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Urinary tract infection (UTI) in uncircumcised infants presenting in the pediatric ward.

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ABSTRACT… Circumcision is the commonest surgical procedure carried out on children. After evaluation of currently available studies and clinical trials the health benefits of newborn male circumcision outweigh the risks. **Objectives:** To determine the frequency of urinary tract infection (UTI) in uncircumcised infants presenting in the pediatric floor of Faisalabad Medical University. **Study Design:** Descriptive Cross Sectional study. **Setting:** Pediatric Ward, Emergency and OPD, Allied Hospital, Faisalabad. **Period:** July 2017 Dec 2017. **Material & Methods:** After Ethical Review, all male uncircumcised subjects were included with consent from the patients. Data regarding the disease, presenting complaints was collected after complete examination of the child. Age, weight, temperature, history of previous UTI, dysuria, and colour of urine was noted. Urine sample was collected in a sterile container with the help of the parents and sent to the lab for complete examination and culture. Relevant baseline investigation was also sent to the laboratory for examination. Results of the urine complete examination and urine culture were also noted. **Results:** In this trial, mean age was calculated as 6.81+2.44 months, mean temperature and weight of the infants was recorded as 99.26+1.06F and 7.06+1.85kgs respectively. Frequency of history of dysuria was recorded in 30% (n=30), frequency of previous history of UTI was recorded in 13% (n=13), frequency of UTI was recorded in 25% (n=25). **Conclusion:** We concluded that the frequency of urinary tract infection (UTI) is higher in uncircumcised infants; however, timely circumcision may reduce the risk of UTI. The current data is primary in our population which needs authentication through some other trials.

Key words: Circumcision, Infants, Urethral Meatus, UTI, Urinary Tract Infection.

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INTRODUCTION

Urinary tract infection (UTI) is one of the most frequent bacterial infections that occur in young infants. Children with UTI are at greater risk of development of renal scaring, ending-up into end-stage renal disease.[1] UTI is more common in uncircumcised male children with highest rate in the first year of life.[2] UTI should be considered while evaluating infants presenting with fever in the first few months of life. Various studies have shown that serious bacterial infections in many infants were due to UTI, with prevalence rate of 1.8%-7.5%. While evaluating these infants 52% were uncircumcised males. It was concluded that gender, race, circumcision status, and clinical factors predict the presence of UTI.[3]

Male circumcision is a minor surgical procedure in which foreskin (or prepuce) is removed from the penis. After evaluation of currently available studies and clinical trials the health benefits of newborn male circumcision outweigh the risks.[4-5] It is done in various conditions one of these is the prevention of UTI in male infants. Increased periurethral bacterial colonization is more in uncircumcised males thus leading to UTI.[5-6] After various clinical studies, it was reported that circumcision should be done while treating young patients with UTI.[7] Uncircumcised infants have 5-10 times more risk of developing UTI during first year of life compared to circumcised newborns and chances of complications increases with increasing age of the infants.[8] Similarly, UTI risk in uncircumcised infants also depends on the

degree of visibility of urethral opening.[1]

Dubrovsky AS, et al reported that 25% of the uncircumcised infants had positive urine cultures and UTI.[1] ZorcJJ, et al reported the frequency of UTI in uncircumcised infants to be 21%.[3] Morris BJ, et al reported it to be 32%.[2]

The rationale of this study is that UTI is a major complication in uncircumcised male infants leading to serious bacterial infection. Studies regarding the frequency of UTI in uncircumcised male infants done in Pakistan are limited. I have designed this study to know the frequency of UTI in uncircumcised male infants. Early diagnosis and management of UTI in these infants can decrease morbidity and mortality in these infants.

MATERIAL & METHODS

In this descriptive cross sectional study done at Pediatric floor, Faisalabad Medical University, Faisalabad in 6 months after ethical review, patients were included using non-probability consecutive sampling. Sample size of 100 was calculated using WHO sample size calculator with confidence level of 95%, absolute precision = 8 and p=21%[3], All male uncircumcised infants of age <one year were included in the study. Infants with previously diagnosed renal calculi or posterior urethral valves; Infants with renal parenchymal disease like nephrotic syndrome, glomerulonephritis, or renal failure; Infants who have received antibiotics in last 2 weeks of presentation; Infants with immunodeficiency state; Infants with history of insertion of a urinary catheter within the previous 7 days or having congenital genitourinary anomalies like atonic or neurogenic bladder or hypospiadias were excluded from the study.

Age, weight, temperature, history of previous UTI, dysuria, and colour and urine was noted. Urine sample was collected in a sterile container with the help of the parents and sent to the lab for complete examination and culture. Relevant baseline investigation was also sent to the laboratory for examination. Results of the urine complete examination and urine culture were also noted.

The data was analyzed using SPSS version 20. Qualitative variables including history of dysuria, previous history of UTI, urine color and presence of UTI was analyzed and frequency was calculated along with percentage. For the quantitative variables like age, weight, temperature, urine culture and number pus cells/ HPF, mean + SD was calculated. Effect modifiers like age, body temperature and previous history of UTI was stratified to find out the effect of these on the outcome, through chi square ($p < 0.05$) was considered significant).

