represented the age bracket under investigation. The purposive sampling method also facilitated the efficient collection of data from a population readily available within the educational institution.

Results

The study included 293 research participants. There were 5 students of 19 years of age, 73 students of age of 20 years, 152 were 21 years old while 60 students were 22 years of age and lastly there were only three students in the 23rd years of their age. The frequencies are shown in the table 01 below. Out of 293 students there were 106 (36.2%) males just and remaining 187 (63.8%) were females. The composition depicts almost 1:3 ratio from male to female respectively. The frequencies are shown in table 02 below. The table 03 below provides data on the eruption status of wisdom teeth among the study population. The sample size is 293, representing the medical school student population within the age range of 19-23 years. The category of fully erupted wisdom tooth composed of 10.2% or 30 students among a total of 293 sample under study. The group included the subjects who have got their wisdom tooth or teeth completely visible breaking the gum structure. The group just represent a 10^{th} of the proportion of the entire population selected for research. The next category comprised of the portion of the research participants who presented with partial eruption were 108 in count making it 36.9% being just above one third of the population. But it still represents the second most common class of the research. The group represents the stage of eruption where tooth or teeth have started emerging the surface of gum structure but not fully visible. Almost exactly the half of the population and highest of its proportion presented with no eruption at all. It was 50.9% from a group of 149 subjects. They experienced no feeling of eruption of wisdom teeth or any pain at the site of eruption and neither any other associated symptoms regarding eruption of the tooth. It is worth mentioning that the cases were maximum of up to 23 years of age where just 3 from that year and 60 cases were 22nd year of their age. Lastly a group of cases who had to undergo surgical removal of the wisdom tooth due to any reason. There were 6 such cases making a valid proportion of 2% of the research sample. The reasons of surgical removal could be impaction, associated pain, overcrowding or any other issue hampering oral cavity functioning. The surgical intervention

is common modality opted for problematic wisdom tooth.

Table 1: *Age*

Serial No.	Age (in Years)	Frequency	Valid Percentage
1.	19	5	1.6
2.	20	73	24.9
3.	21	152	51.9
4.	22	60	20.5
5.	23	3	1.0
Total		293	100.0

Table 2: *Gender*

Serial No.	Gender	Frequency	Valid Percentage
1.	Male	106	36.2
2.	Female	187	63.8
Total		293	100.0

Table 3: *Eruption of Wisdom Tooth versus the Age*

Serial No.	Status of Wisdom Tooth Eruption	Frequency	Percentage	p value
1.	Fully erupted	30	10.2	0.110
2.	Partially erupted	108	36.9	
3.	Not erupted	149	50.9	
4.	Surgically removed	6	2.0	
Total		293	100.0	

Discussion

The research aimed to explore the relationship between the eruption status of wisdom teeth and the age of individuals chosen between 19 years to 23 years of age limit from a medical school student population. A cohort of 293 individuals was analyzed, considering categories of eruption status: fully erupted, partially erupted, unerupted, and surgically removed. The result indicated an insignificant p-value of 0.110 in the association between wisdom tooth eruption status and age among the selected population (ages 19-23 years). The results were consistent with recent research in dental and oral health.[9] These findings suggest that within this specific age range, the eruption of wisdom teeth is not significantly correlated with age[10]. This outcome aligns with the understanding that wisdom tooth eruption is highly variable and influenced by a range of genetic, environmental, and individual factors.[5,11] Recent research has increasingly emphasized the multifactorial nature of wisdom tooth eruption, highlighting genetic predispositions, craniofacial growth patterns, and individual differences in tooth development as significant determinants[12]. While age remains a general indicator for the potential eruption of wisdom teeth, it is not a precise predictor within this narrow age bracket due to the diverse pace of dental development observed in individuals.

The insignificance of the association underscores the need for a more comprehensive and personalized approach when assessing the eruption of wisdom teeth[13]. Factors such as dental development, skeletal maturity, and overall health should be considered alongside age to develop a more accurate estimation of wisdom tooth eruption[14,15]. Dental practitioners and researchers should utilize a holistic approach, integrating various parameters and advanced imaging techniques, to tailor recommendations and interventions for individuals in this age group.

Conclusion

In conclusion, the findings of this study, corroborated by an insignificant p-value from the statistical analysis, indicate that wisdom tooth eruption is not significantly associated with age among individuals within age bracket of 19-23 years in the medical school student population. Recent research supports the understanding that wisdom tooth eruption is a complex process influenced by a multitude of factors, making it challenging to establish a definitive correlation with age within this specific age range.

It is imperative for dental practitioners and researchers to consider a holistic assessment of dental development, skeletal maturation, and individual variations in tooth eruption patterns when evaluating wisdom tooth eruption. It is purely a subject of forensic deontologist and dental anthropology to emphasize on the area of interest. Further research focusing on a broader age spectrum and incorporating advanced diagnostic methods is warranted to enhance our understanding of the intricate factors influencing wisdom tooth eruption and age correlation, ultimately improving dental health assessment and management.

Conflict of Interest *None*

Funding Source *None*

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Authors Contribution

FM: Conceptualization of Project
AS: Data Collection
ZAB: Literature Search
MM: Statistical Analysis
AS: Drafting, Revision
MASF: Writing of Manuscript

Diagnostic Accuracy of Transvaginal Sonography in Adenomyosis Taking Histopathology as Gold Standard in Infertile Women

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Abstract

Objective: To assess the accuracy of transvaginal sonography in the detection of adenomyosis, with histopathological examination serving as the gold standard, among a population of women struggling with infertility.

Material and Methods: In this study, a group of 193 women with infertility & suspected adenomyosis was included. Each subject was examined using transvaginal ultrasound, followed by surgical interventions such as dilatation and curettage, accompanied by detailed follow-up assessments. The effectiveness of transvaginal sonography in identifying adenomyosis was evaluated by comparing it to the histopathological diagnosis.

Results: Histopathological analysis confirmed adenomyosis in 162 (83.9%) of the 193 patients, whereas transvaginal sonography identified 151 (78.2%). The sensitivity, specificity, positive predictive value, negative predictive value and overall accuracy of transvaginal sonography in diagnosing adenomyosis were calculated to be 90.74%, 87.10%, 97.35%, 64.29%, and 90.16%, respectively.

Conclusion: Transvaginal sonography demonstrates considerable sensitivity and specificity in diagnosing adenomyosis, obviating the necessity for supplementary diagnostic investigations.

Keywords; Adenomyosis, Transvaginal Sonography (TVS), Histopathology.

How to cite: *Iqbal I, Saeed S, Sarwar U, Khan A, Rehman S, Qavi Y. Diagnostic Accuracy of Transvaginal Sonography in Adenomyosis Taking Histopathology as Gold Standard in Infertile Women. Esculapio - JSIMS 2023;20(01):21-24.*

DOI: https://doi.org/10.51273/esc24.25132015

Introduction

Coined in 1972, the term 'adenomyosis' refers to the occurrence of endometrial glands and stroma embedded deep within the myometrium. Adenomyosis is a gynecological condition characterized by the proliferation of endometrial tissue into the uterine muscle layer, often resulting in uterine enlargement and potentially severe menorrhagia.[1] Transvaginal ultrasound (US) has become the premier imaging technique for diagnosing adenomyosis. Findings from the US are categorized into three distinct groups mirroring the histological features of adenomyosis: (a) displacement of endometrial glands and stroma, (b) myometrial hyperplasia or hypertrophy, and (c) augmented vascularity. Displaced endometrial glands present as echogenic nodules and striations, extending from the endometrium into the myometrium.

Fluid within these glands can result in the formation of myometrial cysts and fluid-filled striations detectable via ultrasound.[2] Current knowledge regarding the prevalence of adenomyosis and its reproductive implications remains imprecise.[3] Adenomyosis has been implicated in infertility, though the exact mechanisms remain elusive.[4] Research yields conflicting reports on impact of adenomyosis on in vitro fertilization (IVF) outcomes; while some studies suggest a detrimental effect, others do not corroborate this finding.[5] It has been linked to an increased rate of miscarriage and overall poorer perinatal outcomes.[6,7] The correlation between endometriosis and adenomyosis is well-documented, positioning adenomyosis as a potential contributory factor to infertility in patients with endometriosis.[8,9] It is more

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Submission Date: 05-12-2023
1st Revision Date: 05-01-2024
Acceptance Date: 12-03-2024

frequently diagnosed in women approaching the end of their reproductive years[10]. Transvaginal sonography, with its wide availability, cost-effectiveness, and non-invasive nature, stands as the universally preferred initial diagnostic method for assessing uterine structural anomalies. It is also recognized as a valuable supplement to hysteroscopy and laparoscopy in the identification and delineation of intrauterine irregularities, potentially facilitating more targeted surgical planning.[11]

Materials and Methods

It is a descriptive cross-sectional analysis carried out at Radiology Department of Services Hospital Lahore for 06 months from June 10, 2021, to December 10, 2021. The Institutional Review Board approved the research, and all the participants provided written informed consent. The study included 193 cases, selected based on a 95% confidence interval and a 5% margin of error, with the expected sensitivity being 89.1%, specificity 90.6%, disease prevalence 24.4%, and a precision rate of 9%. The recruitment of participants was done using a non-probability consecutive sampling technique. For the diagnosis of adenomyosis using TVS, the primary indicator was the presence of a non-uniform myometrial echotexture. Participants underwent TVS employing a HITACHI EUB-7000 HV ultrasound system with a 5-9 MHz transvaginal probe, followed by invasive procedures such as fractional curettage or dilatation and curettage, coupled with systematic follow-ups. A single examiner conducted all evaluations to reduce potential bias within the study. Infertile female patients aged between 20-45 years. Patients clinically suspected of adenomyosis and referred for scanning. Absence of consent. Patients presenting contraindications to TVS.

Results

Data was systematically analyzed utilizing SPSS software, version 25.0. Qualitative variables, including the diagnosis of adenomyosis via TVS and histopathological assessment, were expressed using frequencies and percentages. Quantitative variables, such as age and body mass index(BMI) were articulated through means and standard deviations. To address potential effect modifiers, data was stratified by age and BMI. Following stratification, the diagnostic accuracy parameters were recalculated. The study encompassed 193 patients with a clinical suspicion of adenomyosis. The age distribution ranged from 20 to 45 years, with a mean age of 35.3 ± 18.3 years. A majority, 105(54.4%), fell within the 31-45 year age bracket, while 88 (45.6%) were within the 20-30 year age range. Regarding BMI classifications, 100(51.8%) patients presented with a normal BMI, 86(44.6%) were overweight, and 7(3.6%) were categorized as obese. Out of the 193 participants, adenomyosis was histopathologically confirmed in 163(83.9%) cases, while transvaginal sonography identified 151(78.2%) cases. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy of transvaginal sonography in the diagnosis of adenomyosis were established at 90.74%, 87.10%, 97.35%, 64.29%, and 90.16%. When stratifying for age, TVS exhibited high sensitivity and specificity in the detection of adenomyosis across both age groups. Similarly, stratification by BMI revealed that transvaginal sonography maintained high sensitivity and specificity for adenomyosis detection across all BMI categories.

Table 1: *Frequency distribution of adenomyosis according to age group, BMI, Histopathology & TVS*

Age Group	Frequency (n=193)	Percentage (100)
20-30 YRs	88	45.6
31-45 YRs	105	54.4
BMI		
normal	100	51.8
Overweight	86	44.6
obese	7	3.6
Adenomyosis on Histopathology		
Positive	162	83.9
Negative	31	16.1
Adenomyosis on TVS		
Positive	151	78.2
Negative	42	21.8

Table 2: *Statistical Analysis.*

Parameter	Value
Sensitivity	90.74%
Specificity	87.10%
Positive predictive value	97.35%
Negative predictive value	64.29%
Accuracy	90.16%

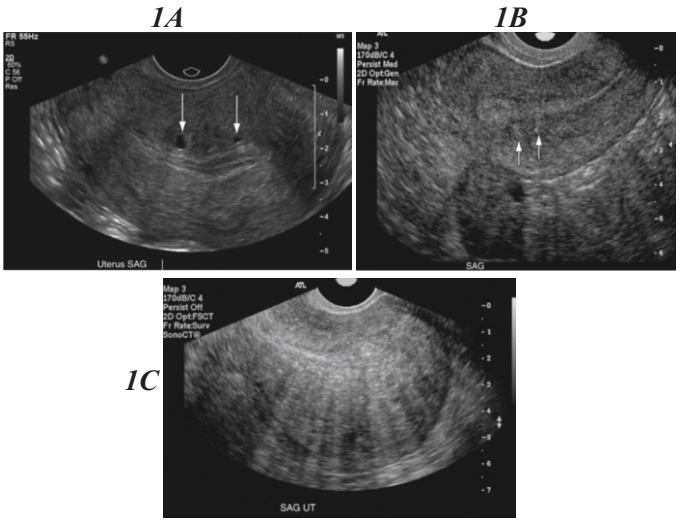

Figure-1: *A depicts a sagittal section of the uterus with arrows pointing to circular, cystic structures within the myometrium, consistent with myometrial cysts. These cysts are typically anechoic representing fluid-filled spaces within the uterine muscle layer. Figure 1B shows the uterus in a sagittal plane, with indications of linear echogenic striations in the myometrium. Figure 1C shows sagittal TVS with diffuse heterogeneous uterine enlargement and sub endometrial myometrial thickening*

Discussion

This study underscores the diagnostic capability of TVS in identifying adenomyosis, revealing a sensitivity of 90.74% and specificity of 87.1%. Notably, our study presents a diagnostic accuracy of 90.16%, which emphasizes the reliability of TVS as a non-invasive outpatient diagnostic modality that resonates with greater patient compliance.

Contrary to the established mean age of adenomyosis diagnosis in the mid to late forties as reported by Marques et al.[12], Orlov and Jokubkiene[13], and Van Den Bosch and Van Schoubroeck[14], our study delineates a younger mean age of 35.3±18.3 years. These findings surpass those in the literature, where Bazot et al.[15] reported a sensitivity of 65%, and Chapron et al.[16] found a sensitivity of 52.9%. This discrepancy suggests that adenomyosis may be affecting women at an earlier reproductive age than previously documented, signaling a shift in the demographic profile of this condition. Our research contributes new insights into the diagnostic landscape of adenomyosis. The high specificity found in our cohort aligns with the findings of Kandeel et al.[17] and Zannoni et al.[18], corroborating the efficacy of TVS in diverse populations. Further supporting our results, Decter et al.[19] and Naredi et al.[20] highlight the adaptability of TVS across different BMI categories, suggesting a broader applicability of this diagnostic tool in infertile patients as also studied by Gordts et al & Sughra et al.[21,22]

The research recognizes its limitations, particularly the small number of participants that could affect the breadth of population representation. The singular institutional context of the study may also constrain the transferability of its outcomes to different clinical scenarios.

Conclusion

The study highlights the potential role of TVS as a primary, non-invasive, cost-effective tool for diagnosing adenomyosis in infertile women, showcasing sensitivity and specificity rates of 90.74% and 87.10% respectively. This study also suggests the necessity of considering a lower age threshold for suspicion of adenomyosis and potentially broadening the demographic scope in clinical practice regarding infertility & its treatment.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

II, SS: Conceptualization of Project
II: Data Collection
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SR, SQ: Statistical Analysis
SS: Drafting, Revision
YQ: Writing of Manuscript

Assessment of Self-Medication Practices among Undergraduate Students Before and During COVID-19

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Abstract

Objective: To assess self-medication knowledge, prevalence, reasons, and conditions among undergraduate medical students.

Material and Methods: A survey was conducted among 329 undergraduate healthcare students in tertiary care hospitals & IOD using a self-administered questionnaire. Descriptive statistics were used to summarize the data, and categorical variables were analyzed with Chi-square and logistic regression tests at a significance level of $p < 0.05$.

Results: Self-medication was prevalent among 202 (61.4%) participants: 54 (26.7%) before COVID-19, 16 (7.9%) during COVID-19, and 132 (65.3%) both periods. Knowledge levels varied: 179 (54.4%) with poor knowledge, 150 (45.6%) with good knowledge regarding self-medication. Painkillers 176 (87.1%) were commonly self-administered class of drug, with fever 166 (82.6%) being the most treated condition. Individuals often used their own prior prescriptions 125 (62.5%) as a source of information for self-medication. The predominant reason for self-medication was fear of contact with the infected person during the pandemic, along with fear of quarantine or isolation.

Conclusion: In conclusion, this study reveals concerning self-medication practices among undergraduate healthcare students, particularly with painkillers for common ailments. Field of study, academic year, and personal background influenced self-medication tendencies, while highlighting knowledge gaps. The COVID-19 pandemic exacerbated these behaviours, necessitating immediate attention. Healthcare education must adapt to equip future professionals with decision-making skills amid rising self-medication practices.

Keywords: Coronavirus, SARS, Self-Medication, Self-Administration

How to cite: *Arshad J, Syed U, Ali SN, Zafar S, Khalid M. Assessment of Self-Medication Practices among Undergraduate Students Before and During COVID-19. Esculapio - JSIMS 2023;20(01):25-30.*

DOI: https://doi.org/10.51273/esc24.25132016

Introduction

Self-treatment is a world-wide health concern.[1] Self-medication is defined as the intake of drug by a person to treat self-analyzed illnesses/symptoms and irrational use of OTC drugs without any expert advice from a health professional. Medications most often used for self-care are analgesics, antipyretics, antitussives, anti-diarrheal and calcium and vitamin supplements, steroids, sedatives and herbal and homeopathic remedies.[2] Self-care implementation is of great interest in both developed and under-developed countries however, greater in under-developed countries where human resources are discreet.[3] Self-intake of drugs, if unguided, may have negative impacts on the life of individuals, medicines may be used for a period more than prescribed, which may lead to increased drug dependence, incorrect use of drug regimen which increases chances of drug resistance due to the improper use of medicines.[4] Perso-

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Submission Date: 26-09-2023
1st Revision Date: 16-10-2023
Acceptance Date: 13-02-2024

nal intake of drugs among students of medical institute may result due to their habit of being easily compelled by the electronic and print media, which encourages self-intake of drugs.[5] They are upcoming healthcare workers, so their perspective might impact their practices and the risk associated with the use of drugs.[6] In December 2019, the first case of corona virus disease emerged in Wuhan, China. The disease is documented in more than 215 countries since that period.[7] On March 2020, it was announced a world-wide pandemic by WHO.[8] COVID 19 is an infectious respiratory disease that can be transmitted easily by sneezing, coughing or when the affected person may come in close contact with another person.[9] Enhanced prevalence of the disease led to fear & anxiety among the general public all around the world, which is made worse by having no proper knowledge of its vaccination and medication for its treatment.[10] They may have found it easy to get relief by self-medicating in order to avoid getting the virus from healthcare workers and hospital environments, to save their money and time, to get quick relief, in dealing with mild illnesses or due to difficulty in securing appointments with a physician.[11] Undergraduate students of medical college being future healthcare workers are an integral part of convincing patients regarding self-treatment and can help to educate the public about the sensible intake of drugs in the future.[12] The main goal was to evaluate the practices & reasons of self-treatment among students before and during COVID 19 and to assess their knowledge regarding personal intake of drugs.

Material and Methods

This study was conducted from July 2022 to March 2023 in CMH Lahore Medical College. The approval to conduct this research was obtained from CMH Lahore Medical College and Institute of Dentistry Ethical Review Committee (Case#.703 /ERC/CMH/LMC). All the respondents were well-versed on the study intentions and were required to consent before admission to the study. The study was an academic cross-sectional study using a validated self-administered questionnaire. It was conducted in CMH Lahore Medical College and Institute of dentistry in Punjab, Pakistan among undergraduate students of Medicine, Dentistry, Nursing and Allied Health Sciences. Sample Size was calculated using Cochran's formula using a confidence level of 95% and margin of error set at 5%. The formula yielded a required sample size of 329.

The questionnaire used for this study was designed by the researchers following an extensive review of similar studies.[13] The questionnaire was approved after a Cronbach's alpha score of 0.773. The questionnaire consisted of 5 sections, Section A evaluated the demographic characteristics of the participants involved, Section B asked questions about knowledge of self-medication, Section C and D consisted of questions about practices of self-medication and the medications used, conditions and sources used for self-medication, Section D asked questions about reasons for self-medication either before COVID-19 or during COVID-19. The questionnaire used a 5-point Likert rating scale, with responses ranging from strongly agree(5) to strongly disagree(1). To determine the students' level of knowledge, a total score of at least 32 out of 40 (≥80%) was considered "good" knowledge, while a score below 32 (<80%) was categorized as "poor" knowledge. An informed written consent was obtained from individuals after explaining the purpose of the study and involvement was voluntary. The privacy of participants was respected and there will was no identification of anyone partaking in this study. Students were informed that their responses would be anonymous and confidential.

Data was analyzed by using Statistical Package Programme for Social Science (SPSS) version 26 by IBM. Chi-square test was done with associations with $p < 0.05$ was considered significant.

Results

Mean age was 21± 0.8 years SD=1.44, Individuals 20 years old or older 176(63.5%) engaged in self-medication compared to those who are less than 20 years old 26(50%). Prevalence of self-medication was more among males 65 (67.7%). The prevalence of self-medication practices among the respondents was 202 (61.4%) among them 54(26.7%) self-medicated only before COVID-19, 16(7.9%) self-medicated only during COVID-19 while 132(65.3%) self-medicated both during and before COVID-19. (Table-1) Results indicate that out of a total of 329 respondents, 179(54.4%) Cutoff score < 80, had poor knowledge about self-medication practices out of which 97(54.2%) practiced self-medication while 82(45.8%) did not practice self-medication.

150 (45.6%) Cutoff score > 80 had good knowledge out of which 105 (70.0%) were involved in self-medi-cation practices and 45 (30%) were not practicing self-medication. The chi-squared test was performed on the data, with a p-value of 0.003, suggesting that there is a statistically significant association between knowledge and practice of self-medication. (Table 2) Pain killers 176(87.1%) was the class of medication most often used, followed by antibiotics 152 (75.2%) (Fig-1.1). The most commonly treated conditions by using self-medication were fever 166 (82.6%) followed by headache 165 (82.1%). The most common source of self-medication was an individual's own prior prescription 125 (62.5%). The percentage of people who had fear of contact with a person with infection was higher during the pandemic 63 (44.4%) than it was before 57 (31.3%). Fear of being in quarantine or isolation if they contracted the disease was more prevalent during the pandemic 40 (28.2%) than before 34 (18.7%). The percentage of people self-medicating due to a delay in receiving treatment at health facilities was higher during the pan-demic 16 (11.3%) than before 19 (10.4%) (Fig-1)

Table 1: *Distribution of respondent's demographic characteristics based on the practice of self-medication (n = 329)*

Variable	Engagement in self-medication, YES *n* (%) *n* = 202 (61.4)	No self – medication *n*(%) *n*=127 (38.6)	Chi-square	*p*-value
Gender				
Male	65 (67.7)	31 (32.2)	2.277	0.131
Female	137 (58.8)	96 (41.2)		
Age				
<20	26 (50.0)	26 (50.0)	3.386	0.066
≥20	176 (63.5)	101 (36.5)		
Field of study				
Medicine	112 (70.9)	46 (29.1)	30.859	**0.000***
Dentistry	44 (73.3)	16 (26.7)		
Allied Health Sciences	33 (47.1)	37 (52.9)		
Nursing	13 (31.7)	28 (68.3)		
Year of education				
1st Year	39 (52.0)	36 (48.0)	52.879	**0.000***
2nd Year	29 (36.7)	50 (63.3)		
3rd Year	66 (90.4)	7 (9.6)		
4th Year	62 (69.7)	27 (30.3)		
5th Year	6 (46.2)	7 (53.8)		
Background				
Urban	174 (64.4)	96 (35.6)	5.895	**0.015***
Rural	28 (47.5)	31 (52.5)		

**Statistically significant (p<0.05)*

Table 2: *Knowledge about self-medication practice among respondents (n = 329)*

		SD	D	U	A	SA
Knowledge question[a]						
1	Self-medication is defined as "the taking of drugs, herbs or home remedies on one's own initiative, or on the advice of another person, without consulting a doctor or pharmacist."	10 (3.0)	16 (4.9)	27 (8.2)	131 (39.8)	145 (44.1)
2	Using an old prescription to treat a recurring condition is self-medication	9 (2.7)	42 (12.8)	50 (15.2)	169 (51.4)	59 (17.9)
3	Using left-over medications from a prior properly diagnosed illness to treat a recurrent one is self-medication	18 (5.5)	55 (16.7)	66 (20.0)	152 (46.2)	38 (11.6)
4	A physician's prescription is necessary before the purchase of any medication	5 (1.5)	40 (12.2)	40 (12.2)	114 (34.7)	130 (39.5)
5	It is possible to correctly treat illnesses without the physician's prescription	48 (14.6)	97 (29.5)	88 (26.7)	86 (26.1)	10 (3.0)
6	Using prescription only medications without the doctor's prescription can cause complications	8 (2.4)	13 (4.0)	54 (16.4)	157 (47.7)	97 (29.5)
7	Self-medication can lead to drug dependence and adverse drug reaction	9 (2.7)	8 (2.4)	53 (16.1)	127 (38.6)	132 (40.1)
8	Self-medication can cause pathogen resistance	8 (2.4)	14 (4.3)	39 (11.9)	120 (36.5)	148 (45.0)
Cut-off score	Remark	Self-medication	No self-medication			
<80	Poor knowledge	97 (54.2)	82 (45.8)			
>80	Good knowledge	105 (70.0)	45 (30.0)			
		$\chi^2 = 8.607$	*p*-value = 0.003			

[a] *Maximum obtainable score = 40; % individual score = score obtained by an individual ÷ by total obtainable score × 100. Strongly agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2, strongly disagree (SD) = 1*

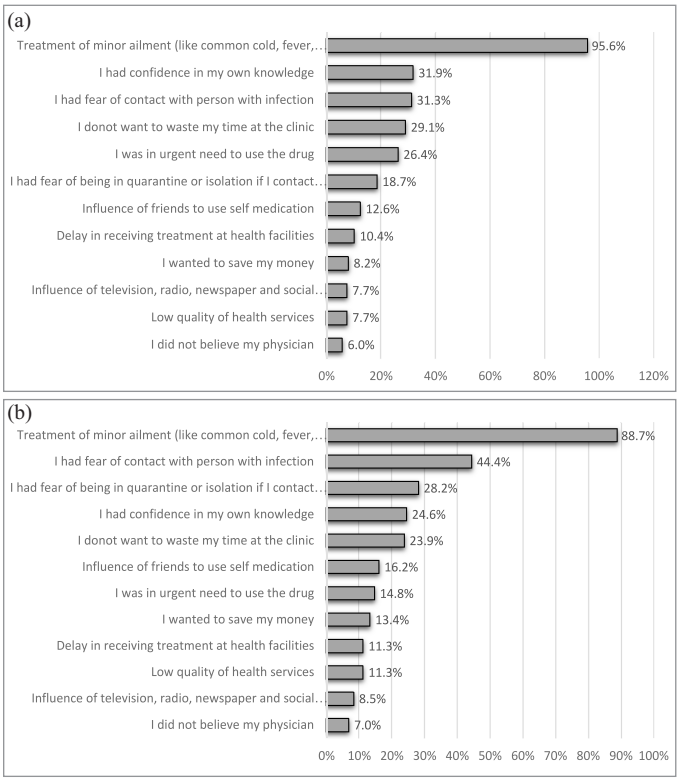

Fig-1: (a) = *Reasons of self-medication before COVID-19, (b)= Reasons of self-medication during COVID-19*

Discussion

In this study, we are investigating the prevalence of self-medication and the reasons of self-medication before and during COVID-19 as well as the knowledge among undergraduate students of CMH Lahore medical college and Institute of dentistry. Important finding of this study is that self-medication is a common practice among undergraduate healthcare students of CMH LMC & IOD, with a prevalence of 61.4%. The results of our prevalence study are consistent with earlier studies of university students and the general population from various countries.[14] The study found that Dentistry and Medicine students engaged in self-medication more frequently than those in Allied Health Sciences and Nursing. This finding may indicate that these groups of students require specific education on the proper use of medications.

The study also found that 3rd and 4th-year students were more involved in practicing self-medication. This could be related to their increased exposure to patient care and prescription medication during this stage of their training. Therefore, it is important to address medication use early in healthcare training to promote safe and responsible practices.[15] The results of this study highlight an important issue in healthcare education. The significant association between knowledge and self-medication practices underscores the importance of education in promoting safe and responsible medication use. Specifically, the finding that a higher proportion of individuals with good knowledge engaged in self-medication practices suggests that education alone may not be sufficient to address self-medication practices, and that interventions targeting other factors, such as attitudes and beliefs, may also be necessary.[16]

According to this study, painkillers were the most commonly used class of medication. This is consistent with earlier studies that have also identified painkillers as the most frequently used medication in cases of self-medication.[17] Antibiotics and anti-cough medications were also commonly used, indicating a potential misuse of these medications.[18] The study also found that fever and headache were the most commonly treated conditions through self-medication. This may be due to the fact that these are common symptoms that individuals can easily recognize and self-treat. However, it is important to note that self-treatment of these conditions can potentially mask underlying health issues, leading to delayed diagnosis and treatment.[19] The study shows a concerning result that the most common source of self-medication was an individual's own prior prescription, as this can lead to the misuse and overuse of medications. The fact that over half of the participants relied on their own academic knowledge to self-medicate is also alarming, as it suggests that healthcare professionals may not be immune to engaging in unsafe self-medication practices. It is encouraging to note that a significant proportion of participants sought counselling from a pharmacist, as this indicates a recognition of the importance of seeking professional advice. However, it is important to note that social media was also identified as a common source of information for self-medication, which raises concerns about the accuracy and reliability of information obtained through these channels.[20] The findings of this study highlight the impact of the COVID-

19 pandemic on self-medication practices. The fear of contracting the disease and the resulting need to avoid contact with others was identified as a significant factor influencing self-medication during the pandemic. This is not surprising, given the need for social distancing and the strain on healthcare facilities during the pandemic. The fear of being quarantined or isolated if they contracted the disease was also a prevalent reason for self-medication during the pandemic.[21]

Another noteworthy finding is decrease in reliance on personal knowledge. This could be due to the overwhelming amount of information available on social media and other sources, leading to confusion and uncertainty about which medications to take.[22] It is also interesting to note that, despite the changes brought about by the pandemic, the most common reason for self-medication before and during the pandemic was the treatment of minor ailments such as the common cold, fever, and cough. This highlights the need for education on safe self-medication practices, as these are common conditions that individuals may attempt to treat on their own.[23] Recall bias is a common limitation in self-report studies where participants may not remember events accurately. Another limitation is the potential for respondents to discuss the questionnaire with others, which could affect the responses. This is a common limitation of self-administered questionnaires, and future studies could consider using other data collection methods to minimize this limitation. The numbers of participants were not equal in all the fields of study involved in the research. While the study findings are valuable, it is important to exercise caution when generalizing them to the broader population of healthcare students in the region.

Conclusion

The study found that self-medication was a common practice among the study population, with painkillers being the most commonly used class of medication. The study also identified that Medical and Dental students engage in self-medication more frequently than those in Allied Health Sciences and Nursing.

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Authors Contribution

JAM: Conceptualization of Project
JAM: Data Collection
JAM: Literature Search
SNA: Statistical Analysis
SZ: Drafting, Revision
MK: Writing of Manuscript

Correlation of Stature with Head Circumference of Male Adults of Upper Punjab

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Abstract

Objective: This study aimed to find how head circumference and stature related to males in Upper Punjab between the ages of 21 and 30.

Material and Method: The investigation was conducted using a quantitative methodology. The 382 adult male residents of Kharian City provided the data. The program SPSS 25 was used to conduct the analysis.

Results: The average stature, as determined by descriptive data, was 170.4 cm. 56.45 cm was the average head circumference. The height and head circumference have a 0.518 Pearson correlation. The value of r shows a statistically significant positive correlation. After the regression analysis was completed, the regression equation was used to label the regression curve.

Conclusion: The results of this investigation showed a correlation between head circumference and stature. Measuring head circumference will help forensic experts determine stature, especially when only the head is exposed due to a natural or artificial calamity.

Keywords: Correlation, anthropology, head circumference, stature, measurement

How to cite: *Bibi F, Butt US, Serwer A, Zaheen U, Farid N, Khattak MA. Correlation of Stature with Head Circumference of Male Adults of Upper Punjab. Esculapio - JSIMS 2023;20(01):31-35.*

DOI: https://doi.org/10.51273/esc24.25132017

Introduction

A bone examination can be used to identify a human corpse during an autopsy examination. In forensics, bones are valuable. Following a natural disaster, morphometric analysis of the bone remains can provide information about the person they belong to.[1] Forensic pathologists and anthropologists must recognize age, sex, and race as essential identifying characteristics.[2] Since there is a proportionate biological relationship between stature and every region of the human body, particularly the head, face, trunk, and extremities, estimating stature is also crucial in forensic investigations.[3]

The development of quick and straightforward identification techniques is essential since mass deaths from natural disasters frequently call for them. As predicted, a study in China revealed that natural catastrophes harm people's mental and physical health, in addition to decreasing rural households' income[4]. Postponing the identification of their loved ones' remains will only make the survivors' mental suffering worse.

The two main ways used to evaluate height are mathematical and anatomical. The second approach estimates height using a regression equation or a multiplication factor[5]. Researchers have discovered a connection between measurements of different bodily components and stature by using their developed linear regression equations. Numerous studies have demonstrated a relationship between height and dimensions of the upper limbs, such as the arm, finger, forearm, and phalanges.[6]

The length and width of various body parts have long been used for a variety of reasons. The dimensions of the skull that are most frequently measured are its circumference, height, and length. Cranial length is measured as the separation between the posterior-most point in the sagittal plane and the ridge between the eyebrows. The head circumference is measured above the ears,

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Submission Date: 09-01-2024
1st Revision Date: 25-01-2024
Acceptance Date: 07-03-2024

in the middle of the forehead.[7] In recent years, it has been evident that head circumference and stature positively correlate.[8] The measurement of an individual's height is determined by extending from the apex of the head to the lowest point of the foot. Height is the most extensively researched attribute due to its low level of exertion, cost-effectiveness, and ease of quantification. Measuring someone's height can provide essential details about their health and the financial situation of both parties[9]. Many methods have been used to measure stature. The tool that physicians and researchers utilize the most is the stadiometer[10]. Since both innate and environmental factors play a significant role in height growth, many studies have been conducted globally to develop their regression equations. Since the location affects the ecological conditions differently. As a result, no one regression equation can be used for every circumstance[11]. Every country needs its regression equations[12]. This study aimed to develop a regression equation using head circumference as a predictor to estimate the height of men in the population under study. There has been no previous study done in this area.

Materials and Methods

This study was conducted at CMH Kharian Medical College. The study design used was descriptive cross-sectional. Men in Kharian City, ages 21 to 30, participated in the study. Sample size for correlation was generated using Power Analysis and Sample Size Software (PASS) version 11.013. Sample size was calculated to be 382. A non-probability sampling technique called purposive sampling was used. The height of a person was measured while standing upright in an anatomical position. The vertical distance from the vertex to the floor was used to determine it. One person took the measurements to prevent errors brought on by individual differences. Every measurement (in centimeters) was noted on a proforma. The head's largest circumference was measured by going above the opisthocranion and measuring from glabella to glabella. Only adult male attendants (aged 21–30) who accompanied patients to the CMH Hospital Kharian's outpatient department were selected for sampling. Their informed consent was acquired after presenting the subjects with a comprehensive explanation of the study's goals. The men with Dwarfism, Gigantism, Skeletal, Spine & Long bone deformities (acquired or congenital), persons with obvious head deformity and persons with surgical correction after injury to facial bones were excluded. The data was analyzed using SPSS version 25.

Results

Using SPSS version 25, numerical analysis was applied to the acquired data. 170.4 cm was determined to be the mean height. A minimum of 148 cm height was required. The maximum height was 188 cm. There was a ±6.85 standard deviation. 56.45 cm was the average head circumference. 52.30 cm was the minimum and 61.50 cm maximum head circumference, respectively. ±1.69 is the standard deviation. Regression analysis equation: Height =51.98+ 2.10 × Head circumference.

The statistical measures provided P-value, Standard

Table 1: *Quantitatively, both head circumference and stature are recorded in centimeters.*

	Maximum	Minimum	SD	Mean
Standing height	188.00	148.00	6.85	170.4
Head Circumference	61.50	52.30	1.69	56.45

Table 2: *Quantitative explanations of the standard error of estimate, coefficient of determination, and Pearson coefficient*

	P value	SEE	R	R^2
Head Circumference	.000	5.86	0.518	0.269

Error of Estimate (SEE), Coefficient of Determination (R-squared), and Pearson Coefficient (R) offer insights into the regression analysis. The low P-value indicates statistical significance, supporting the applicability of the regression equation. Meanwhile, the SEE, R-squared, and R provide information on the accuracy of predictions and the strength of the relationship between variables. These measures collectively validate the findings and assess the regression model's fit to the data.

Table 3: *Statistical analysis of correlation between head circumference and regression coefficients.*

	B	Values of t	Std. Error	Sig
Head circumference	2.098	11.816	.178	0.01
(Constant)	51.98	5.18	10	0.02

Table No 3 presents the statistical analysis of the correlation between head circumference and regression coefficients. For head circumference, the coefficient B is 2.098, indicating the change in the dependent variable associated with a one-unit change in the independent variable. The associated t-value of 11.816 suggests that the coefficient is significantly different from zero.

The standard error is 0.178, and the significance level (Sig) is 0.01, further supporting the significance of the coefficient. Similarly, for the constant term, the coefficient is 51.98, with a t-value of 5.18 and a standard error of 10. The significance level is 0.02, indicating that the constant term is also statistically significant. These results collectively provide insights into the relationship between head circumference and the regression coefficients, confirming their significance in the analysis.

Regression Curve:

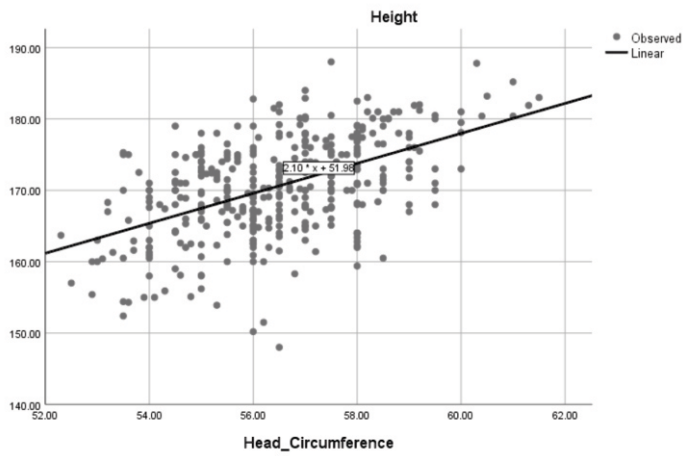

Fig-1. *The curve of regression model under consideration involves the dependent variable of height and the independent variable of head circumference.*

Discussion

These days, it is all too usual for people to perpetrate violent crimes, such as dismembering murder victims, suicide bombs, explosions, accidents, and earthquakes. Pakistan is included on the list of countries prone to natural catastrophes due to its diverse geography and climate. Forensic experts aim to identify human remains by anthropometric methods at disaster scenes accurately. In prosthetics, ergonomics, reconstructive surgery, and forensic medicine, anthropometric measures are predominantly employed to collect relevant data.

Measurements are conducted systematically and with meticulous attention to detail. The neck and head are the primary anatomical regions readily accessible or frequently exhibited for identification. These unidentifiable people frequently have "rounded" or changed facial features. When determining the identity of a suspect, one of the most crucial elements is their height. In many nations worldwide, anthropometric head measurements positively correlate with height, which can help determine personal identity and lower the number of likely victims. Because every country has a unique climate, traditions, and genetic composition, anthropometric measurements and regression models cannot be applied to the Pakistani region[14]. The objective of this study is to employ head circumference measurements as a means of determining the height of individuals belonging to the Kharian ethnic group. To identify unidentified, mutilated bodies, a regression equation for height estimate is devised.

In the current study, the average standing height of adult men was 170.4 cm. The study's samples range from 148 to 188 cm, from low to high. 6.85 cm was the average variation. An Islamabad research found that the average height of men was 170.5 cm, with an 8.06 centimeter variation[15]. Variations in average male stature can be attributed to various factors, including genetic variability within communities, environmental variables such as nutritional quality and accessibility to health care, socioeconomic disparities, and differences in sampling procedures and research populations. Male average height was reported to be greater in another Peshawar survey, measuring 183.5 cm[16]. A study conducted in Romania revealed that the range of adult male height is between 154 and 194 cm.[17]

The average head circumference, according to the research, was 56.45 cm. The head circumference measurements ranged from 52.30 cm to 61.51 cm. 1.69 cm was determined to be the standard error. A significantly elevated p-value of 0.518 was observed in the present study, indicating a substantial association between height and head circumference. The connection is positive. Several additional studies have found similar positive correlations between these two measures. Males' head circumference was measured at 56.29cm, and their mean height was 170.45 cm in a survey done in Maharashtra, India. These two variables were found to have a correlation value of 0.36718. Research conducted in Gujarat, India, revealed a significant correlation of 0.575 between head circumference and height, as indicated by a statistically significant p-value[19]. The study conducted in India yielded a Pearson's coefficient value of 0.729[20]. The study conducted in Nigeria examined the r values across different ethnic groups, revealing a range of values from 0.21 to 0.29, 0.31 to 0.34, and 0.39[21]. According to a Karnataka study, head circumference and height were correlated by 0.494[22]. A correlation of 0.55 was found between head circumference and stature by Mohammed et al.[23] The r-value for the relationship between head circumference and height

was also 0.51024 in a Mumbai research study.

Conclusion

The results of this study will shed light on how to calculate height after a natural or man-made disaster in the same region that has left only an adult's head standing. Various domestic and international research projects will be compared using it as well. A regression equation that enhances justice could be developed with the help of this investigation.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

FB: Conceptualization of Project
FB, AS: Data Collection
UZ, NF: Literature Search
USB: Statistical Analysis
USB, MAK: Drafting, Revision
FB: Writing of Manuscript

Post-traumatic Stress Disorder in Women in Post-Natal Period

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Abstract

Objective: To assess and evaluate the presence of post-traumatic stress disorder and its associated factors affecting the women in post-natal period.

Material and Methods: Data was collected through a cross-sectional survey from February 2023-July, 2023 at the Department of obstetrics and gynaecology, Ghurki Trust Teaching Hospital Lahore and 101 women fulfilling various diagnostic criteria for post-traumatic stress disorder in post-natal period were included in the study. PTSD symptoms were assessed using the "City Birth Trauma Scale" (CBTS) questionnaire including various stratification of events. SPSS 27.0 software was used for data analysis.

Results: The results showed the possible outcome of several factors such as mode of delivery, family system, support and terms with partner or any previous psychiatric illness/PTSD or PTSD following child birth. Women with partner support had a significantly lower incidence of distress & impairment symptoms (33.3%) compared to those without support (81.8%) as $p<.05$.

Conclusion: Our study depicted statistically significant link between PTSD criteria for distress and impairment and partner support and good terms with partner. Given that, partner support ought to be more than what is provided to lower the incidence of PTSD in women following child birth.

