Original Article

Significance of Histopathological Examination in Appendicectomy Specimens

Samra Sameen, Iram Nadeem Rana, Amna Jahan, Athar Ali and, Tariq Zulfiqar

Objective: To analyze the clinical benefits of histopathological examination in appendicectomy cases with initial clinical diagnosis of acute appendicitis.

Methods: This is a retrospective study conducted in Histopathology section of Services Institute of Medical Sciences, Lahore spanning over a period of 15 months from Jan. 2018 to Mar.2019.

Results: Total 1147 cases of appendicectomy with presumed clinical diagnosis of acute appendicitis were received during the study period. Out of these 54% were males and 46% were females. Majority of the patients belonged to second and third decade of life. Histopathologic examination revealed acute appendicitis in 83.8% cases, lymphoid follicular hyperplasia causing obstruction in 8.4% cases, worm infestation in 0.3% cases, fibrosed appendix in 0.7 %, chronic granulomatous inflammation in 0.09% and neoplastic lesions in 0.5% of cases while no evidence of acute appendicitis identified on histological examination in 0.5% cases.

Conclusions: Routine histopathology examination should be performed in all cases so that any incidental finding is not missed which may affect the patient management

Keywords: Appendicectomy, appendicitis, histopathology.

Introduction

Acute appendicitis is most common surgical emergency and appendicectomy is one of the commonly performed surgeries all over the world.[1] The incidence of appendicitis is increasing in developing countries due to ever increasing trends towards western eating habits.[2] In spite of all recent advancements in diagnostic modalities, preoperative clinical diagnosis of acute appendicitis is accurate in only 60-80% of cases.[3] Therefore, histopathological examination of all appendicectomy specimens remains the gold standard method for confirmation of appendicitis.[4] Life time risk of appendicitis in children and young adults is reported to be about 7%. Appendicitis may be caused by a number of reasons which can be either obstructive or non obstructive. Luminal obstruction is one of the foremost causes of appendicitis and some of the classical causes of obstruction include fecolith, lymphoid hyperplasia and foreign bodies. However, there may be some uncommon causes as well including parasitic infestations, tuberculosis and tumors.[5]

Methods

It is a retrospective study conducted in Pathology Department, Services Institute of Medical Sciences(SIMS), Lahore spanning over a period of 15 months, starting from January 2018 to March 2019. All the surgically resected appendices, whether removed by open surgery or laparoscopy, submitted to department of Pathology, SIMS for histopathology were included in the study. A total of 1147 cases of appendicectomy were received during this period in Histopathology section, SIMS. Relevant clinical data was retrieved. Gross findings were noted. Specimens were fixed in 10% neutral buffered Formalin, routine tissue processing and paraffin embedding was done. Sections were prepared for microscopy after cutting at 5 micron thickness and staining with Haematoxylin and Eosin.3 Representative sections were taken from appendices after gross examination (one longitudinal section from tip and two transverse sections from base and body of appendix). In case of tumors, extra sections were taken according to recommended protocols including need of submission of entire appendices particularly in cases of mucinous neoplasms of appendix. Microscopic examination was performed in all specimens by a histopathologist and in case of a neoplastic diagnoses, second consultation from another histopathologist in the department was taken. Data was entered and analyzed by using Microsoft excel 2010 and results were prepared.

Results

Total 1147 appendicectomy specimens were received in the department of Pathology, SIMS spanning over a study period of 15 months from January 2018 to March 2019. Out of these 1147 cases, 621(54%) were males and 526(46%) were females, thus making a maleto female ratio of 1.2:1 **(Fig-1)**. Minimum patient age was 3 years and maximum age of presentation was 84 years. Mean age of the patients was 22 years with age group of 13-22 years of age making maximum contribution to number of patients (344 patients).

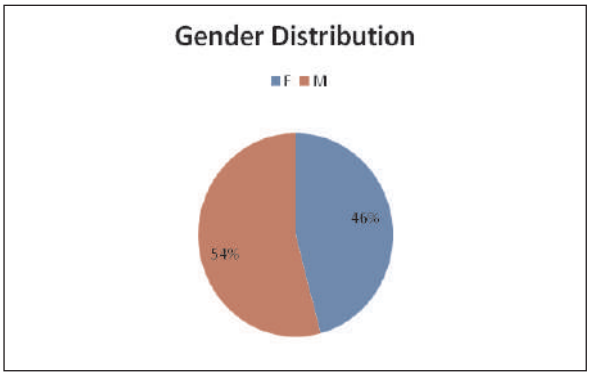

Fig-1: Gender distribution in appendicectomy specimens.

