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UTI IN FEBRILE CHILDREN LESS THAN FIVE YEARS OF AGE: PROSPECTIVE STUDY OF PREVALENCE

Paediatrics

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ABSTRACT

Objective: To determine the prevalence of urinary tract infection in febrile children, less than 5 years of age.
To assess the validity of microscopic urine analysis and urine culture in the diagnosis of urinary tract infection.
Design: Prospective study.
Setting: Children attending the department of paediatrics with febrile illness during 2015-2018.
Subjects: 370 children between 1 month to 5 years of age.
Methods: Data related to age, sex, nutritional status, socioeconomic status and predisposing risk factors like urethral instrumentation, bowel habits etc, were noted. A thorough physical examination and relevant investigations were carried out in all these patients. Routine urinary microscopy was done in all patients and urine culture was done in those who showed pyuria of >5 pus cells/HPF in centrifuged urine sample.
Results: In our study, overall prevalence of UTI was 3.5% in febrile children between 1 month to 5 yrs and 4.1% in children <2yrs and 7% in Children <1 year of age with M:F ratio of 1:1 in children <2yrs.
Prevalence of culture positivity was 44% in those who showed >10 pus cells/HPF in centrifuged sample of urine and 2.5% in those who showed >5pus cells/HPF.
Conclusions: The presence of obvious source of fever such as upper respiratory tract infection or otitis media is not reliable in excluding urinary tract infection. Overall prevalence of UTI in our study was low (3.5%) and prevalence among children <2yrs was 4.1% and <1 year of age was 7%. Pyuria of >5pus cells/HPF (centrifuged urine sample) should be considered as significant and further evaluation should be done to initiate prompt treatment and successful outcome.

KEYWORDS

Children, Infants, UTI, Prevalence, Pyuria.

INTRODUCTION

Children with fever comprise a substantial proportion of the practice in out patient department and Emergency Medicine. Fever is the most common reason for children under 5 years of age to visit Emergency / outpatient departments. Unlike occult bacteremia or severe bacterial illness (in infants and children) little attention has been focused on the identification of urinary tract infections in febrile children in the emergency department, despite recent information that suggests a high prevalence of urinary tract infections and significant associated morbidity in these patients. Quite often, child receives antibiotics emperically, without adequate evaluation for urinary tract infection. Fever, however, is often the only symptom in children with urinary tract infections.

Fever and significant bacteriuria and pyuria in children with undocumented sources of infections must be presumed to be symptoms of pyelonephritis, an invasive infection of the renal parenchyma requiring prompt treatment.

Recent studies using renal parenchyma - avid nuclear scans to determine the presence of urinary tract infection have revealed that more than 75% of children under 5years of age with febrile urinary tract infection have pyelonephritis.[1, 2, 3]

Among the children below 5 years of age with h/o recurrent urinary infections, makes them at higher risk of renal scarring, only one-third among them being asymptomatic.[4]

The present study is undertaken to estimate the prevalence of urinary tract infection in febrile children less than 5 years of age and to assess the validity of routine microscopic urine analysis and urine culture in the diagnosis of Urinary tract infection.

AIMS AND OBJECTIVES

1. To determine the prevalence of urinary tract infection in febrile children, less than 5years of age.
2. To assess the validity of microscopic urine analysis and urine culture in the diagnosis of urinary tract infection.

METHODS OF STUDY

A total of 370 children were included in the study, data related to age, sex, nutritional status, socioeconomic status and predisposing risk factors like urethral instrumentation, bowel habits etc, were noted. A complete history related to the onset, duration of fever and associated symptoms such as nausea, vomiting, diarrhea, urinary disturbances, other system involvement was obtained.

A thorough physical examination with relevant investigations was carried out in all the patients. Routine blood counts, urine analysis was done and those showing pus cells > 5 per HPF in centrifuged urine sample were taken as study group and urine culture sensitivity was done in them. In culture positive cases, one case DTPA scan was done & the case was also followed later on, the detailed data was entered in the proforma.

Collection Of Urine Sample

From all 370 cases a sample of urine was collected. In children under 2years of age urine was collected by a bag and in others midstream clean catch sample was collected.