Keywords: Child birth, Diagnostic and Statistical Manual of Mental Disorders, Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Partner support, Post-natal period, Post-traumatic stress disorder (PTSD)

How to cite: *Arshad M, Sadaqat A, Afzal R, Arshad H, Rasheed I, Khan MMF. Post-traumatic Stress Disorder in Women in Post-Natal Period. Esculapio - JSIMS 2023;20(01):36-42.*

DOI: https://doi.org/10.51273/esc24.25132018

Introduction

Post-traumatic stress disorder is a mental health condition triggered by shocking or horrible events, often resulting in depressive symptoms. It is common in women following childbirth, as it can be distressing or traumatic for first-time mothers or those with pregnancies with poor outcome. This can negatively impact the woman's rela-tionship with her spouse, family dynamics, parent-child interactions, and child's development. The well-being and mental state of both parents are crucial for a child's development and the overall well-being of the family.[1-3] Partners fully involved and prepared for childbirth expe-rience less emotional breakdown postpartum. Women with complicated childbirth may experience mental health issues, increasing the risk of post-partum depre-ssion and psychosis. Risk factors for developing PTSD include negative experiences, bad obstetrical history, psychological difficulties during pregnancy, previous psychiatric problems, PTSD history, and bad partner relationships.[4,5] Despite the evidence, PTSD is still an area of very little research all around the world especially in an under developed country like Pakistan, and is not routinely screened for. Affected women are therefore rarely identified and treated for PTSD following child birth. Research in this area has typically adapted ques-tionnaires developed for use in other groups, such as military veterans, which may not apply to women after birth. It is also important to examine which symptoms are predictive of distress, impaired functioning, and

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Submission Date: 06-11-2023
1st Revision Date: 16-12-2023
Acceptance Date: 16-02-2024

the need for treatment. The City Birth Trauma Scale takes into account such factors and is used for the evaluation of PTSD following child birth in our study of women in post-natal period up to 1 year excluding first forty days. This scale has questions asking about the intrusion, mood, avoidance, negative cognition and hyperarousal and diagnostic criteria is based on these questions according to the DSM-5 so we tend to find correlation between various symptoms, social support and PTSD following child birth.[6]

Material and Method

A cross-sectional survey, using non-probability consecutive sampling technique, was conducted from February 1st, 2023-July 31st, 2023 at the Department of Obstetrics and Gynaecology, Ghurki Trust Teaching Hospital Lahore after the ethical approval from the Institutional Review Board LMDC. One hundred and one women following child birth were included in the study keeping in account 4-6% women developing post-traumatic stress disorder following childbirth in a study done in 2021. All participants included were briefed and they verbally consented to be part of this study. Married women of reproductive age group in the post-natal period from 6 weeks to 1 year with alive and healthy babies and no history of Neonatal intensive care unit (NICU) admission were included in this study. Women in post-natal periods of less than 6 weeks or more than 1 year or NICU admission of their baby for more than 4 hours were excluded. Women participating were asked about their sociodemographic details; age, parity, mode of delivery, family system, partner support and terms with partner, any previous history of PTSD/ psychiatric illness, and residential address followed by the questions in the City Birth Trauma Scale questionnaire which is a self-reported tool.[6] It has 31 items which are based on either Yes/No answer options or a Likert-type scale (0=not at all, to 3=5 or more times). Two Out of these, 29 questions being asked correspond to diagnostic criteria for PTSD according to DSM-5 (PTSD subscales) which is based on 8 criteria and score ranges from 0-69. The participants fulfilling the diagnostic criteria A i.e. Stressor criterion (fulfilled if women responded yes to Q1 or Q2) or diagnostic criterion H i.e. Exclusion criterion (if women score 1 or more on Q29 in CBTS questionnaire then exclude them from diagnostic PTSD) were excluded from the study group and a total of 101 participants were included in the study who fulfilled the requirements for inclusion and diagnostic criteria of the City Birth Trauma Scale. The rest of the diagnostic criteria according to the questions in the City Birth Trauma Scale were criteria of Re-experiencing symp-toms, Avoidance symptoms, Negative cognitions and mood, Hyperarousal, Duration (of symptoms), Distress and impairment, PTSD with dissociative symptoms and PTSD with delayed onset. Sociodemographic details were used for descriptive statistics and we drew multiple comparisons between biopsychosocial factors and PTSD subscales to find the associations of statistical signifi-cance using the Chi-square test of independence. The level of significance was set at 5%. Analysis was per-formed using SPSS 27.0 software.

Result

A total of 101 women were included in our study with a mean age of 28.30±4.58 ranging from 20-42 years as shown in Table 1 with other details. In Table 2, the data provides an overview of the subscales of post-traumatic stress disorder (PTSD) in the study sample, particularly focusing on various symptoms and exhibiting their frequency. These subscales constitute the diagnostic criteria for PTSD in women in the post-natal period. Re-experiencing symptoms were reported by 60.4% out of all the women with spontaneous vaginal delivery (52.5 %) and 66.7% women out of all those women with a lower-segment Caesarean section (47.5%) ($p>.05$). Women with partner support had 61.1% incidence of re-experiencing symptoms, while those without had an 81.8% incidence ($p>.05$). Women with 'good' terms with their partner showed a 62.5% incidence of re-experiencing symptoms, while those with 'poor' terms had an 80.0% incidence. Women with a previous psychiatric illness history had a 50.0% incidence of re-experiencing symptoms, similar to those without a previous history (50.0%)($p>.05$). Women from a joint family system had a 65.3% incidence of re-experiencing symptoms, compared to 57.7% in the nuclear family system. The analysis suggested no significant associations between the mode of delivery, partner support, terms with the partner, previous psychiatric history, or family system with re-experiencing symptoms. The result follows a similar pattern of analysis for avoidance symptoms, Negative cognition and mood, and Hyperarousal assessing its association with various demographic factors ($p>.05$). Women with partner support had a significantly lower incidence of distress & impairment symptoms (33.3%) compared to those without

support (81.8%) (p<.05). Women with 'good' terms with their partner showed a lower incidence of distress & impairment symptoms (35.4%) compared to those with 'poor' terms (100%) as p<.05. No significant associations were observed for PTSD with dissociative symptoms for the provided demographic factors. Out of all the 101 women, majority (72.3%) had early onset PTSD after childbirth while very less percentage of women (3%) developed delayed onset PTSD and this includes 47.5% of the women who developed PTSD after child birth and 26.7 % women who had experienced some trauma prior to child birth but symptoms appeared after child birth.

Table 1: *Demographic Characteristics.*

Parameters	Categories	N	%	Mean±SD (Range)
Age (years)				28.30±4.58 (20-42)
Mode Of Delivery	Spontaneous vaginal delivery	53	52.5	
	Lower-segment Caesarean section	48	47.5	
Partner Support	Yes	90	89.1	
	No	11	10.9	
Terms With Partner	Poor	5	5.0	
	Good	96	95.0	
Previous History Of Psychiatric Illness	Yes	2	2.0	
	No	99	98.0	
Family System	Joint	75	74.3	
	Nuclear	26	25.7	

Table 2: *Post-traumatic stress disorder subscales.*

Subscales		N	%
Re-experiencing Symptoms			
	Yes	64	63.4
	No	37	36.6
Avoidance symptoms			
	Yes	37	36.6
	No	64	63.4
Negative cognitions & mood			
	Yes	44	43.6
	No	57	56.4
Hyperarousal			
	Yes	71	70.3
	No	30	29.7
Distress & impairment			
	Yes	39	38.6
	No	62	61.4
PTSD with dissociative symptoms			
	Yes	80	79.2
	No	21	20.8
Duration			
	Prior to birth	27	26.7
	After Birth	48	47.5
PTSD Onset			
	Early Onset	73	72.3
	Delayed Onset	3	3.0

Discussion

Post-traumatic stress disorder is a mental health condition resulting from shocking events, often causing depressive symptoms and mixed emotions, particularly

Table 3: *Association between demographic profile and Diagnostic criteria of PTSD*

	Categories	Re-experiencing symptoms		p-value
		Yes	No	
Mode Of Delivery	Spontaneous vaginal delivery	32(60.4%)	21(38.6%)	.512
	Lower-segment Caesarean section	32(66.7%)	16(33.3%)	
Partner Support	Yes	55(61.1%)	35(38.9%)	.320
	No	9(81.8%)	2(18.2%)	
Terms With Partner	Poor	4(80.0%)	1(20.0%)	.428
	Good	60(62.5%)	36(37.5%)	
Previous History Of Psychiatric Illness	Yes	1(50.0%)	1(50.0%)	1.000
	No	63(63.6%)	36(36.4%)	
Family System	Joint	49(65.3%)	26(34.7%)	.490
	Nuclear	15(57.7%)	11(42.3%)	
		Avoidance symptoms		
		Yes	**No**	
Mode Of Delivery	Spontaneous vaginal delivery	21(39.6%)	32(60.4%)	.512
	Lower-segment Caesarean section	16(33.3%)	32(66.7%)	

Partner Support	Yes	32 (35.6%)	58 (64.4%)	.525
	No	5 (45.5%)	6 (54.5%)	
Terms With Partner	Poor	2 (40.0%)	3 (60.0%)	1.000
	Good	35 (36.5%)	61 (63.5%)	
Previous History Of Psychiatric Illness	Yes	1 (50.0%)	1 (50.0%)	1.000
	No	36 (36.4%)	63 (63.6%)	
Family System	Joint	29 (38.7%)	46 (61.3%)	.637
	Nuclear	8 (30.8%)	18 (69.2%)	
		Negative cognitions & mood		
		Yes	**No**	
Mode Of Delivery	Spontaneous vaginal delivery	20 (37.75%)	33 (62.3%)	.214
	Lower-segment Caesarean section	24 (50.0%)	24 (50.0%)	
Partner Support	Yes	36(40.0%)	54 (60.0%)	054
	No	8 (72.7%)	3 (27.3%)	
Terms With Partner	Poor	4 (80.0%)	1 (20.0%)	.164
	Good	40 (41.7%)	56 (58.3%)	
Previous History Of Psychiatric Illness	Yes	2 (100%)	-	.187
	No	42 (42.4%)	57 (57.6%)	
Family System	Joint	35 (46.7%)	40 (53.3%)	.286
	Nuclear	9(34.6%)	17 (65.4%)	
		Hyperarousal		
		Yes	**No**	
Mode Of Delivery	Spontaneous vaginal delivery	36 (67.9%)	17 (32.1%)	.583
	Lower-segment Caesarean section	35 (72.9%)	13 (27.1%)	
Partner Support	Yes	62 (68.9%)	28 (31.1%)	.499
	No	9 (81.9%)	2 (18.2%)	
Terms With Partner	Poor	5(100%)	-	.318
	Good	66 (68.8%)	30 (31.3%)	
Previous History Of Psychiatric Illness	Yes	2 (100%)	-	.353
	No	69 (69.7%)	30 (30.3%)	
Family System	Joint	52 (69.3%)	23 (30.7%)	.719
	Nuclear	19 (73.1%)	7 (26.9%)	
		Distress & impairment		
		Yes	**No**	
Mode Of Delivery	Spontaneous vaginal delivery	18 (34.0%)	35 (65.0%)	.313
	Lower-segment Caesarean section	21 (43.8%)	27 (56.3%)	
Partner Support	Yes	30 (33.3%)	60 (66.7%)	**.003
	No	9 (81.8%)	2 (18.2%)	
Terms With Partner	Poor	5 (100%)	-	**.007
	Good	34 (35.4%)	62 (64.6%)	
Previous History Of Psychiatric Illness	Yes	2 (100%)	-	.147
	No	37 (37.4%)	62 (62.6%)	
Family System	Joint	28 (37.3%)	47 (62.7%)	.649
	Nuclear	11 (42.3%)	15 (57.7%)	

		PTSD with dissociative symptoms		
		Yes	No	
Mode Of Delivery	Spontaneous vaginal delivery	40 (75.5%)	13 (24.5%)	.331
	Lower-segment Caesarean section	40 (83.3%)	8 (16.7%)	
Partner Support	Yes	73 (81.1%)	17 (18.9%)	.233
	No	7 (63.6%)	4 (36.4%)	
Terms With Partner	Poor	4 (80%)	1 (20%)	1.000
	Good	76 (79.2)	20 (20.8%)	
Previous History of Psychiatric Illness	Yes	2 (100%)	-	1.000
	No	78 (78.8%)	21 (21.2%)	
Family System	Joint	61 (81.3%)	14 (18.7%)	.371
	Nuclear	19 (73.1%)	7 (26.9%)	

** statistically significant at a 5% level of significance

in first-time mothers or those with pregnancy risks, leading to a disturbed state of life.[1,2] The study explores the lack of routine post-partum screening and proper diagnosis for women during childbirth, focusing on symptoms that meet PTSD subscales using the City Birth Trauma Scale (CBTS) questionnaire. It aims to identify biopsychosocial and sociodemographic details that affect women's quality of life and prevent normal symptoms from being overemphasized or considered normal physiological phenomena.[6] In a study, it was found out that 2-9% women develop PTSD following childbirth due to traumatic birth experiences by new mothers and prevalence of 17% postpartum depression. Women with high-risk pregnancies might have increased risk of developing PTSD after child birth including bad obstetrical history, psychological difficulties in pregnancy (particularly depression or bipolar disorder in early pregnancy) , trauma related to mode of delivery or history of mental health problems.[5,7] In our study, only 2% of percent of women had pre-existing psychiatric illness/PTSD. They had all the PTSD symptoms in postnatal period too which would make the treatment to be prolonged and difficult, however, the correlation was found to be statistically insignificant with all the PTSD subscales. According to the criteria F (duration) for PTSD mentioned in CBTS, there were 47.5% women who had new onset PTSD following child birth out of all the women who fulfilled any single criteria for PTSD while 26.7% women were found out to be having symptoms/PTSD criteria fulfilled prior to the child birth but PTSD symptoms were not manifested in them in full swing until the birth of their babies. This indicates that the prior history of any sort of trauma or abuse may aggravate the PTSD symptoms and affect the responses to a new triggering event i.e. child birth.

Out of 101 women, 72.3% women had early onset PTSD while only 3% women developed delayed onset PTSD i.e more than 6 months after birth including the women who had PTSD prior to birth but it became evident only after their child birth. The apparent incidence of PTSD in women beyond 6 months post-partum is less than what has been summarized for first 6 months due to lack of enough knowledge on former, indicating the need of more care and support which is often unavailable to the women in Post-natal period at homes and their workplaces, in case of working women due to a lot stigma being associated with seeking help and coping with stress.[7] The study found that PTSD can result from birth complications and mode of delivery. Of 52.5% of women who had spontaneous vaginal deliveries and 47.5% who had caesarean sections, the mode of delivery did not significantly affect PTSD subscales. However, some studies suggest that instrumental vaginal or emergency caesarean sections are associated with PTSD more than normal vaginal or elective caesarean sections. Some studies found no relationship between mode of delivery and stress symptoms.[8,9]

Other sociodemographic factors studied in relation to the development of PTSD following child birth are partner support, terms with partner (good/poor) and family system in which the women were residing (joint/nuclear). In our study, 89.1% women who filled the questionnaires had partner support and 95% women were on good terms with their partners yet a large number of women had re-experiencing (63.4%), hyperarousal (70.3%) and dissociative symptoms (79.2%) while relatively lower number of women experienced avoidance symptoms (36.6%), negative cognitions and mood (43.6%) and distress and impairment (38.6%). In contrast to our findings, where women had experienced

various stress symptoms, none of the sociodemographic factors had any significant association with PTSD symptoms subscales but distress and impairment. Although, majority of women (61.4%) didn't experience distress and impairment following childbirth, it is significantly associated with partner support (p=0.003) and terms with partner (p=0.007) which are seemingly interconnected yet two different factors. Partner support is crucial for a healthy pregnancy and the positive birth experience.[10] More the support a woman has for child birth, less is the incidence for distress and impairment after child birth and vice versa. Maladaptive stress coping in post-natal period can impair normal functionality.[9] Another systemic review found that the partner support was one of the protective factors against PTSD after child birth and woman who were satisfied with it tend to had less negative experiences.[10] This helped in prevention of long-term adverse effects on child, maternal reluctance to breastfeeding, impaired mother-baby bond, mental health problems in mother and distress in couple's relationship associated with PTSD.[11,12] Depression and stress negatively impact couple relationships and parent-child bond development. Social support from family and friends is crucial. Joint family systems (74.3%) have good support, but cultural norms and bias increase stress symptoms, while nuclear families are not stress-free. A longitudinal course showed that women with PTSD had perceived poor social support, one of the risk factors for development of PTSD but we didn't find this correlation significant.[13,14] Sociodemographic parameters indirectly impact stress-related symptoms leading to PTSD after childbirth, with a strong association between distress and impairment symptoms and partner support. However, more research is needed to generalize results to a larger population.

The study has limitations due to its clinical setting and lack of specific questionnaires for identifying stress symptoms in ante-natal and post-natal periods. Additionally, some women may feel vulnerable due to social and cultural stereotyping. Further research should involve larger sample sizes and use the study population as a reference. This could help develop policies supporting women's post-natal needs with therapeutic approaches.

Conclusion

Social support, particularly partner support, is crucial for women during pregnancy and post-natal periods. Prenatal counselling, awareness campaigns, and flexible working hours are essential. Couple counselling and support unit development at secondary and tertiary healthcare levels can help prevent, screen, diagnose, and limit factors leading to post-traumatic stress disorder.

Conflict of Interest *None*

Funding Source *None*

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Authors Contribution

AS: Conceptualization of Project
MA, IR: Data Collection
RA, HA, MA: Literature Search
MA, MMFK: Statistical Analysis
AS: Drafting, Revision
MA: Writing of Manuscript

Role of Diffusion Weighted Imaging in Localization of Non-palpable Undescended Testes Taking Laparoscopic Finding as Gold Standard

Rukhsana Nasim,[1] Abeer Yasin,[2] Muhammad Kaleem [3]

Abstract

Objective: To ascertain the accuracy of diffusion-weighted imaging (DWI) in the localization of undescended testes.

Material & Methods: This prospective cross-sectional study was conducted in the radiology department of a tertiary care hospital from 01-06-2022 to 15-12-2023. Total of 150 patients were included in the study. Two experienced radiologists independently examined, one observing conventional MRI alone and the other observing DWI-MRI. Following that, all of the patients underwent laparoscopic examination. The data was entered into a proforma. The findings of conventional MRI alone and DWI-MRI were correlated with laparoscopic findings. A 2 x 2 table was used to calculate the sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of DWI in comparison to laparoscopy.

Results. The average age was 10.37 +/- 5.663. Conventional MRI imaging localized 50.6 % of the cases in our study, 55% of cases via DWI-MRI and 60% by laparoscopy. Sensitivity, specificity, PPV, NPV, and accuracy of conventional MRI were 72 %, 83 %, 86 %, 66 % and 76 % respectively, while for DWI-MRI was 82 %, 86 %, 93 %, 89 %, and 78 % respectively.

Conclusion: The detection of undescended testes is improved by DWI-MRI. DWI-MRI is a recommended imaging tool for improving MRI's preoperative diagnostic accuracy in localization and identification of nonpalpable undescended testes.

Keywords: Radiology; Magnetic Resonance imaging; diffusion weighted imaging; laparoscopy

How to cite: *Nasim R, Yasin A, Kaleem M. Role of Diffusion Weighted Imaging in Localization of Non-palpable Undescended Testes Taking Laparoscopic Finding as Gold Standard. Esculapio - JSIMS 2023;20(01):43-47.*

DOI: https://doi.org/10.51273/esc24.25132019

Introduction

Cryptorchidism, also known as undescended testes (UT), is the absence of one or both testes in the scrotal sac.[1] It affects about 1 - 4.5 percent of newborns, with the incidence rising to 30 - 45 percent in preterm babies.[2] During infancy, 75 percent of full-term neonates and 90 percent of preterm neonates have UT, which drops to 0.8 - 1.2 percent by one year of age.[1,3,4]

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Submission Date: 10-01-2024
1st Revision Date: 25-01-2024
Acceptance Date: 05-03-2024

Untreated cryptorchidism has been linked to a variety of complications. 10% of infertile males had a history of UT, with the risk increasing up to six-fold in bilateral UT compared to unilateral UT or the normal population.[5] If the patients are not treated, the risk increases.[6] UT is estimated to be responsible for 10% of testicular malignancy, increasing the risk by up to 35 to 48 times when compared to the general population, with seminoma being the most commonly diagnosed malignancy in these patients.[7,8] Torsion has also been reported in these patients, and it has a positive correlation with the length of UT.[9] Early intervention is critical for reducing infertility and lowering the risk of cancer in the future.[10]

Because of its non-invasiveness and ease of access, sonography is first line and popular imaging modality for the evaluation of UT. However, poor diagnostic accuracy

because of location of UT in pelvic/ abdominal cavity necessitates further evaluation with MRI and diagnostic laparoscopy.[1] Laparoscopy remains the gold standard tool for detecting non-palpable UT with 100% sensitivity and specificity, but it is an invasive procedure.[1]

Conventional MRI has a somewhat poor sensitivity for detecting non-palpable UT. Sometimes, it is unable to localize the atrophied testes, making conventional MRI less reliable in distinguishing who require intervention from those who do not. So more research is required.[6,7]

The combination of DWI with conventional MRI sequences has become the area of interest in order to improve diagnostic accuracy in UT localization.[8,9] In a Recent study carried out in Pakistan, analysis of 416 UT patients reported that the location of UT for DWI using laparoscopy as the gold standard had sensitivity (SN)=65% and specificity (SP)=98%.[10] Additionally, a research conducted in 2010, enrolled 36 patients concluded that the combination of DWI and conventional MRI sequences, with SN=0.91, SP=1 for observer 1 & SN=0.88, SP=0.75 for observer 2, had a higher diagnostic accuracy than either technique alone (SN=0.85, SP=1 for observer 1 & SN=0.85, SP=0.75 for observer 2) or with DWI alone (SN=0.88, SP=0.75 for observer 1 & SN=0.82, SP=0.75 for observer 2).[10] Since there are few comparative studies in the area, more research is necessary to establish an early diagnosis based on evidence and to intervene promptly in the care of UT. Our hypothesis was that the sensitivity and specificity of imaging non-palpable undescended testes in the abdomen would be increased by including DWI in conventional MRI. The goal of this study was to determine the diagnostic accuracy of DWI by comparing it to traditional MRI sequences, with laparoscopic findings serving as the reference.

Material & Methods

This prospective cross-sectional study was carried out at Lahore General Hospital's Department of Radiology, Lahore, Pakistan. From 01-06-2022 to 15-12-2023, samples were taken using a non-probability consecutive technique. Informed and written consent was taken from patients or guardians of the patients as applicable. All male patients referred from the surgical OPD due to the absence of palpable testes in one or both scrota and inguinal canal, age ranged from 1 to 30 years were included. Patients with ambiguous genital, previous history of scrotal, inguinal, or lower abdominal surgery, Diagnosed case of any renal malformation, Claustrophobic patients, and patients refusing laparoscopic evaluation were excluded from the study.

After taking approval from institutional review board (IRB) of PGMI / Lahore General Hospital, Lahore, Pakistan a total of 150 patients were enrolled and data was collected. MRI was performed on 3 Tesla machine (G.E manufacturer) and protocols included multiplanar T2WI, T1WI, T2 FATSAT, and the addition of a DWI sequence with b values of 0, 400, and 800 s/mm^2. A consultant radiologist with 5 years of experience reviewed the conventional MRI images on PACS and filled proforma. Another consultant radiologist with same experience reviewed DWI-MRI images of same patient and added his findings in proforma. Postop findings were taken from surgical ward. It was recorded in the proforma.

The collected data were entered into the Statistical Package for Social Sciences (SPSS) version 22 and analyzed. Mean ±SD was calculated for quantitative variables, and frequency and percentage were used for qualitative variables. A 2 X 2 table was used to calculate the sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of conventional MRI alone and DWI+MRI conventional sequences using laparoscopy as the gold standard.

Results

The average age was 10.37 $\pm$/- 5.663 years. In our study, 50% of cases were diagnosed using only the conventional MRI, 55% were localized by DW-MRI, and 60% by laparoscopy, as shown in Tables 1 and 2. The sensitivity, specificity, positive and negative predictive values, and diagnostic accuracy of DW-MRI for undescended testes were calculated using laparoscopy as the gold standard.

Table 1: *2x2 table of Conventional MRI*

MRI	Laparoscopy		Total	
	Positive (n=91)	Negative (n=59)		
Positive(n=76)	66 (TP)	10 (FP)	76	S_N=72%
Negative(n=74)	25 (FN)	49 (TN)	74	S_P=83%
Total	91	59	150	PPV=86% NPV=66% Accuracy=76%

Table 2: *2x2 table of DWI-MRI*

DWI- MRI	Laparoscopy		Total	
	Positive (n=91)	Negative (n=59)		
Positive(n=83)	75 (TP)	8 (FP)	83	S_N=82%
Negative(n=76)	16 (FN)	51 (TN)	67	S_P=86%
Total	91	59	150	PPV=93% NPV=89% Accuracy=78%

Discussion

Undescended testes, also known as cryptorchidism, necessitate prompt treatment due to the risk of complications such as testicular malignancy, testicular torsion, infertility, and trauma. Furthermore, it may result in psychological stigma, making both parents and patients concerned about the condition.[6] There is no definitive agreement on the primary management of undescended testes. Radiological approaches such as USG, CT, and MRI, as well as surgical approaches such as laparoscopy, have been widely used. Laparoscopy, despite being widely regarded as the most conclusive diagnostic approach, is an invasive procedure and many complications can occur. So, there is need of non-invasive procedure. An ultrasound examination, as being considered first line imaging modality, is always performed if the testis is impalpable. Ultrasound has a high positive predictive value for inguinal located testes in expert hands, such as 91 % with a sensitivity of 78%.[12] According to some studies, even when a pediatric surgeon and urologist diagnosed a nonpalpable testis, an inguinal testis was discovered in 21-85 percent of patients during surgery.[14] When testis is found in an inguinal location by ultrasound, a primary inguinal exploration can be considered, avoiding a diagnostic laparoscopy.[13] But when testis is not localized in inguinal canal, it become very difficult to identify it. In some cases, differentiation from inguinal lymph nodes become difficult during ultrasonography. As a non-invasive, non-radiation, and non-contrast diagnostic tool, MRI has a truly great potential to be the most reliable and widely accepted diagnostic instrument.[3,4] It has excellent soft tissue contrast with fine spatial resolution. The overall mean age of the patients in our study was 10.37 +/- 5.663 years, which differs from the mean age of 7.21 +/- 1.43 years as calculated by Zainab et al.[1] Because the risk of developing testicular cancer and infertility increases with age, the age at diagnosis is an important prognostic factor in the case of undescended testes. In our study, the sensitivity, specificity, and accuracy of DWI-MRI for diagnosis of non-palpable undescended testes were 82 %, 86 %, and 78 % respectively.

Numerous prior researches have determined the DW-specificity, MRI's sensitivity, and diagnostic accuracy in identifying cryptorchidism. Overall sensitivity, specificity, and diagnostic accuracy of DW-MRI in detecting cryptorchidism have been reported by Fazal et al. to be 65.1%, 98.1%, and 81.3 percent, respectively.[10] According to Zainab et al., the overall DW-MRI diagnostic accuracy, specificity, and sensitivity for diagnosing cryptorchidism are 91.40 percent, 84.35 percent, and 93.51%, respectively.[1]

An additional investigation by Kantarci et al. using a conventional MRI sequence alone and in conjunction with DWI found that the combination of DWI and conventional MRI sequences had a higher success rate (SN = 0.91, SP =1 for observer 1 & SN = 0.88, SP =0.75 for observer 2) than did MRI (SN = 0.85, SP =1 for observer 1 & SN = 0.85, SP =0.75 for observer 2) and DWI (SN = 0.88, SP =0.75 for observer 1 & SN = 0.82, SP =0.75 for observer 2) alone.[4] Our analysis yielded lower values than this. Using conventional MRI, Abd-El Gawad et al. reported 87 percent, 50 percent, and 83 percent sensitivity, specificity, and accuracy. He reported sensitivity, specificity, and accuracy of 91.5%, 66.7%, and 88.67%, respectively, using DWI.[11]

Similar studies that combined the use of conventional and DWI reported 95.8%, 100%, and 96.2 % in terms of sensitivity, specificity, and accuracy. Laparoscopy revealed that atrophic testes were the cause of false-negative cases, particularly in patients who were older.[11]

Higher results were recorded by Emad-Eldin et al.[16]; they verified that a sensitivity of 93%, specificity of 87%, and accuracy of 91.5 percent were obtained when MRI was utilized alone. The results improved to a sensitivity of 93%, specificity of 100%, and accuracy of 95.70% when DWI was added to traditional MRI.

DWI also has main role in the many clinical situations i.e. the identification of cancer in a variety of viscera, including the liver, kidney, prostate, and other organs, when using abdominal MRI. The way DWI works is that it uses the diffusion of water molecules to show how cellular the tissue is, which results in different images than when using traditional MRI sequences to help characterize the tissue at the microscopic level.

The degree of water diffusion restriction in biological tissue is inversely correlated with tissue cellularity. In tissues with intact membranes and strong cellularity, there is more restriction of water molecules. Because the testicles inside the abdomen have more cells than the surrounding organs, they can be identified on DWI as having a higher signal intensity. Therefore, in order to detect non-palpable undescended testes, we supplemented standard MRI sequences with DWI.[15]

In order to validate the clinical findings, all of the patients in our study who were sent to our department due to clinically non-palpable testes underwent local grey scale and doppler USG imaging. Following that, the patients were advised to undergo a standard hospital MRI sequence along with a DWI sequence.

Conclusion

With a sensitivity of 82% and specificity of 86%, the study found that conventional MRI in conjugation with DWI offer significantly superior diagnostic accuracy when compared to conventional MRI sequences. Diffusion-weighted imaging can therefore be a very useful tool in the localization of non-palpable undescended testes. So that early intervention should be done for reducing infertility and lowering the risk of cancer in the future.

Sources of funding: *None*

Conflict of interest: *None*

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Authors Contribution

RN, AY: Conceptualization of Project
RN, AY, MK: Data Collection
RN, AY, MK: Literature Search
MK, AY: Statistical Analysis
RN: Drafting, Revision
MK, AY: Writing of Manuscript

ACL Reconstruction with Peroneus Longus Autograft Using Endobutton & Bioabsorbable Interference Screw and Brace Free Rehabilitation

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Abstract

Objective: To assess the functional outcome of arthroscopic anterior cruciate ligament (ACL) reconstruction with Peroneus longus tendon autografts using endobutton and interference screw at one-year follow-up post-operatively and brace-free rehabilitation.

Material and Methods: A prospective study included 53 patients with clinical and radiological ACL deficiency. Arthroscopic ACL reconstruction was performed using Peroneus Longus double bundle autografts with subsequent brace-free rehabilitation. Pre- and postoperative assessment at one-year follow-up utilized the International Knee Documentation Committee (IKDC) score. Graft length and diameter were measured perioperatively, and donor site morbidity was evaluated using The American Orthopedic Foot and Ankle Score (AOFAS).

Results: The study included 51 (94.4%) males and 2 (3.7%) females, mean age 27.3±7.2 years. Majority were left-sided procedures (64.8%). Peroneus Longus graft mean length and diameter were 116.8±5.3mm and 8.2±0.2mm respectively. At one-year follow-up, ankle joint movement at the graft site was preserved (mean AOFAS 98±0.8). There was a significant improvement in IKDC score postoperatively ($p < 0.05$).

Conclusions: ACL reconstruction with Peroneus longus autograft offers knee stability and facilitates early rehabilitation. Utilizing endobutton and bioabsorbable interference screw fixation supports graft strength until sufficient graft-to-bone healing occurs. Patients regain pre-injury activity levels, including stair climbing, sitting cross-legged, and squatting without difficulty.

Keywords: Anterior cruciate ligament, ACL Reconstruction, Peroneus longus.

How to cite: *Hashmi AR, Afgan S, Hamid A, Aslam A, Asghar J, Nasir AS, Khalid MMB, Ibrahim M. ACL Reconstruction with Peroneus Longus Autograft Using Endobutton & Bioabsorbable Interference Screw and Brace Free Rehabilitation. Esculapio - JSIMS 2023;20(01): 48-53.*

DOI: https://doi.org/10.51273/esc24.251320110

Introduction

Injury to the Anterior Cruciate Ligament (ACL) is a common and the most prevalent injury resulting from sports related trauma.[1,2] ACL injury if not addressed, can lead to instability of the knee, meniscal injuries or degenerative changes in the knee joint. The attending consultants have long been in search of alternate methods and substitute grafts for the reconstruction of ACL (ACLR). The objective of ACLR is to restore stable knee biomechanics as well as to provide rehabilitation for sports and routine activities. Surgeons have adopted various different techniques for ACLR. Thus, with changing concepts, newer and safe alternative graft options have been in use recently.[3] Various studies have documented the Peroneus longus (PL) as an auto-graft that has sufficient biomechanical properties safe enough to be used in ACLR without having any major biomechanical and kinematic effects on the functions of foot and ankle from which it was harvested.[4,5] Amongst the different choices of auto grafts available, Semitendinosus

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Submission Date: 12-02-2023
1st Revision Date: 17-02-2024
Acceptance Date: 05-03-2024

and Gracilis (Hamstring), and the bone patella bone tendon grafts are already being used for ACLR with good functional outcome. Despite the available variety of auto graft options, controversy still exists regarding the most suitable graft for ACLR.[6,7] The usage of PL tendon autograft however, is a recent advancement in the management of ACL injuries.[7,8] Among its benefits are good strength and the ease of harvest. The mean thickness of PL auto graft nearly matches that of native ACL. But only a few studies are available regarding the donor site morbidity following the harvest. This study was carried out to investigate functional outcome, biomechanical stability, along with donor site morbidity of harvesting the PL graft for ACLR.

Material and Methods

Following the approval from the Institutional Review Board, this study was done on 53 patients admitted through Out Patient Department with Clinical and Radiological deficiency of ACL in the Orthopedic Surgery Department of a tertiary care Hospital, Lahore from May 2019 to June 2022. Following the informed consent, detailed history and clinical examinations were performed, including the knee stability tests, the Anterior and posterior Drawer test, Pivot Shift and the Lachman Test. Patients were evaluated with radiographs of the knee and findings were confirmed by Magnetic Resonance imaging (MRI).

Patients aged between 16-45 years with primary injuries to the ACL on MRI and complete ACL tear confirmations on diagnostic arthroscopy were included in this study. Those Aged greater than 45 years with evidence of bi-compartmental and tri-compartmental OA of knee, multi-ligamentous injury, Associated MCL injury, Fractures around the knee, Presence of Pathological condition in the affected limb were not included in the study.

A total of fifty-three patients were included in the study of ACL injury. Prior to the surgery, patients were treated elsewhere with a knee immobilizer. Pre-operatively the International Knee Documentation Committee (IKDC) was used to evaluate the functional status of the injured knee. Physiotherapy was started to improve the strength of quadriceps muscle and to decrease the joint effusion. All patients presented to the Out Patient Department six months after the sustaining ACL injury. Under spinal anesthesia, the patient was positioned in supine position for the surgery. Intravenous antibiotic was given 5 minutes before the inflation of the tourniquet which was placed on the thigh in all cases. A single 3cm long longitudinal incision was given almost 4-5 cm proximal to the tip of lateral malleolus (Fig-1).

After the subcutaneous tissues, deep fascia was incised and Peroneus Longus and Peroneus Brevis tendons were identified. Using the artery forceps or Kelly the PL was separated from peroneus brevis (PB) muscle. The tendons were then stitched with each other distally using Coated VICRYL® (Polyglactin 910) No.1 Suture. The peroneus longus tendon just proximal to distal unification of both tendons was sutured with VICRYL® (Polyglactin 910) No.1 Suture and cut sharply with the knife and extracted with the help of a tendon stripper approximately 5cm from fibular head taking care not to injury the common peroneal nerve. The mean length of graft was 116.8±5.3mm. The graft was folded on itself to constitute a double bundle graft. To determine the precise diameter of the graft for passage through the femoral and tibial tunnels (Figure 3), cylindrical sizers were used whereby the tendons were passed through it. The mean diameter was measured 8.2±0.2mm on average. The harvested tendon was placed on the tendon board and pre-tensioning was performed following which the endobutton was applied to one end. Wound closure was done using absorbable subcutaneous 2/0 VICRYL® (Polyglactin 910) Suture and interrupted 2/0 PROLENE® (Polypropylene) suture was used to close the skin incisions.

Figure 1. 3 cm incision and identification of PL Tendon

Figure 2: *Tenodesis of PL to PB and Harvested PL Tendon*

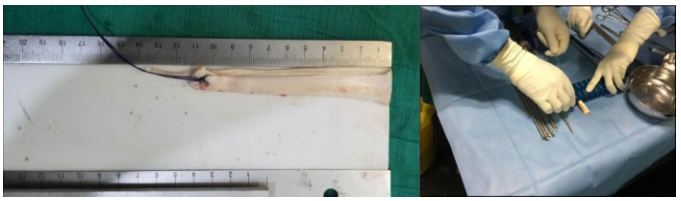

Figure 3: *Measuring PL tendon.*

Standard arthroscopic approach was used to place the portals for the intra-articular examination. An awl was carefully positioned onto the posteromedial aspect of the lateral femoral condyle just distal to residual ridge 8-10mm above inferior articular surface to mark the location for femoral tunnel. Guide wire was passed through the marked position over which reamers of adequate sizes were used for the femoral tunnel. The knee was flexed up-to about 70 to 80º, then using the anteromedial portal the tip of the tibial drill guide was placed with 45 to 55 degrees angulation of the guide wire. Guide wire was then drilled through the medial side of tibia to emerge under vision from the articular surface of tibia at the footprint of the native ACL. Cannulated reamers were then used to make the tibial tunnel with diameter the size of the harvested graft. The graft was then passed through the tunnel under arthroscopic vision up to the markings labeled on the graft. Once the endobutton had flipped across the lateral femoral condyle the knee joint was then flexed and extended through full range to ensure firm setting of the graft in its position. Bio-absorbable screw was placed and tightened at the tibial tunnel until satisfactory purchase was achieved while keeping the knee in 40-60 degree of flexion. Post operatively graft tension is checked by performing anterior drawer and Lachmann`s test. In case of slackness further tensioning on graft is made on the femoral side by further tightening the tight rope. Patients were prescribed antibiotics and analgesics post-operatively. Knee immobilizer was given to all patients at the end of surgery. Post-operative radiographs were done to ensure proper endobutton position over the lateral condyle of femur and the position of the bio-absorbable interference screw.

Follow Up and Assessment

On the first postoperative day, active and passive range of motion exercises of knee and ankle were initiated. Knee was inspected on day four postoperatively to assess the surgical wound, effusion, overlying skin condition. Patients were discharged on oral antibiotics and analgesics and were given the rehabilitation protocol to continue exercises at home. Patients were called for follow-up on day 10 for removal of the skin stitches and were advised to continue the Knee immobilizer for one month. Post-operative rehabilitation protocol was divided into three-phases. Phase I – This was the initial recovery phase and comprised the first two weeks. In the first week patients were advised to elevate the operated leg. Cold therapy in the form of ice packs was applied immediately after surgery and used for at least 20 minutes every other hour for 24-48 hours. In the second week patients were advised to weight bear by putting 50% of the body weight through the operative leg. Phase II - Two to six weeks after surgery, progression to full weight bearing without crutches was recommended and closed kinematic chain (CKC) exercises were started. Straight leg raise exercises were recommended. Knee immobilizer was discontinued after 04 weeks of surgery.

Phase III - Six weeks to three months after Surgery, walking, leg curls, leg presses, cycling were advised. Following the third month postoperatively walking, jogging, light running, leg raising were advised. Postoperative knee function was evaluated by the International Knee Documentation Committee (IKDC) and for the assessment of donor ankle function The American Orthopedic Foot and Ankle Score (AOFAS) was used at one-year follow-up. Paired Sample t-test was used to calculate the significance between the mean IKDC pre and post operatively at one-year post-operatively.

Results

Of the total of 53 patients, 51 (94.4%) were males and 2(3.7%) females with mean age of 27.3±7.2. Eighteen (33.3%) patients were operated on the right side and 35(64.8%) on the left. Forty-one (75.9%) patients had injury as a result of direct trauma due to road traffic accident, whereas 10 (18.5%) patients presented following sports injury and 2(3.7%) patients presented secondary to indirect trauma to the knee. All patients were operated on more than 06 months after injury. Peroneus Longus graft mean length and diameter was 116.8±5.3 mm and 8.2±0.2mm respectively (Table 1). Pre-operatively, the Lachman test was reported positive in 52 cases (96.3%) and negative in 1 case (1.9%). Post operatively Lachman test was normal in 52 cases (96.3%), whereas 1 patient (1.9%) had 1+ laxity (Table 2). Preoperatively Pivot shift was found positive in 32 subjects (59.3%) and negative in 21 (38.9%) but postoperatively 53 patients (100%) showed negative pivot shift test. (Table 2). The functional outcome of the knee was evaluated by IKDC score at one-year follow-up. Pre-opera-

tive IKDC score was 29.21±1.3 and post-operatively 93.40±1.3 at one year post-operatively. There was a significant improvement in the IKDC score at one-year operative (p-value <0.05). The range of motion of the knee joint was fully intact at the end of one-year follow up. The foot and ankle functions at the donor site were grossly preserved at one-year follow-up, with mean AOFAS of 98±0.8. (Table 3).

Table 1: *Patient Demographics*

Characteristics	Mean	SD	Min	Max	N (%)
Age	27.3	7.2	16	45	
Sex					
Male					51 (94.4)
Female					2 (3.7)
Injury Mechanism					
RTA					41 (75.9)
Sports					10 (18.5)
Other					2 (3.7)
Side on injury					
Right					18 (33.3)
Left					35 (64.8)
Graft Length	116.8	5.3	110	130	
Graft Thickness	8.2	0.2	8	9	

Table 2: *Lachman & Pivot Shift test preoperative vs post-operative.*

Lachman test grade	Preoperative	Postoperative
Negative	01	52
1+	19	01
2+	30	00
3+	03	00
Pivot shift test	**Preoperative**	**Postoperative**
Negative	21	53
Positive	32	00

Table 3: *Functional Outcome*

Functional Outcome	Mean	SD	Min	Max	*p- value*
Pre- IKDC	29.2	1.3	27	31	
Post- IKDC	93.4	1.3	91.0	96	<0.05
AOFAS	98.0	0.8	96.0	99.0	

Discussion

Our results showed favorable outcomes following ACLR using PL double-bundle Autograft one year post-operatively. There have been multiple previous studies demonstrating the functional outcome using other grafts such as the Hamstring tendon, Bone patellar-bone tendon (BPTB) and the synthetic grafts each having their merits and demerits.

The Bone-patellar-tendon-bone graft is to date still considered the gold standard for ACLR, owing to its relative ease of harvest, bigger size, better strength and good bone to bone healing.[9] A ten-year clinical study of ACLR using BPTB press-fit fixation, showed the subjects to have stable knees and high participation in contact sports such as soccer.[10] Thus, the choice of graft for ACL in high demand sports players is the BPTB. The demerits of this graft are difficulty in harvesting of graft in patients with osteoporotic bone, anterior knee pain following the harvest, numbness around knee, quadriceps weakness, iatrogenic fracture of patella and donor site morbidity. This makes it a less favorable choice in patients with occupation requiring frequent kneeling. In a study by Muller et al. there was donor site discomfort in 57% of the patients undergoing ACLR using the BPTB graft[11] where as Kartus et al. showed that 65% of their patients had difficulties with knee walking at 2 years post-operatively.[12] In contrast, these complications are avoided when using the PL autograft, with the added benefit of showing similar and comparable functional outcomes. In a local study in 2022,[13] the outcomes between PL and BPTB grafts for ACLR in 30 patients were compared and the results showed comparable functional outcome of both techniques with less operative time for the PL due to shorter harvesting time. The study also showed greater average diameter of 8.4mm of PL graft in contrast to 8.1mm of the BPTB graft. Studies have shown that there is a positive correlation between 1 mm increase in graft diameter and higher IKDC score.[14] Hamstrings tendon (HT) is also a popular choice for an autograft among the surgeons performing ACLR.[15] Following its harvest from the knee, it carries potentially the same disadvantages as those of BPTB and Quadriceps tendon including knee laxity and quadriceps-hamstring imbalance. When comparing the tensile strength of four strand HT with PL graft of same cross-section, Rudy et al. reported no significant difference (405.8 N ±202.9 N vs 446.1 N ± 233.2 N).[16] A systematic review and meta-analysis comparing the functional outcomes following ACLR using PL and HT graft demonstrated that the PL has comparable results with HT in terms of functional outcome and graft survivorship, and concluded the PL to be a suitable donor for ACLR outside of the knee, thus avoiding the complications following harvest from the knee.[17] The only concern following the PL harvest was a slight decrease in AOFAS score although it was statistically insignificant. Our study demonstrated an excellent AOFAS score at one-year follow-up of 98±0.8. This shows that PL has minimal donor site morbidity when compared to other grafts. A longer

follow-up and a larger study subjects may further improve our understanding in regards to graft selection when performing ACLR.