Out of these total 1147 cases, 961(83.8%) cases were proved histologically as acute appendicitis. Among these 738 (64.3 %) were confirmed histologically as acute appendicitis alone while 73 (6.4%) cases showed periappendicitis with acute appendicitis and 150 (13.1%) of the patients showed acute suppurative appendicitis. Lymphoid follicular hyperplasia was seen in 96 (8.4%) cases while worm infestation was seen in 4(0.3%) cases. 8(0.7 %) appendices were fibrosed and no evidence of acute appendicitis identified on histological examination in 6(0.5%) cases. One (0.09%) of the specimen had chronic granulomatous inflammation and neoplastic lesions were identified in 6(0.5%) of cases **(Fig-2).** 55(4.8%) cases were comprised of autolyzed appendix and 10(0.9%) of the patients had some other associated pathologies as well.**(Table -2)**

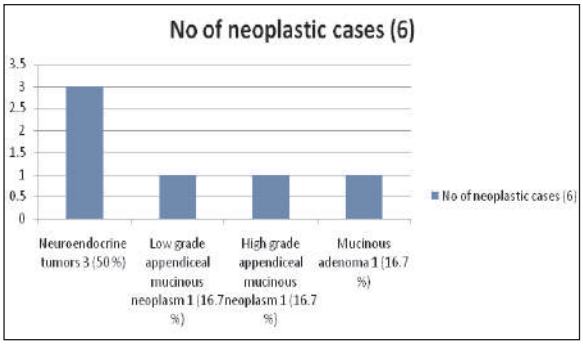

Fig-2: Histological diagnosis of neoplastic entities.

Table-1: Analysis of histopathological findings in appendicectomy specimens.

Histopathological Diagnosis	No of Cases	%
Acute appendicitis	738	64.3%
Acute appendicitis with periappendicitis	73	6.4%
Acute suppurative appendicitis	150	13.1%
Lymphoid follicular hyperplasia	96	8.4%
acute appendicitis with worm infestation	04	0.3%
Tumors	06	0.5%
Fibrosed appendix	08	0.7%
No evidence of acute inflammation seen	06	0.5%
Chronic granulomatous inflammation	01	0.09%
Associated pathologies	10	0.9%
Autolyzed appendix	55	4.8%
Total Cases	1147	100%

Table-2: List of associated pathologies.

Associated Pathologies	No of Cases	%
Haemorrhagic ovarian cyst	03	30%
Muture cystic teratoma	02	20%
Ovarian endometroitic cyst	02	20%
Folicular ovarian cyst	01	10%
Meckel's diverticulum	01	10%
Ovarian serous adenoma	01	10%

Discussion

The vermiform appendix is considered by most as a vestigial organ. Its clinical significance lies in its tendency to undergo inflammation which may lead to clinical presentation of acute appendicitis.[6]

There are many common and some uncommon causes of acute appendicitis. Common causes of appendicitis includes fecolith and lymphoid hyperplasia leading to luminal obstruction while uncommon causes include tumors, granulomatous inflammation and parasitic infestations.[7]

Appendicectomy is a common surgical procedure for the management of acute appendicitis. This current study reviews the histopathological findings of appendicectomy specimens received during 15 months period in Pathology department, SIMS.

During this study period 1147 specimens of appendix were received. Maximum number of patients belonged to age group 13-22 years of age. Number of appendicectomies performed was more in males (54%) compared to females (46%).

This is comparable to study by Al-Fatah which had 58% males and 42 % females in their study.[8] Among 1147 patients, 93 % of the patients showed inflammatory lesions whether in the form of acute appendicitis alone or associated with periappendicitis, suppurative appendicitis, lymphoid follicular hyperplasia or worm infestations. This rate is comparable to study by others like Patel M et al (91.3%)(8) and Divya R et al (92.3%).[9]

In our study 4(0.3%) patients had evidence of parasitic infestation with enterobius vermicularis **(Fig-3).**

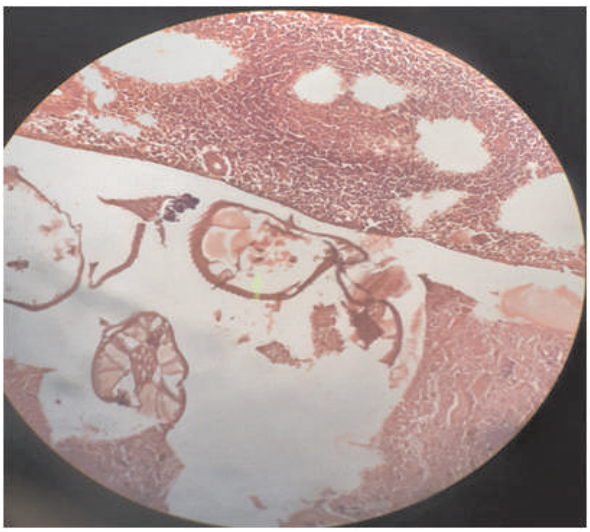

Fig-3: Appendix with enterobius vermicularis worm infestation.