Collection Of Bag Sample

In children below 2 years of age the genitalia was cleaned with soap and water and person collecting sample washed hands before touching the sterile container or bag for collecting urine sample. In males prepuce is retracted if possible, in females below 2 years of age labia was split apart and washed. Urine around 10ml was collected in the sterile container, and sent for Urine culture and sensitivity. In children above 2 years of age midstream clean catch urine sample was collected.

Method Of Collection Of Mid Stream Clean Catch Sample

After taking the above precautions child was allowed to pass urine, mid stream sample was collected in sterile container and was sent for culture and sensitivity.

URINE ANALYSIS

The fresh urine sample obtained from the above techniques were subjected for routine urine examination, culture and sensitivity. The urine specimens were centrifuged in a standard manner,10ml of urine was spinned at the rate of 2500 rpm for 20-30mintes, supernatant decanted off and sediment resuspended in the remaining 0.2ml.The

urine was examined under microscope for Hematuria, and Leukocyturia. In the present study more than 5 pus cells/HPF in a centrifuged urine sample was taken as significant pyuria and culture and sensitivity was performed in that patient / case.

URINE CULTURE

The mid stream clean catch urine was inoculated into blood and mac conkey agar plates with a 0.01ml calibrated loop. All plates were incubated at 35-370C for 24hrs under aerobic condition to obtain accurate colony count. On culture of mid stream sample of urine, a colony count of more than 105 /ml organisms of a single species was considered as significant.

Samples showing insignificant growth, mixed growth of two or more pathogens or growth of non-pathogens were not considered as culture positive. The following definitions were employed in the present study.

SIGNIFICANT PYURIA

Presence of more than 5 pus cells /HPF in a centrifuged urine sample.

POSITIVE URINE CULTURE

A positive urine culture was defined as growth of >105 colonies of a single urinary tract pathogen/ml of specimen in a mid stream of urine.

NAME :
AGE :
SEX :
ADDRESS :
SOCIO-ECONOMIC STATUS :
CASE STUDY NO :
UTI NO :
DATE :
OP/IP NO :
I /II / III /IV / V (Based on Modified Kuppuswami SES classification)
PROFORMA
HISTORY OF PRESENT COMPLAINT :
Fever (Rectal 38.3 C (or) Axillary temp 37.8 C)
H/O fever more than 3 days (definite source / no definite source) H/O taking antibiotics - YES/NO

ASSOCIATED COMPLAINTS:
Neonates :
Vomiting /lethargy /diarrhoea /jaundice /seizures.
Infants and young children :
Diarrhoea /vomiting /abdominal pain /poor weight gain.
Older children :
Urgency /burning /frequency /flank pain /colour /foul smelling /bed wetting.

Presence of any risk factors :
Female /uncircumcised male /toilet training
dribbling /complete emptying YES / NO
Urethral instrumentation / perineal hygiene /pin worm infestation.
Constipation /anatomic abnormality.
Bowel and bladder hygiene : good/poor
Past history :
H/O similar complaints in the past.
H/O tuberculosis, diabetes, hypertention.
Family history :
Birth history :
Developmental history : normal/delayed
Immunization status : un immunized/partially immunized/completely immunized.

General Examination :
Pallor/jaundice/cyanosis/clubbing/pedal edema. Generalized lymphadenopathy.
Vitals data: :
Temperature : F
Respiratory Rate : /min
Pulse Rate : /min
BP : mm hg (5th/<50th/>50th/<95th/>95th) Anthropometry :
IAP-I / II / III / IV-with K
Wt: Kgs
Ht: Cms
Hc: Cms
MAC: Cms
Systemic Examination :
Abdominal Examination :
Inspection of Genitalia : Normal / phimosis / meatal stenosis / fused labia Respiratory System :

CVS :
CNS :
Investigations :
1) Urine Analysis - Mid steam sample of urine/Bag Sample Microscopy
2) Suprapubic aspirate: Microscopy
3) Urine culture and sensitivity (lab no. Date:)

Midstream clean catch sample of urine
Suprapubic aspirate Further investigations (if needed)
Hb
TC
DC
ESR
Blood urea
Serum creatinine
Blood culture
Stool examination
PBS
MCU / VCUG / DMSA scan
Ultrasound abdomen (Kidneys, Ureters, Bladder)
Treatment Given :
Follow up:

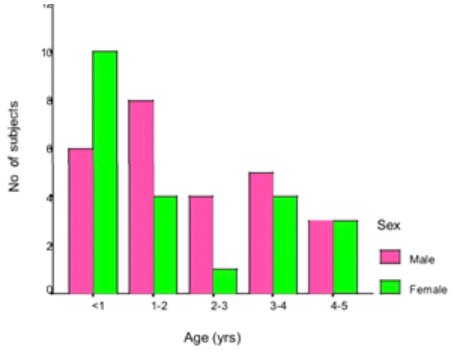


Chart 1: Showing age distribution of male and female subjects who showed >5pus cells/HPF

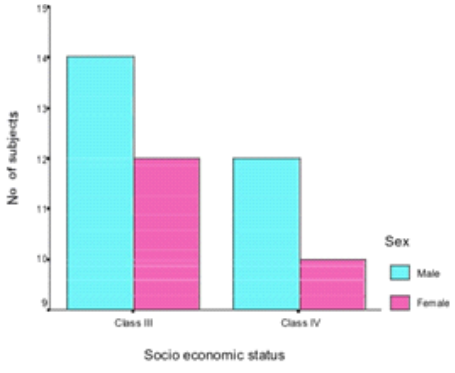
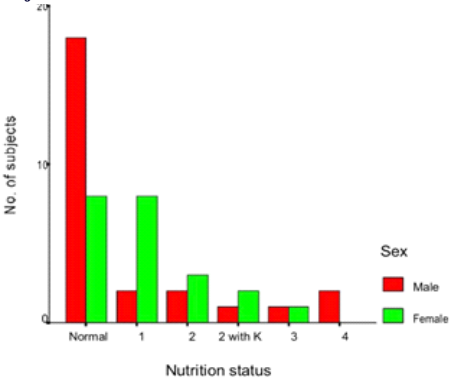


Chart 2: Showing distribution of socioeconomic status of male and female subjects.



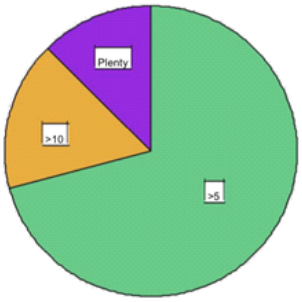


Chart 3 : Pie diagram showing no. of pus cells in urine.

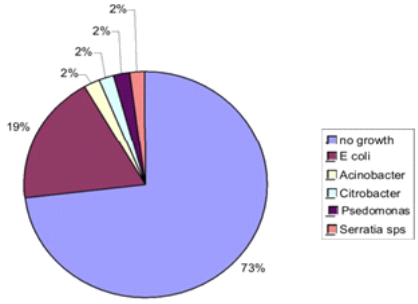


Chart 4: Showing distribution of urine culture.

DISCUSSION

Urinary tract infections are common, potentially serious infections of childhood. They cause acute morbidity as well as long term sequeale including hypertention and impaired renal function. Accurate diagnosis of urinary tract infection is important to facilitate appropriate management of acute illness, and to ensure appropriate evaluation and followup. Equally important is accurately ruling out a urinary tract infection to avoid unnecessary cost and potentially harmful treatment and evaluation.

The present study was a prospective study conducted in department of pediatrics, Narayana medical college and Hospital a period of 21 months between Dec 2012 to Aug 2014 to determine the magnitude of urinary tract infection in febrile children between 1month to 5years and also to assess the validity of routine microscopic urine analysis and culture in the diagnosis of urinary tract infection.

A total of 370 febrile children were included in the study, out of 370 patients in study 165 were males and 205 were females with M:F ratio 1:1.2 and majority of them i.e.64.8%were <2years.

In our study out of 370 children 48 children showed significant pyuria (12.9%). Among those pyuric cases 26% showed significant bacterial growth making an overall prevalence of 3.5%. Among culture positive UTI'S 76% were <2years of age with a overall prevalence of 4.1% in children <2years and 7%in children <1year.