Conclusion

Our study concluded that Arthroscopically assisted ACL reconstruction with peroneus longus autograft using endobutton and bioabsorbable interference screw provides a stable graft and enables early rehabilitation. Graft fixation using endobutton and bioabsorbable screw provides good graft to bone healing. It allows the patient to return to pre-injury level of activity, allows the patient to sit cross legged, climb stairs, play sports and to perform the activities of daily living without any difficulty. The Harvest of the PL does not have any side-effects on the gait of the patient nor on the stability of the ankle joint. Thus, making it a suitable choice for ACLR.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

ARH: Conceptualization of Project
SA, AH, AA, JAC: Data Collection
ARH: Literature Search
AS: Statistical Analysis
ARH: Drafting, Revision
MMBK: Writing of Manuscript

Socio-Economic Impact of COVID-19 Pandemic Among Lower Income Group of People in Pakistan

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Abstract

Objective: To determine the Socio-economic Impact of COVID-19 Pandemic among lower income group of people in Lahore, Pakistan

Material and Methods: An analytical cross-sectional study design was used for conducting this research from April 2021 to September 2021 in Lahore and a self-structured questionnaire with multiple variables was filled by 274 participants. Non- Probability type of convenience sampling technique was used for data collection after informed consent. This paper was structured into two sections: The initial part addressed the socio-economic challenges experienced by impoverished individuals amidst the coronavirus pandemic. The subsequent section assessed the current state of Pakistan's healthcare system. Chi-square test was used for qualitative data analysis and p-value <0.05 was taken as significant.

Results: Most of the participants (65.7%) in this survey were males and had an income of up to Rs.20,000/ month (70.1%).Out of total, 254 (92.7%) respondents had profound impact of Covid-19 on their lives economically. Majority of them 152(55.5%) visited public places while 133(48.5%) avoided social gatherings like marriages, funerals, religious events etc. during pandemic. More than half of the participants agreed that hospital beds and oxygen were neither available nor it was affordable during their stay at hospital. A significant association was found between family income of respondents and financial crisis faced by respondents when sick with covid-19(p-value=0.05), monthly income suffered due to lockdown or decrease in economy (p-value=0.04) and loan was taken to fulfill their household needs during pandemic (p-value=0.00).

Conclusion: The study showed that 254 (92.7%) respondents had profound impact of Covid-19 on their lives economically. A significant association was found between family income of respondents and financial crisis faced by respondents when sick with covid-19, monthly income suffered due to lockdown or decreases in economy and loan taken to fulfill their household needs during pandemic.

Keywords: Socio-economic, impact, pandemic, lower income group

How to cite: *Qureshi I, Manzoor I, Muzammil Z, Muzammil Z, Karamat H, Mubashar Z. Socio-Economic Impact of COVID-19 Pandemic Among Lower Income Group of People in Pakistan. Esculapio - JSIMS 2023;20(01): 54-60.*

DOI: https://doi.org/10.51273/esc24.251320111

Introduction

The outbreak of Covid-19 had a detrimental impact on global healthcare systems with a ripple effect on every aspect of human life.[1] In a response to flatten the curve, governments have enforced border shutdowns, travel restrictions and quarantine in countries which constitute the world's largest economies.[2] The health of people and economies go side by side to either flourish or collapse.[3] Public health is closely concerned with economic welfare and economic growth.[4] As per latest estimates, world's economy is predicted to decline by 5.2 percent and world trade by 13-32 percent in 2020 due to pandemic.[5] The COVID-19 pandemic has caused unparalleled disruptions to the world's economies, resulting in income reduction and elevated

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Submission Date: 03-01-2024
1st Revision Date: 16-01-2024
Acceptance Date: 13-03-2024

unemployment rates.[6] Over half of the job losses were experienced by workers earning in the bottom quarter of weekly incomes.[7] It is expected that in less developed countries with an extended lockdown, the effects on the tens of millions of individuals living in poverty might be significantly harsher compared to those facing disadvantages in more developed nations like Germany and the US, where stronger government assistance is likely available.[8]

According to International Labor Organization (ILO), almost 25 million people around the globe could lose their jobs (loss of workers' income of as much as USD 3.4 trillion) due to this pandemic and it is pushing about 40–60 million people into extreme poverty. In light of the current crisis and subsequent lockdown measures in Pakistan, the anticipated unemployment rate is projected to escalate to 8.1% for the fiscal period of 2020–21.[3,9] One of the consequences of this global economic depression can be seen in the increase in prices of food items and other routine household utilities.[10] Additionally, the economic toll on the trade and travel sectors, pivotal elements of the global supply chain, amounts to trillions and continues to increase.[11] As a result, the cessation of business operations has led to a loss of livelihoods and a rise in unemployment rates, contributing to a 1% decrease in global GDP. This decline has subsequently caused significant hardship for impoverished and vulnerable populations in both urban and rural settings.[12] The challenges of rising health care costs and market power have forced the most vulnerable groups in the country, even harder to restrain a normal life.[13] Social distancing has emerged as a universally implemented preventive measure, playing a crucial role in mitigating the spread of Covid-19. Nonetheless, an examination of socioeconomic and demographic variables underscores a disparate impact of Covid-19 across various segments of the population.[14] Research conducted in New York City demonstrates that Covid-19 disproportionately affects poorer residential areas with lower average incomes, placing them at a heightened risk of infection compared to higher-income locales. These areas experience significantly elevated infection rates, highlighting a broader trend where communities with lower socioeconomic status are more vulnerable. This vulnerability is exacerbated by the scarcity of healthcare services in developing nations, such as India, Pakistan, Bangladesh, and others, further elevating the risk for residents in these socioeconomically disadvantaged areas.[15] This study was undertaken to assess the economic and social impacts of Covid-19 on lower-income groups in Pakistan, aiming to provide recommendations based on its findings. The goal is to assist policymakers in formulating effective response plans and strategies to address the challenges posed by the pandemic within these communities.

Material and Method

This study was conducted from April 2021 to September 2021 and the data was collected from lower income group (income <30,000 Rs/month) of people living in Lahore, Pakistan. An analytical cross-sectional study design was used for conducting this research and a self-structured questionnaire with multiple variables was filled by the participants. Non- Probability type of convenience sampling technique was used for data collection. A sample size of 240 was calculated with the help of WHO sample size calculator with 20% prevalence of financial insecurities among people and by keeping 95% confidence level with 5% margin of error. Those persons who were above 20 years of age, belonged to lower income group (family income less than Rs.30, 000/month) and willing to participate were included in this survey. The gathered data was processed, coded, and analyzed using SPSS version 23. Qualitative information was displayed through frequency tables, bar charts, and pie charts. Meanwhile, quantitative variables were examined using means and standard deviations. IRB approval was taken from Akhtar Saeed Medical and Dental College before data collection. Informed consent was taken from the participants and their confidentiality was maintained during and after the survey. The Chi-square test was utilized, with a p-value of less than 0.05 considered statistically significant.

Results

This study included 274 participants and the mean age of the respondents was 34.6 ± 9.8SD. Out of total, 180 (65.7%) were males and the rest were females. Fifty eight (21.2%) of the total respondents were casual workers or clerical staff, 15(5.5%) were construction workers, 26(9.5%) were drivers, 65(23.7%) were maids, 29(10.6%) were plumbers or electrician, 42(15.3%) were salesmen or security guards and 39(14.3%) were gardeners or waiters. Out of total, 228(83.2%) were married. Out of 274 total respondents, 144(52.6%) had primary education, 70(25.5%) were matric, 39(14.2%) were intermediate and 21(7.7%) were bachelors or above. Among 274 respondents, 75(27.4%) had family

income per month of less than Rs. 10,000, 117(42.7%) had income of Rs.10, 001-20,000 while 82(29.9%) had income of Rs. 20,001-30,000. Out of total, 152(55.5%) were living as a nuclear family while the rest were living as an extended family.

To assess the economic impact of pandemic on lives of respondents, 254(92.7%) out of total, were reported to had a serious impact of Covid-19 pandemic on their lives. Among 274 respondents, 232(84.7%) had effects of pandemic on their jobs and 101(43.6%) among them had lost their jobs. Out of those 42(15.3%) respondents who reported no effects of pandemic on their job, 20 (47.6%) among them still had fear of losing job. Out of total 274, monthly income of 234(85.4%) respondents suffered due to lockdown or decrease in economy. Out of total, 133(48.5%) respondents were given leaves by their organizations during pandemic and 40(30%) among them were given paid leaves. Out of 274 respondents, only 53(19.3%) said that their household monthly expenses were easily fulfilled during pandemic. Among 137(50%) respondents who took loan to fulfill their household needs during pandemic, 65(47.5%) took loan from their relatives, 39(28.5%) from their friends and 33(24%) respondents took loan from their employer (Table 1).

Table 1: *Economic impact of Covid-19 pandemic on life of respondents*

Variable	Frequency (n=274)	Percentage
Economic impact of pandemic on life		
Yes	254	92.7
No	20	7.3
Effects of pandemic on job		
Yes	232	84.7
No	42	15.3
If yes (n= 232), then jobs lost by respondents		
Yes	101	43.6
No	131	56.4
If no (n= 42), still had fear of losing job		
Yes	20	47.6
No	22	52.4
Income suffered due to lockdown or decrease in economy		
Yes	234	85.4
No	40	14.6
Leaves given during pandemic by their organizations		
Yes	133	48.5
No	141	51.5
If yes(n= 133), then paid leaves given		
Yes	40	30
No	93	70
Household monthly expenses easily fulfilled during pandemic		
Yes	53	19.3
No	221	80.7
Loan taken by respondents to fulfill household needs		
Yes	137	50
No	137	50
If yes (n=137), then from;		
Relatives	65	47.5
Friends	39	28.5
Employer	33	24

To assess the social impact of Covid-19 on lives of people it was observed that 134(48.9%) of the total respondents visited their family and friends regularly during this pandemic. However, 152(55.5%) of the total 274, avoided going out to public places like shopping malls, parks, mosques etc. Among total respondents, 133(48.5%) avoided social gatherings like marriages, funerals, religious events etc. during pandemic. While 177(64.6%) of the total respondents, felt socially isolated or depressed due to pandemic. Among 274 respondents, 206(75.2%) followed SOP's set by the government like wearing mask etc. Out of total 274, 156(56.9%) were vaccinated for Covid-19 and 124 (45.3%) of the total respondents, reported death due to Covid-19 in their family or friends.

Table 2 showed those respondents who got sick with Covid-19 and were suffered financially as well as socially during this pandemic. Among total 274, 237(86.5%) respondents gave history of flu or fever during past one year. Out of total, 192(70.1%) respondents were reported to have their Covid-19 test done and among them, 123 (64%) had their test done free of cost, 51(26.6%) paid less than Rs. 10,000 and only 18(9.4%) respondents paid Rs. 10,001-20,000 for Covid test to be done. Out of those 192 who were tested for Covid-19, 173(90.1%) respondents isolated themselves when detected positive and family members of 154(8.2%) quarantined themselves. Out of 192 respondents who were detected positive for Covid-19, 121(63%) were hospitalized and 106(87.1%) among them were hospitalized in Government hospitals while the remaining 15(12.4%) were admitted in private hospitals. Out of 121 who were admitted in hospital, beds and oxygen were easily available to only 56(46.3%) and 61(50.4%) respondents among 121 reported that they were affordable as well. Among

121 respondents who were admitted in hospital, 60 (49.6%) were admitted in ICU and 41(68.4%) among them had to go on ventilator. Among 121 respondents, cost of medication during their stay at hospital was reported to be Rs.10,001-25,000 by56(46.3%) respondents, Rs.25,001-50,000 by 29(24%) respondents, Rs. 50,001-75,000 by 21(17.4%) respondents and more than Rs.75,000 by rest of them.

Table 2: *Socio-economic impact on sufferers of Covid-19 pandemic*

Variable	Frequency (n= 274)	Percentage
History of flu or fever during past one year		
Yes	237	86.5
No	37	13.5
Covid-19 test done due to illness		
Yes	192	70.1
No	82	29.9
If yes (n=192), then cost paid for Covid-19 test		
Free testing done	123	64
Less than Rs. 10,000	51	26.6
Rs.10,001-20,000	18	9.4
Respondents who isolated themselves when tested positive (n=192)		
Yes	173	90.1
No	19	9.9
When detected positive for Covid (n=192), family members of respondents quarantined		
Yes	154	80.2
No	38	9.8
History of hospitalization due to Covid - 19 while sick (n=192)		
Yes	121	63
No	71	37
If yes (n=121), then admitted in		
Government hospital	106	87.6
Private hospital	15	12.4
Oxygen and beds easily available in hospital (n=121)		
Yes	56	46.3
No	65	53.7
Affordability of beds and oxygen in hospital (n=121)		
Yes	61	50.4
No	60	49.6
Admission in ICU while sick(n= 121)		
Yes	60	49.6
No	61	50.4
If yes (n= 60), then need of ventilator due to severe illness		
Yes	41	68.4
No	19	31.6
Cost of medication during hospital stay(n=121)		
Rs. 10,000-25,000	56	46.3
Rs.25,001-50,000	29	24
Rs.50,001-75,000	21	17.4
More than 75,0001	15	12.3
Hospital expenses borne by employer/organization(n=121)		
Yes	40	33
No	81	67
Loss of job while suffering from Covid-19 (n=192)		
Yes	70	36.5
No	122	63.5
Re-employment/new job after recovery from disease(n=70)		
Yes	55	21.4
No	15	78.6
Salary deducted while on leave due to illness(n=192)		
Yes	129	67.2
No	63	32.8
Financial crisis faced by respondents when sick(n=192)		
Yes	177	92.2
No	15	7.8

Table 3 showed a significant association between family income per month of respondents and financial crisis faced by respondents when sick with covid-19(p-value = 0.05), monthly income suffered due to lockdown or decrease in economy (p-value=0.04) and loan taken to fulfill their household needs during pandemic (p-value = 0.00). A significant difference was also observed between family income and paid leaves given by their respective organization (p-value=0.003), those who regularly visited their family and friends (p-value = 0.03), those who were vaccinated for covid-19 (p-value = 0.05) and those respondents who still had fear of losing job due to pandemic (p-value=0.028).

Discussion

This study was carried out among lower income class in Pakistan to assess the economic and social impacts of Covid-19 on their lives. Out of 274 respondents in this study, 254 (92.7%) had profound impact of Covid-19 on their lives economically. Whereas in another survey carried out in Belgium employees, out of 3821 respon-

Table 3: *Bivariate analysis of family income per month and socio-economic impact of pandemic*

Variable	Family income in rupees per month			P-value
	Less than Rs. 10,000	Rs. 10,001-20,000	Rs. 20,001-30,000	
Financial crisis faced by respondents when sick due to Covid-19(n=192)				0.058*
Yes	49	74	54	
No	3	6	6	
Monthly income suffered due to lockdown or decrease in economy (n=274)				0.049*
Yes	61	107	66	
No	14	10	16	
Loan taken to fulfill household needs during pandemic(n=137)				0.005*
Employer	10	17	6	
Friends	8	18	13	
Relatives	18	30	17	
Paid leaves given by organization during pandemic(n=133)				0.003*
Yes	5	23	12	
No	23	49	21	
Visited family or friends regularly during pandemic(n=274)				0.033*
Yes	32	52	50	
No	43	65	32	
Vaccinated(2doses) for Covid-19(n=274)				0.052*
Yes	34	70	52	
No	41	47	30	
Fear of losing job due to pandemic (n=42)				
Yes	3	6	11	0.028*
No	4	12	6	

dents, 1051 had economic impact of Covid-19 on their lives while 2770 had no effect.[16] Out of 274 respondents during this survey, 232 (84.7%) responded that Pandemic had effected their jobs whereas 42(15.3%) had no effect on job. While in another survey carried out in Belgium employees, out of 3821 respondents, 1284 reported that pandemic had affected their job.[16]

In this survey, out of 232 respondents whose jobs were effected due to Pandemic, 101 (43.53%) had lost their jobs. In a study conducted in America, out of 587 participants,14.5% lost their job due to Covid-19.[17] Out of 274 respondent in this study, only 133 (48.5%) were given leaves by their respective organization during this Pandemic and among them, 40(30%) respondents were given paid leaves by their organization. Whereas, in a global survey during Covid-19, out of 29 countries, 27 countries gave paid leaves while 2 countries did not give paid leaves during the Pandemic.[18] In this survey, out of 274 respondents, only 53(19.3%) had easily fulfilled their household monthly expenses. Whereas, in another survey carried out in Australia, out of 2375 respondents, 808 had easily fulfilled household monthly expenses.[19] Out of 274 respondents in current study, 177(64.6%) were socially isolated or depressed and 97(35.4%) were not socially isolated or depressed. Contrary to this, in another research conducted in Shenzhen China, out of the 340 participants, 284(83.53%) reported no depression whereas 41(12.06%), 11(3.24%), 2(0.58%) and 2(0.58%) pointed to mild, moderate, moderately severe and severe levels of depression.[20]

Among the 121 participants who were hospitalized, 56 (46.3%) reported easy access to oxygen and hospital beds. Conversely, another study conducted in England noted that bed capacity surged by an additional 2,711 beds, marking a 53% increase from the baseline figure of 4,123 beds.[21] Out of the 121 respondents who were hospitalized, hospital expenses of 40(33%) were borne by their employers/organization while expenses of 81(66%) were not borne by their concerned organization. In Singapore, the government covers hospitalization costs for all patients, regardless of their nationality. In Japan, hospitalization expenses are managed through a combination of regular financing mechanisms and contingency funds. Meanwhile, Hong Kong addresses these costs through existing financing structures that fully cover the required care.[22]

Out of the 192 respondents who were tested positive for Covid-19, 70(36.5%) lost their jobs due to Covid-19 and among them 55(78.6%) got a new job after recovery. However, in another research carried out on Hispanic adults, 68.8% Hispanic non-citizens, 49.1% Hispanic Citizens, 38% non-Hispanic whites and 40.7% non-Hispanic blacks lost their jobs due to Covid-19.[23] Out of the 192 respondents who were tested positive for Covid-19, salary of 129(67.2%) was deducted when they were on sick leave. However in another research conducted at New Delhi, India, out of 245 respondents, only 58(23.6%) reported deduction in salary.[24] Out of the 192 tested respondents who were tested positive

for Covid-19, 177(92.2%) suffered from financial crises while they were sick. However in a research conducted at Bangladesh, out of total 465 respondents, majority of respondents (67.5%) reported obstacles faced in income and consumption in daily life during the Covid-19 pandemic. The most serious issue was losing their jobs (49.5%) as a result of the pandemic. In total, 52.3% of respondents reported that even their basic needs were not being fulfilled.[25]

Conclusion

Covid-19 has a profound impact on everyone's life socially and economically but its main victims are those from lower socio-economic class. In this survey, majority of the participants (92.7%) agreed that Covid-19 had great economic impact on their lives and many of them lost their jobs (43.6%) due to pandemic. Most of them (80.7%) were not able to fulfill their monthly expenses and 92% of them badly suffered from financial crisis when they were sick during this pandemic. Majority of them visited public places and did not avoid social gatherings. More than half of the participants agreed that hospital beds and oxygen were not available neither they were affordable during their stay at hospital.

Conflict of Interest: *None*

Source of funding: *None*

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Authors Contribution

IQ, IM, ZM: Conceptualization of Project
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ZM, IQ, ZM: Literature Search
IQ, ZM: Statistical Analysis
ZM: Drafting, Revision
IQ, IM: Writing of Manuscript

Comparing Carotid Artery Stenting and Carotid Endarterectomy in Symptomatic and Asymptomatic Carotid Stenosis

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Abstract

Objective: In patients with symptomatic and asymptomatic carotid artery stenosis, this retrospective observational study compared the clinical outcomes and side effects of carotid endarterectomy (CEA) with carotid artery stenting (CAS). The study took patient-specific risk variables into account and concentrated on major adverse cardiovascular events (MACE), such as myocardial infarction (MI), stroke, readmission, and death.

Material and Method: This was a retrospective observational study carried out at Vascular Surgery Department and Interventional Radiology department of two tertiary care hospitals in Rawalpindi, from Jan 2022 to March 2023. With a 30-day follow-up, 60 patients from two Pakistani tertiary care centres underwent either carotid end arterectomy and carotid artery stenting were included. Patient having asymptomatic and symptomatic carotid disease were selected for the procedure. The impact of risk factors on procedural success and development of major adverse cardiovascular events (MACE) was examined in the study. Data regarding 30-day postoperative parameters of the procedure were collected and evaluated. $p< 0.05$ is considered significant.

Results: The majority of patients in our series were males 46(77%) compared to 14(23%) females in the study. There were no intraoperative mortalities in our patients. The mortality rate of CAS alone was 1(1.66%). Four patients developed complications. Three in CAS group and 1 in CEA group. Comorbidities were present in 46(77%).

Conclusion: Compared to CEA, CAS is linked to a greater risk of stroke or mortality in patients with symptomatic carotid stenosis within 30 days of treatment. Patients' unique characteristics, age, comorbidities, and previous surgical experiences should guide the choice of treatment.

Keywords: carotid stenting, carotid stenosis, carotid artery disease, stroke

How to cite: *Khan R, Mughal UJ, Bhatti AM, Saif AB, Badshah A, Nofal S. Comparing Carotid Artery Stenting and Carotid Endarterectomy in Symptomatic and Asymptomatic Carotid Stenosis. Esculapio - JSIMS 2023;20(01): 61-66.*

DOI: https://doi.org/10.51273/esc24.251320112

Introduction

Stroke is the third leading cause of mortality. Approximately 80 to 85% strokes are ischemic due to carotid artery stenosis (CAS). The prevalence of significant CAS is 7% in women and 9% in men.[1] Ischemic stroke is the most common type of cerebrovascular disease; 15–20% of ischemic strokes are caused by atherosclerotic carotid artery stenosis, especially in the internal artery. About 0.5% of people between the ages of 60 and 79 and 10% of patients 80 years of age and older have significant carotid artery stenosis. The majority of patients don't exhibit any symptoms. The term "symptomatic carotid artery stenosis" refers to internal carotid artery stenosis that is accompanied by ipsilateral carotid lesions and cerebral symptoms. Patients with symptomatic carotid artery stenosis have an elevated risk of recurrent cerebrovascular episodes, and it is a significant

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Submission Date:	14-01-2024
1st Revision Date:	05-02-2024
Acceptance Date:	07-03-2024

cause of ischemic stroke. For almost 60 years, the most effective treatment for symptomatic severe carotid artery stenosis has been carotid endarterectomy. Because carotid artery stenting (CAS), also known as carotid artery stent implantation, is less intrusive than carotid endarterectomy and has a lower risk of cardiac damage and fewer surgical complications, it has grown fast over the past 30 years and is becoming more common.[2]

An alternative to carotid revascularization is carotid artery stenting (CAS), particularly for patients who are at high risk of carotid endarterectomy (CEA). Despite the fact that numerous research have tried to assess the safety and effectiveness of CAS, there is variation in the incidence of perioperative stroke and death in these trials, given the variations in the 30-day even or in-hospital rates reported.[3] As people age, the predicted prevalence of stroke rises. About 2.8% of people over the age of 18 in the general population had experienced a stroke in 2014. In addition, 795,000 or more Americans experienced a new or recurrent stroke per year, with ischemic stroke accounting for approximately 87% of all stroke cases in the US. Globally, 6.5 million people died from strokes.[2] Reduced rates of myocardial infarction (MI) and cranial nerve damage were noted with CAS, but there was no significant difference in the 30-day stroke and death rates linked to CAS and CEA, according to a new meta-analysis. A very large registry's findings indicated that younger patients had the best benefits from CAS when they had severe stenosis and were at high surgical risk.[4] Several studies have reported that CAS is associated with greater risk of stroke or death within 30 days of treatment than that with CEA.[5]

Significant correlations have been shown between congestive heart failure (CHF), cardiac mortality, cardiac arrhythmias, and myocardial infarction (MI). These are known as major adverse cardiac events, or MACEs. Due to the systemic nature of atherosclerosis, patients who have had a CEA are therefore at greater risk of long-term mortality and perioperative cardiovascular risk in comparison to the general population.[6]

Asghar U, calculated mean rate of stroke for CEA group was 3.24±2.35 and average rate of stroke in CAS was 5.32±4.09. The average length of stay was 2.86±1.32 and 2.74±1.98 (p= 0.823). The results of the studies have shown that in angioplasty group the odds of restenosis were 1.8 times higher as compared to endarterectomy.[7] There is very limited data available comparing the incidence of MACE in symptomatic and asymptomatic patients of carotid artery stenosis undergoing carotid endarterectomy and carotid artery stenosis in Pakistan. The rationale of the study is to compare the incidence of MACE including MI and stroke in post-operative period (30 days after the procedure) in patients with symptomatic and asymptomatic carotid artery stenosis undergoing either carotid endarterectomy (CEA) or carotid artery stenting (CAS).

Material and Method

This was a retrospective observational study carried out at Vascular Surgery Department and Interventional Radiology department of two tertiary care hospitals in Rawalpindi, from Jan 2022 to March 2023. The study was commenced after approval from institution ethical committee. Sample collection was done by non-probability consecutive method.

Inclusion Criteria: All the patients aged between 40 and 90 years with symptoms of transient ischemic attacks with concurrent stenosis of more than 50% ICA on ipsilateral side confirmed by ultrasound doppler or Computed tomography angiogram warranting any intervention were included in the study. Moreover, patients who had no symptoms of TIA with stenosis of more than 60% and referred by neurologist owing to high risk of future strokes were also included.

Exclusion criteria. Patients with debilitating strokes, bed bound or those with auto-immune disorders or prior neck radiation exposure were excluded from study. The patient records were analyzed in retrospect. Presenting symptoms or those asymptomatic but had been discussed in MDT and deemed to benefit from intervention were recorded. In addition co-morbid conditions and time of onset of symptoms were also seen. Moreover, demographic data as age, percentage stenosis and other co-morbids were noted. Data was extra plotted in predesignated Performa. The surgical procedure or stenting were performed by a team of trained vascular surgeons and interventional radiologists under Local or regional anaesthesia. Post operatively patients were closely followed for 1 month to assess the complications during that period. Major cardiovascular adverse events were noted at end of 1 month. Statistical Package for Social Sciences (SPSS) version 21 was used for data analysis. Descriptive statistics were used to calculate mean and standard deviation for age, frequencies, and percentages for gender. Chi square test was applied to ascertain significance in of weather conditions on ALI presentation keeping p-value<0.05.

Results

A total of 60 cases participated in the study 30 in each group. The mean age of participants was 68.45 ± 6.5 years ranging from 56 to 82 years. There were 46 (76.7%) males and 14 (23.3%) females in study. The mean stenotic percentage based on NASCET classification of all patients was 69.35 ± 10.72 % with minimum stenosis 55% and maximum 95%. Co morbidities were present in 46 (76.6%) patients. The most common co-morbid in patients was diabetes 25 (41.7%), hypertension in 21(35%), Ischemic heart disease in 16 (26.7%), chronic obstructive pulmonary disease in 8 (13.3%), Chronic kidney disease in 8 (13.3%) and anemia in 10 (16.7%) patients. A total of 12 (20%) patients were asymtomatic and 48 (80%) were symptomatic. The further distribution of these variables in groups is shown in table I.

Table 1: *Demographic characteristics between different groups (n=60)*

S. no	Variable	CAS Group n= 30	CEA Group n=30	p value
1	Age	68.03±6.32	68.87±6.756	0.624
2	Gender			
	Male	23(76.7%)	23(76.7%)	1.000
	Female	7(23.3%)	7(23.3%)	
3	Percent stenosis	78.87±10.523	67.83±10.88	0.277
4	Co-Morbidities			
	No	6(20%)	8(26.7%)	0.542
	Yes	24(80%)	22(73.3%)	
5.	Diabetes Mellitus			
	No	16(53.3%)	19(63.3%)	0.432
	Yes	14(46.7%)	11(36.7%)	
6.	Hypertension			
	No	17(56.7%)	22(73.3%)	0.176
	Yes	13(43.3%)	8(26.7%)	
7.	Ischemic heart disease			
	No	23(76.7%)	21(70%)	0.488
	Yes	7(23.3%)	9(30%)	
8.	COPD			
	No	26(86.7%)	26(86.7%)	1.000
	Yes	4(13.3%)	4(13.3%))	
9.	Chronic Kidney Diseas			
	No	26(86.7%)	26(86.7%)	1.000
	Yes	4(13.3%)	4(13.3%)	
10.	Anemia			
	No	24(80%)	26(86.7%)	0.488
	Yes	6(20%)	4(13.3%)	
11.	Symtomatic			
	No	7(23.3%)	5(16.7%)	0.748
	Yes	23(76.7%)	25(83.3%)	

There was no per-operative mortality or complication during the study. However, post-operatively there were a total of 4 (6.7%) patients in whom there were complications and one patient of CAS group died (1.66%). There were 3 (10%) complications in CAS Group and 1(3.3%) in CEA Group. This difference was insignificant (p value= 0.612). Further distribution of various complications is given in figure 1. The patients were closely followed for a month after discharge and there were no re-admissions. One mortality was due to massive stroke post operatively and his age was 79 years. The patient himself opted for stenting and had hypertension and chronic kidney disease. All patients who had complications were over 70 years of age.

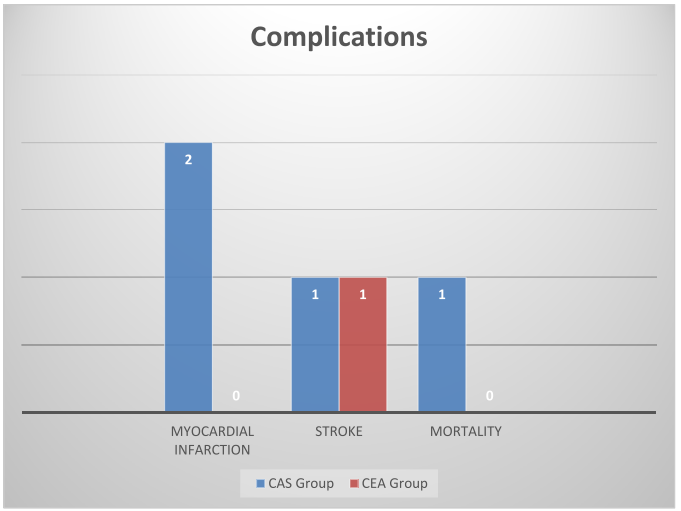

Figure 1: *Showing proportion of various complications in the two groups throughout study (n=4)*

Discussion

The rate of bleeding complications post operatively was nearly same in both the procedures 1.667% and 1.667% in CEA and CAS respectively. The rate of cranial nerve palsy was lesser in CEA 1.667% as compared to CAS being 3.33% post operatively that showed the CEA being superior in this particular area. Kakkos SK In our meta-analysis, CNI at 30 days was significantly lower for CAS compared with CEA (0.11% vs 3.21%, respectively), which has been also observed in a meta-analysis of mainly symptomatic patients.[8] The duration of hospital stay was however longer in CEA mean being 3.33days and compared to hospital stay for CAS being 3.133days on average for each patient owing to invasive nature of carotid endarterectomy.

Post op stroke rate was higher in CAS patients i.e. 10% as compared to 0% in CEA. While post op MI rate is 9.09% in CAS patients as compared to only 10% in

CEA, which proves that in patients with lacunar strokes Endarterectomy should be opted for as a more beneficial procedure. According to Vouyouka et al., compared to women who had CEA, CAS patients had a 2.39-fold greater rate of in-hospital postoperative stroke or death following risk adjustment.[9]

In case of CEA the rate of MI within 24 hours of procedure was 3.33%in CEA, in case of CAS it was 3.33%, evaluated on the basis of series of ECG clinical symptoms and trend of cardiac markers, which is same. The rate of stroke within 24 hours was 3.33% in CEA and 3.33% in CAS evaluated on the basis of series of CT brain for detection of minute strokes by neurology team. The rate of MI within 30 days was 3.33% and 6.667% in CEA and CAS respectively which is higher in case of CAS. Cremonesi A study showed that among 2397 patients, 31% of them being symptomatic, the 30-day rate of composite stroke, MI, or death was 2.25%. Stroke, MI, and death were encountered in 1.71, 0.02, and 0.40%, respectively.[10]

The rate of stroke within 30 days was 3.33% and 6.66% in CEA and CAS respectively. Which is again higher in case of CAS. Kyla M. Bennett the 30-day combined incidence of stroke, death, or MI for women undergoing CAS in this analysis was 6.8% compared with an incidence of 3.8% in women undergoing CEA[11]. Mandy D. Muller in symptomatic carotid stenosis, CAS was associated with a higher risk of death or stroke within 30 days of treatment (periprocedural period; OR, 1.70 [95% CI, 1.31–2.19]; P<0.0001, I2=5%; 10 trials, 5396 participants) compared with CEA.[12] According to Yuan G, CAS is associated with higher risk of stroke but lower risk of MI than those with CEA. Both procedures appeared equivalent in terms of the risk of death. Unlike our study which shows more mortality rate in case of CAS.[13]

In younger age groups mortality rate of CEA is lower as compared to older age groups. As the age progresses the success rate of carotid endarterectomy is showing a decreasing trend so it should be preferred in patients of younger age group where it gives better and long lasting results. Voeks GH study shows patients 70 years and older, the risk of events in CAS-treated patients was approximately twice that for CEA-treated patients (hazard ratio, 2.04; 95% CI, 1.48 –2.82) which is similar to our study.[14]

Out of total 60 patients,27 patients were diabetic and 13 patients underwent CEA and 15 patients underwent CAS. The mortality rate in these CEA patients was 7.69 and in case of CAS was 6.67, stroke rate in CEA patients was 7.69and CAS was 6.67, MI rate in CEA patients was 0% and CAS patients was 0%.This clearly shows that CAS proved to have somewhat better outcomes as compared to CEA in this particular scenario. Cremonesi A study shows age and diabetic status were found to be the only significant independent risk predictors and stroke rates below 2.6%were found in all subgroups, including symptomatic octogenarians[10].

Out of total 60 patients,25 patients were hypertensive and 10patients underwent CEA and 15 patients underwent CAS. The mortality rate in these CEA patients was 10%and in case of CAS was 6.66%, stroke rate in CEA patients was 10%and CAS was 6.66%,MI rate in CEA patients was 0%and CAS patients was 0%.This also has better statistical outcomes for CAS as compared to CEA in terms of development of Major adverse cardiovascular events.

Out of total 60 patients, 6 patients were having either chronic Renal disease, chronic liver disease or chronic obstructive pulmonary disease and 2 patients underwent CEA and 4 patients underwent CAS. The mortality rate in these CEA patients was 50%and in case of CAS was 25%,stroke rate in CEA patients was 50% and CAS was 25%,MI rate in CEA patients was 0% and CAS patients was 0%.This also shows that CAS should be procedure of choice if patient has comorbids in addition to carotid artery stenosis. Out of total 60 patients, 7 patients were having heart disease and 3 patients underwent CEA and 4 patients underwent CAS. The mortality rate in these CEA patients was 33.3%and in case of CAS was 25%, stroke rate in CEA patients was 0% and CAS was 25%, MI rate in CEA patients was 33.3% and CAS patients was 0%.This also shows that CAS should be procedure of choice if patient has some heart issue because development of major adverse cardiovascular events is slightly more in case of CEA as compared to CAS if patient has some heart disease.

Out of total 60 patients,25 patients were having BMI more than 25 and 10 patients underwent CEA and 15 patients underwent CAS. The mortality rate in these CEA patients was 10% and in case of CAS was 6.67%, stroke rate in CEA patients was 0% and CAS was 6.66, MI rate in CEA patients was 10%and CAS patients was 0%.This indicates that in case of obese patients the success rate of both the procedures is comparable in terms of Major adverse cardiovascular events. Out of total 60 patients,19 patients were having Hb less than

10 and 6 patients underwent CEA and 13 patients underwent CAS. The mortality rate in these CEA patients was 16.66 and in case of CAS was 15.38, stroke rate in CEA patients was 16.66 and CAS was 15.38, MI rate in CEA patients was 0%and CAS patients was 0%. The results of both the procedures at compareable in terms of major adverse cardiovascular events.

The higher rates of post op complications like nerve palsies and readmission may be attributed to the fact that the patients allocated for CAS were to a greater extent high risk candidates, having multiple co morbids and declared unsuitable for surgery by pre anaesthesia assessment except for certain cases where CAS was delibrately chosen in surgically fit patients owing to non invasive nature.

Conflict of Interest *None*

Funding source *None*

Conclusion

Compared to CEA, CAS is linked to a greater risk of stroke or mortality in patients with symptomatic carotid stenosis within 30 days of treatment. Because many MAEs happen after discharge after CAS, particularly for symptomatic patients, this study highlights the need of disclosing 30-day outcomes in assessing postoperative MACEs after CAS. The patients who had uncontrolled diabetes or uncontrolled hypertension had more frequent MI, ipsilateral strokes and consequent deaths when subjected to carotid endarterectomy as compared to carotid artery stenting so in such patients carotid stenting should be considered preferable to avert the dangers general anesthesia and later ICU management, therefore decreasing the mortality post operatively.

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UJM, ABS: Literature Search
AMB, RK, ABS: Statistical Analysis
UJM, AMB, RK: Drafting, Revision
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Assessment of Understanding And Perception of Undergraduate Medical Students Regarding Medico-legal Autopsy

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Abstract

Objective: To address the declining interest in forensic medicine and contribute to curriculum improvements by identifying knowledge gaps and exploring perceptions of undergraduate medical students in Pakistan regarding autopsies. It seeks to investigate the impact of autopsy exposure on students' attitudes toward pursuing forensic medicine as a career.

Material and Methods: A cross-sectional study based on a questionnaire was conducted among 272 third and fourth-year MBBS students at a private medical college, over a six-month period.

Results: According to the results of this study, most of the of students correctly understand the basic purpose of forensic postmortem examination, which is to determine the cause of death. However, there are knowledge gaps in understanding the legal and procedural aspects of autopsy. Additionally, the study highlights the students' perception of autopsy, with a substantial portion feeling uncomfortable or considering it disrespectful to the body.

Conclusion: The findings provide insights into how the curriculum can be enhanced to prepare medical students for the ethical, emotional, and professional aspects of forensic pathology.

Keywords: Autopsy, forensic pathology, postmortem examination, medical education, medical students

How to cite: *Maqsood M, Butt MK, Adhami SUZ, Hafeez MH, Javaid T, Sardar H. Assessment of Understanding And Perception of Undergraduate Medical Students Regarding Medico-legal Autopsy. Esculapio - JSIMS 2023;20(01): 67-71.*

DOI: https://doi.org/10.51273/esc24.251320113

Introduction

Autopsy (Autos-self, opis-view) refers to the complete scientific scrutiny of a dead body consisting of both external and internal examination after opening the body, and collection of specimens for chemical and histological examination.[1] It can be used to establish the identity of the body and determine the cause, manner, mode and mechanism of death.[2] It also helps in evaluation of post mortem interval, fatal period as well as causative weapon, and plays an important role in clinical quality control and medical auditing, documentation and education.[3-5] It is divided into two categories: clinical and medico-legal autopsy. Medico-legal autopsy is the scientific study of a dead body done under the law of the state, conducted on the requisition of a legal authority responsible for the investigation of all sudden, suspicious or unnatural deaths.[6] In Pakistan, medico-legal autopsy is used to investigate only the deaths occurring in suspicious conditions and where foul play is suspected by a competent investigating officer under section 174 of Criminal Procedure Code (Cr.P.C) or section 176 Cr.P.C. conducted by a magistrate if death has occurred in police custody or to issue orders for exhumation.[7,8] It is to be conducted by an authorized medical officer appointed by the provincial government at an authorized health care centre.[9] All doctors are required to be proficient in autopsies as well as medico-legal examinations. To this end, undergraduate medical students in Pakistan are taught forensic medicine during the third year of teaching with 100 teaching hours, including practical

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Submission Date: 12-01-2024
1st Revision Date: 28-01-2024
Acceptance Date: 13-03-2024

aspects of Forensic Medicine and Toxicology, to equip the students with appropriate knowledge, skills and attitude.[10] Observation of forensic autopsies specifically provides an opportunity for students to learn about autopsy protocols, as well as the medico-legal and ethical issues concerned with death, and certification of death. The skills and attitude gained by observing autopsies allow them to cope with medico-legal issues properly when they enter the practical field.[11,12] Despite the established importance of autopsies in terms of clinical medicine, forensic medicine, and moreover as a learning tool, globally, clinical and medico-legal autopsy rates have been declining for the last few decades.[13,14] A major reason behind this is the lack of specialists in the field of forensic medicine.[15] While students show curiosity towards forensic medicine as a subject during their studies, they are less willing to pursue a career in forensic medicine.[16,17] The possible reasons for this phenomenon may include prevalent legislation, political, religious or financial factors.[18] This shortage of forensic specialists may also be due to the negative perception of autopsy by undergraduate medical students. There are many social stigmata surrounding postmortem examination which may lead students to have a skeptical view of forensic autopsy.[19] Observation of autopsies by undergraduates may also induce emotional reactions in them not compatible with their learning goals.[20] Students may feel that autopsy is disrespectful to the body, or they may consider it to be a dirty procedure.[21] Students may also be unwilling to conduct autopsies due to a lack of knowledge regarding medico-legal autopsy. This includes medical aspects such as the actual autopsy procedure, as well as legal aspects e.g. proper authorizations and protocols. Therefore students may also be reluctant to specialize in forensic medicine as they do not want to be involved in legal matters.[22,23] In light of the evidence given above, this study aims to assess the knowledge and perception of undergraduate medical students after exposure towards autopsy and its potential role in deterring students from specializing in forensic medicine.

In Pakistan, very few studies have so far been conducted regarding the knowledge and perception of undergraduate medical students. In this situation, it is imperative to conduct a study to assess these factors. The objective of the study is to ascertain the understanding and perception of medical undergraduates towards medico-legal autopsy.

Materials & Methods

A cross-sectional study based on a questionnaire was conducted among conducted among 272 students of third and fourth year MBBS medical students of Shalamar Medical & Dental College, Lahore, over a period of 2 months, where participants were selected by convenience sampling. The first seven questions assessed the knowledge of students while the remaining 12 questions assessed the perception of the students towards forensic autopsy.

We have included students who are currently enrolled in their third year and fourth year of MBBS, and ages between[20-25]. All genders will be included. Students who have not attended autopsy visits to King Edward Medical University, irrespective of age and gender, will be excluded. A self-administered, structured questionnaire written in English related to medico-legal autopsy designed to assess the comprehension, perception, and attitudes of the students of a medical college and the reasons indicating a decline in interest in the subject based on published research.[18,19,24,25] The questionnaire comprised of structured questions with regard to demographic data, the knowledge, perception, experience, and attitude of medical students regarding medico-legal autopsy. After IRB committee approval, students of the third and fourth of Medical College were approached and questionnaires were filled. The collected data was subjected to analysis by SPSS version 17.0 for calculating the frequency and percentage for significance at various levels.