There is a variability in reporting incidence of parasitic infections in appendicectomy specimens depending on geographic area and prevalence and it ranges from 0.2 to 41.8%.[10,11] Another significant finding was chronic granulomatous inflammation seen in one case **(Fig-4).**

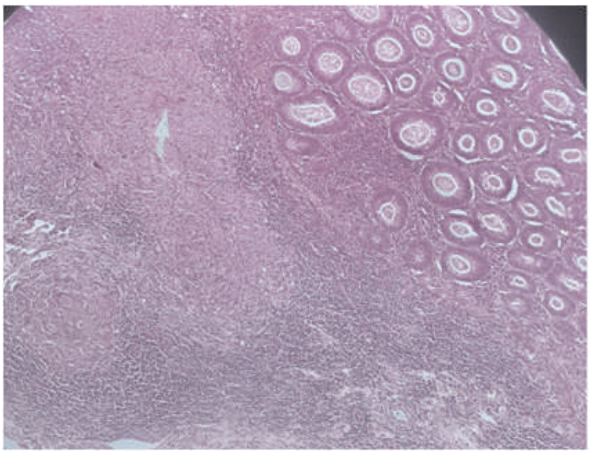

Fig-3: Chronic granulomatous inflammation involving appendix(Arrow pointing to a multinucleated giant cell).

Incidence of granulomatous inflammation in literature varies between 0.14-2.3%.[12,13] 6(0.5%) cases in our study had neoplastic disease which is comparable to study by Kunduz et al who reported 0.78% incidence of appendiceal neoplasms in their 3554 appendicectomy specimens examined.[14] Out of these 3 patients had neuroendocrine tumors **(Fig-5)**, while one case each was diagnosed of mucinous adenoma, low grade appendiceal mucinous neoplasm and high grade mucinous appendiceal neoplasm.

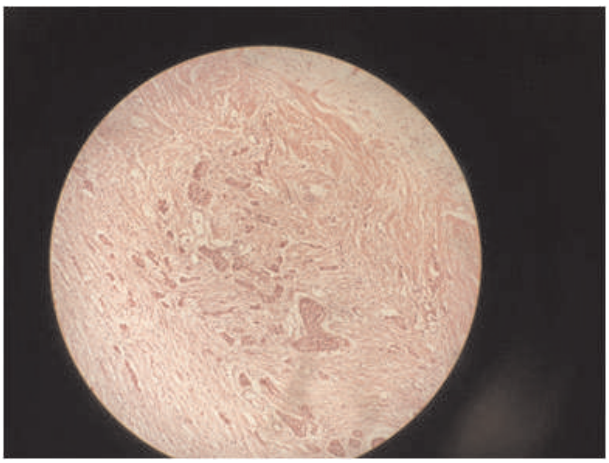

Fig-4: Neuroendocrine tumor of appendix found in tip of an appendix.

Whole of the appendix specimens were submitted in these tumors for microscopic examination. The case of low grade appendiceal mucinous neoplasm was associated with low grade pseudomyxoma peritonei and low grade ovarian mucinous neoplasm.Literature shows that a mucinous tumor of the appendix may coexist with morphologically similar tumor in ovary and may also show pseudomyxoma peritonei. Therefore it is imperative to perform follow up ultrasonography and CT scans to rule out any associated ovarian neoplasm and omental deposits.[5,15]

2.1% of the patients did not show any evidence of acute inflammation in our study. Out of these, 0.7 % were fibrosed appendices, 0.9 % had some other etiology for the clinical manifestations of the patients and 0.5% of the patients did not show any significant histological evidence of acute inflammation. These rates are much lower as compared to others like Sharma et al (5.7%)[16] and Sujhata et al (9.1%).[3] Another significant finding in our study was that of autolyzed specimens contributing 55(4.8%)of the patients. These specimens were sent without formalin which caused the specimen to be autolyzed, so we were unable to examine them histologically. This may have led to missing of some important pathology as mentioned above.

