Original Article

FREQUENCY OF PREVENTION OF OMPHALITIS BY TOPICAL APPLICATION OF CHLORHEXIDINE TO NEONATAL UMBILICAL CORD STUMPS

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Objective: To determine the frequency of prevention of omphalitis by topical application of chlorhexidine to neonatal umbilical cord stumps.

Methods: This quasi experimental study was conducted at departments of Pediatrics and Obstetrics & Gynecology, Lahore General Hospital Lahore, from 01-05-2019 to 01-08-2019. A total of 200 neonates were included in this study. 4% chlorhexidine was applied to neonatal umbilical cord on first, third and fifth day of life and were then observed for prevention of omphalitis in first seven days of life.

Results: Mean age of the neonates was 1.45±0.98 days. There were 90 (45.0%) males and 110 (55.0%) females. Prevention of omphalitis was observed in 188 cases (94.0%) (Table-3). Stratification with regard to age and gender was also carried out.

Conclusions: We concluded that topical application of chlorhexidine to neonatal umbilical cord stumps resulted into significant reduction in omphalitis.

Keywords: neonates, chlorhexidine, umbilical stump, omphalitis

Introduction

Every year, almost 4 million neonatal deaths occur in under developed countries.[1] Infections contribute to be the major cause of neonatal mortality estimating about 1·44 million (36%) deaths. Fifty percent neonatal deaths in developing world are due to infections.[2] Omphalitis is the common cause of sepsis in the first few days of life.[3] Infection of the umbilical cord can lead to omphalitis, resulting into pus, abdominal wall erythema, or swelling. However, if we look around there is not enough data available on the incidence of omphalitis and most centers in developing world don't focus much on cord care and there is also limited evidence exists for appropriate cord-care, so there is a need to address on this issue.

There are various topical antimicrobials available in the market for cord care (eg, ethanol, silver sulfadiazine, triple dye, gentian violet, chlorhexidine, povidone iodine), however 4% chlorhexidine seems to be better choice among all. It has potent bactericidal activity, safe to use, strong binding potential that results in residual effectiveness, and easily affordable due to low cost 4. It decreases bacterial colonization of the cord stump and reduces superficial skin infections .[5]

Omphalitis is a main cause of sepsis.[6] Different studies were conducted in Nepal, Pakistan and Bangladesh to see the effect of chlorhexidine application to the newborn umbilical cord for prevention of omphalitis . A total of 54624 neonates were taken and prevention of omphalitis is noted in a range from 27% to 56%.[7] Another study conducted in Nepal showed prevention of omphalitis in 95% by use of topical chlorhexidine.[2] As there is only one local study conducted in Pakistan on the role of chlorhexidine in prevention of omphalitis and there is disparity among the results of different studies, also no such study has been conducted in tertiary care hospital set up so this study is planned to see the role of chlorhexidine in prevention of omphalitis in neonates born at tertiary care hospital so that if there is significant reduction in the incidence of omphalitis then we can recommend application of chlorhexidine to umbilical cord stump to neonate in tertiary care hospital.

Methods

The quasi experimental study was conducted in the Department of Pediatrics and Obstetrics &Gynecology, Lahore General Hospital Lahorefrom 01-05-2019 to 01-08-2019. A sample of 200 cases was taken using 95% confidence level, 7% margin of error taking an expected percentage of prevention of omphalitis in 42% of cases. 8 Non-probability consecutive sampling was used. Neonates both male and female born at term (38 weeks of gestation determined by ultrasonography) in Lahore General Hospital were included in the study however those neonates born to mothers with history of any infection assessed on the basis of increased total leucocyte count , neonates with congenital anomalies (cardiac, renal, gastrointestinal) determined on clinical examination and ultrasonography and

neonates requiring umbilical vein catheterization with serum total bilirubin level > 16mg/dl within first 24 hour of life were excluded. After ethical clearance, neonates fulfilling the inclusion criteria were recruited for study from neonatal or postnatal ward in Lahore General Hospital. After taking informed consent from parents, neonate was examined by researcher herself and 4% chlorhexidine was applied to neonatal umbilical cord on first, third and fifth day of life and were then observed for prevention of omphalitis in first seven days of life as described in operational definition. All the information was collected and noted in structured proforma.

Data analysis was done with SPSS version 20.0. Quantitative data like age was presented in the form of mean and Standard deviation. Qualitative data like gender, prevention of omphalitis presented in the form of frequency and percentages. Prevention of omphalitis stratified between age and gender to see effect modification. Post stratification done through Chi square test and p value > 0.05 was considered significant.