Results

Among the total 272 students, 124 (46%) were male and 148 (54%) were female students. The number of third year students was 147 (54%) and that of fourth year students was 125 (46%) respectively. Out of 272 students, only 19 students observed 7 autopsies during his MBBS, 3 students observed 6 autopsies, 7 students observed 5 autopsies, 27 students observed 4 autopsies, 16 students observed 3 autopsies, 40 students observed 2 autopsies, 25 students observed a single autopsy, whereas 8 students were such who did not observe any autopsy throughout.

Frequency and percentage of responses of students regarding the different questions reflecting the knowledge and perception of the medical undergraduates towards forensic autopsy is as under.

Table 1: *Percentages of Students' Responses in the 'Yes' Category asked in the Questionnaire*

Sr. No.	Question	Yes/ response %
1	Is the chief objective of a medico-legal autopsy to determine the cause of death?	97
2	Is autopsy a legal requirement in case of all unnatural deaths occurring in suspicious circumstances?	75
3	Do you know who the authority to issue orders for autopsy in Pakistan is?	74
4	Is it necessary to take consent of the relatives to conduct a Medico- legal autopsy?	71
5	Can a Medico-legal autopsy be performed by any medical officer posted at any healthcare center?	90
6	Does postmortem involve both external & internal examinations?	82
7	Does postmortem involve collection of samples to be sent to a chemical examiner and histopathologist?	87
8	Do you think that autopsy helps in achieving the objective of solving crimes?	91
9	How many autopsies have you observed during your 3rd year of MBBS?	
10	Are the the number of autopsies you have observed is sufficient for learning purposes?	78
11	Do you think that teaching of autopsy in MBBS is beneficial for medical students?	78
12	Should the medical students watch the procedure of autopsy for learning purposes?	88
13	Did you feel comfortable while watching autopsy for the first time?	52
14	Do you think opening of a dead body is disrespectful to the body?	42
15	Would you like to opt for this subject in future as a career?	45
16	Do you dislike this subject as it does not deal with living persons?	28
17	Would you like to touch & dissect dead bodies?	45
18	Is autopsy an unpleasant job?	38
19	Would you like to go to court as a witness?	44

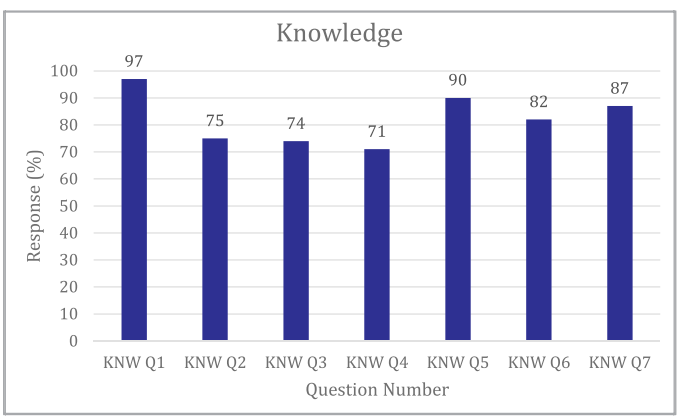

Fig-1: *shows Response Percentages of Each Question Regarding Knowledge of Students*

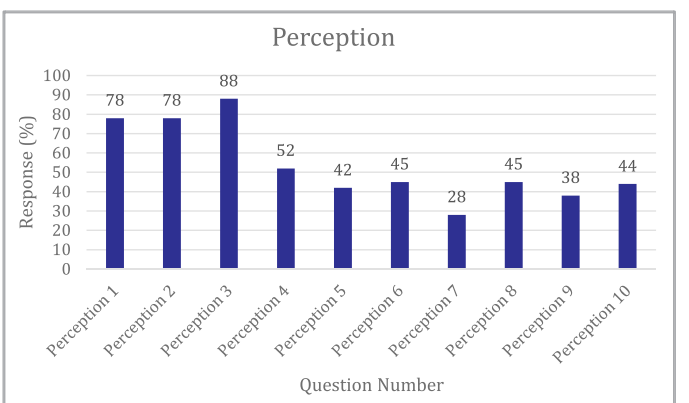

Fig-2: *shows the response percentages of each question regarding perception of students*

Discussion

Forensic autopsy is a significant component of MBBS academic curriculum, where students are encouraged to visit King Edward Medical University Forensic Medicine department once a week throughout their 3rd year, to closely observe and note down their findings on a human body undergoing post-mortem examination. Despite the efforts, students manifest an unwillingness and reluctancy to pursue an interest in adopting a potential career in autopsy and its related affairs. The findings of our study reveal valuable insights into how these undergraduate medical students perceive the importance of forensic autopsy in their training period.

The knowledge assessment questions shed light on the students' understanding of forensic autopsy's funda-

mental aspects. It is encouraging to note that the majority of respondents (97%) correctly identified the chief objective of a medico-legal autopsy as determining the cause of death. This high level of awareness among the students suggests that they have a solid grasp of the primary purpose of forensic autopsy. However, some knowledge gaps were identified in the responses. The fact that only 75% of students recognized that autopsy is not a legal requirement for all unnatural deaths in suspicious circumstances highlights the need for improved education in this area. Additionally, the relatively low percentage (74%) of students who could identify the authority to issue orders for autopsy in Pakistan suggests that more attention should be given to teaching students about the legal aspects of forensic autopsy. In the case of obtaining consent from the relatives for a medico-legal autopsy, 71% of the students correctly understood its necessity. This result underscores the importance of emphasizing the ethical and legal considerations surrounding autopsies in medical education.

The perception assessment questions explored the students' attitudes and beliefs about forensic autopsy, its role in solving crimes, and its relevance to their medical education and future careers. The high percentage of students (90%) who understood that a medico-legal autopsy cannot be performed by just any medical officer demonstrates a well-established perception regarding the specialization and expertise required in forensic pathology. This suggests that students recognize the importance of trained professionals in this field.

The positive response (91%) regarding the belief that autopsy contributes to solving crimes reflects the students' acknowledgment of the broader societal impact of forensic autopsy beyond the realm of medicine. This viewpoint is crucial in fostering a sense of responsibility and social duty among future medical professionals. While a significant portion of the students (78%) felt that the number of autopsies they had observed was sufficient for their learning purposes, similar to a study by Qasim et al, it is essential to consider this result in the context of the medical curriculum's goals and resources. Assessing whether this level of exposure aligns with the educational objectives of the program should be a point of discussion.[21]

The perception that watching an autopsy for the first time was uncomfortable (52%) suggests that students may experience psychological and emotional challenges when first exposed to such procedures. This is similar to 57% response given by students in a previous study by Chawla et al.[22] This highlights the need for comprehensive support and guidance to help students overcome these initial difficulties. Regarding career aspirations, the relatively low percentage of students (45%) interested in pursuing forensic pathology as a career path raises questions about the factors influencing their choices. Previous studies have shown an even lower percentage of students considering forensic medicine as a career option in future.[21,22] A deeper exploration of these factors, such as societal perceptions, professional prospects, and personal preferences, could provide valuable insights. The findings indicate a mixed perception regarding the teaching of autopsy in the MBBS program, with 78% of students considering it beneficial. The positive response to whether students should watch autopsy procedures (88%) suggests a willingness to engage in practical learning experiences, despite initial discomfort. In a previous study by Naz et al, about 67% students preferred watching autopsies on a live basis as compared to video learning.[6] Similar to previous studies, our study revealed that a substantial number of students (42%) felt that opening a dead body is disrespectful.[6,21,22] This result underscores the need for addressing ethical and emotional aspects in the curriculum to help students reconcile their emotions with the demands of their future profession. Our study, being a single-institute survey, had a limita-tion that needs to be addressed, including the need for a larger data sample and the engagement of multiple institutes to approach students on a city-scale, or at a provincial level.

Conclusion

Our study highlights the strong knowledge base among students regarding the primary purpose of forensic autopsy, while also identifying knowledge gaps in legal and procedural aspects. Furthermore, the study underscores the importance of enhancing students' perception of forensic autopsy's role in the field of medicine and their career prospects. It also suggests the need for additional support and guidance to address the psychological challenges associated with autopsy observations. These findings can inform curriculum improvements and provide a foundation for discussions on how to better prepare medical students for the ethical, emotional, and professional aspects of forensic pathology.

Conflict of Interest: None

Funding source: None

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Authors Contribution

MM: Conceptualization of Project
SZA: Data Collection
MKB: Literature Search
MHH: Statistical Analysis
MHH: Drafting, Revision
HS: Writing of Manuscript

Does Colchicine Prevent Progression to Artificial Ventilation in Covid-19 Positive Patients? A Study from Lahore, Pakistan

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Abstract

Objective: To find out the effect of colchicine in prevention of progression to artificial ventilation in Covid-19 patients including young and elderly patients.

Material and Methods: Study was conducted from 1st April 2020 till 30th September 2020 in a private, tertiary care hospital of Lahore. A retrospective cohort study was conducted on conveniently selected 179 PCR or radiologically confirmed Covid-19 positive adult and elderly, male and female patients admitted in Covid ward and Intensive care Unit (ICU) using the electronic as well as paper-based record. Amongst these patients, 33 patients were given colchicine, 137 recovered and 20 progressed to invasive ventilation.

Result: Total 179 patients were included int the study and 96 (53.6%) were males and 83 (46.4%) were females. 52.5% had Diabetes mellitus, 58.7% had hypertension, 27.9% had ischemic heart disease, 8.4% had renal disease, 6.7% had lung disease/smoker. The average length of stay in hospital was 6.569±6.355 days. The outcome and progression to artificial ventilation in the patients who were given colchicine as compared to those who were not given colchicine were not statistically significant with a p value of 0.053 and 0.619, respectively.

Conclusion: Colchicine has not shown a significant improvement in the outcome of Covid-19 and does not help in prevention of progression to invasive ventilation irrespective of age, gender, and co-morbidities.

Keywords: Colchicine, invasive ventilation, outcome, Covid-19

How to cite: *Rana MS, Ghazanfar J, Sarwar H, Sarwar E, Farooq U, Usman M. Does Colchicine Prevent Progression to Artificial Ventilation in Covid-19 Positive Patients? A Study from Lahore, Pakistan. Esculapio - JSIMS 2023;20(01):72-76.*

DOI: https://doi.org/10.51273/esc24.251320114

Introduction

Covid-19 is caused by a novel coronavirus also known as SARS-CoV-2 was first reported in December 2019 in Wuhan, Hubei Province, China.[1] The Coronaviruses (CoVs) are a group of viruses that can be found in birds as well as mammals causing respiratory and intestinal disease.[2]

According to the World Health Organization (WHO) on 28th June 2023, 6,947,192 deaths have been reported globally.[3] World health organization (WHO) on 27th May 2020, defined the severity of the disease as, adults with clinical signs of pneumonia accompanied by one of the following: respiratory rate of more than 30 breaths/min, severe respiratory distress, or oxygen saturation (SpO_2) of less than or equal to 90% on room air.[4] WHO also provided a clinical progression scale to measure the disease severity including the scores from 0 (non-infected) to 10 (death) for Covid-19 clinical status assessment.[5] Patients with intense disease have airway failure and they usually need endotracheal intubation and mechanical ventilation.[6] The Viral load can be a marker to assess the severity of disease and prognosis. Early

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Submission Date: 08-10-2023
1st Revision Date: 18-01-2024
Acceptance Date: 05-03-2024

viral clearances and a negative RT-PCR test by 10th day of onset was found in patients having mild disease as compared to those having severe disease.[7] Another factor associated with the disease severity is inflammation. Thus, the use of corticosteroids and interleukin-6 (IL-6) inhibitors reduce the mortality in severe Covid-19.[8] The infection caused in Covid-19 diseases can be divided into phase of initiation, pulmonary and hyper-inflammatory with treatment varying from antivirals and corticosteroids to anti-inflammatory drugs depending on the intensity of disease. The hyper-inflammatory stage has increased C-reactive protein, d-dimers, pro-inflammatory cytokines, and chemokines and all these indicate towards the disease severity.[9] The inflammatory effect is more eminent in the lungs and the vascular endothelium. Inflammasomes play an important role in innate immunity of Covid-19 infection. The degree of inflammasomes activation particularly the nucleotide binding domain (NOD)-like pyrin domain 3 (NLRP 3) has shown relation with the disease severity.[10] After the emergence of Covid-19, lots of treatment options were considered for its treatment including antivirals, lopinavir, remdesivir and corticosteroids. [11]

Colchicine has been in use for over 2000 years. Colchicine has anti-inflammatory and antiviral properties, and it acts via the tubulin-colchicine complex. Currently, the Food and Drug Administration (FDA) has approved the use of oral Colchicine for the treatment of gout, Familial Mediterranean fever, off-label uses include arthritis and pericarditis.[12] The use of colchicine has shown beneficial results due to its anti-inflammatory effect including the inactivation of NLRP 3 inflammasome. However, only a few randomized control trials support this.[10] Colchicine was found to be beneficial in reducing Covid-19 disease severity and mortality particularly giving it early in the course of disease. Giving colchicine in outpatient settings can also have the same effect.[13]

The use of low dose colchicine as an adjuvant to supportive therapy can help decrease morbidity and mortality.[14] However, according to a study there is minimal role of colchicine in improving the disease outcomes while comparing the effect of colchicine plus standard treatment with standard treatment alone.[15] This study is being carried out to find out the effect of colchicine in prevention of progression to artificial ventilation in Covid-19 patients including young and elderly patients. A lot of research work is being done internationally and nationally on SARS-CoV-2 virus however there are many loopholes that need to be investigated further. This study can be a fruitful addition to the current available literature on Covid-19.

Materials and Method

All in-patients with either laboratory confirmed Covid-19 via Polymerase Chain Reaction test or radiologically reported Covid-19 on CT chest by a consultant radiologist during the study period were included. A total of conveniently selected 179 patients were retrospectively studied by using the electronic as well as paper-based record from 1st April 2020 till 30th September 2020 at a well-known private hospital in Lahore with dedicated Covid ward and Intensive Care Unit. Patients having known thromboembolic condition were not included in the study. The hospital was selected based on administrative convenience and availability of complete electronic medical records after discharge. Patients records and investigations from the first presentation at the hospital till their discharge/death were examined after obtaining consent from the patient or next of kin in case of deceased patients. The ethical review was done by the hospital ethical review committee and the anonymity of the patients was maintained by de-identification of the record. The patients who received colchicine, progressed to invasive or non-invasive ventilation and those who expired and recovered from Covid-19 were included in the study. Data was entered, cleaned and analyzed using SPSS version 24.0. Frequency tables were generated for all possible variables. Means and other parameters of central tendency were calculated for continuous data. Chi Square was applied to find out association between categorical variables. P value of 0.05 was taken as significant.

Results

This study had an objective to find out the role, if any, of colchicine in prevention of progression to artificial ventilation in adult Covid-19 patients. Total 179 patients were included int the study and 96(53.6%) were males and 83(46.4%) were females, 2 out of 83(1.1%) had Covid-19 during pregnancy. The mean age of the patients was 58.266±14.07 with mean stay in hospital of 6.569 ±6.355 days, mean Oxygen requirement of 7.04±2.89 liters. There were 33 out of 179 (18.4%) patients who were given colchicine. The non-invasive ventilation was received by 5 out of 179 (2.8%) patients while 20 out of 179 (11.2%) received invasive ventilation. (Table-1)

52.5% had Diabetes mellitus, 58.7% had hypertension,

27.9% had ischemic heart disease, 8.4% had renal disease, and 6.7% had lung disea.se/smoker. The average length of stay in hospital was 6.569±6.355 days. The outcome of patients who received colchicine was that 12 out of 33 (36.4%) expired and 21 out of 33(63.6%) recovered in comparison to the patients who did not receive colchicine, 30 out of 146(20.5%) expired and 116 out of 146(79.5%) recovered and this difference is statistically insignificant with the p-value of 0.053 using the Chi-square test and taking a statistically significant value of <0.05. The relative risk (RR) of death was 1.7(1.018-3.075) in the colchicine group compared to the group not given colchicine. (Table-2)

The progression to artificial ventilation in patients who received colchicine showed that 5 out of 33 (15.2%) progressed to invasive ventilation and 28 out of 33 (84.8%) did not progress to invasive ventilation as compared to those who did not receive colchicine only 15 out of 146 (10.3%) progressed to invasive ventilation and 131 out of 146 (89.7%) did not progress to invasive ventilation and this difference is statistically not significant with a p-value of 0.619. The relative Risk (RR) of progression to invasive ventilation was found to be 1.47, however, the Confidence Intervals (CI) of 0.57-3.77 indicates that this difference is unlikely to be significantly (Table-3)

Table 1: *Frequency of various variables*

Variable	n=179	Percentage %
Male	96	53.6
Female	83	46.4
Covid-19 and pregnancy	2	1.1
Non- invasive	5	2.79
Invasive	20	11.17
Colchicine received	33	18.4
Expired	42	23.46
Recovered	137	76.53

Table 2: *Outcome and Colchicine*

Variable		Outcome			p value	Relative Risk
			Expired	Recovered		
Colchicine	Given	n=33	12	21	0.053	1.7 (1.018-3.075)
		%	36.4	63.6		
	Not given	n=146	30	116		
		%	20.5	79.5		

Table 3: *Progression to Invasive Ventilation and Colchicine*

Variable		Progression to Invasive Ventilation			p value	RR
			Yes	No		
Colchicine	Given	n=33	5	28	0.619	1.47 (0.57 – 3.77)
		%	15.2	84.8		
	Not given	n=146	15	131		
		%	10.3	89.7		

Discussion

Colchicine is an anti-inflammatory drug that has shown to be beneficial in the treatment of Covid-19 disease. Colchicine helps in reducing mortality and hospitalization. It has shown an advantage in decreasing the level of neutrophils in blood and ultimately decreasing the risk of disease severity.[16] Colchicine decreases inflammation through inhibition of microtubule polarization thus decreasing the viral load.[12] A study conducted in China shows that elevated levels of neutrophils or neutropseverecyte ratio (NLR) play a role in formation of cytokine storm leading towards the inflammatory process in Covid-19, which is associated with the severe disease and mortality.[17]

Our study proved that Colchicine does not decrease the mortality and progression to invasive ventilation. This relationship could also be found in RCTs and meta-analysis done China, UK, Indonesia and Nepal that efficacy of colchicine for the treatment of Covid-19 and in preventing the progression to severe disease is relatively low.[10,11,18,19]

A metanalysis conducted in 2022 included 6 RCTs, and amongst these only one trial included hospitalized patients and had showed that colchicine did not cause any significant reduction in mechanical ventilation.[20]

A study done in Mexico in 2021, showed that 56 patients were given Colchicine and 60 patients received placebo, however, Colchicine had no effect decreasing the symptoms of Covid-19 nor in the days of ICU and hospitalization instead it raised the level of BUN and decreased the level of IL-8, IL-12p70 and IL-17A thus concluding that Colchicine is safe but not effective for the treatment of Covid-19.[21]

A metanalysis done in 2021 showed that there was no association of colchicine with mortality, duration of hospitalization, risk of ventilation or dying of those not ventilated at baseline. There was no benefit of giving colchicine with corticosteroid.[10]

Substantial number of studies done in Pakistan have shown the benefit of Colchicine in decreasing the mortality related to Covid-19. A meta-analysis done in April 2022 in Pakistan showed that Colchicine helped in decreasing the level of CRP, d-dimers and mechanical ventilation.[9]

A meta-analysis conducted in 2021 in Pakistan showed

that 4 out of 6 studies showed the decreasing trend of CRP in comparison between the patients who were given Colchicine and the control group, thus stating the benefit of Colchicine in decreasing the biomarkers of inflammation in moderate to severe Covid-19 patients.[14] Our study was conducted in a single institute so we would recommend randomized controlled trials at a larger scale might help to evaluate the effect of colchicine on progression to invasive ventilation and outcomes. The results in our study did not support the role of colchicine in Covid-19 treatment, however, the sample size was small and the colchicine group was much smaller than the usual care group.

Conclusion

Colchicine does not play a significant role in prevention of progression to invasive ventilation and improving the outcomes irrespective of age, gender, and co-morbidities.

Conflicts of interest: *None*

Funding Sorce: *None*

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Authors Contribution

MSR: Conceptualization of Project
MSR, ES: Data Collection
JG: Literature Search
US, MU: Statistical Analysis
HS: Drafting, Revision
JG: Writing of Manuscript

Effect of Ficus Carica Fruit Versus Atorvastatin on High Fat Diet Induced Hepatic Steatosis

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Abstract

Objective: To evaluate the effect of Ficus carica fruit (fig) and atorvastatin on high fat diet induced hepatic steatosis histologically.

Material and Methods: During this experimental study forty male Sprague dawley rats were randomly divided into five equal groups and were acclimatized for a duration of one week. Throughout the course of 12 week, normal control (NC) group was provided normal rat chow. The remaining four groups were induced hyperlipidaemia in 4 weeks duration. These rats were fed with high fat diet containing 1.5gm cholesterol, 8ml coconut oil and 1gm sodium cholate added per 100gm of standard rat chow diet. Disease control group (DC) was offered high fat diet continuously during the 12 weeks study period. On completion of 4 weeks Ficus carica ethanolic extract (FCE) and pulp of Ficus carica fruit (FCP) and standard hyperlipidemic agent, atorvastatin (ATO) were incorporated to the diet of three experimental animal groups respectively for next 8 weeks. All the animals were sacrificed at the end and their liver parenchymal slides were subsequently analysed for histopathology.

Results: Histopathological evaluation using (NASH) scoring showed that both pulp and ethanolic extract of Ficus carica fruit induced significant decrease in the fatty change of liver parenchyma.

Conclusion: This experimental study concludes that pulp of Ficus carica fruit has evident anti hyperlipidemic activity by reducing hepatic steatosis.

Key words: Ficus carica, pulp, ethanolic extract, Hepatic steatosis.

How to cite: *Perveen F, Nzqvi F, Siddiqui AH, Irum Z, Khan FA, Yaqoob N. Effect of Ficus Carica Fruit Versus Atorvastatin on High Fat Diet Induced Hepatic Steatosis. Esculapio - JSIMS 2023;20(01): 77-81.*

DOI: https://doi.org/10.51273/esc24.251320115

Introduction

Hyperlipidemia, a familial ailment is revealed by the rise of one or more than one lipids in the blood plasma. Lipids are fatty, oily or waxy complexes which are vital to perform many critical functions of body and also act as integral part of building blocks for all living cells. Cholesterol, triglycerides, phospholipids, fatty acids are the main lipids in our body. The macromolecules that transport lipids are labelled as lipoproteins. The metabolic disorder which comprises of disproportionate rise of lipids in the body, especially rise of bad lipids i.e. LDL and reduced amounts of good lipids i.e. HDL is called Dyslipidaemia or hyperlipidaemia.[1] There is a strong assosiation between dyslipidaemia and sluggish life style, high caloric meals, absence of exercise, continious stress & nicotine smoking. Dyslipidemia is the culprit behind many life threatening diseases like hypertension, diabetes mellitus,[2] stroke, myocardial infarctions and arrythmias.[3] Drugs may be

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Submission Date: 21-10-2023
1st Revision Date: 11-01-2024
Acceptance Date: 09-03-2024

prescribed to individuals who are unable to manage their blood lipids even after life style modifications and improved exercise routine. Commonly prescribed drugs to treat dyslipidaemia include statins, fibrates, resins and Bile acid sequestrants.[4] In addition to these drugs many herbal remedies are also used to treat dyslipidaemias, like ginger juice, fenugreek seeds and leaves, turmeric, rosemary, Artichoke leaf extract, Yarrow etc.[5]

Fig (Ficus carica Linn) commonly available in Pakistan, embraces one of the biggest species of medicinal plants which include woody trees and shrubs. Recent research has shown that Ficus carica has proven hypoglycaemic, antipyretic, hepato-protective, antispasmodic & anti HSV potential.[6] It has also shown antimicrobial effects against Proteus Mirabillis & Bacillus subtilis. Ficus carica has established antioxidant and protective effect on ischemic myocardial tissue as well as antiplatelet effect.[7] Furthermore hepato-protective effect of Ficus Carica has been proven in hepatotoxicity induced by CCl4.[8]

We have planned this study to test the anti-hyperlipidemic activity of Ficus carica fruit on liver of high fat diet (HFD) rat by comparing histopathological evidence using NASH scoring. This will provide an alternate treatment of hyperlipidaemia in form of Ficus carica fruit which is cost effective as well as easy to take.

Method and Material

Total 40 healthy male Sprague dawley rats were procured and were retained for 1 weeks in the Post Graduate Medical Institute, Lahore animal facility for acclimatization. The rats were provided a room temperature of 25±5°C, with 12 hours of light dark cycle. All the rats were given free access to rat chow diet and tap water. They were then divided into five group by simple random sampling technique. During the course of 12 week, normal control (NC) group was provided normal rat chow. The remaining four groups were induced hyperlipidemia in 4 weeks duration. These 4 groups were given high fat diet (HFD) containing. 1.5gm cholesterol, 8ml coconut oil and 1gm sodium cholate added per 100gm of standard rat chow diet.[9-11] Disease control group (DC) was offered high fat diet throughout the research period of 12 weeks. On completion of 4 weeks Ficus carica ethanolic extract (FCE) and pulp of Ficus carica fruit (FCP) and standard hyperlipidemic agent, 30mg/kg atorvastatin (ATO) were incorporated to the diet of three experimental animal groups respectively for next 8 weeks.[12]

Ficus carica plant was purchased locally and was identified by Botany department of GC University, Lahore. To prepare ethanolic extract of Ficus carica fruit, we soaked 100 gm of Ficus carica in a solution of 80% ethanol, 13 in 1: 10 ratio, producing a 40% yield of extract. The ethanolic extract of Ficus carica fruit was kept at 4ºC. The ethanolic extract of Ficus carica was dispensed daily by oral route in morning at a dose of 500mg/kg to HFD + FCE group for next 8 weeks. Bits of Ficus carica pulp were dispensed to HFD+FCP group in amount of 1250 mg/kg as daily morning oral dose.[11,14] Similarly, HFD+ATO group was dispensed a single oral dose of 30mg/kg atorvastatin in morning for next 8 weeks.[15] Afterwards, on completion of 12 weeks, all the animals were sacrificed and liver histopathology was performed.

Histopathology of samples were performed at Pathology department of PGMI Lahore. An adequate portion of liver was excised and the liver sample was processed in an automatic tissue processor. Afterwards, the sample was embedded in paraffin and with the aid of microtome, approximately 5 micrometre thick sections of liver parenchyma were sliced. These cut sections were then positioned on the glass slides and subsequently stained with eosin and haematoxylin. Under light microscope, each slide was carefully reviewed from one side to other with help of pathologist, to grade the non-alcoholic hepatic steatosis.

Hepatic steatosis was graded by using Non-Alcoholic Steatosis Hepatitis, Clinical Research Network (NASH CRN) scoring system.[16] This scoring system categorised the tissue according to involvement of parenchyma into four grades. Grade 1 indicated Parenchymal involvement 0-5% by steatosis, Grade 2 indicated parenchymal involvement 2:5-33% by steatosis, Grade 3 indicated parenchymal involvement 33-66% by steatosis and Grade 4 indicated parenchymal involvement above 66% by steatosis.[17]

Results

Hepatic steatosis was graded by using Non-Alcoholic Steatosis Hepatitis, Clinical Research Network (NASH CRN) scoring system. Under light microscope, the prepared slides of liver were examined histologically. The fatty change in liver parenchyma in all groups were compared by applying Kruskal Walli's test. This test revealed statistically highly significant difference in fatty change among different groups with p value 0.001. (Table 1) In group wise comparison using Mann Whitney

U test, the disease control and experimental groups had highly significant histopathological changes as compared to NC group. The change in experimental groups was significantly lower than DC group. However, the experimental groups had no significant difference among themselves. (Table 2)

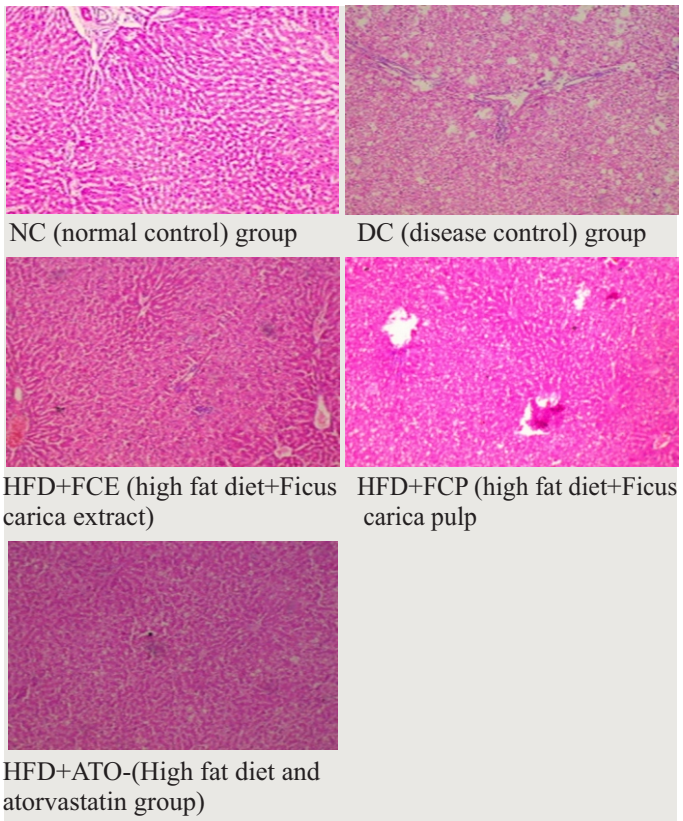

Fig-1: *Hematoxylin and eosin stained section of rat liver showing fat deposition (magnification 10x)*

Table 1: *Comparison of hepatic steatosis among different groups by Kruskal Walli's test*

Groups	N	Mean Rank	Chi square	p value
NC	8	4.5	29.55	0.00
DC	8	34.5		
HFD+FCE	8	21.06		
HFD+FCP	8	18.56		
HFD+ATO	8	23.88		

Discussion

Hepatic steatosis is a disease state in which there is accumulation of triglycerides in more than 5% of the hepatic cells when liver is examined histologically.[18] Hepatic Steatosis is well known as fatty liver disease or adipose liver disease. Hepatic steatosis is alarming as it may advance to dreadful outcomes related to liver

Table 2: *Pairwise comparison of hepatic steatosis among various groups using Mann Whitney U test*

(I) GROUP	(J) GROUP	Z	p value
Normal control	Disease Control	-3.87	<0.00
	HFD+FCE	-3.66	<0.00
	HFD+FCP	-3.66	<0.00
	HFD+ATO	-3.65	<0.00
Disease Control	HFD+FCE	-3.30	0.001
	HFD+FCP	-3.28	0.001
	HFD+ATO	-2.95	0.003
HFD+FCE	HFD+FCP	-0.81	0.4
	HFD+ATO	-0.79	0.4
HFD+FCP	HFD+ATO	-1.43	0.152

such as hepatic dysfunction and insufficiency and hepatic carcinoma[19]. There may be added extra-hepatic clinical manifestations like type 2 diabetes mellitus, chronic renal disease, cardiovascular disease, and extra-hepatic neoplasms in this disease. In order to prevent the advancement of fatty liver disease and its complications, one must address the related risk factors linked to this condition, such as obesity, excessive alcohol consumption, diabetes mellitus, and metabolic syndrome.[18] The most common cause of hepatic steatosis is hyperlipidemia. Hyperlipidemia can cause hepatic steatosis which needs to be treated by different allopathic and herbal medicines.[20] Various plant seeds and fruits have been investigated to impart their anti hyperlipidemic effects and there role in prevention of hepatic steatosis is being evaluated.

Ficus carica herb has many therapeutic uses. Ficus carica leaves have demonstrated hypolipidemic effect in rats in recent studies.[21] We compared ethanolic extract of Ficus carica fruit, the pulp of Ficus carica fruit with standard drug atorvastatin. Preparation of ethanolic extract is a lengthy and cumbersome process, whereas Ficus carica fruit is easily available, edible and its use is simpler than extract. In our research, we compared the effect of extract as well as pulp of Ficus carica fruit with atorvastatin, a standard drug to treat hyperlipidemia. Hyperlipidemia was induced by the use of 1.5gm cholesterol, 8ml coconut oil and 1gm sodium cholate in all the animal groups except normal control. After sacrificing the animal, liver samples were obtained to evaluate them histopathologically, and hepatic steatosis was graded in the light of NASH scale.[16] The results revealed that normal control (NC) had normal liver parenchyma without signs of added fatty infiltration. In contrast, the disease control (DC) group displayed highest grade of hepatic steatosis in the liver parenchyma. Afterwards,

the experimental groups were evaluated. It was quite obvious that the experimental groups demonstrated considerably less hepatic steatosis in contrast to disease control group. Unfortunately, the normal parenchymal lobular configuration of liver was not restored in experimental groups. Similar studies on activity of Ficus carica Linn was demonstrated using Lead acetate induced hepatotoxicity.[22] Another related research was performed to evaluate the hepato-protective effects of Ficus carica in Non-alcoholic fatty liver disease (NAFLD). The results were astonishing with chronic treatment of 16 weeks as it reduced the liver enzymes including ALP, AST and ALT.

Regarding comparison between the experimental groups, histological evaluation and NASH scoring revealed that pulp of Ficus carica fruit was most effective in reducing hepatic steatosis as compared to ethanolic extract of Ficus carica fruit and Atorvastatin. Ficus carica fruit pulp is beneficial as it is more convenient to take orally and has no lengthy preparation like ethanolic extract. Research conducted on phytochemical analysis of Ficus carica fruit shows that it contains phenols, organic acids, flavonoids, fibre, phytosterols, anthocyanin pigments, coumarins and certain volatile compounds e.g. aliphatic alcohols and hydrocarbons. These high contents of polyphenols, condensed tannins and flavonoids are responsible for anti-oxidant and antimicrobial effects of Ficus carica fruit and are the probable reason of its preventive effect on hepatic steatosis in our research.[23] Consequently, it is concluded that pulp of Ficus carica fruit reduces development of hepatic steatosis and it opens avenues for more advanced research to evaluate the molecular mechanism of this effect.

Conclusion

This experimental study concludes that pulp of Ficus carica fruit has beneficial role in preventing development and progression of diet induced hepatic steatosis.

Conflict of Interest: *None*

Source of Funding: *None*

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Authors Contribution

FP: Conceptualization of Project
FN: Data Collection
AHS: Literature Search
ZI: Statistical Analysis
FAK: Drafting, Revision
NY: Writing of Manuscript

Peripartum Hysterectomy in A Tertiary Care Hospital

Sadia Afzal Randhawa,[1] Sarwat Nazir,[2] Mahnoor Ahsan Bhoon[3]

Abstract

Objective: To identify the indications and risk factors associated with EPH so they can be timely diagnosed and managed to help to improve the maternal morbidity and mortality.

Methods: The study design opted for the present research was observational retrospective, where the pregnant women were assessed for various demographic characteristics, indications, high risk factors and maternal and fetal outcome. All the pregnant women who underwent caesarean hysterectomy were included in the study period from oct 2010 to oct 2014 and January 2017 to December 2017. All the data was filled on a predesigned Performa after taking consent from the patient. This study was carried out in Gynae unit 1, Sir Ganga Ram Hospital Lahore.

Results: The mean age of the women was 25.8 years.59 (66.29%) of the females were in the age category of 21 to 30, whereas 23 (25.84%) belong to 31-35 years of age and 7(7.86) were in the age group 36 to 40. The maximum number of parity was of 4 to 6 ,61.19%. Majority of the deliveries 92.13 were done by cesarean section (CS).

Conclusion: EPH is very vital procedure that saves lives and manages life threatening obstetrical hemorrhage when other methods failed to control bleeding. This procedure most of time is unforeseen and compulsory, however the timely decision of EPH procedure may improve the maternal outcome and hence help in decreasing maternal mortality.

Key words: Emergency peripartum hysterectomy (EPH), placenta previa, uterine rupture, maternal morbidity and mortality, healthcare providers

How to cite: *Randhawa SA, Nazir S, Bhoon MA. Peripartum Hysterectomy in A Tertiary Care Hospital. Esculapio - JSIMS 2023;20(01): 82-85.*

DOI: https://doi.org/10.51273/esc24.251320116

Introduction

The removal of the uterus either at the time of cesarean section (CS) or after vaginal delivery, or within the puerperium period is known as Emergency peripartum hysterectomy (EPH). It is a life saving procedure and is done in the face of persistent and life-threatening obstetric hemorrhage when all conservative measures fail.[7,8,9,10] EPH can be rightly categorized as a near miss event. This is very vital to highlight the events as it explains the standards of healthcare providers and assist to improve the maternal morbidity and mortality. In 1876, the first cesarean hysterectomy was done by Eduardo Porro of Milan for PPH resulting in live baby and mother. The worldwide incidence of peripartum hysterectomy is around 1 per 1000 deliveries, being higher among low-income countries. This rise in incidence in developing countries may be due to decreased availability and lack of antenatal services especially in rural areas. The leading cause still is uterine atony (UA) in developing countries and abnormal placentation in developed countries. It is published and observed a change of trend in epidemiology in several studies. Uterine rupture is now replaced by abnormal placentation that is caused by high rate of caesarean section in the world. Community based use of misoprostol, oxytocin,

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Submission Date: 11-12-2023
1st Revision Date: 10-01-2024
Acceptance Date: 13-02-2024

condom catheter balloon, and noninflatable anti-shock garments for the management of hypovolemic shock, B-lynch sutures, uterine artery and internal iliac artery ligation which are termed as conservative medical and surgical methods have been supported effectively to control and manage the obstetric hemorrhage. An option of uterine artery embolization is also available in some selected center's possibly due to innovation in interventional radiology.[1] An increased risk of abnormal placentation and EPH was related in various studies with previous uterine scar. It is published in literature that the incidence of EPH ranges between 0.24 to 5.09 per thousand of deliveries worldwide. In comparison to non-obstetric morbidity and mortality, peripartum hysterectomy being an unplanned and emergency procedure is associated with significant high risks of complications.[2] Although life saving but is associated with devastating outcomes like injury to surrounding structures especially bladder and bowel, need for multiple blood transfusions and associated blood reactions and anesthetic and ICU complications along with a high rate of maternal morbidity and mortality.[1,7,8,9,10] perfection in traditional methods of postpartum hemorrhage (PPH) management and blood transfusion facilities has improved the outcome.[1] The main aim of study was to assess the changing trends in peripartum hysterectomy.

Material and Methods

The study design opted for the present research was observational retrospective, where the pregnant women were assessed for various demographic characteristics, indications, high risk factors and maternal and fetal outcome. The study duration was of 5 years. The venue of the study was Gynae Unit 1, Sir Ganga Ram Hospital Lahore which is a 680 bedded tertiary care hospital. All the women who deliver at hospital after 28 weeks of gestational age and experienced hysterectomy at the time of delivery or afterward within the defined period of puerperium were included in the study. The retrieved information contains demographics along with diagnostic history of all the women.

Results

Total number of deliveries in five years were 30'762, SVDs were 17'444 and caesarean sections were 13,318 and total no of caesarean hysterectomies were 89. The mean age of the women was 25.8yrs with range 21-30 (66.29%) in 59 patients, whereas 23 (25.8%) belong to 31-35 years of age, while 7,7.86% belongs to 36 to 40 years. 48 women (53.93%) were of gestational age 28-36 weeks, 38 (42.69%) were of gestational age 37-41 weeks while 3 women (3.37%) were above 41 weeks. 27 (30.33%) women were of parity 1-3, 55 (61.79%) were of parity 4-6 while 7 (7.86%) were of parity above 6. (30.33%) women were of parity 1-3, 55 (61.79%) were of parity 4-6 while 7 (7.86%) were of parity above 6.

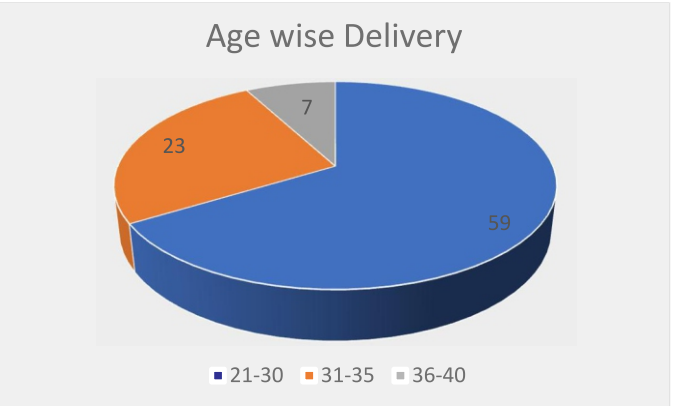

Figure 1: *Age wise Delivery*

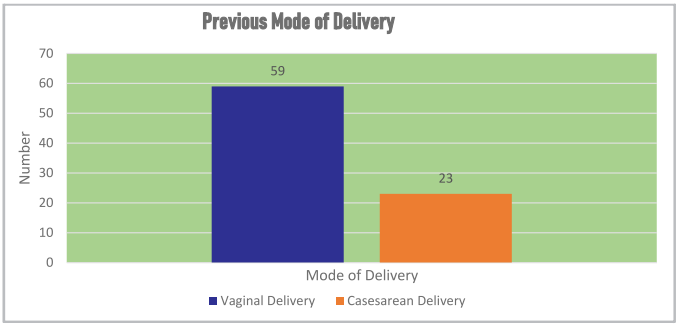

Figure 2: *Previous Mode of Delivery*

Table 1: *Indications for peripartum hysterectomy*

Indications For Peripartum Hysterectomy	Number	Percentage
Uterine atony	14	75.73
Placenta Accreta	24	26.96
Placenta Increta	28	31.46
Placenta Percreta	7	7.86
Placenta bed bleeding	11	12.5
Uterine rupture	5	5.61

Table 2: *Indications for Caesarean delivery*

Indications	Number	Percentage
Placenta previa plus previous surgery	58	65.16
Previous surgery	17	19.10
Antepartum hemorrhage due to placenta previa	8	8.98
Rupture uterus	2	2.24
Fetal distress	3	3.37
Fetal malpresentation	1	1.12

Table 3: *Perioperative morbidity and mortality*

Intraoperative Complications	Number	Percentage
Bladder injury	26	18.84
Blood transfusions	89	64.50
Broad ligament hematoma	4	2.89
ICU admission	7	5.07
Pulmonary edema	7	5.07
Wound disruption	5	3.62

Discussion:

The study was planned to determine the trends in peripartum hysterectomy among delivering mothers. We not only report various types of hysterectomy but also highlight the indications for hysterectomy and CS along with complications arising in intraoperative and postoperative period. Despite of advancement in surgery and medical fields, PPH remains the prominent cause of maternal morbidity and mortality. To treat the life-threatening obstetric hemorrhage EPH is performed because controlling with conventional methods is sometimes difficult. The incidence reported of EPH ranges between 0.24 and 5.09 per 1000 deliveries. The incidence reported in our study is supported by the above literature and other published studies. We observed in our study that majority of the cases were with poor access to the healthcare. We also reported in our study that major indication of EPH was abnormal placentation, uterine atony, and uterine rupture. We also observed in our findings the increased cases with adherent placentation; the percentages were supported by other published studies3. Due to previous history of CS, adherent placentation become among one of the commonest indications. A study done in Dublin also showing that indication of hysterectomy changing from uterine rupture from 40.5% to 9.3% and increase in morbidly adherent placenta from 5.4% to 46.5% due to increase in previous caesarean section rate. The study held by Kwee et al. testified that both previous CS and cesarean section in key pregnancy were associated with significant increased risk of EPH. The effort to separate the adherent placenta can cause massive hemorrhage. A timely decision to go with hysterectomy can lead to improved outcomes. We reported in our study most of the cases with multipara who underwent EPH. This finding is supported by other published studies.4 Among hysterectomy performed, most of the type was total hysterectomy. The percentages available in literature ranges among 53-80%.4 It is presumed that this type of hysterectomy involved lesser blood loss, lessening the operative time and less complication in comparison to other types. Our study reported the risk factors like multiparity, placenta previa, previous cesarean section, and cesarean in index pregnancy. Other published studies quote with similar risk factors.5 Fortunately, we never observed any maternal mortality in our study. Moreover, the EPH complications were also studied and analyzed by Machado LS et al. Contrary to our study he claimed the maternal morbidity ranging between 26 to 31% and the commonest complication was blood transfusion requirement and urinary tract injury. Similarly, in some studies, the incidence of Eph reported is quite low as compared to other studies. For example, as in North India they carried 56 Eph in 8 years, the increasing incidence in tertiary care hospitals like ours is due to more referrals of high-risk cases especially with low lying placenta and multiple caesarean sections. The increased number of caesarean section is also alarming, especially increasing the need to focus on the decision of doing caesarean in primigravida patients and patients with previous one.2

Conclusion

We may conclude that EPH is very vital procedure that saves lives and manage life threatening obstetrical hemorrhage when other methods failed to control bleeding. This procedure most of time is unforeseen and compulsory however the increasing frequency in young patients and abnormal placentation needs a serious review of indications of caesarean section especially in primigravida's and also the improvement in expertise in caesarean hysterectomy, thus the expectancy of risk factors can be reduced with the timely decision of EPH procedure, and it will help in improving maternal mortality and will improve the maternal and fetal outcome.