Prevalence of febrile UTI in infants in our study is almost similar to study by Dharni Dharaka et al [6] (1993)who reported a prevalence of 5.4% in febrile infants, Hoberman et al [5] (1993)who reported prevalence of 5.3% in infants.

Overall prevalence of UTI in febrile children in our study was 3.5% and 7% in children <5years and infants respectively in contrast to study conducted by R.K.

Kaushal et al [7] (2003) who reported higher prevalence of 8.4% and 12.3% in children <5years and infants respectively.

Overall prevalence of febrile UTI in infants in our study(7%)was higher compared to report by Shaw K.N et al [1] (1998)from USA who reported prevalence of 3.3% in febrile infants.

In our study prevalence of UTI in <2years age group was 4.1% which was similar to study by Roberts k.et al [8] (1983)who coated prevalence of 4.1%.P.R Srivasths et al [9] (1996)reported a prevalence of 2.48% in children <2years which was lowest reported from a developing country.

M:F ratio of culture positive cases in the age group of <2years was 1:1 and in children >2years there was male preponderance, although children with known renal anamolies were excluded in our study.we detected renal anamolies for the first time(6 out of 13)by USG examination, this explaining the male preponderance in our study.

Among culture positive cases 69% grew E.coli and 7%each of pseudomonas, citrobacter, acinobacter, serratia species, which correlates with other studies. Bryan C.S et al [10] (1984) reported E.coli as the common urinary pathogen in 85%of cases. According to Aravind Bagga et al (2000) 90% of first symptomatic urinary tract infection and 70% recurrence infections were due to E.coli. Hoberman et al [5] (1993)reported as E.coli as the most common bacterium isolated in his study.

Because of economical constraints urine cultures were done only in children who showed significant pyuria which revealed positive culture in 26%.Hence validity of urine examination could not be accurately ascertained.

In our study 40% of children who showed numerous pus cells were culture positive and 44%who showed >10% were culture positive and 2.5% of children showing >5pus cells were culture positive. Hence the presence of pyuria of >5leukocytes/HPF in a centrifuged sample is a significant indicator of UTI.

SUMMARY

Total no. of children studied were 370 of them 240 children were below 2 years and 130 were above 2 years, out of which 165 were males and 205 were females. 48 children showed significant pyuria, all pyuric children belong to III and IV socioeconomic status of modified Kuppuswami SES classification The over all prevalence rate of urinary tract infection in the present study was 3.5% with maximum prevalence in children <2 years age 4.1% and <1 year of age 7%.

12.9% of cases showed significant pyuria. Among pyuric patients 26% were culture positive with a M:F ratio of 1:1 in children < 2 years , a male preponderance in children > 2 years Among culture positive cases majority (69%) grew E.coli.

The positive urine culture was seen in 2.5%, 44% and 40% of children with pus cells > 5 and >10 and numerous /HPF respectively indicating the validity of the definition of significant pyuria as pus cells > 5 in centrifuged urine specimen.

CONCLUSIONS

1. Primary Care Pediatricians should be aware of the possibility that febrile children may have urinary tract infection and should consider obtaining a urine culture specimen as part of their diagnostic evaluation.
2. Present study reveals similar overall prevalence of UTI (3.5%) in febrile children 1 month to 5 years and 4.1% in children <2 years and 7% in children <1 year of age. These results are similar yo other studies conducted in developed countries. (2 - 4%)
3. The Prevalence of culture positivity was much more in children who showed >10 pus cells / HPF
4. The study would have been more conclusive if urine cultures were done in all febrile children screened, but economical constraints limited us to do urine culture only in those children showing significant pyuria of > 5 pus cells/ HPF of centrifuged urine sample and we found that 26% of febrile pyuric children were culture positive hence the validity of study cannot be assessed.

Prevalence of culture positivity was 44% in those who showed >10 pus cells/HPF in centrifuged sample of urine compared to 2.5% in those who showed > 5 pus cells/HPF.

1. In our study, there was no much difference between male & female gender in regard with pyuria.
2. Hence we conclude that pyuria of > 5 pus cells /HPF in centrifuged sample should be considered as significant pyuria and further evaluation should be done promptly to initiate treatment and to prevent morbidity and long term sequelae.

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