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URINARY TRACT INFECTION IN YOUNG UNCIRCUMCISED INFANTS

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Abstract:

Circumcision is the commonest surgical procedure carried out on children. Neonatal circumcision rates vary widely between different cultures, with rates as high as 64% in North America, between 10% and 20% in Australia, and far lower rates in Europe and Asia. It is also undertaken on medical grounds with benefits thought to include improved hygiene, a reduced incidence of urinary tract infection (UTI), sexually transmitted diseases, penile cancer, and phimosis, and a reduction in the incidence of human papilloma virus related cervical cancer in female sexual partners.

Objective: *To determine the frequency of urinary tract infection (UTI) in uncircumcised infants.*

Study Settings: *Pediatric Ward, Emergency and OPD, Allied Hospital, Faisalabad*

Study Design: *Descriptive cross sectional study*

Duration Of Study: *Six months after the approval of synopsis*

Methodology: *After the approval to carry out this study from Ethical Review Committee, all male uncircumcised subjects meeting the inclusion and exclusion criteria were included in the study. Written informed consent was taken from the patients. Data regarding the disease, presenting complaints and other relevant data according to questionnaire were collected after complete examination of the child. 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.*

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+1.85 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).*

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.*

Keywords: Infants, circumcision, urinary tract infection (UTI)

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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 pains. 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 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. No local data is available regarding the frequency of UTI in uncircumcised male infants. 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 AND METHODS:

This descriptive cross sectional study was done at the Pediatric Ward, Emergency and OPD, Allied Hospital, Faisalabad. Six months after the confirmation of synopsis Sampling was done using Non-probability consecutive sampling. The size of the sample was taken as 100 it 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.

After the approval to carry out this study from Ethical Review Committee, all male uncircumcised subjects meeting the inclusion and exclusion criteria were included in the study. Written informed consent was taken from the patients. Data regarding the disease, presenting complaints and other relevant data according to questionnaire were collected after complete examination of the child. 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 cell/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).

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RESULTS:

A total of 100 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the frequency of urinary tract infection (UTI) in uncircumcised infants.

Age distribution of the patients was done, it shows that 51%(n=51) were between 1-6 months of age whereas 49%(n=49) were between 7-12 months of age, mean±sd was calculated as 6.81±2.44 months. (Table No. 1) Mean temperature and weight of the infants was recorded as 99.26±1.06F and 7.06±1.85 kgs respectively. (Table No. 2) Frequency of history of dysuria was recorded in 30%(n=30) whereas 70%(n=70) had no findings of the morbidity. (Table No. 3) Frequency of previous

history of UTI was recorded in 13%(n=13) whereas 87%(n=87) had no findings of the morbidity. (Table No. 4) Frequency of UTI was recorded in 25%(n=25) whereas 75%(n=75) had no findings of the morbidity. (Table No. 5)

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 No. 6-8)

TABLE No. 1: AGE DISTRIBUTION
(n=100)

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

TABLE No. 2: MEAN TEMPERATURE AND WEIGHT OF THE INFANTS
(n=100)

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

TABLE No. 3: FREQUENCY OF HISTORY OF DYSURIA
(n=100)

Dysuria	No. of patients	%
Yes	30	30
No	70	70
Total	**100**	**100**

TABLE No. 4: FREQUENCY OF HISTORY OF UTI
(n=100)

Previous history of UTI	No. of patients	%
Yes	13	13
No	87	87
Total	**100**	**100**

TABLE No. 5: FREQUENCY OF URINARY TRACT INFECTION (UTI) IN UNCIRCUMCISED INFANTS
(n=100)

UTI	No. of patients	%
Yes	25	25
No	75	75
Total	**100**	**100**

TABLE No. 6: STRATIFICATION FOR FREQUENCY OF URINARY TRACT INFECTION (UTI) IN UNCIRCUMCISED INFANTS WITH REGARDS TO AGE

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

TABLE No. 7: STRATIFICATION FOR FREQUENCY OF URINARY TRACT INFECTION (UTI) IN UNCIRCUMCISED INFANTS WITH REGARDS BODY TEMPERATURE

Body temperature	UTI		P value
	Yes	No	
Upto 100	9	75	0.000
>100	16	0	

TABLE No. 8: STRATIFICATION FOR FREQUENCY OF URINARY TRACT INFECTION (UTI) IN UNCIRCUMCISED INFANTS WITH REGARDS TO HISTORY OF UTI

History of UTI	UTI		P value
	Yes	No	
Yes	11	2	0.000
No	14	73	

DISCUSSION:

Circumcision is the commonest surgical procedure carried out on children. Neonatal circumcision rates vary widely between different cultures, with rates as high as 64% in North America, between 10% and 20% in Australia, and far lower rates in Europe and Asia. It is also undertaken on medical grounds with benefits thought to include improved hygiene, a reduced incidence of urinary tract infection (UTI), sexually transmitted diseases, penile cancer, and phimosis, and a reduction in the incidence of 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 ZorcJJ, 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 that circumcisions would be required to prevent one UTI, it is interesting to note that this approach to circumcision has been adopted empirically by many paediatric urologists over the past decade, and from personal communications it would be difficult to find a urologist who would not offer a circumcision to a boy with recurrent UTI or a boy who developed a UTI despite conservative treatment in the presence of a serious underlying abnormality of the urinary tract such as VUR, posterior urethral valves, neuropathic bladder, and many other conditions. In their experience many boys troubled with recurrent UTI in the clinical settings described above have been “cured” by a circumcision. It is an intervention that should always be considered. However, a note of caution must be struck on assessing the benefit of circumcision even in the presence of an underlying abnormality of the urinary tract. In aninteresting

controlled trial, Kwak et al could find no benefit for circumcision when it was done at the same time as anti-reflux surgery for severe VUR, irrespective of the age of the patient. [10]

However, contrary to this another study[11]determined whether there is a hierarchy of risk among uncircumcised boys whose urethral meatuses are visible to differing degrees and concluded that they did not see variation in the risk of urinary tract infection with the visibility of the urethral meatus among uncircumcised boys. Compared with circumcised boys, they saw a higher risk of urinary tract infection 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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