Conflict of Interest *None*

Funding Source *None*

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Authors Contribution

SAR: Conceptualization of Project
SAR: Data Collection
SAR, SN, MAB: Literature Search
SAR: Statistical Analysis
SAR, SN, MAB: Drafting, Revision
SAR: Writing of Manuscript

Original Article

Evaluation of Histopathological Changes in Aminoglycoside Induced Nephrotoxicity and Protective Role of Citrullus lanatus Seeds (Ethanolic Extract) in Animal Model

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Abstract

Objective: To assess histopathological changes induced by aminoglycoside in nephrotoxicity and explore the protective role of Citrullus lanatus seeds in an animal model.

Material and Methods: The research, conducted from July 01, 2017, to December 31, 2018, at the Department of Pharmacology, King Edward Medical University Lahore, and UVAS, Lahore, received approval from the Institutional Review Board (IRB). The Animal Experimental Study involved 40 healthy albino Wistar rats, divided into five equal groups. Group A served as the normal control, receiving oral normal saline once daily. Group B, the disease control, received intraperitoneal (IP) injections of Gentamicin at 80mg/kg/day in two equally divided doses, with a 12-hour interval, for 14 days. Groups C and D received oral doses of Citrullus lanatus seed extract (CLSE) at 400 mg/kg and 600 mg/kg/day, respectively, concurrently with Gentamicin at 80mg/kg/day IP in two equally divided doses for 14 days. Histopathological changes such as tubular dilatation (outer and inner), tubular inflammation and tubular necrosis were compared in Aminoglycoside and Citrullus lanatus seeds extract treated groups.

Results: Groups C and D exhibited a significant decrease in tubular inflammation, tubular necrosis, and tubular dilatation, with a p-value < 0.001 compared to Group B.

Conclusion: The administration of CLSE in aminoglycoside-induced nephrotoxicity in albino rats significantly mitigated nephrotoxic effects by reducing inflammation, tubular necrosis, and tubular dilatation.

Keywords: nephrotoxicity, aminoglycosides, citrullus lanatus seeds, tubular inflammation, tubular necrosis, tubular dilatation.

How to cite: *Yousaf N, Zia AE, Talha U, Khan FA, Zahra SMN, Talat H. Evaluation of Histopathological Changes in Aminoglycoside Induced Nephrotoxicity and Protective Role of Citrullus lanatus Seeds (Ethanolic Extract) in Animal Model. Esculapio - JSIMS 2023;20(01):86-90.*

DOI: https://doi.org/10.51273/esc24.251320117

Introduction

Aminoglycosides, an important group of bactericidal antibiotics, were discovered in 1940 from the Streptomyces and Micromonospora genera of bacteria widely used in hospitalized patients. These antibiotics treat serious infections caused by aerobic gram-negative bacilli and are often combined with penicillins to combat gram-positive organisms.[1] Common examples include amikacin, gentamicin, tobramycin, and streptomycin.[2] Administered parenterally, aminoglycosides diffuse through the outer membrane of bacteria via porin channels. Their antibiotic function involves binding to the 30S ribosomal subunit, causing a misreading of the genetic code and depleting polysomes, rendering the bacterium incapable of synthesizing vital proteins for growth. The bactericidal effect is concentration and time-dependent, with metabolites rapidly excreted in the urine by glomerular filtration.[3] Major side effects include nephrotoxicity, ototoxicity, neuromuscular paralysis, and allergic reactions. Aminoglycoside-induced nephrotoxicity accounts for 58% of acute renal failure cases 4, with gentamicin being particularly nephrotoxic and associated

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Submission Date: 08-01-2024
1st Revision Date: 28-01-2024
Acceptance Date: 08-03-2024

with higher patient mortality. The mechanism involves binding to the megalin receptor in the proximal tubular epithelium, forming a complex that induces oxidative stress, leading to various cellular responses such as apoptosis, necrosis, and inflammation.[5]

Herbal products, known for their less adverse effects and cost-effectiveness, are being explored for their nephroprotective roles against aminoglycoside-induced oxidative stress. Various herbs, including Aloe vera, Silymarin, Kabab chini, Curcumin, Rosemary, Ginger, Propolis, black seeds, and Turmeric have been studied for their potential benefits. However, there is still a lack of a definitive treatment for gentamicin-induced nephrotoxicity.[6] Citrullus lanatus, a fruit from the Cucurbitaceae family, is being investigated for its potential nephroprotective effects due to its antioxidant and therapeutic components.[7] The study aims to explore the impact of Citrullus lanatus seeds on aminoglycoside-induced nephrotoxicity, considering the fruit's potential as a safe, cost-effective, and efficient nephroprotective agent when co-currently with aminoglycosides. The findings may contribute to the development of a new, affordable drug for nephroprotection.

Materials and Methods

The study was done from July 01, 2017, to December 31, 2018, at the Department of Pharmacology, King Edward Medical University Lahore, following approval from the Institutional Review Board (IRB) under reference number 165/RC/KEMU. Citrullus lanatus fruit was procured from the local fruit market in Lahore and underwent proper slicing to separate seeds. The identification process was carried out by authorized personnel from Government College University, Lahore. The Citrullus lanatus seed extract (CLSE) used in the study was prepared at PCSIR, Lahore. A dried concentrated extract weighing 28 grams was collected and mixed with 5 ml of distilled water in a tightly closed bottle, protected from sunlight, and stored at 4°C. This prepared extract was used throughout the experiment.

For individual rats, specific doses of CLSE were calculated, namely 400 mg/kg and 600 mg/kg, respectively. These doses were administered through a feeding gauge of no. 16. Nephrotoxicity was induced in rats by administering Gentamicin sulfate at a dose of 80 mg/kg intraperitoneally (IP) in two equally divided doses for 14 days at 12-hour intervals. A total of 40 male adult healthy albino rats, weighing between 150-200 grams, were procured from the local market and randomly divided into five groups, each containing eight rats. Group A served as the healthy control group, receiving 0.5 ml of distilled water orally once daily with a 16-gauge feeding tube. Group B, the disease control group, received Gentamicin at a dose of 80 mg/kg/day IP in two equally divided doses at 12-hour intervals for the duration of 14 days. In the study, Citrullus lanatus seed extract (CLSE) was administered to rats in Group C at a dosage of 400 mg/kg body weight orally once daily, concurrently with gentamicin at a dose of 80 mg/kg/day intraperitoneally (IP) in two equally divided doses for a duration of 14 days. Similarly, rats in Group D received CLSE at a dosage of 600 mg/kg body weight orally once daily, concurrently with gentamicin at a dose of 80 mg/kg/day IP in two equally divided doses for the same 14-day period. Group E rats received the Citrullus lanatusseeds ethanolic extract in the dose of 600 mg/kg/day body weight orally with a 16 gauge feeding tube once daily along with 0.5 ml of normal saline I.P for 14 days. Euthanization occurred 24 hours after the last dose, and rats were sacrificed on day 15 through slaughtering. Kidneys were removed, weighed, and sliced for further analysis. The kidney slices were fixed in 10% formalin, and standard H & E staining was employed for slide preparation. The slides were then examined under a microscope to assess renal changes, including proximal tubular dilatation, necrosis, and inflammation. Semi-quantitative grading of histopathological changes was done as following!

– No pathological change (absence of all parameters defined above)
+ Mild (less than 25% of the tissue affected)
++ Moderate (25 – 50 % of the tissue affected)
+++ Severe (more than 50 % of the tissue affected

The data underwent statistical analysis using GraphPad Prism version 8. One-way analysis of variance (ANOVA) followed by Tukey's multiple comparison tests was employed for group comparisons. A significance level of $p < 0.05$ was considered statistically significant.

Results

Size of kidney (cm): At day-14, width of the kidneys were taken to observe the size of kidneys and no significant difference in length and width of the rats' kidneys among the groups was observed. (Table-1) Inflammation: At day-14, there was significant difference in inflammation among the groups at day 14 with p-value <0.01. (Table-2) (Fig-1,2&3) Tubular necrosis: There was also significant difference among the groups at day 14 with p-value <0.01 in tubular necrosis. (Table-3) (Fig 1,2 &3) Tubular dilatation [diameter (μm^2)]. A significant difference was seen among the groups for outer

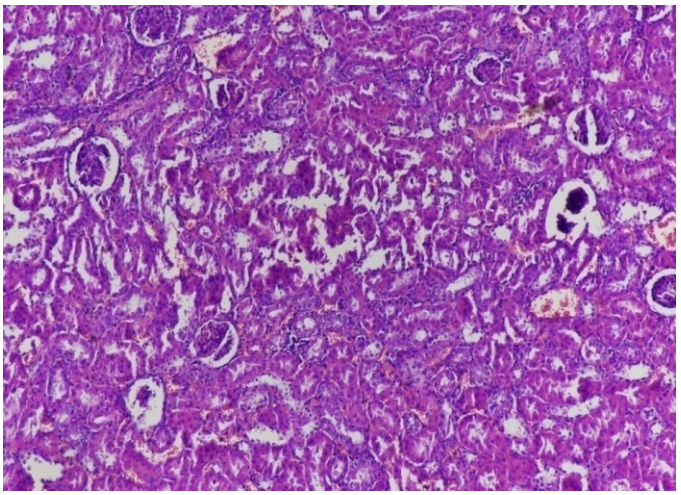

Fig 1: *Group B (positive control) Photomicrograph showing increased tubular dilatation, severe inflammation and necrosis (10 x 10; H&E)*

tubular dilatation with p-value 0.02 and for inner tubular diameter with p-value 0.03 **(Table-1) (Fig-1,2 &3)**

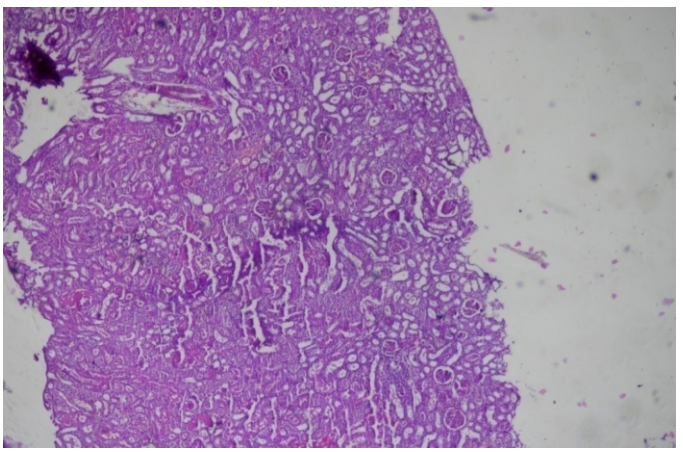

Fig 2: *Group C (low dose Citrullus lanatus seeds extract prophylactic group). Photomicrograph showing moderate to severe inflammation, moderate tubular dilatation*

Table 1: *Comparison of size (width-cm) among groups A, B, C, D, and E.*

	Group-A (n=8)	Group-B (n=8)	Group-C (n=8)	Group-D (n=8)	P-value
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Size of kidneys (width-cm)	0.59±0.07	0.58±0.07	0.58±0.07	0.57±0.07	0.99
Tubular dilatation (Outer)	1972.73±1.26	1384.29±0.36	1547.54±0.28	2042.28±48.93	0.02
Tubular dilatation (Inner)	699.10±0.62	508.23±0.25	493.52±0.35	811.31±42.91	0.03

Group A = normal control, Group B = disease control, Group C = low dose, Group D = high dose.

Table 2: *Comparison of inflammation among groups A, B, C, D, and E (Chi-Square Test)*

Inflammation	Group -A (n=8)	Group-B (n=8)	Group-C (n=8)	Group-D (n=8)	value
	n (%)	n (%)	n (%)	n (%)	
No pathological change	8 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Mild	0 (0.0%)	0 (0.0%)	2 (25.0%)	6 (75.0%)	<0.01
Moderate	0 (0.0%)	2 (25.0%)	3 (37.5%)	2 (25.0%)	
Severe	0 (0.0%)	6 (75.0%)	3 (37.5%)	0 (0.0%)	

**P-value < 0.05, ** P-value < 0.01, *** P-value < 0.001, ns=not significant*

Group A=normal control, Group B = disease control, Group C=low dose, Group D =high dose.

Table 3: *Comparison of tubular necrosis among groups A, B, C, D, and E (Chi-Square Test)*

Tubular necrosis	Group-A (n=8)	Group-B (n=8)	Group-C (n=8)	Group-D (n=8)	-value
	n (%)	n (%)	n (%)	n (%)	
No pathological change	8 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Mild	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (37.5%)	<0.01
Moderate	0 (0.0%)	3 (37.5%)	4 (50.0%)	3 (37.5%)	
Severe	0 (0.0%)	5 (62.5%)	4 (50.0%)	2 (25.0%)	

**P-value < 0.05, ** P-value < 0.01, *** P-value < 0.001, ns = not significant*

Group A = normal control, Group B = disease control, Group C = low dose, Group D = high dose.

and moderate to severe necrosis (10 x 10; H&E)

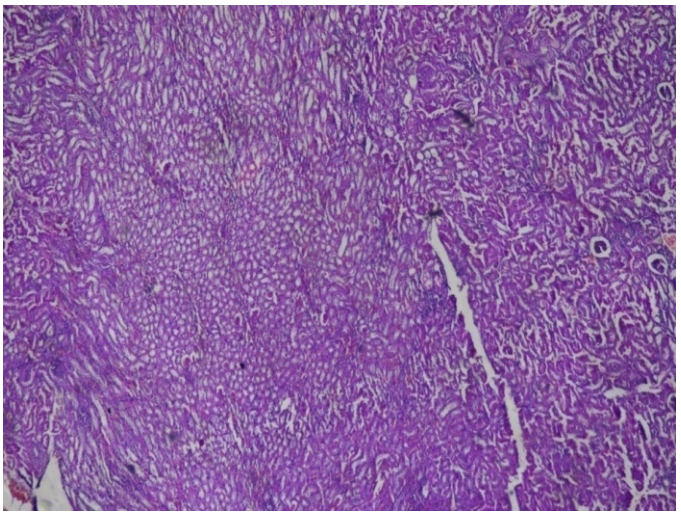

Fig 3: *Group D (high dose Citrullus lanatus seeds extract prophylactic group). Photomicrograph showing moderate to mild inflammation, mild tubular dilatation and mild necrosis (10 x 10; H&E)*

Discussion

Nephrotoxicity in albino rats was induced using gentamicin as it is documented one of the most nephrotoxic drug among aminoglycosides. On day 14 of the study, the length of kidneys across all groups was consistent, leading to the utilization of kidney width (cm) to assess the impact of gentamicin and Citrullus lanatus seed extract on kidney size. No statistically significant change in kidney width was observed when comparing groups B, C, D, and E to the normal control group A. Gross examination revealed that in the positive control group B, kidneys appeared slightly globular and pale with a shiny surface and whitish spots, indicating nephrotoxic effects of gentamicin (acute renal injury), as described in a previous study. In contrast, normal control group A and group E kidneys were red in color. This could suggest that the insignificant change in kidney size may be attributed to the protective use of Citrullus lanatus seeds.[8] Microscopically, positive control group B exhibited severe inflammation in 75% of rats and moderate inflammation in 25% after induction of nephrotoxicity by gentamicin. In group C, where 400 mg/kg of Citrullus lanatus seed extract was given concurrently with gentamicin, 25% of rats showed mild inflammation, 37.5% showed moderate inflammation, and 37.5% showed severe inflammation. Increasing the extract dose to 600 mg/kg in group D resulted in 75% of rats showing mild inflammation and 25% showing moderate inflammation. These findings support the anti-inflammatory properties of the extract, attributed to the presence of antioxidants that counteract oxidative injury and inflammation caused by gentamicin.[9] No signs of inflammation were observed in normal control group A, and in group E, where only the extract was given, no inflammation was noted, consistent with a previous study.[8]

Regarding tubular necrosis, normal control group A showed no necrosis at day 14. Positive control group B exhibited severe necrosis in 62.5% of rats and moderate necrosis in 37.5% after nephrotoxicity induction. In group C, 50% had moderate tubular necrosis, and 50% had severe necrosis. Group D showed 37.5% mild necrosis, 37.5% moderate necrosis, and 25% severe necrosis. Statistically significant results indicated a reduction in tubular necrosis after using Citrullus lanatus seed extract, potentially due to antioxidative effects of vitamin E and flavonoids present in the extract.[10] Group E showed no tubular necrosis, aligning with a previous study concluding that Citrullus lanatus seed extract does not cause tubular necrosis in healthy rats.

At day 14, tubular dilatation significantly decreased in positive control group B compared to normal control group A. However, in groups C and D, tubular dilatation increased when Citrullus lanatus seed extract was administered concurrently with gentamicin, suggesting the potential of the extract to reverse tubular dilatation to normal, possibly due to its antioxidant effect. This aligns with a previous study where tubular damage due to gentamicin was reversed by the antioxidant effect of Kabab chini.[11] In group E, the effect of Citrullus lanatus seed extract on tubular dilatation was statistically insignificant compared to normal control group A, consistent with a study showing no significant histological findings in the kidneys of normal rats given Citrullus lanatus seeds.[9]

Conclusion

The present study confirms the nephroprotective effect of Citrullus lanatus seeds extract. This beneficial effect of Citrullus lanatus seeds might be due to their antioxidant potential. This study may be helpful for development of economical safe and efficacious nephroprotecive agent. Further researches are required to explore the active constituents responsible for nephroprotective effect.

Conflict of Interest: *None*
Funding Source *None*

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Authors Contribution

NY: Conceptualization of Project
INY, AEZ: Data Collection
MUT: Literature Search
FAK: Statistical Analysis
SMNZ: Drafting, Revision
HT: Writing of Manuscript

Frequency of Contrast Induced Acute Kidney Injury in Patients Undergoing Cardiac Catheterization at Jinnah Hospital Lahore

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Abstract

Objective: To determine the frequency of contrast induced acute kidney injury in patients undergoing cardiac catheterization in Jinnah Hospital, Lahore.

Material & Methods: It was a cross sectional study conducted at the cardiology department of Jinnah Hospital. After taking ethical approval from Ethical Review Board (Ref No. ERB130/2/03-11-2022), the study was completed in six months i.e. from 04-11-2022 to 30-04-2023.Total of 217 patients of either sex who underwent cardiac catheterization were included in the study. CI-AKI was defined as increase of serum creatinine 0.5mg/dl or 25% increase from baseline creatinine within 48 hours after exposure to contrast material.

Results: Of total 217patients, 54.8% were male and 45.2% were female. 25 patients (11.5%) in study population developed CI-AKI . Risk of developing CI-AKI was clearly associated with old age, diabetes, hypertension, coronary artery disease and angioplasty.($p < 0.05$)

Conclusion: The conclusion of the study was that frequency of CI-AKI in subjects undergoing cardiac catheterization is 11.5% which is quite significant. Old age, history of diabetes mellitus, hypertension, ischemic heart disease and angioplasty were significantly related with higher risk of developing CI-AKI.

Keywords: Contrast induced AKI, Cardiac catheterization

How to cite: *Afzal MU, Nawaz A, Saeed MA, Butt MM, Sulehri FU, Kashif M. Frequency of Contrast Induced Acute Kidney Injury in Patients Undergoing Cardiac Catheterization at Jinnah Hospital Lahore. Esculapio - JSIMS 2023;20(01):91-94.*

DOI: https://doi.org/10.51273/esc24.251320118

Introduction

Acute kidney injury (AKI) is defined as the increase in serum creatinine value more than 1.5 times the basal value or the decrease in glomerular filtration rate by more than 25% or the decrease in urine output below 0.5 mL/kg/h.[2] Acute kidney injury (AKI) is a frequently documented entity in admitted patients ranges form 18-70% with more frequent in critically ill patients.[3] Among multiple causes of AKI, administration of intravenous contrast is one of the leading causes of AKI and ranked third most cause of AKI in hospitalized patients[1].

IV contrast is used both for diagnostic and therapeutic purposes. Cardiac catheterization is one of the important procedures where intravenous contrast is used. The term 'contrast induced AKI (CI-AKI)' has been used to describe renal injury with contrast exposure.[4]

It is less common with contrast exposure in patients with normal renal functions as compared to patients already having underlying renal disease.[5]

CI-AKI is considered reversible form of AKI though it may be related to the adverse outcomes.[6]

Definition of the Contrast-induced nephropathy (CIN) is deterioration of renal parameters, measured as either a twenty five percent rise in serum creatinine (S/Cr) from baseline or a 0.5 mg/dL (44 µmol/L) rise in absolute Serum Creatinine , within forty-eight hours of administration of intravenous contrast.[7] CIN has strong correla-

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Submission Date: 12-01-2024
1st Revision Date: 29-01-2024
Acceptance Date: 02-03-2024

tion with a higher risk of mortality.[8]

There are multiple risk factors for developing CIN. Pre-existing renal insufficiency is the most important risk factor for CIN. Other important risk factors are advancing age, underlying liver disease, atherosclerosis, heart failure, anaemia and dehydration.[9]

The incidence of CIN ranges from 5 to 27% with less chances in patients with normal renal functions.[10] According to study by Rear et al , following coronary angiography or percutaneous coronary intervention, CIN is reported in upto 50% of high risk patients.[11]

Materials and Methods

The study was conducted at the cardiology department of Jinnah Hospital, Lahore. The duration of the study was 6 months after synopsis approval i.e., 04-11-2022 to 30-04-2023. A sample size of 217 was determined taking expected frequency of CI-AKI at 10% with confidence level of 95% and 5 % margin of error. Non-probability consecutive sampling. Indoor patients undergoing cardiac catheterization (Angiography and percutaneous coronary intervention). Both male and female gender. Patients between 18 to 65 years of age were included. Patients of ESRD currently on dialysis. Patients already having underlying renal disease. Patients underwent open heart surgery within 3 days after coronary angiography were included. After the synopsis approval, patients admitted to the cardiology ward of Jinnah Hospital Lahore who met the inclusion criteria were evaluated. Informed consent was obtained. Fifty millilitres of low-osmolal contrast 'Ultravist' with an osmolality of 600 mosm/kg was used intra-arterially for cardiac catheterization. Five millilitres of venous blood were drawn for the measurement of serum creatinine, at the baseline and 48 hours after the catheterization. All the laboratory investigations were performed in the pathology laboratory of Allama Iqbal Medical College, Lahore. Data collection was carried out by the investigator himself via a questionnaire. Contrast induced AKI was recorded as per operational definition and it was managed as per hospital protocol. In order to analyze data, the software SPSS 22.0. was utilized. Categorical variables like gender, diabetes, hypertension and ischemic heart disease were described as percentage and frequency. Whereas the quantitative variables e.g. age was reported as mean ± standard deviation. However, the outcome variables i.e. CI-AKI was stratified by age, gender, diabetes mellitus (BSR >200mg/dl), hypertension (BP >140/90mmHg), ischemic heart disease, procedure (angiography/ angioplasty) and analyzed. Chi- square test was employed taking p-value ≤ 0.05 as significant to know the difference by age, gender and with respect to outcome variable.

Results

217 patients were included in our study population.21 (9.4%) had age 30-40 years,54(24.9%) had age 41-50 years,98(45.2%) had age 51-60 years and 44 patients (20.3%) had age 61-65 years. Among 217, majority 119 patients (54.8%) were male and 98 patients(45.2%) were female(Table 1).Regarding associated comorbidities, 138 patients(63.6%) had diabetes, 141 patients (65%) had hypertension while 72 patients (33.2%) had prior history of ischemic heart disease (Table 2).172 patients (79.3%) had undergone angiography while 45 patients (20.7%) had angioplasty. 25 patients (11.5%) in study population developed CI-AKI while 192 patients (88.5%) did not had CI-AKI (Table 3). When we cross tabulated age of patient with CI-AKI, it showed significant result (p value <0.001) implying the significant

Table 1: *Cross tabulation of CI-AKI with age groups and Gender*

	Contrast Induced AKI		p-value
Age of Patient	Yes	No	
30-40 year (n=21)	1 (4.76%)	20 (95.24%)	<0 .001
41-50 year (n=54)	0 (0%)	54 (100%)	
51-60 year (n=98)	1 (1.02%)	97 (98.98%)	
61-65 year (n=44)	23 (52.3%)	21 (47.7%)	
Total (n=217)	25 (11.5%)	192 (88.5%)	
Gender			
Male (n=119)	13(10.92%)	106(89.08%)	0.762
Female (n=98)	12 (12.24%)	86(87.76%)	
Total (n=217)	25 (11.5%)	192(88.5%)	

Table 2: *Cross tabulation of CI-AKI against comorbidites*

	Contrast Induced AKI		p-value
Diabetes Mellitus	**Yes**	**No**	
Yes (n=138)	22 (15.94%)	116 (84.06%)	**0.007**
No (n=79)	3 (11.5%)	76 (88.5%)	
Total (n=217)	25(11.5%)	192(88.5%)	
Hypertension			
Yes (n=141)	23(16.31%)	118(83.69%)	**.003**
No (n=76)	2 (2.63%)	74 (97.37%)	
Total (n=217)	25(11.5%)	192(88.5%)	
IHD			
Yes (n=72)	18 (25%)	54(75%)	**<.001**
No (n=145)	7 (4.82%)	138 (95.18%)	
Total (n=217)	25(11.5%)	192(88.5%)	

association of old age with risk of CI-AKI. While gender difference was not statistically significant (Table 1). On cross tabulation of diabetes, hypertension and ischemic heart disease with CI-AKI, all three comorbidities were statistically significant.

Table 3: *Cross tabulation of Cardiac catheterization procedure with Contrast induced AKI*

Cardiac	Contrast Induced AKI		Total	p value
Catheterization	**Yes**	**No**		
Procedure				
Angiography	13	159	172	**<.001**
	8.17%	91.83%	100%	
Angioplasty	12	33	45	
	26.66%	73.34%	100%	
Total	25	192	217	
	11.5%	88.5%	100%	

Discussion

Acute renal injury due to contrast is common in patients undergoing cardiac catheterization. It is a commonly reported issue in literature however local data is scarce.

CI-AKI is correlated with higher risk of hospitalization, higher morbidity and conversion to chronic kidney disease in high-risk population undergoing the procedure. CI-AKI also has poor prognosis in long term in high-risk population. Thus, the study was performed to find the incidence of CI-AKI in local population and elaborate the association between various risk factors and risk of CI-AKI. Out of total 217 patients, 25 patients (11.5%) in study population developed CI-AKI while 192 patients (88.5%) did not develop CI-AKI. This shows that the frequency of CI-AKI is high in those undergoing cardiac catheterization. The findings of our study are compatible with study conducted at cardiology department Hyatabad Medical Complex of Peshawar in 2014. In this study, 177 admitted patients underwent cardiac catheterization and CI-AKI was observed in 18 patients (10% of study population)[12]. Similarly, in a meta-analysis (Aug 2019) of 12 studies including 6342 patients who underwent cardiac catheterization after STEMI showed that overall incidence of CI-AKI was about 13%[13]. In our study, there was significant association between age of patients and CI-AKI with overall p value<.001. Out of total 21 patients in the age group between 30-40 years, only 1 patient (5%) developed CI-AKI while 23 patients out of 44(52%) developed CI-AK in the age group 61-65 years. A study done by Moos SI et al in 2013 showed increased risk of CI-AKI in patients aged > 65 years (odds raio:1.95)[14].

Our study determined that frequency of CI-AKI was 10% in males while 12% for females but it was not statistically significant (p = 0.762). A study by Sidhu RB et al in 2008 including 13127 patients showed that there was no difference among different gender in young patients but it was noted that frequency of CI-AKI was higher for females compared with males in the age group 65-79 years old with p<.00115.

Statistically significant association was noted between diabetes mellitus and risk of CI-AKI in our population. In the diabetes group frequency of CI-AKI was 15.9% vs 3.9 % in non-diabetic group (p=0.007). These results were similar to an Iranian study (2010) which demonstrated that risk of contrast induced nephropathy was greater in diabetics when compared to non-diabetic patient (p<0.05)16. Similarly, there was statistically significant association noted between hypertension and CI-AKI. In our study CI-AKI occurred in 19% hypertensive patient's vs 2% normotensive patients (p = 0.003). Our study also found statistically significant association between ischemic heart disease and risk of CI-AKI. It showed that the incidence of CI-AKI was 25% in those with history of IHD vs 4.82% in those with no IHD (p = <0.001). It has been found in Our data that there is statistically significant difference occurs in the incidence of CI-AKI in those undergoing angiography vs angioplasty (7% vs 26% respectively) with p value<0.001. A study by Marenzi G et al in 218 patients with anterior wall MI undergoing angioplasty showed incidence of CI-AKI at 19%[17].

There are limitations to our current study which include single centre study and sample size which was not much larger than the previous studies. Our study did not include patients who were >65 years and <30 years of age. The large sample size and inclusion of all age groups will make data more reliable and accurate. There was also no follow up of the patients who had AKI after contrast so we cannot comment on long term consequences of CI-AKI. Despite all these limitations, our study had many strengths as well. It highlighted a very important clinical entity on which very limited local data is available. Our study can provide important insights into future studies conducted on CI-AKI

Conclusion

It is concluded that there is very much high frequency (11.5%) of CI-AKI observed in patients undergoing cardiac catheterization. Significant association of CI-

AKI occurs with old age, history of diabetes mellitus, hypertension, coronary artery disease and angioplasty.

Conflict of Interest *None*

Funding Source *None*

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Authors Contribution

MUA, AN: Conceptualization of Project
MAS, MMB: Data Collection
MUA, FUS: Literature Search
AN, MK: Statistical Analysis
MAS, MMB: Drafting, Revision
MUA, AN: Writing of Manuscript

Efficacy of Bubble CPAP in Managing Respiratory Distress in Neonatal Intensive Care Unit

Maryam Jamil,[1] Mohammed Abbas,[2] Shazia Naz,[3] Abeer Qadir,[4] Hassan Abbas,[5] Mohammed Ali Khan[6]

Abstract

Objective: To determine the efficacy of BCPAP (bubble continuous positive airway pressure) in management of neonates presenting with respiratory distress.

Material and Method: This is a Descriptive Case series conducted in Neonatal Intensive Care Unit, Punjab Rangers Teaching Hospital, Lahore, over 6 months from 3rd August, 2022 to 3rd February, 2023. 60 neonates of both gender, received within 2 hours of delivery and symptoms of respiratory distress syndrome (as per operational definition). BCPAP (Bubble continuous positive airway pressure) was initiated at 5cm H2O to maintain pulse oximeter saturations above 90% in babies weighing over 1.5kg. Neonates were monitored for 48 hours, and Silverman Anderson Retraction Scores were assessed before and after this period. Efficacy, defined as a 3-point or greater reduction in the Silverman Anderson Retraction Score after 48 hours, was evaluated.

Results: 35 % (n=21) were male whereas 65% (n=39) were females. This study found that percentage of efficacy was 88.3% of BCPAP in management of neonates presenting with respiratory distress.

Conclusion: BCPAP has proven to be the choice of primary respiratory support in neonates with Respiratory Distress Syndrome due to its efficacy and cost-effectiveness in a limited resource setting.

Keyword: Bubble CPAP, Neonate Respiratory Distress, RDS, Supplemental Oxygen

How to cite: *Jamil M, Abbas M, Naz S, Qadir A, Abbas H, Khan MA. Efficacy of Bubble CPAP in Managing Respiratory Distress in Neonatal Intensive Care Unit. Esculapio - JSIMS 2023;20(01): 95-99.*

DOI: https://doi.org/10.51273/esc24.251320119

Introduction

In global perspective, approximately 2.5 million neonates die out of the 140 million live births.

Respiratory Distress syndrome remains one of the most frequent cause of mortality in the neonatal period. The manifestation of this syndrome is a usually a consequence of decreased surfactant synthesis and produces symptoms of tachypnoea, increased work of breathing with retraction of suprasternal, intercostal and subcostal areas, cyanosis, grunting, stridor and poor feeding. Worsening condition without intervention lead to ventilation-perfusion mismatch, atelectasis and type 1 and type 2 respiratory failure.[1,2] These symptoms start at birth and deteriorate over next 2-3 days.

The rate of neonatal mortality is significantly elevated in low and middle-income nations compared to high-income countries. In 2019, the infant mortality rate in United States due to respiratory distress syndrome (RDS) was reported to be 11.5 per 100,000 live births. However, in a study in Ethiopia the total incidence of neonatal mortality was 59.87 per 1000 neonates-days observations and in 2019, sub-Saharan Africa and Southern Asia comprised of 80% of global neonatal fatalities.[1,3] 75% of these deaths occur in the first week, and nearly one million newborns passing away within 24 hours. Respiratory issues are the primary cause of neonatal intensive care

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Submission Date: 10-01-2024
1st Revision Date: 26-01-2024
Acceptance Date: 13-03-2024

unit (NICU) admissions, responsible for about 25% of NICU deaths.[4] Gender-based research suggests a higher risk of distress in males, as reported by Aynalem et. al.[5]

Continuous Positive Airway Pressure (CPAP) is vital in managing neonatal respiratory distress. Nasal CPAP, commonly used in NICUs, offers numerous benefits. Effective CPAP administration requires close coordination among physicians, nurses, and families. CPAP is increasingly accessible in developing countries due to cost-effective devices. It can be given through variable flow, high flow nasal cannulas, or bubble CPAP (bCPAP), which involves generating bubbles using a water column. The mixed oxygen is delivered at 6-7L/min flow and 5-6cm H2O pressure.[6] The intranasal bubble CPAP delivery system is cost-effective, aiding in maintaining open airways and supporting respiratory function, particularly in premature neonates experiencing signs of respiratory distress. Using this method, gas passes through the nasal device, and pressure is established in the circuit by submerging the CPAP circuit's distal end in a predetermined depth of water. This action produces bubbles and induces pressure fluctuations within the circuit. The simplicity and cost-effectiveness of this CPAP method makes it preferable in limited-resource settings. Kinshella et al . reports that the price of stand-alone CPAP unit cost 100 to 1000 times higher than equipment used in this case.[7]

Studies in Nepal emphasize the early benefits of bubble CPAP within 24 hours of birth.[8] Multiple studies from low-income countries show CPAP's survival advantages over oxygen alone in preterm and VLBW neonates.[9-13] This novel bubble CPAP system has been designed in such a way to administer pressurized and humidified gases in the absence of need of manual power, compressed air or electricity without compromising on quality and acessibility.[14]

Pakistan faces significant neonatal mortality challenges, primarily due to respiratory distress. As a third-world country, we require straightforward and efficient approaches to enhance neonatal care provided in hospitals. Various studies in Pakistan report varying efficacy rates of bubble CPAP, with survival rates ranging from 71% to 93.3%.[13]

This study aims to assess bubble continuous positive airway pressure's efficacy in managing neonatal respiratory distress, offering evidence tailored to the local population. The focus is on BCPAP, which has proven to be a more cost-effective option in a low-income setting compared to CPAP generated by driver devices or ventilators, which include expensive accessories replacement. This will enhance regional guidelines for neonatal respiratory distress management, improving our understanding of this critical issue.

Materials and Methods

This study is a Descriptive Case series conducted in Neonatal Intensive Care Unit, Neonatal Intensive Care Unit, Punjab Rangers Teaching Hospital, Lahore, over 6 months from 3rd August, 2022 to 3rd February, 2023. The sample size of 60 neonates is calculated, using the WHO calculator, with 95% confidence interval, 7% margin of error and percentage of efficacy i.e. 93.3% with BCPAP in neonates with respiratory distress.[13] The sampling technique is non-probability, consecutive sampling. The study included neonates of both gender, received within 2 hours of delivery and symptoms of respiratory distress syndrome (as per operational definition). The patients excluded from the study were those with birth weight <1.5 kg, very preterm (<33 weeks of gestation) congenital anomalies like Tetralogy of Fallot's, Cleft lip and palate, congenital diaphragmatic hernia, choanal atresia and neonates with severe cardiovascular instability (on clinical examination).

The study enrolled 60 eligible infants from the Neonatology Department's emergency unit, with parental informed consent obtained. Demographic data, including baby name, age at admission, gestational age at birth, birth weight, and Apgar score, were meticulously recorded. BCPAP was initiated at 5cm H_2O to maintain pulse oximeter saturations above 90% in babies weighing over 1.5kg. This method involved creating bubbles by immersing the end of a respiratory circuit, facilitating exhalation against a water column. Neonates were moni-tored for 48 hours, and Silverman Anderson Retrac-tion Scores were assessed before and after this period. Efficacy, defined as a 3-point or greater reduction in the Silverman Anderson Retraction Score after 48 hours, was evaluated. Data collection employed a standardized proforma, and subsequent analysis was performed using SPSS Statistics. Quantitative data, such as age at presentation, birth weight, gestational age at birth, Apgar score, and Silverman Anderson Retraction Scores before and

after treatment, were expressed as mean and standard deviation. Qualitative data, including gender, efficacy, and mode of delivery, were presented as frequency and percentage

Stratified analysis was conducted by gestational age, gender, and birth weight, with a chi-square test applied for significance (p-value set for analysis).

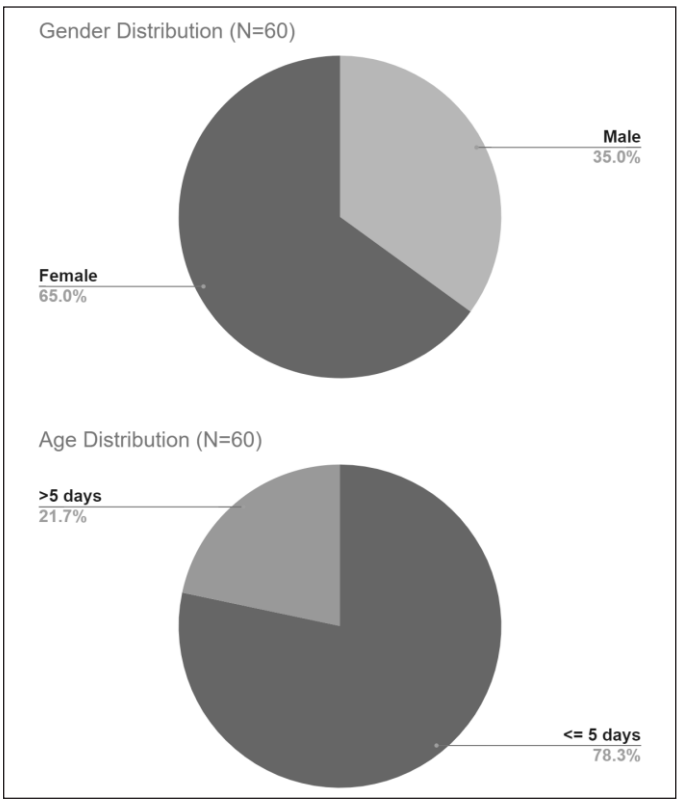

Fig No. 1: *Age and Gender Distribution*

Results

After 60 patients fulfilling inclusion and exclusion criteria will be selected to determine the efficacy of BCPAP in management of neonates presenting with respiratory distress. Age distribution of the patients was done, it shows that out of 60 patients, 78.3% (n=47) were in age group of <= 5 days and 21.7%(n=13) were in age group of >5 days and mean age was calculated as was 3.88±1.94 days. (Fig No. 1) Gender distribution of the patients was done, it showed that 35 % (n=21) were male whereas 65% (n=39) were females. (Fig-1) This study found that percentage of efficacy was 88.3% of BCPAP in management of neonates presenting with respiratory distress. (Table No. 1) The Silverman Anderson retraction Score calculated after initiating BCPAP in the patients was less than by almost 60% (Table No. 2)

Table 1: *Distribution of efficacy (N= 60)*

	Frequency	Percent
Yes	53	88.3
No	7	11.7
Total	60	100.0

Table 2: *Silverman Anderson Retraction Scores before and after BCPAP (N=60)*

Variable	Mean±SD
SARS (Before)	7.41±1.3
SARS(After)	3.15±0.60

Table 3: *Stratification of efficacy with respect to gender using chi-square test N= 60*

			Efficacy		Total	P-value
			Yes	No		
Gender	Male	Count	17	4	21	
		% within Gender	81.0%	19.0%	100.0%	
	Female	Count	36	3	39	
		% within Gender	92.3%	7.7%	100.0%	0.191
Total		Count	53	7	60	
		% within Gender	88.3%	11.7%	100.0%	

Discussion

Neonatal respiratory distress syndrome (RDS) is a common issue in newborns, especially preterm infants. It remains a leading cause of morbidity and mortality among these infants.[15] In this study of 60 patients, 78.3% were in the <= 5 days age group, with a mean age of 3.88±1.94 days. Gender distribution showed 35% males and 65% females. The study found that BCPAP was effective in 88.3% of neonates with respiratory distress.[15]

Neonatal respiratory distress is characterized by increased work of breathing, including nasal flaring, tachypnea, chest retractions, or grunting. Tachypnea is defined as a respiratory rate exceeding 60 breaths per minute, often seen in various respiratory, cardiovascular, metabolic, or systemic diseases. Neonatal chest walls, composed primarily of cartilage, are more pliable, predisposing them to decreased functional residual capacity and atelectasis. Decreased lung compliance, as seen in TTN, RDS, pneumonia, or pulmonary edema, results in marked tachypnea.[16-20]

RDS affects preterm infants more than term infants. The incidence is inversely related to gestational age, and more severe in smaller and more premature

neonates.[15] In the United States, RDS affects about 24,000 infants annually, primarily preterm ones. It is the most frequent complication seen in prematurity and can lead to significant morbidity and mortality in very low birth weight infants. Risk factors of RDS include, low birth weight, prematurity, male gender, white race, late preterm delivery, perinatal hypoxia, maternal diabetes, and ischemia, and delivery in the without labor.[21]

RDS, historically known as hyaline membrane disease, involves the eosinophilic membrane lining distal airspaces. The ruddy appearance of lung tissue from infants suffering from RDS is similar in to hepatic tissue. The components of hyaline membrane include cellular debris, fibrin, leukocytes and red blood cells. Microscopic examination shows pulmonary tissue with areas of atelectasis and dilated alveoli.[15]

Bubble CPAP is the preferred mode of delivering CPAP in resource-poor setting due to it's simple set-up and efficacity. This proved to be so in this study with 88.3% efficacy in reducing symptoms of respiratory distress in neonates compered to nasal oxygen. Earlier initiation of b-CPAP in RDS, especially in preterm infants, is recommended for faster stabilization and avoidance of downward spiraling of alveolar instability, lung collapse and fall in functional residual capacity which leads to hypoxemia and respiratory failure. [22]

Conclusion

In current study, we determined the efficacy of bubble continuous positive airway pressure in management of neonates presenting with respiratory distress, where the percentage of efficacy was 88.3% of bubble continuous positive airway pressure. B-CPAP is highly successful in improvement of condition neonates and very low rate of mortality after B-CPAP. This study will help us to improve our knowledge and current guidelines for management of neonates with respiratory distress.