Fig-1: Umbilical cord of a three-minute-old child. A medical clamp has been applied.

Results

Total 200 neonates were included in this study during the study period of six months from 01-05-2019 to 31-08-2019. Mean age of the neonates was 1.45±0.98 days. **(Table-1)** There were 90 (45.0%) males and 110 (55.0%) females **(Table-2).** Prevention of omphalitis was observed in 188 cases (94.0%) **(Table-3).** Stratification with regard to age and gender was carried out and presented in **Tables 4 and 5.**

Table-1: Distribution of cases by age.

Age (Days)	Number	Percentage
1 Day	111	55.5%
2 Days	89	44.5%
Total	200	100.0%
Mean±SD	1.45±0.98	

Table-2: Distribution of cases by gender

Gender	Number	Percentage
Yes	188	94.0%
No	12	06.0%
Total	200	100.0%

Table-3: Distribution of cases by age.

Prevention	Prevention of Omphalitis Yes	No	Total
0-1 Day	106	05	111
2 Days	82	07	89
Total	200	12	200

Table-4: Stratification with regard to age.

Age	Prevention of Omphalitis Yes	No	Total	P-value
0-1 Day	106	05	111	
2 Days	82	07	89	0.320
Total	200	12	200	

Table-5: Stratification with regard to age.

Gender	Prevention of Omphalitis Yes	No	Total	P-value
Male	106	07	90	
Female	82	05	110	0.338
Total	200	12	200	

Discussion

Every year, 3.1 million neonatal deaths occur worldwide. Out of which infections account for about 30% .[1] In areas with high-mortality rates, infections are the major cause .[9] In such a situation, it is essential to take such measures that can prevent infection-related death. These measures should be simpleand cost-effective so that can be implemented in different regions across the world .[10] Topical application of antiseptics is one such measure that can decrease the rate of infections by reducing the bacterial colonization of the skin or umbilical cord in newborns.

Among different antiseptics available, chlorhexidine is the most studied agent in newborn infants. Different researches have shown that topical application of chlorhexidine has resulted into significant reduction in the rates of bacterial colonization of the umbilical cord. [11,12]

In our study, out of 200 cases, 90 (45%) were male and 110 (55%) were female. While 111 (55.5%) were on day 1 of life and 89 (44.5%) were on 2nd day of life with mean+SD 1.45±0.49. Frequency of prevention of omphalitis by topical application of chlorhexidine to neonatal umbilical cord stumps in tertiary care hospital was done that showed 12 (6%) developed omphalitis and 188 (94%) remained healthy. A 2-year hospital-based study of neonatal omphalitis in eastern Turkey reported an even increased incidence of omphalitis , 7.7% inpatient newborns per year .[13]Gram-positive bacteria (mainly S. aureus) 68% were more commonly isolated from the cord than Gram-negative bacteria (mainly E. coli) 60%. Mortality rate was 15%.

A study conducted at Royal Women Hospital Elsevier that was of 6 years duration. In that study bacteria isolated from swabs taken from clinically apparent infections of the stump of the umbilical cord showed an overall infection rate of 0.7% (200/27,107), in which Gram-negative organisms were more isolated as compared with Gram-positive organisms (171/118). [14] In the last few years, new evidence from different studies conducted in Bangladesh, Nepal and Pakistan has been published regarding prevention of omphalitis and is noted in a range from 27% to 56%.[2,3,13] Another study conducted in Karachi, showed prevention of omphalitis in 42% after application of topical chlorhexidine on neonatal umbilical cord.[7] Another study conducted by Mullany et al (2006) demonstrated prevention of omphalitis in 95% by use of topical chlorhexidine. [2]

Based on CHERG (child health epidemiology reference group) rules,they concluded that application of chlorhexidine to newborn umbilical cord can significantly reduce incidence of umbilical cord infection and all-cause mortality among home births in community settings. This cost effective and simple measures can save a major number of newborns in developing countries. Chlorhexidine has now been used for cord care in hospitals and is included in WHO's essential drug list. There has been no side effect noted by its use in hospital and community setting and also no side effects have been noted in any of the included subject in our study.

Conclusion

We concluded that there is significant prevention of omphalitis by topical application of chlorhexidine to neonatal umbilical cord stumps in our tertiary care hospital.

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