RESULTS

Hundred (100) uncircumcised infants were enrolled. Age distribution shown in Table-I and Table-II shows the mean temperature and weight of the infants. History of dysuria was seen in 30% (n=30), Previous history of UTI was seen in 13% (n=13) and UTI was documented in 25% (n=25). (Table-III)

Effect modifiers like age, body temperature and previous history of UTI was stratified to find out the effect of these on the outcome, through chi square ($p < 0.05$) was considered significant). (Table-IV-VI)

Age (in months)	No. of Patients	%
1-6	51	51
7-12	49	49
Total	100	100
Mean+SD	6.81+2.44	

Table-I. Age distribution. (n=100)

Variable	Mean	SD
Temperature (F)	99.26	1.06
Weight (kgs)	7.06	1.85

Table-II. Mean temperature and weight of the infants. (n=100)

	No. of patients n	%
Dysuria	30	30
Previous history of UTI	13	70
UTI	25	25

Table-III. Frequency of dysuria, previous UTI and UTI. (n=100)

Age (in months)	UTI		P-Value
	Yes	No	
1-6	11	40	0.41
7-12	14	35	

Table-IV. Stratification for frequency of urinary tract infection (UTI) in uncircumcised infants with regards to age.

Body Temperature	UTI		P-Value
	Yes	No	
Upto 100	9	75	0.000
>100	16	0	

Table-V. Stratification for frequency of urinary tract infection (UTI) in uncircumcised infants with regards body temperature.

History of UTI	UTI		P-Value
	Yes	No	
Yes	11	2	0.000
No	14	73	

Table-VI. Stratification for frequency of urinary tract infection (UTI) in uncircumcised infants with regards to history of UTI.

DISCUSSION

Circumcision is mostly done in the neonatal period or infancy. Its occurrence rate varies from 64% in North America, to 20% in Australia, to much less in Europe. It also has many medical benefits including improved hygiene, reduced risk of UTI, STDs, penile cancer, and phimosis, and even reduction in human papilloma virus related cervical cancer in female sexual partners.

The rationale of this study was that UTI is a major complication in uncircumcised male infants leading to serious bacterial infection where local data is scarred regarding the frequency of UTI in uncircumcised male infants. So we designed this study to know the frequency of UTI in uncircumcised male infants. Early diagnosis and management of UTI in these infants can decrease morbidity and mortality in these infants.

In this trial, mean age was calculated as 6.81+2.44 months, mean temperature and weight of the infants was recorded as 99.26+1.06F and 7.06+1.85 kgs respectively. Frequency of history of dysuria was recorded in 30% (n=30), frequency of previous history of UTI was recorded in 13% (n=13), frequency of UTI was recorded in 25% (n=25).

The findings of our study are in agreement with Zorc JJ, et al who reported the frequency of UTI in uncircumcised infants to be 21%.[3] Morris BJ, et al reported it to be 32%[2], and Dubrovsky AS, et al reported that 25% of the uncircumcised infants had positive urine cultures and UTI.[1]

Singh-Grewal et al[9] concluded after a study on circumcision in infants in relation to urinary tract infection, that circumcision has a preventive role in terms of incidence of UTI and most of the urologist have been recommending it in the infancy, especially in boys having recurrent UTIs. Similarly, boys having abnormality of urinary tract like VUR, posterior urethral valves, neuropathic bladder, etc are also referred to pediatric surgeons for circumcision. Studies have shown significant reduction in the UTI after circumcision in boys previously having recurrent UTI. A study showed that there was no benefit of circumcision when done along with anti-reflux surgery in cases of severe VUR.[10]

However, contrary to this, another study[11] was done to see the incidence of UTI in relation to the visibility of urethral meatus in uncircumcised infants and found no change in the risk of UTI with the visibility of the urethral meatus. When compared to circumcised boys, risk of UTI in uncircumcised boys, irrespective of urethral visibility.

Before the age of 1 year, boys are more susceptible to UTI than girls.[12] The trends of susceptibility in sex reverse after that time. Phimosis is thought to be one of major factors leading to UTI in boys. Hiraoka et al[12] evaluated boys with febrile UTIs and found that the meatus of boys aged 0–6 months among their study subjects was significantly more tightly covered than that in healthy neonates. In Israel[13], boys receive neonatal circumcision routinely at 1 week. The incidence of UTI in Israeli boys peaks 2–4 weeks post-circumcision and then decreases later. As such, the incidence of UTI in Israeli boys is lower

than girls after the age of8 weeks. In boys with acute pyelonephritis under the age of 6 months, a non-retractile prepuce was the most important risk factor for recurrent UTI.[14]

In summary, recording the incidence of urinary tract infection in uncircumcised infants is useful for pediatricians, urologists and parents as well to understand the importance of circumcision for prevention of UTI.

CONCLUSION

The frequency of urinary tract infection (UTI) is higher in uncircumcised infants, however, timely circumcision may reduce the risk of UTI. The current data is primary in our population which needs authentication through some other trials.

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