Conflict of interest: *None*

Funding source: *None*

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Authors Contribution

MAK: Conceptualization of Project
HA: Data Collection
AQ: Literature Search
SN: Statistical Analysis
MA: Drafting, Revision
MJ: Writing of Manuscript

Diagnostic Accuracy of Sonographic Twinkling Artefact in Localization of Ureteric Stones Keeping Low Dose Computed Tomography as the Gold Standard

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Abstract

Objectives: To determine the diagnostic accuracy of color Doppler twinkling artifact in conjunction with grey-scale ultrasound for diagnosis and localization of ureteric stones, keeping low dose computed tomography findings as the gold standard in adult patients presenting with lumbar pain.

Materials & Methods: In this cross-sectional study, a group of 190 adult patients were enrolled for the diagnosis of ureteric calculi. Each subject was examined using greyscale ultrasound, followed by color Doppler ultrasound for twinkling artifacts. The effectiveness of ultrasound in identifying calculi was evaluated by comparing it to the low-dose computed tomography. Density of the stones in computed tomography was correlated with the outcome of shock wave lithotripsy. All the collected data was entered and analyzed on SPSS version 25.0.

Results: The mean age of the patients was 48.41±16.69 years. For diagnosing ureter calculi the sensitivity, specificity, negative predictive value , positive predictive value, and diagnostic accuracy of Doppler ultrasound were 90.4%, 73.9%, 77.2%, 88.7% & 85.3% respectively taking computed tomography findings as gold standard.

Conclusion: Twinkling artifacts in conjunction with grey-scale ultrasound demonstrate considerable sensitivity and relatively low specificity in diagnosing ureteric calculi.

Keywords: Doppler ultrasound, Twinkling artifact, computed tomography, ureteric calculi.

How to cite: *Rashid A, Iqbal I, Khan A, Aamir HS, Saeed S, Omer MA. Diagnostic Accuracy of Sonographic Twinkling Artefact in Localization of Ureteric Stones Keeping Low Dose Computed Tomography as the Gold Standard. Esculapio - JSIMS 2023;20(01): 100-103.*

DOI: https://doi.org/10.51273/esc24.251320120

Introduction

Ureteric stones are recognized as one of the most painful disorders of the urogenital system causing obstructive uropathy. Such patients usually present with severe flank pain, nausea and vomiting. It affects 20% of the general population worldwide.[1] Ultrasound Urine Ketone Body (KUB) has been established as the cost-effective, non-ionizing, easily available investigation modality for the diagnosis of urolithiasis.[2] Sonographic detection of ureteric stones is often a challenging subject due to their location behind the beam-attenuating tissues e.g. fat & bowel. Twinkling artifacts on color Doppler ultrasound can detect these small calculi in conjunction with grey-scale ultrasound since its intensity is dependent on the architecture of the stone.[3] The "Twinkling artifact" also known as the "color comet tail artifact" was first described in 1996.[4] It is operator-dependent & requires a probe with a scale setting at high color velocity to differentiate from renal vessels. Spectral Doppler spectrum shows close vertical bands with saturated amplitude.[5] Low-dose CT KUB is a promising CT technique with reduced radiation dose to the patient and with the added benefit of high sensitivity and specificity for urinary stone detection.[6,7]

Materials & Methods

This study is a descriptive cross-sectional analysis

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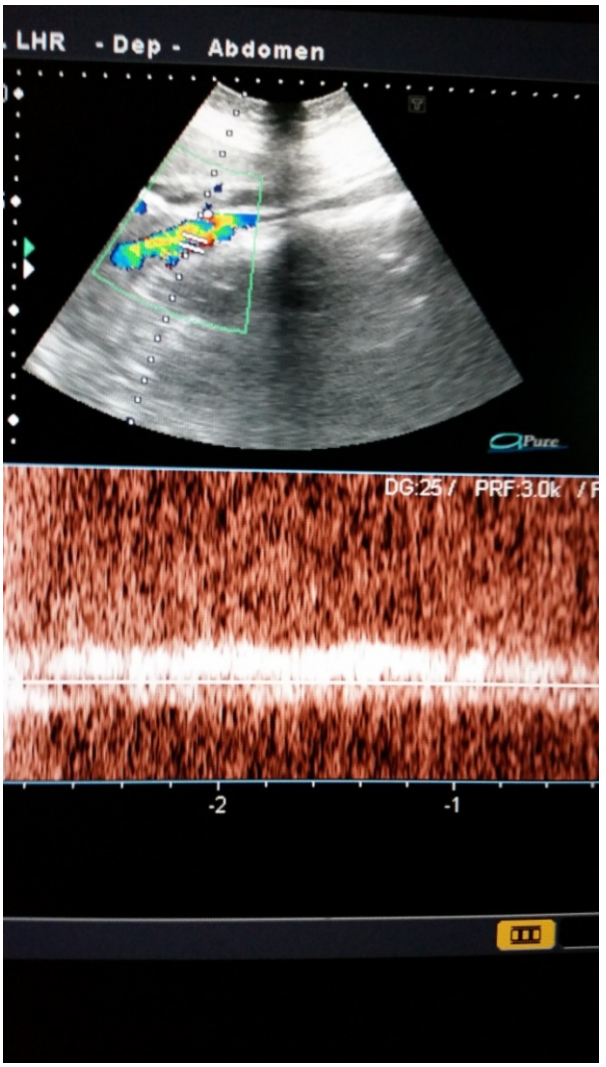
Submission Date: 05-12-2023
1st Revision Date: 29-01-2024
Acceptance Date: 12-03-2024

carried out at the Radiology Department of Services Hospital in Lahore from June 10, 2021, to December 10, 2021. The Institutional Review Board approved the research, and all the participants provided written informed consent. The study included 190 cases. They were selected based on a 95% confidence interval and a 5% margin of error, with the expected sensitivity being 97% & specificity 70%. The recruitment of participants was done using a non-probability consecutive sampling technique. For the diagnosis of ureteric calculi, the primary indicator was the presence of an acoustic shadowing on greyscale ultrasound & twinkling artifact on color Doppler ultrasound.

Presence of ureteric colic in patients 18-60 years of age both males and females. Ureteric stones (5-20mm size)causing hydronephrosis on grey-scale imaging. Denial to undergo CT. contra-indications to CT e.g. Pregnancy. Presence of alternate diagnosis e.g. Appendicitis, Gastroenteritis, Ovarian Pathology, Renal mass, fever, and UTI. Obese patient (BMI >30). Patients clinically suspected of ureteric colic and referred for CT scanning were examined after informed consent. The Sonographic study was performed using Xario-200 (Toshiba)with a convex 3–6 MHz probe by a consultant Radiologist. Both flanks were scanned in a supine position with grey scale ultrasound looking for hydronephrosis & nephrolithiasis. If hydronephrosis was observed then the ureter was traced from the renal pelvis up to the ureterovesical junction in a lateral position. Stone measurement was done in the longest dimension. Colordoppler was used to generate twinkling artifact. The twinkling artifact was analyzed & patients were further examined with low dose CT KUB to determine sensitivity, specificity, Positive predictive value and Negative predictive value. CT KUB was performed with a 16 slice- Toshiba Aquilion 2007 machine using our standard protocol for renal colic (120 kV, 200 mAs, and 3mm reconstruction in Sagittal and coronal planes).

Results

Data was analyzed by SPSS software, version 25.0. Qualitative variables, including the diagnosis of twinkling artifact via grey scale & Doppler USG, as well as CT KUB, were expressed using frequencies and percentages. Quantitative variables, such as age and BMI, were expressed as through means and standard deviations. In this study total of 190 patients were enrolled with a mean age of 48.41±16.69 years. Male patients were 77% and females were 23%. Mean value of the BMI of the patients was 22.97±4 kg/m^2 with minimum and maximum values of 16.50±29.82 kg/m^2 respectively. Our study results showed the



sensitivity, specificity, PPV, NPV, and diagnostic accuracy of Doppler USG were 90.4%, 73.9%, 77.2%, 88.7% & 85.3% respectively.

Table 1: *Comparison of diagnosing ureteric stone by Doppler USG taking CT finding as Gold standard*

		CTKUB Findings		Total
		Positive	Negative	
Doppler USG twinkling artefact	Positive	85	25	110
	Negative	9	71	80
Total		94	96	190
Sensitivity			90.4%	
Specificity			73.9%	
Positive predictive value			77.2%	
Negative predictive value			88.7%	
Diagnostic accuracy			85.3%	

Greyscale Ultrasound of ureter in conjunction with color Doppler demonstrating Twinkling artifact and its spectral pattern

Discussion

Twinkling artifact on color Doppler USG is seen on or behind the stone in collaboration with grey scale imaging at the site of ureteric stones. Krakhotkin et al results matched with our study & concluded high sensitivity (90%) and lower specificity for stones greater than 5 mm 8. Twinkling artefact is more valuable for stones greater than 5mm in size.[9-13] Few other studies including Hanafi et al also concluded the high false-positive value of using twinkling artifacts for stones less than 5mm.[14-16] Stones with rough surfaces produced more intense twinkling artifacts than those with smooth surfaces showing an interesting relationship between twinkling artifacts & stone composition.[17,18] CT density value also plays a role in the success of ESWL, with the value of <1180 HU favoring a successful outcome.[19,20] Twinkling artefact is highly operator dependent with a small risk of high false positive rates.[21,22] Low-dose CT KUB reduces the radiation burden while maintaining high sensitivity and specificity for ureteric stone detection.[23,24]

Conclusion

High sensitivity & good diagnostic value of color Doppler twinkling artifact makes it a reliable method for the diagnosis of urolithiasis and its efficacy is proven by correlation with the findings of low dose computed tomography.

Conflict of interest *None*

Funding Source *None*

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Authors Contribution

AR, II: Conceptualization of Project
AR: Data Collection
AK, HSA: Literature Search
SS, MAO: Statistical Analysis
II: Drafting, Revision
AK, MAO: Writing of Manuscript

Short Term Side Effects of COVID-19 Vaccination in Patients Presenting At a Tertiary Care Hospital, Lahore

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Abstract

Objective: To determine the frequency and factors associated with short term side effects of COVID-19 vaccination in patients presenting at Tertiary Care Hospital, Lahore

Material and Methods: This was a cross-sectional study with non-probability sampling conducted at the vaccination center of a tertiary care hospital, Lahore, among 381 adults from December 2021-Feburaray 2022. Data was collected through a semi-structured questionnaire and analyzed using SPSS version 23 whereas p-value ≤ 0.05 was taken as significant.

Results: Among 381 adults, 171 (44.9%) experienced short term side effects after COVID-19 vaccination. There were 163(42.8%) males and 218(57.2%) females with a mean age of 30.09±9.26 years. Among 171(44.9%), weakness 72 (18.9%) was the most reported side effect, followed by local swelling 69(18.1%), local pain 63(16.5%) and fever 52(13.6%).Female gender, fear about side effects, family member's experience of side effects, vaccination due to self-protection, media and government advice were significant factors associated with short term side effects.

Conclusion: Short term side effects were reported among 171 (44.9%) of patients. Health education and public awareness are required to remove the fear of side effects among public.

Keywords: Covid-19, Vaccination, Fear, Side effects.

How to cite: *Humayun K, Hameed R, Khan S, Ghias F, Farooq MU, Tahir Z. Short Term Side Effects of COVID-19 Vaccination in Patients Presenting At a Tertiary Care Hospital, Lahore. Esculapio - JSIMS 2023;20(01): 104-108.*

DOI: https://doi.org/10.51273/esc24.251320120

Introduction

COVID-19 emerged as pneumonia of unknown etiology in Wuhan City of China in 2019. Later, respiratory droplet analysis showed a novel coronavirus and named as 2019-nCoV. It was re-named as Coronavirus disease-19 (COVID-19) by the World Health Organization (WHO) on February 11, 2020. Also, it was declared as a public health emergency of international concern (PH EIC) on 30th January 2020 and a Pandemic on 11th March 2020 by the WHO.[1,2,3] Containment measures such as border control, country wide lockdown, quarantine houses, sealing of areas, standard operating procedures implementation such as use of masks, sanitizer and social distancing were recommended to be key preventive strategies.[4] In such a situation vaccine was a ray of hope, hence different vaccine designs were utilized to formulate vaccination against COVID-19 namely live attenuated viral vaccine, recombinant viral-vectored vaccines, inactivated viral vaccines, protein subunit vaccines, virus-like particles and nucleic acid-based vaccines.[5] The first COVID-19 vaccination got authorization for emergency use in the USA in December 2020.[6] Since 2021, approximately 7.5 billion vaccination coverage has been reported globally. About 120 million people have been vaccinated in Pakistan.[7]

Vaccination safety was ensured by competent authori-

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Submission Date: 30-11-2023
1st Revision Date: 18-01-2024
Acceptance Date: 03-03-2024

ties, still public hesitancy for vaccination was the biggest challenge at that time. Due to rumor mills, vaccine hesitancy was substantial in Pakistan as per expectations, as we have observed that in the case of polio.[7,8]

It has been reported that 50-90% persons who received COVID-19 vaccination complained of some side effects which included redness, swelling and pain as local and headache, muscle pain and fatigue as systemic side effects.[6] Various studies conducted in Pakistan showed that pain at injection site was the most commonly reported side effect, followed by swelling, myalgia, fever and headache.[7,9]

As literature review suggested scarce research in Lahore hence, this study was designed to determine short term side effects of COVID-19 vaccination in Lahore.

Materials and Methods

This was a cross-sectional study with non-probability sampling conducted at the vaccination center of a tertiary care hospital, Lahore, among 381 adults from December 2021-Feburaray 2022. After approval from the ethical review board of the institute, a total of 381 adults of both genders, ≥ 18 years of age who gave consent were included through convenient sampling. Adults who refused to participate, those who were less than 18 years of age according to their identity card and those who did not receive COVID-19 vaccination were excluded from the study.

All participants were given a brief introduction about the purpose and outcome of the study. The participation was completely voluntary, and they could withdraw from the study anytime without any consequence. Participants were interviewed following the administration of the COVID-19 vaccination. The questionnaire included socio-demographic characteristics, knowledge about vaccination, acceptance of COVID-19 vaccine, concerns regarding COVID-19 vaccine and side effects after vaccination. In order to ensure no adverse reaction was ignored, the participants were first asked to report any reactions they might have suffered after receiving the vaccine within three days. On the fourth day, the researcher contacted participants through phone and asked about a list of adverse reactions. The side effects were local swelling at the injection site, weakness, fever, nausea, joint pain, itching, decreased appetite and decrease sleep. These variables were chosen as these were reported in clinical trials of vaccination and the most frequent side effects reported by other studies[6,8,9]. Participants who reported no side effects were also included in this study.

Data was then entered and analyzed through SPSS Version 23.0 and frequency and means with standard deviation were calculated. Chi square was applied to assess strength of association, where p-value ≤ 0.05 was taken as significant at 95% confidence interval.

Results

Total of 381 individuals were questioned, 171 individuals (44.9%) had short term side effects after Covid-19 vaccination whereas 210(55.1%) did not report any short-term side effects. Among participants, 163(42.8%) were male, while the mean age of participants was 30.09 ± 9.26 years. About 59(15.5%) were illiterate, 285 (74.8%) were employed. The study also showed that 151(39.6%) had fear that they will have side effects before going for vaccination, while 193 (50.7%) participants claimed that their family members have experienced some sort of side effect. Approximately, 36(9.4%) experienced side effects within an hour, 111(29.1%) in one day and 24(6.2%) in 3 days and about 87(22.8%) had side effect after the 1st dose. About 250(65.6%) of the

Table 1: *Association of variables with short term side effects of COVID-19 vaccination (n=381)*

Variable		Experienced Side effects		P-Value
		Yes n (%)	No n (%)	
Gender	Male	59 (36.2%)	104 (63.8%)	0.003
	Female	112 (51.4%)	106 (48.6%)	
Fear About Side effects	Yes	113 (74.8)	38 (25.2)	0.000
	No	58 (25.2)	172 (74.8)	
Family member experienced side effects	Yes	125(64.8)	68(35.2%)	0.000
	No	46(24.5%)	142(75.5%)	
Will opt vaccination of different type	Yes	151(49.3)	155(50.7)	0.000
	No	20(26.7)	55(73.3)	
Will opt booster dose	Yes	141(48.1)	152(51.9)	0.020
	No	30(34.1)	58(65.9)	
Vaccinated for self-protection	Yes	99(39.6)	151(60.4)	0.004
	No	72(55)	59(45)	
Vaccinated due to Government advice	Yes	48(37.2)	81(62.8)	0.031
	No	123(48.8)	129(51.2)	
Vaccinated due to media advice	Yes	28(31.8)	60(68.2)	0.005
	No	143(48.8)	150(51.2)	

**P-value <0.05 significant. Test Applied: chi-square*

population examined reported that they were getting vaccination for their own protection. On the other hand, 88(23.1%) were motivated by the media and 129(33.9%) were getting vaccination due to the government's advice. About 293(76.9%) were willing to get a booster jab, 115(30.2%) think that it can cause infertility while 255 (66.9%) considered it safe during lactation.

Table 2: *Association of socio demographic and other vaccine related factors with occurrence of vaccine related side effects (n=171)*

Variables		Side-effects		P Value
		Yes	No	
		Weakness		
Gender	Male	17(28.8)	42(71.2)	0.011
	Female	55(49.1)	57(50.9)	
Family Member experience side effects	Yes	59(47.2)	66(52.8)	0.026
	No	13(28.3)	33(71.7)	
Vaccinated due to media advice	Yes	7(25)	21(75)	0.045
	No	65(45.5)	78(54.5)	
		Nausea		
Education	Illiterate	8(26.7)	22(73.3)	0.008
	Literate	13(9.2)	128(90.8)	
Occupation	Employed	8(6.3)	119(93.7)	0.000
	Unemployed	13(29.5)	31(70.5)	
Vaccinated due to media advice	Yes	0(0)	28(100)	0.027
	No	21(14.7)	122(85.3)	
Side effect after dose	First Dose	6(6.9)	81(93.1)	0.029
	Second Dose	15(17.9)	69(82.1)	
		Fever		
Fear about side effects	Yes	43(38.1)	70(61.9)	0.002
	No	9(15.5)	49(84.5)	
Vaccinated due to media advice	Yes	4(14.3)	24(85.7)	0.043
	No	48(33.6)	95(66.4)	
Family income	Up to 50,000	38(26.2)	107(73.8)	0.005
	More than 50,000	14(53.8)	12(46.2)	
		Local Pain		
Family income	Up to 50,000	60(41.4)	85(58.6)	0.004
	More than 50,000	3(11.5)	23(88.5)	
Family Member experience side effects	Yes	56(44.8)	69(55.2)	0.000
	No	7(15.2)	39(84.8)	
Side effects after dose	First Dose	42(48.3)	45(51.7)	0.002
	Second Dose	21(25)	63(75)	
		Local Swelling		
Vaccinated due to media advice	Yes	17(60.7)	11(39.3)	0.016
	No	52(36.4)	91(63.6)	

**P-value <0.05 significant. Test Applied: chi-square*

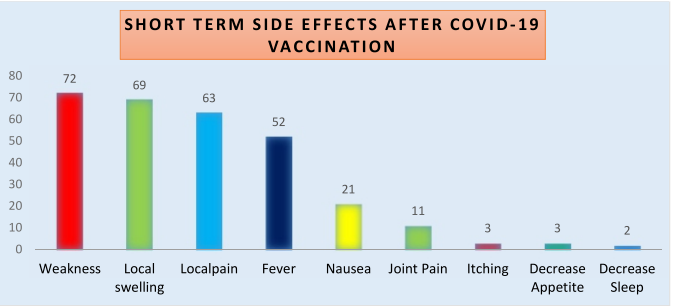

Fig-1: *Short-term side effects of COVID-19 vaccination*

Discussion

The COIVD-19 disease was a leading public health dilemma that can cause mild to severe respiratory illness including mortality. This pandemic was inciting the panic due to a number of reasons as it was a new virus, no one had its immunity and it was highly contagious. The main strategy to overcome this deadly infection was the proper vaccination of people. The disease mostly affected the elderly people, individuals suffering from co-morbidities such as diabetes and carcinoma. Therefore, the present study was carried out at the Vaccination Center of Tertiary Care Hospital, Lahore to determine the short-term side effects following COVID-19 vaccination and found that the respondents who had side effects following COVID-19 vaccination, 74.3% were up to 35 years old and 25.7% were above 35 years old. A similar study carried out by Azimi and teammates (2021) reported that among participants, who had side effects after vaccination, 56.8% were up to 40 years old and 43.2% were above 40 years old.[10] It was found during the study that the majority (57.2%) of the respondents were female, while 42.8% were male respondents. The findings of our study are comparable with a study undertaken by Alamer and fellows (2021) who also confirmed that most of the participants (52.0%) were females and 48.0% were males.[11] Education plays an important role and motivates people to get vaccinations. It is worth mentioning here that 47.2% of respondents were matric and above, while 15.5% were illiterate. The findings of a study conducted by Tahir and comrades (2021) are better than our study results reported that 59.6% of participants were above intermediate and the remaining were having intermediate qualification.[12] Study revealed that among respondents, 39.6% had fear of side effects of vaccine, but the results of a study performed by Syed and companions (2021) highlighted that a significant majority (95.8%) had fear of side effect

of vaccine.[13] The results of our study exhibited better scenario than the study carried out by Elnaem and coworkers (2021) who asserted that 76.8% of participants had any side effects of vaccine, while in our study the prevalence of any side effect was 44.9%.[14] In our study, 9.4% of respondents felt side effects in one hour, while 29.1% and 6.3% of respondents felt side effect after <24 hours and ≥ 72 hours, respectively. Likewise, Adam and associates (2021) reported that 32.1% of respondents had no side effect while 59.4% and 8.5% of respondents felt side effects after <24 hours and >24 hours, respectively.[15] The findings of our study further highlighted 22.8% and 22% of respondents felt side effect after the first dose and second dose, respectively. However, Elnaem and coworkers (2021) indicated in their study that 24.4% and 39.0% of participants felt side effect after the first dose and second dose, respectively.[14]

As far as short-term side effects of COVID-19 vaccination are concerned, the study demonstrated that most of the respondents (18.9%) felt weakness, followed by local swelling (18.1%), local pain (16.5%), fever (13.6%), nausea (5.5%), joint pain (2.9%), decreased appetite (0.8%), itching (0.8%) and decreased sleep (0.5%). A similar study carried out by Abbas and collaborators (2021) confirmed that the majority of the participants (45.4%) had fatigue / malaise, followed by headache/migraine (39.5%), fever (33.7%), soreness, redness, swelling at the injection site (27.3%), chills and rigor (20.5%) and flu-like symptoms (13.7%).[16] Likewise, Adam and associates (2021) reported that the majority of the respondents had fever (41.2%), followed by myalgia (36.71%), malaise (36.71%), headache (24.2%), muscles & joint pain (23.0%), pain & swelling at injection site (19.7%), chills (13.9%), dizziness (8.2%), nausea (7.3%), sore throat (7.3%), diarrhea (6.1%), depression (3.9%), cough (3.3%), dyspnea (3.3%), anxiety (2.1%), redness at injection side (1.2%), anosmia (1.2%) and seizure (0.9%).[15]

The study also identified the reasons for uptake of COVID-19 vaccination and found that the majority (65.6%) said they are taking COVID-19 vaccination for protection, 33.9% said on government advice and 23.1% said due to media advertisement. A study undertaken by Tahir and comrades (2021) confirmed that the majority (81.6%) of the respondents who were willing to take vaccine stated that they wanted to protect themselves.[12] A similar scenario was also reported by an Indian study undertaken by Kishore and partners (2021) who reported that 49.4% took COVID-19 vaccine for their protection.[17] It is worth-mentioning here that many respondents (76.9%) were willing to go for a booster dose. The findings of a study conducted by Lai and colleagues (2021) are comparable but exhibited better scenario than our study results, which confirmed that 84.8% of participants were ready to go for a booster dose.[18] Among the respondents, 30.2% had the misconception that vaccines can cause infertility. Almost the same results were reported by a study conducted by Rahman et al. (2021) who asserted that >35.0% participants believed that the vaccine could create infertility.[19] In our study, 66.9% of participants agreed that the vaccine is safe during lactation. A study undertaken by Mose (2021) reported that 61.0% of lactating mothers were willing to receive the COVID-19 vaccine.[20]

Chi-square analysis reported that females were more prone to experience side effects a compared to males. Similar findings were reported by Yasmin et al., (2023) from Pakistan, Jayadevan and colleagues (2021) from India.[21,22] This difference was also observed in other inactivated virus vaccinations, such as measles and rubella. This can be due to strong immune system and frequent side effects reporting by females. Limitations of this study included convenient purposive sampling. Hence, results cannot be generalized. Also, clinical examination, past medical history and co-morbidities were not inquired in this study. Further studies with community based survey and inclusion of the above factors are recommended.

Conclusion

The current study concluded that the mostly observed side effects were weakness, local swelling, local pain and fever. Short term side effects of COVID-19 vaccination were found more among females than males. However, no serious side effects were reported. Health education through media and community based sessions can help in rectification of misconceptions and boost vaccine uptake.

Conflict of Interest: ***None***

Funding Source : ***None***

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Authors Contribution

KH: Conceptualization of Project
KH: Data Collection
RH: Literature Search
SK: Statistical Analysis
MUF: Drafting, Revision
SK, ZT: Writing of Manuscript

Knowledge and Practices of General Practitioners Regarding Differentiation of Dengue Fever From Dengue Hemorrhagic Fever: A Cross-Sectional Survey

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Abstract

Objective: To determine Knowledge and Practices of General Practitioners regarding differentiation of dengue hemorrhagic fever (severe dengue) from Dengue Fever.

Material and Methods: A cross sectional study was conducted in Lahore city from June 2023 to August 2023. Using convenient purposive sampling technique, 370 general practitioners (GPs) of Lahore city were selected and questioned about how they differentiated DF from DHF. Responses about clinical signs (right sided upper abdominal tenderness, increased capillary refill time, narrow pulse pressure, tachycardia), evidence of fluid leak on ultrasonography of abdomen and worsening hematological parameters on serial complete blood count CBCs (decreasing platelets <50000, leukopenia and raised hematocrit) were recorded in structured questionnaire. Data was entered and analyzed using SPSS 20.

Results: 308(83%) were males and 62 (16%) were females with mean experience 16.74±7.65 years. 56.4% responded that they checked right sided upper abdominal tenderness to identify DHF, 41% mentioned used of tachycardia, 23% increased capillary refill time, 27% mentioned narrow pulse, 112/370 (30%) said Ultrasound abdomen and chest to check of fluid leak and thickening of gall bladder wall, 84% mentioned serial CBCs to look for worsening thrombocytopenia, 67% used worsening leukopenia and 67% used increasing hematocrit as sign of DHF.

Conclusions: Majority of general practitioners of Lahore city lacked necassary practices regarding identification of severe dengue fever. It is recommended that health authorities must take concrete steps to ensure dissemination of standard protocols and guidelines as well as continuous medical education and capacity building for health care workers.

Keywords: diagnosis of severe dengue/DHF/DSS, general practitioners, Lahore city

How to cite: *Zaidi SRH, Haider SH, Bokhari M. Manssora R, Iqbal MS, Naqvi AF. Knowledge and Practices of General Practitioners Regarding Differentiation of Dengue Fever From Dengue Hemorrhagic Fever: A Cross-Sectional Survey. Esculapio - JSIMS 2023;20(01):109-113.*

DOI: https://doi.org/10.51273/esc24.251320121

Introduction

Dengue fever is one of the viral disease caused by bite of mosquito characterized by rapid spread.[1]

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Submission Date: 22-11-2023
1st Revision Date: 14-01-2024
Acceptance Date: 12-03-2024

The World Health Organization (WHO) has ranked dengue as one of the top ten threats to Global health in 2019, and estimates a 3.9 billion prevalence of people, accounting to 40%-50% of the world's population being at risk of infection. 128 countries worldwide are at risk of dengue infection, of which 70% of the global burden being in Asia.[1] The reported dengue cases to WHO increased from < 0.5 million in 2000 to > 3.34 million in 2016, characterized by a worldwide outbreak. Although the world-wide numbers declined in 2017, there was a significant rise again in 2019 with 4.3 million cases worldwide.[1]

A dengue epidemic occurred in Karachi In 2006.[2] In Punjab province, in year 2003, 2006 and 2007cases of dengue were also reported.[2] However Lahore city was hit by dengue epidemics in 2008 and 2010.[2] Dengue has become endemic in Pakistan like Chikungunya virus (CHIKV), West Nile virus (WNV), and Japanese encephalitis virus (JEV) and pose significant diagnostic difficulties due to multiple reasons.[3,4,] However, recently DENV antigen, IgM and IgG antibodies can be detected by some assays that are commercially available.[5-8]

Proper case management is a key issue in dealing with infectious disease outbreak in order to curtail morbidity and mortality. As much of the mortality caused by dengue is due to dengue Hemorrhagic fever (DHF). If the diagnosis gets delayed and patients are not managed accordingly detrimental consequences can occur. Therefore, its crucial that DHF may be identified early and managed accordingly. WHO classified the more serious dengue illness as Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) in guidelines published in 1997.[9] However, WHO in 2009 reclassified it as Dengue and Severe dengue.[9] Raise in hematocrit levels bleeding, pleural effusion, thrombocytopenia with <100,000 platelets/µL, abdominal pain, restlessness, sudden drop in temperature and vomiting, are the manisfestations of severe dengue.[9] Plasma leakage couldn't be detected in early phase of severe disease through who guidelines of 1997 and 2009. Various researchers from across the world explored potential early phase clinical, laboratory and radiological markers of severe dengue. Nainggolan et al identified that gallbladder wall thickening on ultrasonograpgy can be sign of detect plasma leakage in earlier phase.[10] Role of ultrasonography in dengue was also documented by a report from Indonesia.[11] Significant association of four parameters with DSS, hypoalbuminemia, hemoglobin concentration, thrombocytopenia and elevated AST level, were reported in A meta-analysis.[12,13] Srisuphanunt found that hematocrit (>40%), age (>17 years), anorexia, neutrophils (≤51%), atypical lymphocyte (>3%), platelet count (≤97 × 103/µL), PT (>13.1 s), albumin (≤2.7 g/dL), PTT (>28.5 s), ALT (>141 U/I) AST (>104 U/I), predicted severity.[14]

Ibrar, et al, reported from Karachi, that half of the general practitioner didn't know that for diagnosing probable dengue, leucopenia can be used, 140 (35%) did not know warning signs and criteria for diagnosis of severe dengue. 136(34%) were not aware of abdominal pain and persistent vomiting as warning signs.[15] Khan et al, also reported lack of knowledge of physicians about certain topics about dengue in hit list cities. Questions regarding dengue, symptoms vaccines, medication not be given to dengue fever or shock patients were answered as "Do Not Know" by the physicians of a selected hospital. Criteria for diagnosing Dengue Hemorrhagic Fever was known by 44.5% only.[16] General practitioners retain an important position in the hierarchy of health care providers as far as this disease is concerned. They are the first contact by the majority of patients for management of any illness. So the way they manage dengue fever in community can architect the fate of epidemic in terms of morbidity and mortality. In the light of above mentioned facts the study was carried out to appraise Knowledge and Practices of General Practitioners regarding differentiation of Dengue Fever from dengue hemorrhagic signs to highlight discrepancies in the current management practices and to guide the policy makers for introduction and improvement of standardized management protocol and continuous capacity building of Health Care workers.

Material and Method

A descriptive cross sectional study was conducted in Lahore city for three months duration. Convenient purposive sampling technique was used to select study participants, which were general practitioners (GP) of Lahore city. 370 GPs were questioned about how they differentiated DF from DHF and based upon the responses questionnaire was filled and relative answers were recorded in structured questionnaire. Responses about clinical signs (right sided upper abdominal tenderness, increased capillary refill time, narrow pulse pressure, tachycardia), evidence of fluid leak on ultrasonography of abdomen and worsening hematological parameters on serial complete blood count CBCs (decreasing platelets <50000, leukopenia and raised hematocrit) were recorded. Data was entered and analyzed in SPSS 20. Means and standard deviations were calculated for continuous variables like age and experience, proportions and percentages were calculated for categorical variables.

Results

Study included general practitioners out of which 308 (83%) were males and 62 (16%) were females. General Practitioners had mean age of 41.6 years with standard deviation of 7.5 years. General Practitioners had experience 16.74 years of with standard deviation of 7.65 years. The results of this study shows that amongst

those GPS who participated in the study 165 (44%) did post-graduation studies while 202(55%) did not do any post-graduation study. This study included 158(42%) GPs who were concurrently working in some tertiary care hospitals 213 (57%) GPs were not working in any such settings. 212(61.1%) of the GPs who participated in the study have attended some sort of course or seminar regarding clinical management of dengue fever. While 135 (38.9%) had not attended any course on dengue fever management. While 23 (6.9%) GPs did not answer this question. (Table 1). 209/370 (56.4%) responded that they checked right sided upper abdominal tenderness to identify DHF, 154/370 (41%) mentioned used of tachycardia as signs of DHF, 87/370 (23%) used increased capillary refill time, 102/370 (27%) mentioned narrow pulse pressure to identify DHF. Only 112/370 (30%) said that they advise Ultrasound abdomen and chest to check of fluid leak and thickening of gall bladder wall as sign of DHF. However a vast majority 311/370(84%) mentioned serial CBCs to look for worsening thrombocytopenia as sign of DHF, 248/370 (67%) used worsening leukopenia as sign of DHF and 284/370 (67%) used increasing hematocrit as sign of DHF. (Table 2)

Table 1: *Characteristics of Study Participants (n=370)*

Gender	Male	308(83%)
	Female	62 (16%)
Postgraduation study after basic medical qualification	Yes	165(44%)
	No	202(55%)
Concurrently working in tertiary care hospital	Yes	213 (57%)
	no	212(61.1%)
Attended some course/ training/seminar regarding clinical management of dengue fever.	yes	212(61.1%)
	No	135(38.9%)
	Did not answer	23 (6.9%)

Table 2: *Practices of assessing of clinical/ laboratory/ radiological parameters for identification of severe dengue fever.(n=370)*

Right sided upper abdominal tenderness	**Yes**	**209 (56.4%)**
	No	161 (43%)
Tachycardia	yes	154 (41%)
	no	216(58%)
Increased capillary refill time	yes	87(23%)
	no	283(76%)
Narrow pulse pressure	yes	102(27%)
	no	268(72%)
USG abdomen and chest for fluid leakage and gall bladder wall edema	yes	112(30%)
	no	258(69%)
Worsening thrombocytopenia on serial CBCs	yes	311(84%)
	no	59(15%)
Worsening leukopenia on serial CBCs	yes	248(67%)
	no	122(32%)
Increasing heamatocrit on serial CBCs	yes	248(67%)
	no	122(32%)

Discussion

While hyper endemicity dengue fever is becoming more evident, it is of paramount importance that severe dengue may be identified as early as possible to treat high risk patients accordingly. General practitioners are usually first level of health care providers, so if they identify, manage and refer severe dengue in earlier stage of disease, morbidity and mortality can be further reduced. Results of the study show that a vast majority of general practitioners are missing many important clinical/ laboratory and radiological parameters to identify the severe form of dengue which is both unfortunate and alarming. 56% responded that they checked right sided upper abdominal tenderness to identify DHF which shows that a large majority was missing on this pathagnomonic sign of sever dengue. 41% mentioned used of tachycardia as signs of DHF. Again this signs is very important and less that half of the sample GPs used it to identify the disease. Similar is the case with 23% used increased capillary refill time, similar is the case with 27% mentioned narrow pulse pressure where a big proportion missed out on thos clinical parameter. Only 30% said that they advise Ultrasound abdomen and chest to check of fluid leak and thickening of gall bladder wall as sign of DHF. However a vast majority 84% mentioned serial CBCs to look for worsening thrombocytopenia as sign of DHF, 67% used worsening leukopenia as sign of DHF and 67% used increasing hematocrit as sign of DHF. GPs were identifying severe dengue more through CBCs parameters (67%-84%) than through clinical signs (23%-56%) and USG abdomen(30%). However, high deficiency in adequate practices is noted in this study. Our results are unanimous with the finding of Ibrar 27 and khan 28, who also identified lack of correct practices and knowledge in doctors managing dengue fever and reported from 35-44% doctors were unaware of diagnosing criteria and clinical parameters of severe dengue fever or dengue haemorrhagic fever. Moreover it is noteworthy that these studies were conducted in physicians working in tertiary care hospitals who have more chances to update their knowledge through workplace interaction with colleagues and seniors consultants, seminars/symposia and worshops being held in such

setups, and access to disease management guideline/ SOPs made available by such organization. While a general practitioner who is not working in tertiary care hospital, has much lowersuch chances to upgrade his knowledge regarding management practices of various diseases. This alarming situation calls for the dissemination of standard protocols and guidelines as well as continuous medical education in context of dengue fever manage-ment of general practitioners through workshops, lec-tures, symposia so as to ensure the capacity building for workforce to deal this menace.

Conclusion

A vast majority of general practitioners of Lahore city lacked relevant practices regarding identification of severe dengue fever. This, it is imperative that capacity building og general practitioners must be ensure via workshops or symposia. It is recommended that health authorities must take concrete steps in this context and ensure capacity buiding for health care workers of community.

Conflict of interest: *None*

Funding source: *None*

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Authors Contribution

SRHZ: Conceptualization of Project
SHH: Data Collection
MB: Literature Search
RM: Statistical Analysis
MSI: Drafting, Revision
AFN: Writing of Manuscript

Crataegus Oxyacantha (Hawthorn) Fruit – Histopathological Safety Profile in "Brain, Bone and Joint Tissue" of Dyslipidemic Rats

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Abstract

Objective: To evaluate the safety profile of ethanolic extract of Crataegus oxyacantha fruit in comparison with Atorvastatin om histological samples of brain, bone, and joint tissues.

Materials & Methods: A 2-month experimental study was conducted from July to September 2023 at Animal House of Akhtar Saeed Medical & Dental College on 48 male albino Wistar rats (aged 6 weeks) divided into 8 groups with 6 rats each, weighing 180-200 grams. Group 1 (Healthy Control) received a normal rat diet and 2 ml of Normal Saline for 2 months. Group 2 (Disease Control) was given a High-Fat Diet (HFD) and 2 ml of Normal Saline for 1 month, while 3-5 (Prophylactic Groups) received HFD along with Crataegus oxyacantha fruit's ethanolic extract, atorvastatin, and combination of them in doses of 40 mg/kg OD, 80 mg/kg OD and 20+40 mg/kg OD orally respectively for 1 month. Groups 6 to 8 (Therapeutic Groups) were given Crataegus oxyacantha fruit's ethanolic extract, atorvastatin, and in combination respectively after induction of dyslipidemia from the 30th to 60th day in the doses as mentioned above. Animals were sacrificed on the 30th day from Prophylactic Groups along with Group 2 and the remaining groups on the 60th day i.e., at the end of the study for the collection of brain, bone, and joint tissues. The histopathological results were analyzed by assigning percentages.

Results: Our study concludes that Crataegus oxyacantha which has hypolipidemic potential does not cause any organ damage in bone, joint, and brain tissue when compared to Atorvastatin.

Conclusion: Results show that Crataegus oxyacantha can be used as a safe alternative in treating hyperlipidemia in comparison with Atorvastatin.

Keywords: Histopathological evaluation of Bone, Joint and Brain Tissue, Crataegus oxyacantha, Atorvastatin

How to cite: *Zahra SMN, Bukhari SAB, Bukhari SAF, Zaheer S, Yousaf N, Piracha MI. Crataegus Oxyacantha (Hawthorn) Fruit – Histopathological Safety Profile in "Brain, Bone and Joint Tissue" of Dyslipidemic Rats. Esculapio - JSIMS 2023;20(01): 14-118.*

DOI: https://doi.org/10.51273/esc24.251320122

Introduction

Dyslipidemia results in significant morbidity and mortality around the world. Genetic predisposition, sedentary lifestyle, or high caloric intake are the underlying causes. The absence of lipoprotein lipase activity or deficiency of apoprotein CII31 is the basis of underlying pathogenesis due to which defective lipid metabolism occurs.[1] The oxidative stress results in vascular lining injury and consequently enhanced atherosclerotic plaque formation. This results in stroke, angina, and other ischemic cardiovascular diseases such as myocardial infarction.[2] Metabolic diseases such as diabetes mellitus etc., are associated with dyslipidemia.[3] Dyslipidemia also causes a major hepatic pathology i.e., Non-Alcoholic Fatty Liver Disease (NAFLD).[4] Dyslipidemia should be prevented by dietary and life-

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Submission Date: 09-01-2024
1st Revision Date: 02-02-2024
Acceptance Date: 09-03-2024

style modifications first. The medical therapy includes anti-hyperlipidemics such as statins, bile acid binding resins, sterols, fibrates, and niacin. These drugs especially statins (HMG Co-A Reductase Inhibitors) are considered effective in treatment as well as the prevention of cardiovascular diseases in cases of dyslipidemia. Atorvastatin is given around the world due to its hypolipidemic effects. It acts as a competitive inhibitor of hydroxymethylglutaryl-coenzyme a reductase (rate-determining) enzyme in cholesterol synthesis through the mevalonate pathway. Atorvastatin also increases hepatic LDL receptor expression thus reducing LDL-C levels. It acts mainly in the liver and decreases hepatic cholesterol levels leading to increased hepatic cholesterol uptake and reduction of cholesterol levels in plasma.[5]

Prophylactic use of statins in cases of familial hyperlipidemia has already been established by researchers but adverse effects such as myalgia result in poor compliance thus dyslipidemia and its consequences remain untreated. Amongst all the known adverse effects, statin-induced myopathy (rhabdomyolysis) is the worst which has even led to the death of patients in the past[6]. Muscle pain can sometimes be confused with bone and joint pain. To confirm the underlying cause of pain, bone, and joint biopsies can be taken for histopathological assessment. Negative side effects of statins on bones are not confirmed yet, rather the opposite has been suggested i.e., an increase in bone mass density and reduced fracture risk.[7]

Neurodegenerative disorders like amyotrophic lateral sclerosis and psychiatric illnesses are associated with statins[8] and can be evaluated by brain tissue biopsy. Decreases in serum lipid levels have been suggested to affect the development of neuronal membranes, nerve synapses, and myelin sheath. This contributes to stunted serotonin activity that alters psychological behavior and impairs neurocognition.[9]

This is a serious issue that should not be ignored, different treatment strategies should be considered for dyslipidemia. Many phytochemicals alone or in combinations have been utilized in dyslipidemia treatment. Crataegus oxyacantha (Hawthorn), because to its antioxidant characteristics due to the presence of Flavonoids, is considered to have hypolipidemic potential.[10] Keeping in mind, this research was designed to assess to effects of Crataegus oxyacantha fruit on brain, bone and joint tissues in comparison to atorvastatin.

Materials & Methods

A 60-day study was conducted on 48 male albino Wistar rats (aged 6 weeks) divided into 8 groups with 6 rats each weighing 180-200 grams. Group 1 (Healthy Control) received a normal rat diet and 2 ml of Normal Saline for 2 months. Group 2 (Disease Control) was given a High-Fat Diet (HFD) and 2 ml of Normal Saline for 1 month, while 3-5 (Prophylactic Groups) received HFD along with Crataegus oxyacantha fruit's ethanolic extract, atorvastatin, and combination of them in doses of 40 mg/kg OD, 80 mg/kg OD and 20+40 mg/kg OD orally respectively for 1 month. Groups 6 to 8 (Therapeutic Groups) were given Crataegus oxyacantha fruit's ethanolic extract, atorvastatin, and in combination respectively after induction of dyslipidemia from the 30th to 60th day in the doses as mentioned above. Animals were sacrificed on the 30th day from Prophylactic Groups along with Group 2 and the remaining groups on the 60th day i.e., at the end of the study for the collection of brain, bone, and joint tissues. The samples were stored in formalin and then histopathological slides were made for their examination. The histopathological results were analyzed by assigning percentages. Percentages were assigned to histopathological findings using the Chi-Square test.