Conclusion

Appendicitis has peak incidence in second and third decade of life. It is important to send all the appendicectomy specimens for histopathologic examination with proper fixation in formalin in order to confirm the diagnosis of acute appendicitis as well as to rule out any possibility of incidental findings like parasitic infestation, neuroendocrine tumors or mucinous neoplasms of appendix.

Deptt. of Histopathology SIMS/
Services Hospital Lahore

References

1. Al-Fatah MA. Importance of Histopathological Evaluation of Appendectomy Specimens. Al-Azhar Assiut Medical Journal 2017;15:97103.
2. Jat MA, Al-Swailmi FK, Mehmood Y, Alrowaili M, Alanazi S. Histopathological examination of appendicectomy specimens at a districthospital of Saudi Arabia. Pak J Med Sci 2015;31(4):891-894. doi: http://dx.doi.org/10.12669/pjms.314 7453.
3. Sujatha R, Anushree CN, Singh N. Histopathological spectrum of appendicectomy specimens -A prospective study. Indian Journal of Pathology and Oncology, 2017;4 (4):638-642.
4. Jones AE, Phillips AW, Jarvis JR, Sargen K.The value of routine histopathological examination ofappendicectomy specimens. BMC Surgery 2007, 7:17 doi:10.1186/1471-2482-7-17.
5. Lamps LW. Appendix. In Gold blum JR, McKenney JK, Lamps W, Myers JL, editors. Rosai and Ackerman's Surgical Pathology.11th ed. Philadelphia: Elsevier; 2018.p 617-647.
6. Akbulut S, Tas M, Sogutcu N, Arikanoglu Z, Basbug M, Ulku A, Semur H, Yagmur Y. Unusual histopathological findings in appendectomy specimens: A retrospective analysis and literature review. World J Gastroenterol 2011; 17(15): 1961-1970 Available from: URL: http://www.wjgnet.com/1007-9327/full/v17/i15/ 1961.htm DOI: http://dx.doi.org/10.3748/wjg.v17.i15.1961.
7. Turner JR. The Gastrointestinal Tract.In: Kumar V, Abbas AK, Aster JC, editors. Robbins and Cotran Pathologic Basis of Disease.9th ed. Philadelphia: Elsevier Inc.; 2015. p. 750-817.
8. Patel MM, Shah RJ. Impact of Histopathological Examination of Appendix in Context to Clinical Management of Patients.Annals of Pathology and Laboratory Medicine 2017; 4(6): A 699-704 DOI: 10.21276/APALM.1496.
9. Rabindranath D, Khan AA, Ansari H, Senthil P. Unusual incidental findings of routine histopathological examination of appendectomy specimens- a 2-year retrospective analysis with review of the literature. Int J of Allied Med Sci and Clin Res 2016; 4(1):90-98.
10. Anwar I, Hassan H, Khalid A. Parasitic Infestation of the Appendix, Masquerading as Acute Appen- dicitis.Int. J Pathol 2016; 14(2)74-78
11. Mardani A, Feizi F, Fakhar M, Beyranvand HB, Farrokhi M, Abbasi M, Asfaram S. Enterobius vermicularis infection among appendectomy specimens in Qom Province, Central Iran: a retrospective study. Comp Clin Pathol 2017; 26:12131219. DOI 10.1007/s00580-017-2512-5
12. Chawda HK, Miskin AT, Dombale V D. Spectrum of histopathological lesion in surgically removed appendix.Journal of Drug Discovery and Therapeutics 2015;3(28): 53-56 Available Online at www.jddt.in CODEN: - JDDTBP .
13. Unver N, Coban G, Arici DS, Buyukpinarbash N, Malya FU, Onaran OL et al. Unusual Histopathological Findings in Appendectomy Specimens: A Retrospective Analysis of 2047 Cases. International Journal of Surgical Pathology DOI: 10.1177 / 1066896918784650.
14. Kunduz E, Bektasoglu HK,Unver N,Aydogan C,Timocin G,Destek S. Analysis of appendiceal neoplasms on 3544 appendectomy specimens. Med Sci Monit, 2018; 24: 4421-4426.
15. Yabanoglu H; Caliskan K; Aytac HO; Turk E; Karagulle E, Kayaselcuk F ; Tarim MA.Unusual Findings in Appendectomy Specimens of Adults: Retrospective Analyses of 1466 Patients and a Review of Literature. Iran Red Crescent Med J. 2014; 16(2):e12931 .
16. Sharma S, Mahajan D, Mohsin-ul-Rasool, Bashir S, Hafiz A, Wajahat M Histopathology of Appendicectomy Specimen: A 5 Year Study Sch. J. App. Med. Sci., 2014; 2(1B):176-180.