Results

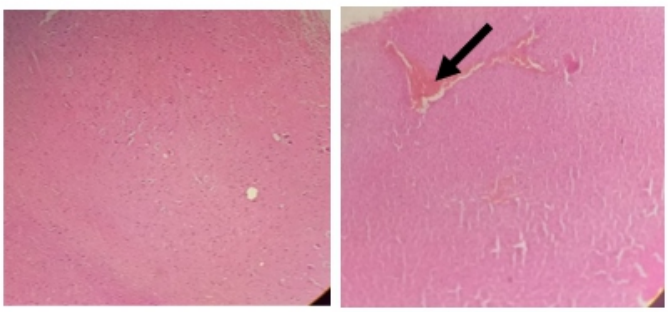
- Group 1 = Healthy Control (sacrificed at day 60 of study)
- Group 2 = Disease control (sacrificed at day 30 of study)
- Group 3= Crataegus oxyacantha 40 mg/kg/day, Group 4 = Atorvastatin 80 mg/kg/day
- Group 5 = Combination (Crataegus oxyacantha 20 mg/kg/day + Atorvastatin 40 mg/kg/day) along with high-fat diet (to evaluate prophylactic effects – sacrificed at day 30 of study)
- Group 6 = Crataegus oxyacantha 40 mg/kg/day, Group 7 = Atorvastatin 80 mg/kg/day
- Group 8 = Combination (Crataegus oxyacantha 20 mg/kg/day + Atorvastatin 40 mg/kg/day) after inducing hyperlipidemia (to evaluate therapeutic effects – sacrificed at day 60 of study).

Table 1: *Brain - Hemorrhage*

Brain Hemorrhage	Group 1 (n=6) n (%)	Group 2 (n=6) n (%)	Group 3 (n=6) n (%)	Group 4 (n=6) n (%)	Group 5 (n=6) n (%)	Group 6 (n=6) n (%)	Group 7 (n=6) n (%)	Group 8 (n=6) n (%)
Mild	-	-	-	-	-	-	-	-
Moderate	-	-	-	-	-	-	-	-
Severe	-	-	-	1 (12.5%)	-	-	2 (25.0%)	-

Table 2: *Bones & Joints – Hypocellularity*

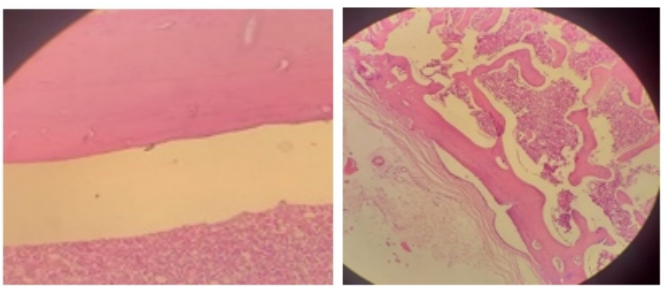
Hypocellularity in Bones & Joints	Group 1 (n=6) n (%)	Group 2 (n=6) n (%)	Group 3 (n=6) n (%)	Group 4 (n=6) n (%)	Group 5 (n=6) n (%)	Group 6 (n=6) n (%)	Group 7 (n=6) n (%)	Group 8 (n=6) n (%)
Mild	-	-	-	-	-	-	-	-
Moderate	-	-	-	-	6 (100.0%	-	-	6(100.0%)
Severe	-	-	-	6(100.0%)	-	-	6(100.0%)	



(a) (b)

Figure: 1 (a): *Photomicrograph (10×10; H&E) showing a longitudinal section of normal brain in G-1, G-2, G-3, and G-6 showing glial cells, neurons, and vessels.*

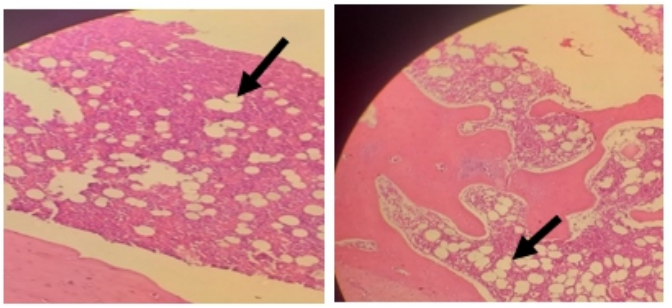
Figure: 1 (b): *Photomicrograph (10 x 10; H&E) showing a longitudinal section of the brain in G-4, G-5, G-6, and G-7 showing brain hemorrhage (black arrow).*



(a) (b)

Figure: 2 *(a) – Photomicrograph (10 x 10; H&E) showing longitudinal section of normal bone in G-1, G-2, G-3, and G-6 showing osteocytes, osteoclasts, compact bone, and marrow.*

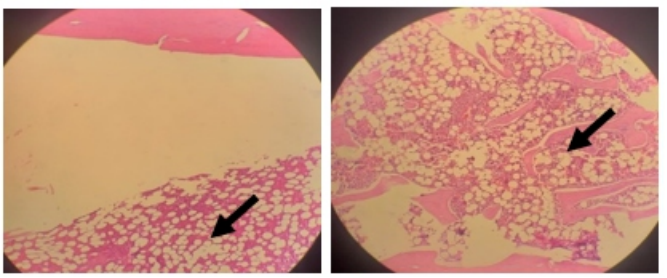
Figure: 2 *(b) – Photomicrograph (10 x 10; H&E) showing a longitudinal section of the normal joint in G-1, G-3, and G-6 trabecula and periosteum along with osteocytes, osteoclasts, compact bone, and marrow.*



(a) (b)

Figure: 3 *(a) – Photomicrograph (10 x 10; H&E) showing longitudinal section of bone in G-5 and G-8 showing moderate hypocellularity (black arrow).*

Figure: 3 *(b) – Photomicrograph (10 x 10; H&E) showing a longitudinal section of the joint in G-5 and G-8 showing moderate hypocellularity (black arrow).*



(a) (b)

Figure: 4 *(a) – Photomicrograph (10 x 10; H&E) showing longitudinal section of bone in G-4 and G-7*

showing severe hypocellularity (black arrow).

Figure: 4 *(b) – Photomicrograph (10 x 10; H&E) showing longitudinal section of joint in G-4 and G-7 showing severe hypocellularity (black arrow).*

Discussion

Atorvastatin, like other statins, can cause serious musculoskeletal and hepatorenal adverse effects. Therefore, an alternative such as Crataegus oxyacantha (Hawthorn), which has hypolipidemic potential, was tested on rats at the animal house of ASMDC in Lahore.

To differentiate the muscle pain from that of bone and joint, biopsies were taken for histopathological assessment to confirm the underlying cause of pain. Histological examination of bones and joints of rats in our study may indicate a toxic potential of Atorvastatin in G-5 & 8 showing moderate hypocellularity while in G-4 & 7, severe hypocellularity in bones as well as joint tissues. Healthy and disease control groups (G-1 and G-2), as well as Crataegus oxyacantha treated groups (G-3 and G-6), showed no changes in bones and joints as the longitudinal section of the bone showed normal osteocytes, osteoclasts, compact bone, and marrow while joint showed normal trabecula indicating its bone and joint safety potential.

Some studies conducted support our results while others contradict them. Animal studies related to the protective role of Crataegus oxyacantha on bones supported our findings.[11] Regarding the effects of Atorvastatin, in some patients, the development of arthralgias and tendinopathies have been reported with their use while other studies have suggested improvement in bone metabolism i.e., increase in bone mass density and reduced fracture risk.[12] During a study conducted on the effects of statins on bone metabolism and treatment of bone catabolic diseases, it was observed that statins, when administered in oral therapeutic doses, had minimal efficacy in treating osteoporosis. However, they were found to be safe and effective in treating bone or its inflammation, especially in the case of osseous deficiencies. When applied locally, statins also showed promise in treating periodontitis by targeting accessible bony defects.[13] Researchers developed an animal model to promote the healing of critical bone size defects using local statin application which showed an apparent osteogenic and angiogenic effect.[14] Another research in mice has shown that atorvastatin can increase bone mass and promote osteogenesis, thus boosting bone formation.[15]

In our study, histopathology of brain tissue only showed hemorrhage in 12.5% rats of G-4 and 25% rats of G-7 which were given 80 mg/kg/day of Atorvastatin alone. While the longitudinal section of the brain in G-1, G-2, G-3 G-5, G-6, and G-8 showed normal glial cells, neurons, and vessels. So, in our study Crataegus oxyacantha alone as well as in combination with Atorvastatin was able to prevent brain pathology. This protective potential of Crataegus oxyacantha on the brain is also supported by other studies.[16,17]

Other studies also support our data related to adverse effects of Atorvastatin on brain tissue as meta-analysis confirmed an increase in the risk of hemorrhagic stroke, especially with the use of atorvastatin.[18] Some studies showed contradicting results to this study. The researchers investigated the impact of statins on memory, cognition, and brain volume in the elderly. Their research indicated that there was no difference in the rate of decline in memory or overall cognition between those who used statins and those who did not.[19] One study showed the effectiveness of statin treatment in the prevention or improvement of symptoms of several brain disorders[23]. There are contrasting results shown by different studies about the effects of Atorvastatin on the above-mentioned tissues but Crataegus oxyacantha has shown no adverse effects rather protective role of Crataegus oxyacantha can be assumed.[20]

Therefore, in totality, our multiorgan safety profile suggests that one month-prophylactic or therapeutic treatment with Crataegus oxyacantha alone in doses of 40 mg/kg OD didn't cause any histopathological damage in skeletal muscle, cardiac, hepato-renal, brain, and bone tissue. In comparison, Atorvastatin alone (80 mg/kg) caused brain hemorrhage, and marked hypocellularity in bone and joint tissue. However, its low dose combination with Crataegus oxyacantha (40 mg/kg +20 mg/kg respectively) prevented severe damage causing only moderate changes, which were possibly due to either low dose administration of Atorvastatin, protective effects of Crataegus oxyacantha, or both.

Conclusion

Our research concludes that Crataegus oxyacantha, which has a known hypolipidemic potential, does not cause any histopathological changes. No organ damage was observed in bone, joint and brain tissues when compared to atorvastatin. Atorvastatin caused significant histopathological changes such as marked hypocellularity in bone and joint tissues and brain hemorrhage.

Therefore, we suggest that Crataegus oxyacantha is a safer alternative for treating dyslipidemia, without posing any significant threat to bone, joint or brain tissues.

Funding Source: *None*

Conflict of interest: *None*

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Authors Contribution

SMNZ: Conceptualization of Project
SABB: Data Collection
SAFB: Literature Search
SZ: Statistical Analysis
NY: Drafting, Revision
MIP: Writing of Manuscript

Comparison of Structural Alterations of Incus Bone Between Middle Ear Cholesteatoma and Temporal Bone Osteitis Among Patients Who Underwent Mastoid Exploration in Services Hospital, Lahore

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Abstract

Objective: To compare the structural changes of incus bone between middle ear cholesteatoma and temporal bone osteitis among patients who underwent mastoid exploration in Services hospital, Lahore.

Material and Methods: An analytical and hospital based comparative study carried out at ENT- II Services Hospital Lahore during July 2023 to December 2023 for 6 months. Total 60 patients were selected. Random allocation of study participants were done in two groups, Group A and Group B. Each group had 30 patients. Patients with middle ear cholesteatoma were in group A, while all patients in group B had middle ear temporal bone osteitis. A mastoid X-ray displaying haziness of mastoid air cells and CT scan demonstrating the intracranial and extracrainal extrusion were carried out. SPSS 20 was used to analyze all data.

Results: The study's cases had an average age of 31.00±11.07 years. With a p-value of 0.322 (> 0.05), the mean age of two groups was statistically equal. In this study, there were 26 (43.3%) male cases and 34 (56.7%) female cases, with female to male ratio of 1.31 and 1. All groups had structural alterations in Incus bone. Long process was seen in 16(26.7%) cases, Lenticular process was seen in 25(41.7%) of the cases, there were 14(23.3%) cases who had short process and in 5(8.3%) cases all were eroded.

Conclusion: The results of this study demonstrated strong correlation between localized middle ear cholesteatoma and temporal bone osteitis and alterations in incus bone.

Keywords: Cholesteatoma, Incus bone, Mastoid exploration, Temporal bone osteitis

How to cite: *Ghauri SM, Farooq SO, Ahmad J, Nadeem M, Riaz B, Ayub T. Comparison of Structural Alterations of Incus Bone Between Middle Ear Cholesteatoma and Temporal Bone Osteitis Among Patients Who Underwent Mastoid Exploration in Services Hospital, Lahore. Esculapio - JSIMS 2023;20(01): 119-123.*

DOI: https://doi.org/10.51273/esc24.251320123

Introduction

A cholesteatoma is a lesion that causes damage to the underlying tissues and has three-dimensional epidermal structures. It tends to return after removal and can cause hearing loss, bone degradation, otorrhea, facial nerve paralysis, and intracranial problems. As much as 50 dB of conductive hearing loss can result from osseous erosion.[1,2] Cholesteatoma leads to conductive hearing loss by eroding the incus bone, a component of the ossicular chain.[3] The clinical examination just shows the tip of the iceberg in terms of the disease's scope. Common bones called osseous bones were deteriorated in cases of middle ear cholesteatoma and chronic suppurative otitis media.[4] 50 dB conductive hearing loss may result from ossicular erosion; hearing loss more than 60 dB is considered sensorineural. One definition of chronic suppurative otitis media is a persistent infection of the middle ear cleft's mucosa. The eustachian tube, hypotympanum, mesotympanum, epitympanum, aditus, and mastoid air cell system are among the struc-

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Submission Date: 15-01-2024
1st Revision Date: 28-01-2024
Acceptance Date: 10-03-2-24

tures affected by middle ear cleft. They are challenging to treat due to the surrounding necrotic skin margins.[5] Choleatoma is the first sign of chronic suppurative otitis media, which leads to automastoidectomy. Ventilating the mastoid is well documented to alter the course of a disease and stop its consequences.[6] A histological examination indicates a considerable proliferation of capillaries and the infiltration of histocytes containing lysosomal enzymes, including acid phosphatase, protease, hyluronidase, and cathepsin. Ossicles are frequently damaged by chronic suppurative otitis media, and 78% of patients usually experience multiple ossicular injury.[5] Thirty percent of middle ear cases are cholesteatoma.[7] There is reported to be a high percentage of ossicular injury (56%), in chronic suppurative otitis media.[8] A 50 dB conductive hearing loss might result from lenticular process erosion. The most common defect of the ossicular chain is cholesteatoma, which causes erosion of the long process of the incus. Rather than its flimsy blood supply, the reason is owing to its fragile construction and location. Examining patients who had a history of hearing loss allowed results to be compared with preoperative and intraoperative findings to assess the diagnostic utility of the ossicular chain. It was discovered that the incidence of ossicular destruction in adults and children is comparable.[9] Loss of hearing is a frequent consequence. The majority of patients find surgery beneficial. An extensive and ongoing follow-up programme is necessary for patients suffering from ossicular necrosis.[10] Cholesteatoma is associated with conductive hearing loss both before and after surgery, if the surgeon removes portions of the ossicular chain, as the mass may encircle and erode the bones.[11] The type of surgery can also have an impact on hearing. Generally, superior hearing results result from stapes preservation.

The purpose of this study is to provide information regarding the initial stages of cholesteatoma and localised middle ear temporal osteitis. Ossicles can be destroyed by middle ear granulation tissue, which is a result of temporal bone osteitis.[12] Granulation tissue, choleasteotoma, or both may be the cause of the distinctive skeletal abnormalities seen in CSOM. Many theories have been proposed to explain the mechanism of bone degradation, including pressure necrosis, infection, hypermic decalcification, enzymatic, chemical, and immunological.[13] Ossicles have not yet been the subject of a comparison research due to the distinct natures of the two diseases. This study can assist to prioritise the early treatment of these problems in order to spare patients from deafness, which is one of the major disabilities in the world, as well as from potentially fatal disease consequences.

Materials and Methods

An analytical and hospital based comparative study was carried out at the Services Hospital Lahore's ENT Unit II. This study was conducted from July 2023 to December 2023 for 6 months. A random non-probability convenient sampling technique was used to pick a sample size of 60 patients who met the inclusion criteria (30 patients in each group). The sample size was estimated using a 10% level of significance and a 90% test power, with a 61% expected proportion of choleasteatoma and a 27% expected granulation. On a predesigned proforma, information from clinical examination, investigations, imaging and personal data were recorded. By employing a table of random numbers, the patients were split into two groups: group A and group B. Every group consisted of thirty patients. Group A consisted of all patients with middle ear cholesteatoma, while group B included patients with middle ear temporal bone osteitis. Following the taking of a medical history, an ossicular chain and tympanic membrane status as well as an atticoantral illness diagnosis were made by means of a microscope examination of the ear. The degree of hearing loss was determined using pure tone audiometry. A CT scan demonstrating intracranial and extracrainal extension, as well as a mastoid X-ray displaying the haziness of mastoid air cells, were carried out. A mastoid exploration was conducted, and the condition of the incus bone was recorded for both conditions.

Results

There were 26(43.3%) male and 34(56.7%) female cases in this study with ratio female to male ratio of 1.31 and 1. In Localized Middle Ear Cholesteatoma and Temporal bone Osteitis group there were 13(43.33%) male and 17(56.67%) female in each group. The mean age of cases in this study was 31.00±11.07 years while mean age in Localized Middle Ear Cholesteatoma was 32.40 ± 12.16 years and in Temporal bone Osteitis group were 29.60±9.88 years. The mean age in both groups was statically same, p-value = 0.322 (> 0.05). Structural changes of Incus bone were in all groups were seen. Long process was seen in 16(26.7%) cases, Lenticular process was seen in 25(41.7%) of the cases, there were 14(23.3%) cases who had short process and in 5(8.3%) cases all were eroded. According to incus bone changes

in Localized Middle Ear Cholesteatoma 4(13.3%) had long process, 13(43.3%) had lenticular process, 8(26.7%) had short process and 5(16.7%) had all erosions while in Temporal bone Osteitis group 12(40%) cases had long, 12(40%) had lenticular 6 (20%) had short process. On applying Chi-square test we found significant association between Long process and lenticular process with temporal bone osteitis while lenticular process was also higher in Localized Middle Ear Cholesteatoma, p-value 0.025 (< 0.05).

Table 1: *Descriptive Statistics of age (years) in both study groups.*

	Mean	S.D	Min.	Max.
Localized Middle Ear Cholesteatoma	32.40	12.16	18	56
Temporal bone Osteitis	29.60	9.88	18	50
Total	31.00	11.07	18	56

Table 2: *Comparison of Changes in incus bone in both study groups*

Changes in incus	Study groups		Total
	Localized Middle Ear Cholesteatoma	Temporal bone Osteitis	
Long process	4	12	16
	13.3%	40.0%	26.7%
Lenticular process	13	12	25
	43.3%	40.0%	41.7%
Short process	8	6	14
	26.7%	20.0%	23.3%
All eroded	5	0	5
	16.7%	.0%	8.3%

Discussion

Since prehistoric times, chronic suppurative otitis media has been a significant contributor to middle ear illness. It is one of the most prevalent ear conditions in developing nations, it signifies the final phase of the otitis media illness continuum and is distinguished by an irreversible alteration in the middle ear cleft.[14] The prevalence of CSOM varies greatly among emerging nations, ranging from 0.4% to 33.3%.[15] About 80% of patients with cholesteatoma have partial or complete ossicle degradation, whereas 20% of individuals with chronic otitis media without cholesteatoma have ossicular chain erosion. Cholesteatomas have a high death and morbidity rate, can lead to intratemporal and cerebral problems, and erode bone.[14]

There are basically four main types of ossicular malformations. The most prevalent one involves simply the long process of the incus, leaving the malleus and stapes intact. Loss of incus and erosion of the stapes suprastructure are the second most prevalent defects. Third, the malleus handle and stapes are unaffected by the cholesteatoma that is expanding into the middle ear. Lastly, all ossicles may disappear, with the exception of the stapedial foot plate. Erosion of the long process of incus by cholesteatoma appears to be the most frequently encountered defect of the ossicular chain. The reason is because of its delicate structure rather than its tenuous blood supply.[12] Under a microscope, surgical procedures reveal the shattered ossicles. Another test for conductive hearing loss is the tuning fork test. However, when the ossicular chain is intact or a cholesteatoma fills the space left by the damaged ossicles, hearing may occasionally be normal.[16] Furthermore, partial or complete ossicular chain resorption is frequently linked to an active mucosal COM. Resorptive osteitis could be the cause of this. The impacted ossicles usually exhibit hyperemia, prominent histiocytes, and capillary growth. Usually, the manubrium, stapes crurae, body of the incus, and long process of the incus erode first.[17]

A study was conducted recently to document the different histological alterations linked to chronic otitis media. Following staining with hematoxylin and eosin, ten normal and ten diseased incuses that were removed during the surgery for chronic otitis media (both with and without cholesteotoma) were examined histologically. According to the study's findings, a normal incus had a compact bone pattern with concentric rings, just like any other long bone in the body. Similar alterations were observed in the pathological incuses of chronic otitis media (with and without cholestoetoma), including stratified squamous epithelium with deformed concentric rings and expanded osseous gaps.[18] Males had a higher incidence of cholesteatoma (60%) compared to females (40%), with 53.33% of patients falling into the younger age range (21-35 years). Just 10% of instances had intact ossicles, whereas 90% of cases had ossicular erosion. In 15% of the instances, the incus was gone, and in 75% of the cases, it had deteriorated. It was also noted that the malleus was the ossicle that was least likely to dissolve.[20] When comparing instances between the ages of 18 and 56, we currently have more female cases than male ones. The study's mean age of cases was determined to be 31.00±11.07 years.

In the current investigation, we discovered that 16 instances (26.7%) had long processes, 25 cases (41.7%) had lenticular processes, 14 cases (23.3%) had short processes, and 5 cases (8.3%) had all of them corroded. In a similar study, 60 patients of cholesteama, regardless of age or gender, were chosen throughout the course of a two-year study period, and their intraoperative ossicular status was noted. In decreasing order, the study's findings indicate that the following osseous structures and their components are implicated in cholesteatoma cases: the lenticular process (in 50 cases, or 83%), the long process of the incus (in 49 cases, or 81.67%), the stapes super-structure (in 29 cases, or 48.33%), the body of the incus (in 26 cases, or 43.33), the head of the malleus (in 23 cases), and the handle of the malleus (in ten cases, or 16.67%).[19]

These results are consistent with the current research, as in our study, lenticular processes were observed in fewer cases in both groups, as were long, short, and entire erosions. Furthermore, a second study was conducted solely to assess the state of the ossicular chain in individuals who needed surgery for cholesteatoma. The study's findings showed that the most prevalent pathology was whole (55.4%) or partial (30.7%) incus erosion. The body of incus (4.8%) and the lengthy procedure (25.9%) were occasionally also involved. The stapes superstructure was more frequently eroded than the bone was completely lost (40.9% vs. 25.9%). The malleus had the least amount of erosion. In 5.5% of cases, the ossicles were found to be completely intact. The most frequent combination of ossicular erosion was incudostapedial erosion (18%) and total ossicular erosion with an undamaged footplate (18.7%). 85% of patients with multiple site involvement had advanced disease when they were diagnosed with incudostapedial erosion. According to the study, there is a higher risk of ossicular erosion and poor hearing outcomes when there is widespread cholesteatoma.[11]

Only a few differences, such as the long, lenticular, and short processes, were seen in the two study groups. We further separated our targeted cases into two groups and discovered that, in the Temporal bone Osteitis group, 12 cases (40%) had long processes, 12 cases (20%) had lenticular processes, and 4 cases (13.3%) had long processes, 13 cases (43.3%) had lenticular processes, 8 cases (26.7%) had short processes, and 5 cases (16.7%) had all erosions. Using the Chi-square test, we discovered a significant correlation (p-value 0.025; < 0.05) between study groups and changes in incus bone. High resolution CT scans are needed for additional research in order to see any changes in the incus bone, which can yield useful data.

Conclusion

The results of this study demonstrated a strong correlation between the lenticular process and the long process in cases of temporal bone osteitis, and a greater incidence of lenticular process in cases of localized middle ear cholesteatoma. Therefore, early middle ear granulation detection can help us make the right management decisions, which can ultimately result in effective treatment and positive prognosis outcomes.

Conflict of interest *None*

Funding source *None*

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Authors Contribution

SMG: Conceptualization of Project
JA: Data Collection
SOF: Literature Search
MN: Statistical Analysis
JA, BR: Drafting, Revision
TA: Writing of Manuscript

Original Article

Attitude and Perception of Private Medical Students While Working in the Anatomy Dissection Hall

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Abstract

Objective: To assess the attitude and perception of medical students towards anatomy learning while in the dissection hall

Material & Method: This was a cross-sectional study carried out at the anatomy department of Shalamar Medical & Dental College Lahore from Editor from 31st March 2019 to 11th December 2019. Responses from 272 MBBS students of 1st and 2nd year from private medical colleges of Lahore were obtained using a Google form through a questionnaire with questions relevant to their experience in the dissection hall & their satisfaction levels. Statistical analysis was carried out using SPSS version 20, and a p-value < 0.05 was taken as statistically significant.

Results: A significant percentage of students felt that dissecting cadavers by themselves helped them in a better understanding of anatomy. Most students (72 %) emphasized that the teaching of gross anatomy must be modified to fulfill the needs of clinical teaching. A total of 50% of the students felt that the time given for anatomy teaching in the dissection hall should be readjusted. Around 24% students were inclined to modernize anatomy by integrating it with other subjects.

Conclusion: Most students were in favor of cadavers being crucial for anatomy teaching, but with that readjustment of sub-specialties of gross teachings is the need of the day. Also, the use of 3D Anatomy in combination with cadavers is a helping tool for better understanding of anatomy concepts.

Keywords: Anatomy, Medical Students, Dissection

How to cite: *Ahamd MO, Tariq U, Baloch MB, Noor J, Fatima M, Khalid S. Attitude and Perception of Private Medical Students While Working in the Anatomy Dissection Hall. Esculapio - JSIMS 2023;20(01): 124-128.*

DOI: https://doi.org/10.51273/esc24.251320124

Introduction

Students and teachers both consider anatomy as an important subject in medical curriculum with regards to the clinical knowledge.[1] Comprehensive knowledge of anatomy plays a vital role in proper understanding of the further clinical disciplines. It remains an integral component of medical education crucial for introduction to the language of medicine and surgery.[2]

Teaching and learning anatomy for the undergraduates are the testing elements for the mentors and students alike. In traditional terms, anatomy teaching is based on face-to-face interaction amongst students and facilitators in the lecture hall, models based practical demonstrations and cadaveric dissections to deliver the core anatomical knowledge[2]. Despite the introduction of new effective learning aids comprising of virtual dissecting room, interactive 3D digital models and students` personal gadgets for youtube learning, the dissection of the cadaver still stands as the significant learning method for special orientation and true exposure of the human anatomy.[3,4] Without the exposure, a considerable disruption is felt in teaching the visual subject.[5]

Anatomy is taught in first 2 years of medical school

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Submission Date: 23-12-2023
1st Revision Date: 21-01-2024
Acceptance Date: 13-03-2024

which includes subspecialties of gross anatomy, embryology, histology and neuroanatomy.[6] Reconstruction of the core anatomy curriculum as well as teaching methodologies need attention worldwide owing to the cadaver shortage, and recent advances in clinical and technological fields. Subsequently, there are less hours being allocated to the anatomy curriculum.[7,8] Also, the changes in the curricula have generated disagreements regarding teaching styles, course content, clinical relevance and time allocated to anatomical courses.[3] Over the decades, members of the clinical faculty have shown a great concern over the current standards of anatomical education.[3] Changes in the undergraduate medical curriculum have taken place, however, without any research into the key aspects of knowledge necessary or without comparing methods of teaching. In this study, perception of students towards anatomy teaching was, therefore, analyzed.

Material and Methods

It was a descriptive cross-sectional study conducted in Anatomy Department of Shalamar Medical & Dental College Lahore from Editor, after taking approval from Institutional Review Board of Shalamar Medical and Dental College Lahore. Study was conducted from July 2018 to December 2018. A total number of 300 MBBS students of 1st and 2nd year from private medical colleges of Lahore were included in the study. After explaining the main purpose of study, written informed consent was taken from each partici-pant and a self-administered questionnaire was distri-buted to students which included about 10 to 11 questions related to the study. The questionnaire included basic information of the participants and the closed ended type of questions relevant to their experience in the dissection hall. Other questions were related to their satisfaction level. Responses were collected and completed by using Google form. Simple convenient sampling technique was used to collect the data. Only 1st year and 2nd year students of Shalamar and provide from other medical colleges of Lahore were included in this study. BDS and other discipline of sciences were not included in the study. Statistical analysis was carried out by using SPSS version 20, frequencies and percentages were calculated and p value < 0.05 was taken as statistically significant.

Results

Out of the 300 MBBS students of 1st and 2nd year, 272 filled in the response. There were 113 students from 1st year and 159 students from 2nd year MBBS. According to our research, 87% of the students considered cadaver dissection important for learning and grasping better concepts of anatomy. In addition, a significant percentage of students felt that dissecting cadaver by themselves helped them in better understanding of anatomy as compared to the already dissected body parts and just remembering the objective structured practical examination (OSPE) points from them ($p<0.001$) (Table-1). Majority of students emphasized that teaching of gross anatomy ($p<0.05$) must be modified to fulfill the needs of clinical teaching. However, a small percentage responded that surface anatomy teaching must be modified and 10% undergraduate students responded that teaching of the developmental anatomy must be modified. The microscopic anatomy was suggested by 12% to be taught in the light of clinical pathology. A total of 76.1% students felt that time given for anatomy teaching in dissection hall should be readjusted ($p<0.05$). Response of students regarding the gross anatomy subspecialty was assessed and it was seen that approximately 50% of students considered no change in time allocation to upper limb lower limb and thorax. But at the same time more than 50% of the students considered increasing the time allocated to head & neck and thorax regions. Questions about their experience were asked to assess the satisfaction of students regarding the topics covered in the dissection hall and demonstrations being clinically correlated or not. Around 72% were of the view that major topics of gross anatomy taught were clinically correlated and 86% considered anatomy essential for future surgery comprehension. Most of students have a perception that anatomy should be taught in combination with clinical subjects in all five years of medical curriculum. Moreover, 64 students were inclined towards modernizing anatomy by integrating it with other subjects (Table-2). Students were of belief that anatomy taught in the dissection hall inculcates the professionalism (68%), team building (17%) and other competencies including interpersonal relationship (13%) besides learning (2 %) in them.

Table 1: *Importance of cadaver dissection.*

Questions	Very Important	Less Important	Not Important
Is cadaver important for learning anatomy	87%	9%	4%
Dissection by myself is better help in learning anatomy as compare d to prosected specimen	68%	20%	12%

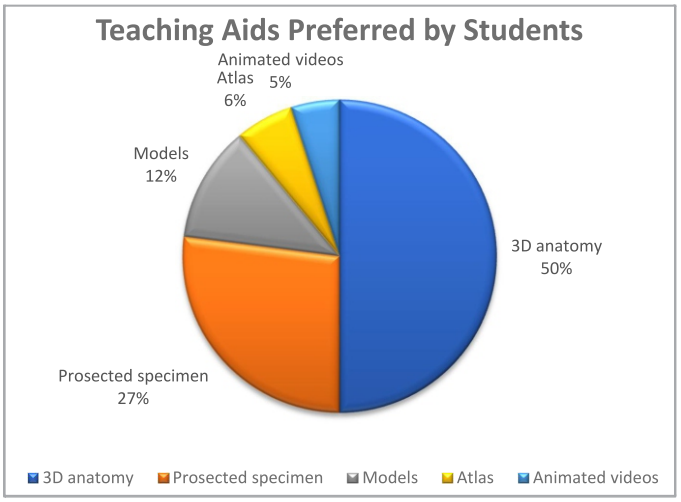

Fig-1: *Teaching Aids preferred by students.*

Discussion

The knowledge of anatomy forms the basic window towards the future clinical scenarios. All medical curricula have anatomy integrated. Not long ago, the transfer of the anatomical knowledge was solely synonymous with dissection. One study has clearly depicted "dissection" to have the pivotal role in anatomy teaching and learning stating, "It is best to begin the anatomy teaching with the cadaver". Present study reported that dissecting cadaver by students helped better understanding of human anatomy which is in accordance to the previous studies.[7,9,10] Similarly, a large majority of students in this study favored dissection as the tool for better comprehension of the subjects` concepts. However, this mode of instructional delivery has been limited by the cadaver availability and ethical and legal concerns. The students are, subsequently, bereft of dissection to learn anatomy in the three-dimensional perspective.[7]

Table 2: *Anatomy modernization for developing concepts*

How should anatomy be modernized, if it is really going to be useful in developing concepts?	**Reduction in amount of factual knowledge**	**49**	**18.014%**
	Integrated with other basics subjects	64	23.53%
	Increased course content of surface and radiological anatomy	19	6.985%
	Taught in combination with clinical subjects in all five years of medical curriculum	100	36.76%
	More stress should be given to applied aspects	35	12.86%
	Increase emphasis on PBL /CBL	5	1.838%

The students of current generation have more prompt access to the available information through electronic media. There are contemporary gadgets like audio-visual aids, virtual dissection tables, anatomy mobile applications in addition to the artificial anatomical models and viscera utilized for technology-based learning. Nonetheless, it was observed that students preferred them as supplements rather than replacement of the dissection altogether.[7,11] The 3D Anatomy atlas was the most indicated aid in our study probably due to its free availability and immediate accessibility. Around 50% of the students considered 3D Anatomy as a helping tool for learning concepts of anatomy which is similar to studies done by Mitrousias V et al. where students using the 3D software showed better performance in examinations, compared to students using prosection.[12] Education in context implies using core subject knowledge to solve clinical problems: unless students dynamically relate concepts, information will remain static and will eventually become extinct. Modification of teaching Anatomy and its subspecialities was, subsequently, highlighted by the students of our institute to emphasize more on the practical learning. Studies have revealed better outcomes of students` learning with the use of more than one practical teaching modalities.[11] However, the use of hands-on practical instruction will always be integral to students learning of anatomy in terms of concept building, information recall and overall subject spatial clarity.[7] The most commonly applied techniques of anatomy teaching are face-to-face based demonstrations and on campus lectures. After pandemic, online-teaching was added to the traditional in-class method. While students were found to be inclined towards modification and digitalization of the anatomy subspecialities, the introduction of new methods are nowhere to replace the traditional dissection.[11]

The reduction in undergraduate teaching and knowledge of anatomy has caused great concern not only for the clinicians but also for the under and postgraduate students especially in surgery; tales of surgeons wearing black arm-bands to signify the death of anatomy have been promulgated in history.[13] Previous studies showed that adequate time was not allocated in the anatomy curriculum, which is similar to current study which shows that inadequate time being given to head & neck and abdomen pelvis regions.[14] This opinion of limited time allocation is further supported by Kumar et al. where the inadequate time for anatomy instruction has its impact on the quality of knowledge of the

graduating doctors with reference to the embryology comprehension based diagnosis of the developmental anomalies.[14]

The satisfaction is although a subjective phenomenon, becomes considerable as to the correlation of anatomy with the clinical subjects involving different teaching modalities. With majority of students satisfied with the clinical correlation of the subject, this reflected confidence of the students on the vertical and horizontal integration incorporated with the clinical knowledge.[11] The results of the study conducted by Sarkar et el. are in accordance with our findings depicting high levels of students` satisfaction with the blended learning.[15] Previous studies show integration of anatomy into clinical sciences has more effect of retention of knowledge, which is according to our study conducted where 37% opinioned that anatomy to be integrated in all clinical years of anatomy.[16] The covid experience together with more inculcation of the medical education in anatomy has led to profound changes in the anatomy curriculum. The biggest one is the change in its role from being a basic subject to more of a practical subject with well clinical integration. This transition could be foreseen in the perception of larger part of the students to bring about changes in anatomy curriculum where it is taught in combination with clinical subjects in all five years of medical school. It is to ensure self-directed learning environment thought to be more beneficial in attaining the required professional development.

Conclusion

Most students were in favor of cadavers being crucial for anatomy teaching but with that readjustment of subspecialties of gross teachings is the need of the day. Also, the use of 3D Anatomy in combination with cadavers is a helping tool of anatomy concepts better understanding.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

MOA,MBB: Conceptualization of Project
FSK, UT: Data Collection
MOA, JN: Literature Search
FSK: Statistical Analysis
JN, MBB: Drafting, Revision
JN, MBB: Writing of Manuscript

Factors Affecting Turnaround Time TAT in Clinical Laboratory at a Tertiary Care

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Abstract

Objectives: The present study was designed to evaluate the turnaround time (TAT) of indoor patient samples and the factors affecting TAT in the clinical laboratory at a tertiary care Hospital.

Materials and Methods: This cross-sectional, descriptive study was conducted at Farooq Hospital Westwood, Lahore. The data of TAT was collected between the period of 1st January to 31st July 2023. Requested tests were received in the Pathology laboratory along with test requisition forms. All were carefully screened for any mistakes. TAT analysis of ABGs, S/E, RFTs, Trop-I, amylase, and CBC of indoor patients was done for eight months.

Results: A total of 18282 indoor patient samples were included in this study. On analysis, it has been observed that the ABGs (n=3407, 99.5%), Trop-I (n=755, 85.40%), S/E (n=6497, 72.39%), CBC (n=16117, 88.15%), amylase (n=326, 86.47%), RFTS (n=7541, 78.07%) were reported within the defined TAT. This study also observed that the main reason for delayed TAT was hemolysed and clotted samples (14.22%), specimen dilution and re-run for the verification of result (12.96%), and incorrect patient registration (12.64%).

Conclusion: Monitoring TAT for laboratory reports is crucial and it plays a significant role in ensuring the effectiveness of the laboratory's operations. The factors influencing the TAT should be monitored and analyzed regularly for better patient care management.

Keywords: Turnaround time, hospital-based pathology laboratory, monitoring of turnaround time, factors affecting turnaround time

How to cite: *Mumtaz A, Farooq O, Yousaf Z, Akbar N, Arshad A, Yasin B. Factors Affecting Turnaround Time in Clinical Laboratory at a Tertiary Care Hospital. Esculapio - JSIMS 2023;20(01): 129-133.*

DOI: https://doi.org/10.51273/esc24.251320125

Introduction

Laboratory investigations are essential for patient care and are conducted routinely in healthcare settings. These investigations play a crucial role in diagnosing, monitoring, and managing various medical conditions. They provide objective data that helps healthcare providers make accurate diagnosis, leading to appropriate treatment plans.[1] For patients with chronic conditions or undergoing treatments, laboratory investigations help monitor the progression of the disease and the effectiveness of therapies. Regular testing allows healthcare providers to adjust treatment plans as needed. Laboratory tests help identify health issues in their early stages, allowing for timely intervention and better treatment outcomes. In some cases, laboratory tests can provide prognostic information, predicting the likely course of a disease and helping clinicians plan appropriate management strategies.[2,3] Laboratory investigations provide objective data that support evidence-based medical decision-making, contributing to better patient outcomes. Routine testing, when used judiciously, can significantly contribute to providing high-quality patient care and improving overall health outcomes. Certain laboratory investigations can also assess an individual's risk of developing certain diseases or conditions, allowing healthcare providers to offer preventive measures. Laboratory tests, such as therapeutic

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Submission Date: 13-12-2023
1st Revision Date: 09-01-2024
Acceptance Date: 18-03-2024

drug monitoring, help ensure that patients are receiving the correct dosage of medications and that those medications are within the therapeutic range. Infections can be identified and treated promptly through laboratory tests, preventing the spread of communicable diseases and guiding appropriate antibiotic therapy.[4] Preoperative laboratory investigations help to assess the patient's overall health status and identify potential risks before surgery. Routine health check-ups often include laboratory tests to assess overall health and identify any potential health issues.[5]

Quality assurance practices ensure that laboratory processes and testing methodologies meet the highest standards. It can lead to cost savings in the long run.[6] Accurate and timely diagnosis can prevent unnecessary treatments, hospitalizations, and complications, reducing overall healthcare costs. Timely laboratory results build trust and confidence among patients and healthcare providers.[7] Clinical laboratory quality assessment did not rely solely on accuracy and precision.[8] Monitoring of turnaround time (TAT) is equally important to provide better facilities to the patients and help the physicians treat the patients in time. In a clinical laboratory setting, the TAT refers to the total time taken to complete a laboratory test from the moment the sample is collected to when the final test result is reported to the healthcare provider or the patient. It is a critical performance metric that directly impacts patient care and clinical decision-making.[9,10]

The TAT can vary significantly depending on various factors, including the type of test being performed, the complexity of the test, the laboratory's workload, the transportation time for the sample, and the efficiency of the laboratory's processes. A shorter TAT is generally desirable as it allows for faster diagnosis and treatment decisions.[11] In emergencies, rapid turnaround times are crucial for prompt and appropriate medical intervention. Efforts to improve TAT often involve optimizing laboratory workflows, using automation, enhancing sample transportation logistics, and implementing efficient information systems for result reporting. Reducing TAT without compromising accuracy is a continuous goal for clinical laboratories to provide the best possible patient care.[6] The present study was designed to evaluate the current TAT of indoor patient samples. The study also attempts to evaluate the factors affecting the TAT in the clinical laboratory of a tertiary care Hospital.

Materials and Methods

This cross-sectional, descriptive study was conducted at Farooq Hospital Westwood, Lahore. which is a 250-bed tertiary care hospital. The data of TAT was collected between the period of 1st January to 31st July 2023. Retrieved information was separated to notice current TAT and factors influencing delayed TAT. All the patient samples along with their Test Requisition Form (TRF) were analyzed which were available at the Department of Pathology laboratory at Farooq Hospital Westwood. Only indoor TRFs, prescribed arterial blood gases (ABGs), serum electrolytes (S/E), renal function tests (RFTs), troponin-I (Trop-I), amylase, and complete blood count (CBC) were included. Samples for post-prandial and fasting blood glucose measurements were excluded because there is no system to record the time of postprandial sample reception. Sudden addition or cancellation of the tests through phone calls by clinicians or nurses, outdoor patient samples, and if the calculated TAT of indoor patient tests was less than 20 minutes were also excluded. TAT refers to the total time taken to complete a laboratory test from the moment the sample is received in the Pathology laboratory to the report completion. The data was recorded and the differences were calculated. The indoor patient samples were collected by phlebotomists. After the collection of samples, the phlebotomist transported these samples to the sample management department. After that, the patient registration was done in laboratory information management system (LIMS) software. At the time of patient registration, the LIMS software automatically generates the registration time which is considered as sample arrival time. The sample receiving time entered in LIMS software is automatically printed on the patient test report as registration time. After complete enrollment of all referenced tests, the samples were transported to the Pathology laboratory by the same phlebotomist. A laboratory technician received all samples with their TRFs and checked them for any pre-analytical errors. After that, all patient samples were delivered to the respective benches for further processing. All patient samples were analyzed through different automated analyzers. After completion of the testing procedure, the observed values for the requested tests were entered into LIMS software against a unique patient registration number. Any analytical error that occurred during the total testing procedure was written on the TRFs immediately by the concerned laboratory technician. The time when the observed value was entered in LIMS software, appears as the reported time on the patient test report. Daily reports generated from the Department of Pathology laboratory at Farooq Hospital Westwood,

Lahore were analyzed for TAT, with the reasons for prolonged TAT mentioned on the TRFs. The total testing procedure of patient samples in the Pathology laboratory of Farooq Hospital Westwood is shown in Figure 1. The present study proposal was approved by the Institutional Review Board (IRB) of the Farooq Hospital Westwood, Lahore.

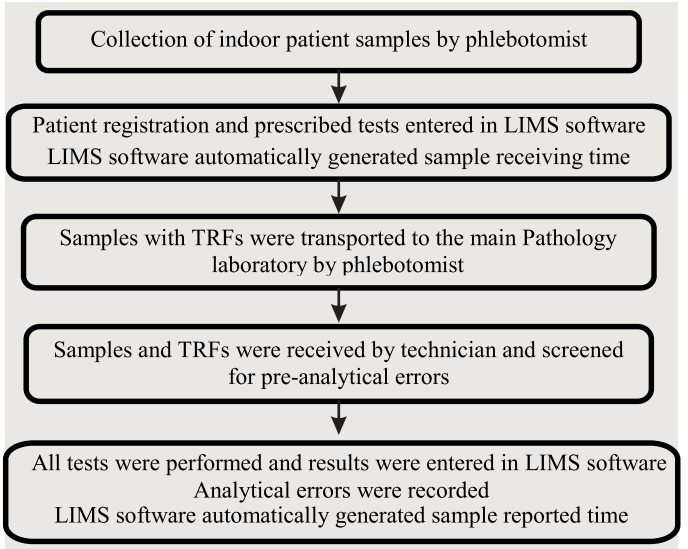

Fig-1: *Flow diagram of the total testing procedure of the Pathology laboratory of Farooq Hospital Westwood*

Results

A total of 18282 indoor patient samples and their TRFs were analyzed. In this study, we analyzed 06 urgent parameters which have an important role in patient care and treatment. From the included 18282 indoor patient samples: the number of prescribed CBC, RFTs, S/E, ABGs, Trop-I, and amylase tests were 18282, 9659, 8974, 3419, 884, and 337 respectively. The defined TAT of each parameter was different (table 1). On analysis, it has been observed that the 3407 (99.5%) ABGs, 755 (85.40%) Trop-I, 6497 (72.39%) S/E, 16117 (88.15%) CBC, 326 (86.47%) amylase, and 7541 (78.07%) RFTs were reported within the defined TAT.

During the total testing procedure, three types of main errors were recorded: pre-analytical, analytical, and post-analytical. Many factors were responsible for delayed TAT. This study observed that the main reason for delayed reporting was hemolysed and clotted samples (14.22%), specimen dilution and re-run for the verification of result (12.96%), incorrect patient registration (12.64%), and others which are described in table 2.

Discussion

Reporting within defined TAT by the Pathology labo-

Table 1: *Frequency of indoor patient samples reported within and after the defined turnaround*

	Arterial blood gases	Troponin-I	Serum electrolytes	Complete blood count	Amylase	Renal function tests
Defined TAT	30 minutes	40 minutes	45 minutes	60 minutes	60 minutes	60 minutes
Total No. of samples	3419	884	8974	18282	377	9659
Samples reported within the defined TAT	3407 (99.5%)	755 (85.40%)	6497 (72.39%)	16117 (88.15%)	326 (86.47%)	7541 (78.07%)
Samples reported after the defined TAT	12 (0.5%)	129 (14.59%)	2477 (27.60%)	2165 (11.84%)	51 (13.52%)	2118 (21.92%)

Table 2: *Frequencies of factors affecting turnaround time*

Errors	Factors	Number of samples (%)
Pre-analytical	Incorrect patients' registration	879 (12.64%)
	Hemolysis and clotted samples	989 (14.22%)
	Insufficient samples	415 (5.96%)
	Wrong barcoding of samples	621 (8.93%)
	Unsuitable sample for the test	102 (1.46%)
	Delay in transportation fromthe sample entry area to the main Pathology Laboratory	477 (6.86%)
Analytical	Delay in testing due to heavy workload	328 (4.71%)
	Troubleshooting	479 (6.89%)
	Integrity of samples	209 (3.00%)
	Need for specimen dilution and re-run for verification of result	901 (12.96%)
Post-analytical	Delay in conducting and approval of reports through LIMS software	381 (5.48%)
	Critical value reconfirmation and consultation	734 (10.55%)
	Reporting system (LIMS software) down	437 (6.28%)

ratory offers support to indoor and outdoor patients is a significant determinant factor for the best healthcare facility.[12] In this study samples with their TRFs were examined to produce important data about the TAT. TAT is defined as the time between samples received in the laboratory till the completion of the report and it varies from type and nature of tests. It also varies on the type of laboratory which may be hospital-based or independent laboratory not attached to the hospital. The meaning of the TAT is significant, but a definitive objective must be to give the right test results in a defined time. In this study, six parameters were analyzed for TAT due to their important significance.

In the present study, approximately 83.28% of samples were reported within the defined time as documented in standard operating procedures (SOPs). A study performed by K. P. Chauhan et al.[13] proposed that the per-centage of samples exceeding the TAT in 2011 was 6.4% which diminished to 4.6% by the year 2012. In the pre-sent study, the variation in TAT was primarily observed due to hemolysis and clotted samples (14.22%) followed by specimen dilution and re-run for the verification of result (12.96 %), and incorrect patient registration (12.64%).

Different factors were responsible for prolonged TAT. In the present study, errors and factors responsible for longer TAT were also analyzed. The most observed errors were pre-analytical (50.10%) followed by analytical errors (27.57%) and post-analytical errors (22.32%). A study done by KN. Desai et al.[14] proposed that 74.2% of the samples were postponed due to pre-analytical errors and another study conducted by F. Paul II et al.[15] emphasized that most delays were due to the fault in the analyzer. In the present study equipment breakdown just caused a 6.89% delay in TAT because of the avail-ability of backup instruments, and more vigilant super-vision of patient tests by the use of the LIMS dashboard. Bhattarai K et al.,[16] and Dawande PP et al.,[6] declared that the pre-analytical delays are the primary drivers of prolonged TAT. The results of these studies were consistent with the present study. The implementation of appropriate corrective measures for maintaining the TAT in the Pathology laboratory is important. Maklouf R. et al[17] revealed the utilization of the pneumatic tube diminished mean hemoglobin TAT from 43 to 33 minutes and mean potassium TAT from 72 to 64 minutes. As not all laboratories have the facility of pneumatic tubes, it is important to make proper protocols and SOPs for reporting urgent tests within in defined TAT. It can be done by the use of the LIMS dashboard and proper monitoring of technical staff by a shift in charges.

Conclusion

Monitoring TAT for laboratory reports is crucial and it plays a significant role in ensuring the effectiveness and efficiency of the laboratory's operations. There has been progress in the laboratory test result TAT lately, with additional express depictions of TAT information in the literature. The accomplishment of quality services is not just imaginable in hospital-based Pathology laboratories without tracking down the elements for delayed TAT and quick improvement of that area by the Pathology laboratory management. The factors influencing the TAT might differ from laboratory to laboratory, and their work strategies but it should be monitored and analyzed for providing timely treatment to admitted patients.

Conflict of Interest: *None*

Source of Funding: *None*

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Authors Contribution

AM: Conceptualization of Project
OF: Data Collection
ZY: Literature Search
NA: Statistical Analysis
AA: Drafting, Revision
BY: Writing of Manuscript

Frequency of Anemia in Women with Preterm Labour

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Abstract

Objective: To determine the frequency of anemia in women experiencing preterm labor, recognizing the critical association between anemia and adverse maternal and perinatal outcomes.

Materials and Methods: This cross-sectional study was done from September 2023 to November 2023 after approval from the Institutional Review Board IRB NO. MRC/1RB/23017. After informed consent 192 pregnant females were included after Institutional Review Board approval. A self-developed questionnaire gathered sociodemographic data, and hemoglobin levels were measured. Statistical analysis employed SPSS version 23, utilizing chi-square for comparisons.

Results: Among the 192 participants, 27.1% were anemic. Bivariate analysis revealed a significant association between anemia and rural residence (p=0.012). No significant correlation was found with other sociodemographic factors.

Conclusion: The study emphasizes the high frequency of anemia in women experiencing preterm labor, supporting the need for heightened public awareness and early screening initiatives. Maternal anemia significantly correlates with preterm births, emphasizing the importance of managing gestational anemia to mitigate adverse outcomes. Public health interventions should target women of reproductive age and healthcare providers to ensure timely screening and management of maternal anemia, ultimately contributing to the reduction of preterm births and associated complications.

Keywords: Anemia, iron-deficiency, preterm birth, maternal health, perinatal outcomes, public health, gestational anemia, sociodemographic factors, hemoglobin levels, pregnancy complications, public awareness.

How to cite: *Naureen S, Mahmood A, Saleem A, Afridi H, Kaleem S, Zulfi QUA. Frequency of Anemia In Women with Preterm Labour. Esculapio - JSIMS 2023;20(01):134-137.*

DOI: https://doi.org/10.51273/esc24.251320126

Introduction

Anemia is a condition where the body has lower than normal levels of hemoglobin, leading to decreased oxygen-carrying capacity of red blood cells.[1] Pregnant women are more vulnerable to anemia, with global prevalence rates of 42%. Iron deficiency is the primary cause of anemia in pregnancy, accounting for around 95%. Anemia during pregnancy can lead to poor maternal and fetal outcomes, including preterm labor, pre-eclampsia, sepsis, and postpartum hemorrhage.[2] Preterm labor refers to the onset of regular uterine contractions before the 37th week of pregnancy, leading to the opening of the cervix and ultimately resulting in the birth of a baby that is not fully developed.[3] This can pose significant health risks to the baby, as they may not be fully capable of breathing, feeding, and regulating their body temperature without medical assistance.[4] Iron deficiency and hypoxia, caused by anemia, can lead to maternal and fetal stress, which raises norepinephrine levels in serum, inducing maternal and fetal stress. This stress stimulates the synthesis of corticotrophin-releasing hormone (CRH), which is a major

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Submission Date: 04-12-2023
1st Revision Date: 06-01-2024
Acceptance Date: 16-03-2024

risk factor for preterm labor.[5] Preterm deliveries are a significant public health challenge with far-reaching effects, constitute a major cause of long-term morbidity and perinatal mortality. Over half of all cases of long-term morbidity are associated with preterm deliveries, while 75% of perinatal deaths result from prematurity.[6] A study conducted in Abbottabad showed that 41.5% of the patients with preterm labor had iron deficiency anemia.[5] While according to Frayne et al preterm labour was observed in 25% percent of anemic pregnant women in Australia, while in Tasmania, there is a prevalence of 18% of Iron Deficiency Anemia (IDA) among expectant women. This study highlights the importance of monitoring and addressing the issue of IDA during pregnancy.[7] Moreover preterm infants are at heightened risk of developing respiratory, gastrointestinal, and cognitive issues, which can have long-lasting implications for their overall health and well-being[6] Therefore, it is important to manage gestational anemia before it leads to far-reaching complications. The WHO guidelines define anemia during pregnancy as hemoglobin levels below 110g/L.[8] As the previous studies have shown variation in the frequency of anemia in women with preterm labour So, based on these results, public awareness can be created regarding this major public health issue among pregnant women as well as treating clinicians for a better future outcome in every aspect to reduce adverse maternal and perinatal outcomes.

Material and Method

This cross-sectional study was done from September 2023 to November 2023 after approval from the Institutional Review Board IRB NO. MRC/1RB/23017. After informed consent pregnant females were included in our study. Those not giving consent were excluded from the study. A sample size9 of 192 was used using a 95% confidence interval and 5% margin of error. The questionnaire was self-developed after literature search. Questionnaire was filled by an interview. Hemoglobin test was done as per standard protocols. Hemoglobin less than 11mg/dl was categorized as anemics. Consecutive sampling was done till the completion of the sample size. The sample was completed using convenience sampling.

SPSS version 23 was used to enter, code, and analyze the gathered data. For age mean and standard deviation was calculated. Chi-square was used to compare the sociodemographic characteristics of anemics and non-anemics. A p-value less than 0.05 was taken as significant.

Results

A total of 192 pregnant females in the study had a mean age of 28.14 years with a standard deviation of 5.88

Table 1: *Socio-demographic characteristics of study respondents n= 192.*

Variables	Frequency (n)	Percentage (%)
Age		
Less than 30 years	142	74.0
More than 30 years	50	26.0
Educational Status		
Below matriculation	136	70.8
Matriculation	4	2.1
Graduate	52	27.1
Residence		
Urban	80	41.7
Rural	112	58.3

Table 2: *Bivariate analysis to compare sociodemographic profile of anemics and non-anemics*

Variables		Anemics N=52	Non-Anemics N=140	P-value
Parity	Less than 2	22 (42.3%)	72 (51.4%)	0.261
	More than 2	30 (57.7%)	68 (48.6%)	
Gestational Age	Less than 28 weeks	26 (50%)	80 (57.1%)	0.376
	More than 28 weeks	26 (50%)	60 (42.9%)	
Place of Residence	Urban	14 (26.9%)	66 (41.1%)	**0.012**
	Rural	38 (73.1%)	74 (52.9%)	
History Of Preterm	Yes	16 (30.8%)	64 (45.7%)	0.062
	No	36 (69.2%)	76 (54.3%)	
Education	Below matriculation	38 (73.1%)	98 (70.0%)	0.464
	Matriculation	0 (0.0%)	4 (2.9%)	
	Graduate	14 (26.9%)	38 (27.1%)	
Age	Less than 30 years	34 (65.4%)	108 (77.1%)	0.099
	More than 30 years	18 (34.6%)	32 (22.9%)	

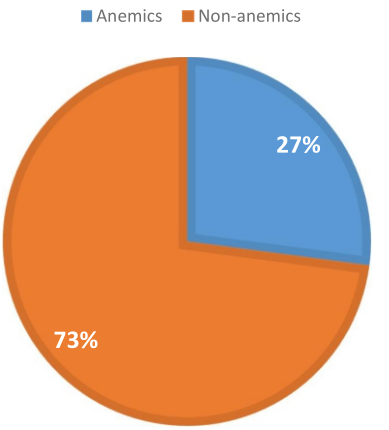

Fig-1: *Frequency of anemia in preganant females.*

years. The sociodemographic characteristics of study participants are shown in table. Bivariate analysis was done to compare sociodemographic characteristics of anemics and non-anemics as shown in Table 2. Anemics were significantly higher in rural residence. P-value 0.012. In this study there were 52 (27.1%) anemics and 140 (72.9%) were not categorized as anemics as shown in Figure 1.

Discussion

Globally, anemia during pregnancy is thought to affect 41.8% of pregnant women. The mean age of our participants is 28 ± 5.8, whereas in a study conducted in India the median age of 388 females with diagnosis of pregnancy during first trimester was 27 years.[10] Out of the total study population,112(58.3 %) lived in urban areas whereas 80(41.7%) resided in rural areas whereas in another study conducted in India 270 (69.58%) were from rural and 118 (30.41%) were from urban back-ground.[11] Ninety-four (49%) of the pregnant ladies were para 2 whereas 89(51%) were para 3 and 4 whereas in British Columbia 264 patients had anemia, 87 (32.95%) patients were primigravida and 177 (67.04%) were multiparous females.[12]

Frequency of anemia in preterm labor was found in 52 (27.1%) patients. Studies have showed association of maternal anemia in pregnancy with increased risk of delivery of premature and low birth weight babies.[13] Research has been conducted to understand how anemia may predispose to preterm labour either directly or indirectly due to increased risk of infection. The direct effect is related to increased synthesis of corticotrophin releasing hormone as a result of tissue hypoxia. In various studies, frequency of anemia in patients with preterm labor was found to be 58.0%.[14]

In another study conducted in Turkey, frequency of anemia in patients with preterm labor was found to be 48.6%.[15] Anemia was significantly associated with resi-dence in rural area (p=0.012), similarly in a study con-ducted in India 61% of the rural population had anemia.[16] Half of the anemic females were of less than 28 weeks of gestation and half were more similarly in a study conducted in Canada 67% of the participants had anemia before 28 weeks of gestation.[17] There was no association found between level of education with anemia in this study, whereas in a study conducted in Ethopia a signifi-cant association <0.05 was found between no education and prevalence of anemia.[18]

In this study, 30% of the anemics had history of preterm labour. The overall relationship between maternal anemia during pregnancy and premature birth was significant (1.56 [95% CI: 1.25–1.95]) in a metanalysis which showed that premature birth and labour is a risk factor of anemia. Anemia is the most frequent blood disorder occurring during pregnancy and can result in complications during pregnancy.[19]

Conclusion

This study concluded that frequency of anemia in women with preterm labour is quite high. So, we recommend that public awareness programs should be arranged regarding this major public health issue among women of reproductive age group as well as treating clinicians for early screening and management of maternal anemia in order to reduce the preterm birth

Conflict of interest *None*

Funding Source *None*

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Authors Contribution

SN: Conceptualization of Project
HA: Data Collection
AM, HA: Literature Search
QAZ: Statistical Analysis
AS: Drafting, Revision
SK: Writing of Manuscript

Effectiveness of Autologous PRP Versus Conventional Mechanical Fixation on Wounds in Terms of Skin Graft Adhesion & Complications

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Abstract

Objective: To determine the efficacy of autologous PRP on wounds in terms of skin graft adhesion and complications as compared to conventional fixation techniques.

Materials and Methods: This study was conducted at the Department of Plastic & Reconstructive Surgery, PIMS, Islamabad, over a period of six months from August 21, 2019 to February 28, 2020. The research was authorized by the Ethics Review Board and Committee ERB no. (F.1-1/2015/ERB/SZABMU/456). Patients were allocated into two groups: Group A received PRP-assisted graft adhesion, obtained through aseptic blood draw, centrifugation, and application to the wound area; Group B underwent conventional fixation with sutures or staples. Graft evaluation and dressing adjustments were performed with dressing changes on the 5th postoperative day.

Results: In Group A (mean age: 34.03±11.07 years) and Group B (mean age: 30.55±11.81 years), Group A exhibited significantly higher efficacy (89.7%) compared to Group B (66.7%) with a p-value of 0.000. Age and gender differences were minimal, except in the subgroup of patients aged 31-40 years and males.

Conclusion: Autologous PRP treatment (Group A) demonstrated superior efficacy in promoting graft adhesion compared to conventional fixation (Group B). The study recommends the clinical adoption of autologous PRP in wound resurfacing procedures to expedite healing.

Keywords: Adhesion, Complications, Conventional, Efficacy, Fixation, Platelet-Rich Plasma (PRP), Skin graft.

How to cite: *Rahim F, Qayyum B, Yousaf A, Malik A, Daniel Z, Zulfi QUA. Effectiveness of Autologous PRP Versus Conventional Mechanical Fixation on Wounds in Terms of Skin Graft Adhesion & Complications. Esculapio - JSIMS 2023;20(01):138-142.*

DOI: https://doi.org/10.51273/esc24.251320127

Introduction

Patients often face significant challenges when dealing with open wounds. There are a variety of options for wound coverage, but split thickness skin grafting is the most commonly used technique in plastic surgery to cover wounds.[1] The effectiveness of a skin graft relies on various factors, including the local blood supply, microbial environment of the wound, blood clotting, and the attachment of the graft to the wound surface. Historically, skin grafts have been secured to the edges of the wound using sutures or staples, and anchored to the wound surface to prevent shifting and fluid buildup underneath the graft. Nevertheless, these techniques can be both costly and time-intensive.[2] Platelet-rich plasma (PRP) is a source of growth factors that are necessary for vascularization and regeneration. PRP contains up to 300% of the normal platelet levels found in blood, and the degranulation of platelets releases growth factors such as platelet-derived growth factor, vascular endothelial growth factor, transforming growth factor-beta[1], and insulin-like growth factor.[3] PRP also

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Submission Date: 15-12-2023
1st Revision Date: 11-02-2024
Acceptance Date: 12-03-2024

contains over 30 bioactive proteins, many of which play a crucial role in tissue healing. Additionally, PRP contains three proteins that act as cell adhesion molecules: fibrin, fibronectin, and vitronectin.[4] Research has shown that using PRP in wound beds can have significant benefits over traditional methods.[5] Waiker et al. conducted a study to examine and compare the effectiveness of conventional mechanical fixation techniques with the application of autologous platelet-rich plasma (PRP) in wound beds. The findings revealed that 95% of patients in the PRP group received their initial post-graft dressing after one week, and 94% underwent their first graft inspection within 10 to 12 days after grafting.[6,7] According to another clinical trial the graft was found to be well-adhered and dry in the PRP group, compared to none in the control group ($p<0.001$). Additionally, graft edema was observed in 68% of patients in the control group and only 10% in the PRP group ($p<0.001$). In the control group, sero-purulent discharge occurred at the graft site in 17%, whereas in the PRP group, it was observed in only 2% ($p<0.001$). Additionally, hematoma beneath the graft leading to notable graft loss and requiring secondary grafting was experienced by 15% of control group patients, compared to only 4% in the PRP group ($p<0.008$).8 Scar hypertrophy was seen in 25.8% of the control group and only 4.7% of the PRP group ($p<0.001$).9Another study by Fakiha K et al. focused on the use of PRP for the fixation of skin grafts in forty post-burn patients.[10] Gupta et al.'s study showcased that PRP's adhesive properties render it safe and efficacious for skin graft fixation.[11] Drawing from the existing research it is evident that PRP has the potential to expedite the regeneration of epithelial, endothelial, and epidermal tissues, trigger angiogenesis, enhance collagen production, facilitate soft tissue recovery, reduce dermal scarring, and improve hemostasis.[12] PRP also facilitates immediate adherence of the graft to the wound bed, preventing any accumulation beneath the graft, enhancing graft acceptance, and decreasing the incidence of complications.[13,14] As there is still a lack of local studies and practice regarding PRP in wound treatment, better management may be provided in the future by further research in this area. This research provides valuable insights into the comparative effectiveness of autologous PRP and conventional fixation methods in promoting skin graft adhesion and minimizing complications, contributing to the advancement of wound care practices in plastic surgery.

Material and Methods

This study was conducted at the Department of Plastic & Reconstructive Surgery, Islamabad, over a period of six months from August 21, 2019 to February 28, 2020. The research was authorized by the Ethics Review Board and Committee ERB no. (F.1-1/2015/ERB/ SZA BMU/456). The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. The study involved 174 participants aged between 18 and 60 years. The population proportion of hematoma in the control group was 0.15[(4)], while the population proportion of hematoma in the PRP group was 0.04[(4)]. The power of the test was 80%, and the level of significance was 5%. The sample size was 87 in each group, making the total sample size 174. This sample size also covered the required sample size to test other complications such as sero-purulent discharge and graft loss. The participant were assigned the groups after, taking informed consent, by simple random sampling technique into Group A (autologous PRP) or Group B (conventional fixation). Aseptic precautions were taken during PRP collection, where blood was centrifuged to separate PRP. In Group A, PRP was applied to the wound bed, and graft adhesion was assessed. Group B received conventional fixation with sutures/staples. Dressings were maintained until the 5th postoperative day, followed by an assessment for complications. The inclusion criteria were traumatic and post-burn wounds, while exclusion criteria were specific with the participants having prior wound treatments, pregnancy or lactation, non-compliance and severe co-morbidities. A meticulous approach to PRP collection was followed, involving aseptic measures, and subsequent data analysis utilized SPSS 20. The primary focus of the study was to compare the efficacy of graft adhesion between the two groups, with complications assessed on the 5th post-operative day. Autologous PRP is effective as compared to conventional fixation in terms of skin graft adhesion and complications.

A biological substance characterized as a segment of the plasma fraction derived from one's own blood, possessing a platelet concentration exceeding the baseline attained through centrifugation.[3] Case was said efficacious when there is no complications were evaluated with 5th post-operative day and instant adhesion (pre-operatively).[9] It was defined as immobility of graft over wound bed. It will be seen per operatively.[1] They

were evaluated on opening first dressing at 5th postoperative day. All these were measured on clinical examination.

1. Infection (sero-purulent discharge)
2. Seroma: collection of fluid on physical examination
3. Hematoma: collection of blood Graft loss[7]

Results

In Group-A 8(9.2%) patients and in Group-B 15(17.2%) patients had infection, 16(18.4%) patients in Group-A and 21(24.1%) in Group-B had seroma, none of the patients had hematoma in both treatment groups and 15(17.2%) patients in Group-B had significant graft loss while none of the patients had graft loss in Group-A patients. (Table-1) The efficacy of Group-A treatment was significantly higher compared to Group-B treatment, i.e., Group-A: 89.7% vs. Group-B: 66.7%, p-value=0.000.For male patients' efficacy was higher in Group-A but it did not reach statistical significance while for female patients efficacy was significantly higher in Group-A patients i.e. Male=0.095 & Female = 0.000. The efficacy of Group-A treatment was significantly higher compared to Group-B treatment, i.e., Group-A: 89.7% vs. Group-B: 66.7%, p-value=0.000. For male patients' efficacy was higher in Group-A but it did not reach statistical significance while for female patients efficacy was significantly higher in Group-A patients i.e. Male= 0.095 & Female= 0.000.

Group-A: PRP: **Group-B:** Without PRP

Table 1: *Complications among patients*

		Group-A	Group-B	Total
Infection	Yes	8(9.2%)	15(17.2%)	**15**
	No	79(90.8%)	72(82.8%)	**159**
Seroma	Yes	16(18.4%)	21(24.1%)	**21**
	No	71(81.6%)	66(75.9%)	**153**
Hematoma	Yes	0(0%)	0(0%)	**0**
	No	87(100%)	87(100%)	**174**
Significant Graft loss	Yes	0(0%)	15(17.2%)	**15**
	No	87(100%)	72(82.8%)	**159**

Table 2: *Efficacy of Treatment in relation to age and gender of patients*

Age	Efficacy	Group		pvalue
		Group-A	Group-B	
17-30 Years	Yes	30(100%)	35(70%)	0.001
	No	0(0%)	15(30%)	
31-40 Years	Yes	29(76.3%)	14(100%)	0.045
	No	9(23.7%)	0(0%)	
>40 Years	Yes	19(100%)	9(39.1%)	0.000
	No	0(0%)	14(60.9%)	
Male		57(86.4%)	44(74.6%)	0.095
Female		21(100%)	14(50%)	0.000

Fig-1: *Significant graft loss without PRP*

Fig-2: *Instant adhesion of skin graft with PRP*

Discussion

Skin grafting is a surgical procedure that transfers skin from one part of the body to another to cover open wounds.[15] There are two types of skin grafts: split thickness and full thickness. Split thickness skin grafts include the epidermis and a piece of the dermis, while full thickness skin grafts include the entire dermis.[16] This investigation used a split thickness graft to cover a body region where skin had been lost. Post-traumatic wounds and serious burns are two of the most common reasons for skin grafts.[17] After the skin was carefully removed from the donor site, it was put over the recipient region and fixed with PRP (group A) & with stitches/staplers (group B). The majority of grafts were meshed to stretch the skin and allow fluid to flow. Infection, fluid or blood accumulation under the graft, or too much movement of the graft on the site caused graft absorption to not occur.[18] Flat surfaces demonstrated better absorption

than curved surfaces, and graft rejection increased morbidity, hospital stay, and expense.[1,20] This investigation found that PRP is much more effective than traditional mechanical fixation. Group A scored 89.7% compared to Group B with a p-value of 0.000. The findings from another study indicate that autologous PRP led to faster and more substantial rates of healing, along with immediate graft adherence. The occurrence of hematoma, graft oedema, drainage, graft loss, and scar hypertrophy was reduced in the PRP group. PRP might diminish cytokine release and curb inflammation in chronic wounds through interactions with macrophages, promoting tissue repair and regeneration.[21] Regardless of the underlying cause, the use of autologous PRP can enhance the success of graft integration on wounds.[22] Nonetheless, autologous PRP faces challenges such as susceptibility to contamination and platelet over-activation triggered by external stimuli, posing difficulties in its clinical utilization.[23] Autologous PRP serves as a beneficial adjunct in wound management because of its safety, affordability, ease of preparation, hemostatic properties, adhesive nature, and healing attributes.[24]

Conclusion

In conclusion, this investigation underscores the efficacy of autologous PRP as a superior alternative to traditional mechanical fixation methods in skin grafting. With a notable 89.7% success rate in Group A compared to Group B, the study demonstrates PRP's capacity for quicker healing, immediate graft adhesion, and reduced complications. While acknowledging challenges such as potential contamination and platelet over-activation, the study advocates for the frequent use of autologous PRP as a cost-effective, safe, and beneficial adjuvant in wound treatment across diverse age groups and wound types.

Conflict of Interest: *None*

Funding Source: *None*

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Authors Contribution

FR: Conceptualization of Project
AKM: Data Collection
BQ: Literature Search
QANZ: Statistical Analysis
AY: Drafting, Revision
ZD: Writing of Manuscript

Short Communication

Demographics of Blood Donors at a Regional Blood Transfusion Centre in a Developing Country Pakistan

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Abstract

Objective: The study was aimed to gather demographic data from blood donors to develop strategies for improving voluntary blood donations.

Material and Method: This study utilized a cross-sectional descriptive design and was conducted at the Armed Forces Institute of Transfusion (AFIT), from November to January 2021.Demographic information of blood donors was collected using a pre-designed form. Statistical analysis was performed using SPSS 23, including calculations of frequency, percentage, and mean ± standard deviation. The blood donors were categorized into different groups based on caste, education, how frequently they donate blood and type of donation. Chi-square test was used.

Results: The blood donors presenting at regional centre were 28.53 ± 7.25 years of mean age. Out of 1000 blood donors, there were 98.8% male and 1.2% were female. Most blood donations came from individuals of Punjabi ethnicity (72.4%). Among the various caste systems in Pakistan, the highest number of donors belonged to the Rajput caste (9.3%). The majority were directed donors (93.6%) and were donating for the first time (65%). There was a positive correlation between the frequency of blood donation and the level of education. Regular donors (50.4%) were mostly those who had qualification of graduation, with a p-value of 0.001.

Conclusion: We found that individuals with higher levels of education are more likely to be frequent voluntary blood donors.

Keywords: Voluntary Blood donor, Demographic data, Directed blood donor

How to cite: *Umar S, Ijaz F, Naeem MA, Tauseef A, Aftab RK, Mufti M. Demographics of Blood Donors at a Regional Blood Transfusion Centre in a Developing Country Pakistan. Esculapio - JSIMS 2023;20(01):143-145.*

DOI: https://doi.org/10.51273/esc24.25201.29

Introduction

Pakistan is currently facing a significant shortage of voluntary blood donors, especially when compared to Western countries.[1] It is crucial to have voluntary blood donors as they provide safe blood to transfusion centres. Unpaid voluntary blood donors are preferred because their blood is considered safer for transfusion, as there is a lower risk of Transfusion-Transmissible Infections (TTI).[2] Directed donors, on the other hand, do not fulfill the demands of blood banks and only contribute to increasing blood bank stores.[3] The World Health Organization has set a target for all countries to achieve 100% voluntary blood donations by 2020. However, in Pakistan, the rate of voluntary blood donation is currently only 10% compared to 90% directed donation. There are various factors that influence unpaid voluntary blood donations and understanding the demographics of blood donors is essential for identifying donors and developing effective strategies for donor recruitment and retention.[4]

Unfortunately, there is limited available data on donor

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Submission Date: 01-09-2023
1st Revision Date: 22-09-2023
Acceptance Date: 01-03-2024

demographics in the Pakistani population. Therefore, the aim of our study was to collect demographic data from blood donors in our region. This data will help in formulating strategies to improve voluntary blood donations.

Material and Method

The study was conducted at the (removed for blind peer freview) from November January 2021. Ethical approval was obtained from the hospital's ethical committee, and informed consent was obtained from all participating blood donors. A validated questionnaire was employed to gather demographic data, encompassing details such as age, gender, ethnic background, caste, literacy level, income, blood donation history, and the nature of donation (directed or voluntary). Personal identification details were not recorded to ensure confidentiality. Statistical analysis was performed using SPSS 23, calculating frequencies, percentages, and mean±standard deviation. The blood donors were grouped based on literacy levels, frequency of blood donation as well as voluntary or directed donor. Chi-square test was used for comparison between groups.

Results

A total of 1000 blood donors were included in the study. The mean age of the blood donor was 28.53 ± 7.25 years. Minimum age was 18 years and maximum was 58 years. Amongst these 988 (98.8%) were males and 12 (1.2%) were females. Out of 1000 blood donors 724 (72.4%) were Punjabi, 147 (14.7%) were Pathan, 67 (6.7%) were Kashmiri, 42 (4.2%) were Sindhi, 13 (1.3%) were Balti and (7) 0.7% were Balochi respectively.

Amongst different caste systems in Pakistan, there were 93 (9.3%) Rajput donors. Other caste Malik 62 (6.2%), Awan, Arain 56 (5.6%) each and Khan 47 (4.7%). Three (0.3%) donors did not disclose their caste. The distribution of blood donors among different castes has been graphically represented in Fig-I. Looking at the literacy level, 131 (13.1%) blood donors had qualification up to middle school, 756 (75.6%) had SSC/HSC and 113 (11.3%) had Bachelor degree. Analysis of salary showed that 114(11.4%) donors had salary < Rs 15,000, 780(78.0%) donors had salary less than Rs 50,000 and more than Rs 16,000. While 102 (10.2%) donors had salary > Rs 50,000. Four (0.4%) donors did not disclose their salaries. First time donors were 650 (65.0%) whereas regular donors were 350 (35.0%)

Directed donors were 936 (93.6%) and voluntary donors were 64 (6.4%).

Frequency of blood donation was correlated directly with literacy level. Highest number of regular donors (50.4%) had literacy level up to graduation and beyond with p value 0.001 (Table I).

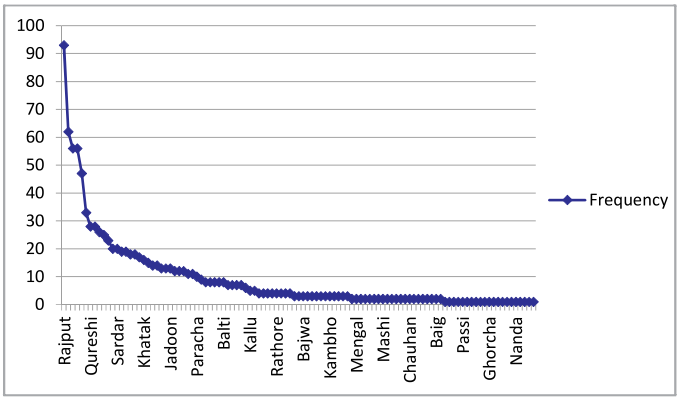

Figure 1: *Distribution of different caste amongst blood donors*

Discussion

Transfusion centers rely on voluntary blood donors to provide safe blood.[1] Unpaid voluntary blood donations are influenced by several factors. The demographics of blood donors are important in identifying donors and guiding donor recruitment and retention strategies.[3] This study was conducted in a regional transfusion center, where a large number of blood donors were enrolled for the purpose of collecting demographic data. In Pakistan, no previous study with 1,000 blood donors has ever been carried out. This study revealed that voluntary donations were far less as compared to directed ones. Most of the directed donors were first time donors. These results were comparable to another study con-

Table 1: *Comparison of literacy group with first time/ regular donors*

Literacy Level	First time Donor	Regular Donor	p value
Up to Middle	83 (63.4%)	48 (36.6%)	
SSC/HSC	511 (67.6%)	245 (32.4%)	0.001
Graduate and beyond	56 (49.6%)	57 (50.4%)	

Table 2: *Comparison of literacy group with voluntary/ directed donors*

Literacy Level	Voluntary Donor	Directed Donor	p value
Up to Middle	127 (96.9%)	4 (3.1%)	
SSC/HSC	710 (93.9%)	46 (6.1%)	0.049
Graduate and beyond	101 (89.4%)	12 (10.6%)	

ducted in Islamabad.[7] Female donors were limited as compared to male donors. These results were similar to a study conducted in Islamabad 5 and USA.[6] In an Australian study,[7] male donors were slightly more than female donors, which was not the case in our community. The majority of donors who presented to our center were between the ages of 18 and 58, which was similar to another study conducted in the United States.[4]

Punjabis made up the majority of the donors who came to our center, followed by Pathans and Kashmiris. These findings may not accurately reflect ethnicity. More data from other transfusion center in all provinces is needed. Donors recruited in this study belonged to 107 different castes. Donor caste information has never been gathered on a national scale. This data can be used by transfusion recruitment teams to educate caste noblemen about the need of voluntary blood donation among their people. The majority of the donors were undergraduate students, and the findings were consistent with that of a study conducted in Islamabad.[5] Educated donors provided more voluntary[9] and regular donations, according to this study. Multiple factors motivate general population to donate blood. We need to analyze these factors to increase the voluntary blood donor pool.[8] It is important to provide adequate information about blood donation through public and donor awareness campaigns. Electronic and social media can play an important role for encouraging voluntary blood donation. In order to overcome the misconception regarding blood donation, it is important to educate potential donors.[2]

Conclusion

In Pakistan literate individuals are frequent voluntary donors based on our study results. Our study aimed to address the lack of data on donor demographics in Pakistan and provide valuable insights for improving voluntary blood donations. Elaborate demographic data is essential for planning recruitment program in a targeted community for an effective outcome.

Conflict of Interest: *None*

Source of Funding: *None*

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Authors Contribution

SU: Conceptualization of Project
SU, FI: Data Collection
MAN: Literature Search
AT: Statistical Analysis
MAN: Drafting, Revision
MM: Writing of Manuscript

Female Urethral Diverticulum: A Case Report

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Abstract

Background: A urethral diverticulum is an out pouching arising from the urethra. The prevalence is unknown. Only 1-6 % cases are reported. Patrons present with recurrent urinary tract infections, urine dribbling and dysparunea. Case: A 60 year old patient presented with recurrent UTI, dysuria and urinary dribbling. On examination there was a urethral diverticulum. Excision and reconstruction of the urethra was done.

Conclusion: Proper examination is necessary in patients presenting with urinary complaints. Many cases of urethral diverticulum remain undiagnosed. Excision of the diverticulum must be done by an experienced urogynaecologist or urologist to prevent complications.

Keywords: Urethral diverticulum, female, excision

How to cite: *Hameed N, Mubeen S. Female Urethral Diverticulum: A Case Report. Esculapio - JSIMS 2023;20(01):146-148.*

DOI: https://doi.org/10.51273/esc24.25201.31

Introduction

A urethral diverticulum (UD) is an outpouching sac arising from the urethra.[1] It may present as a lump near the urethra or pain along the length of the urethra. On pressing the diverticulum external urethral discharge may be seen.[1] It may vary in size from 3mm to 4cm.[2] The etiology of UD is mostly unknown but it may be congenital or acquired. Congenital cases may result from remains of Gartner's duct or abnormal fusion of primordial folds.[3] Many cases are acquired and are caused due to repeated infections and obstruction of the periurethral glands. These rupture and open into the urethral lumen and the cyst epithelializes.[4] It is an underdiagnosed condition and the prevalence is cannot be estimated exactly because only approximately 1% to 6% of cases are reported.[1] Patients may present with multiple symptoms including dyspareunia, incontinence, post micturition dribbling, recurrent UTI, tender mass, frequency and urgency.[5] A case of a patient with recurrent UTI and incontinence is reported who had a 3cm diverticulum.

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Submission Date: 15-01-2024
1st Revision Date: 08-02-2024
Acceptance Date: 05-03-2024

Case History

A 60-year-old lady presented with complaint of urinary incontinence, dysuria and recurrent urinary tract infections for the last 4 years. She had to use incontinence pads due to the continuous dribbling of urine.

Fig-1: *urine flowing with pressing the diverticulum*

She had taken multiple courses of antibiotics for the recurrent urinary tract infections. On examination she was found to have 3cm large urethral diverticulum. On pressing the diverticulum urine flowed which was pus filled. She was advised urine complete examination and urine culture. The reports showed urinary tract infection and culture showed growth of pseudomonas. The

infection was treated and plan of excision of the diverticulum was made after treatment of the infection. After all the pre-op preparation excision of the diverticulum was done. Aseptic measures were taken, patient was catheterized and put in lithotomy position. A 2cm midline incision was made 1cm under the external urethral diverticulum. The urethral diverticulum was separated by sharp and blunt dissection. It was excised. Methylene blue dye test was done. A martius flap was harvested from the left labia majora and sutured to the area from where the diverticulum was excised.

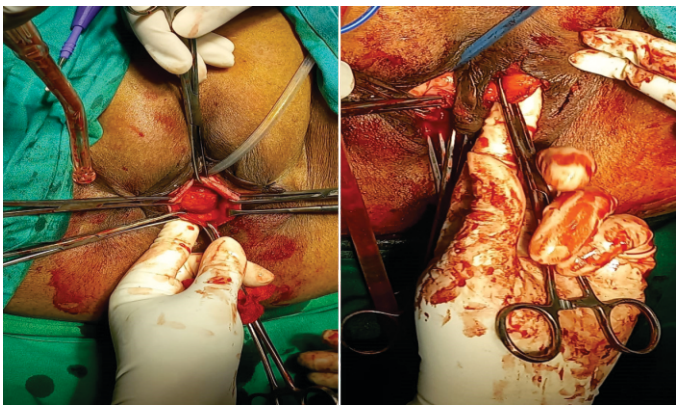

Figure 2: *Urethral Diverticulum after Dissection*

Figure 3: *Martius graft being harvested*

Hemostasis was secured and vaginal epithelium was closed in layers. A tube drain was placed in the labia majora from where the graft was harvested and the incision was closed with interrupted mattress sutures. Vaginal packing was done with 1 roll gauze. Packing was removed after 24 hours and patient was kept catheterized for 21 days.

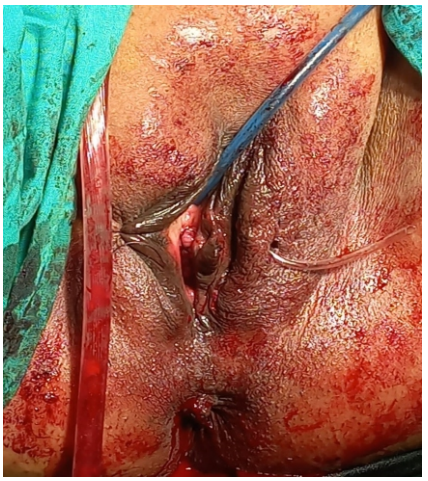

Figure 4: *Post repair picture with tube drain*

Discussion

A urethral diverticulum in this age group is most likely due to the obliteration of the periurethral glands.[4] In a study Four hundred forty-seven women were included who were suspected to have a urethral diverticulum but only 228 women had a documented urethral diverticulum. The common presenting complaints were painful and repeated infections.[5] Diagnosis of urethral diverticulum is clinical but the use of cystoscopy, transvaginal and transperineal usg helps in diagnosis. Urodynamic studies may also be done in complicated cases[6]. After the diagnosis is confirmed the treatment of choice is to excise the diverticulum and to reconstruct the urethra vaginally. The basic steps of the procedure include excision of the diverticulum, water tight closure of urethra and closure of the layers of tissues in the surrounding. Results are usually satisfactory but recurrence has been reported. The use of a Martius graft to revascularise the poor quality tissues has shown to be of advantage. Urinary incontinence can be prevented due to the cushioning effect of the martius flap[6]. Urethral strictures, urethrovaginal fistulas and urinary in continence can be possible complications.[7] These kind of surgeries should be done by urologists or urogynaecologists with vast experience in such kind of procedures[8]. Another surgical options is Endoscopic re-roofing or transurethral incision, in this the narrow diverticular neck is converted into wide diverticular neck allowing free drainage[1]. Marsupialization of the urethral diverticulum through the vaginal approach can be done. An incision is made through the diverticulum to the urethral orifice. To encourage fibrosis the cavity may be packed with oxidized cellulose. There is high risk of urethrovaginal fistula and splayed stream after marsupilization, therefore it should only be considered if the patient is frail, elderly and unfit to undergo diverticulectomy.[9] Recurrence/incomplete excision, Urethral stricture and Urethravaginal fistula are known complications[7].

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NH: Conceptualization of Project
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