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Clinical assessment of prevalence and outcome of urinary tract infection in childrens in ANMMCH, Gaya

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Abstract
The previous reported data suggesting that preventive antibiotics decrease urinary tract infections in children is questionable. However recurrent UTIs are a rare cause of further kidney problems if there are no underlying abnormalities of the kidneys, resulting in less than a third of a percent of chronic kidney disease in adults. Many risk factors are responsible for initial urinary tract infection and recurrent urinary tract infection. This study aims to analyse the risk factors associated with urinary tract infection and analyse the clinical and demographic profile of urine culture positive urinary tract infection patients coming to our hospital.
In the present study we enrolled 50 children diagnosed with the symptoms of the urinary tract infections from December 2017 to August 2018. The study was planned in children referred to IPD and OPD department of Anugrah Narayan Magadh Medical College, Gaya, Bihar. The age of the childrens enrolled in the present study was ranging from 1 to 10 years.
The study group in which the risk factors were analysed had a male preponderance and belonged to low socioeconomic class. In our study population, fever and increased frequency are two important symptoms followed by abdominal pain. Recurrent infection was most often due to unresolved bacteriuria or persistent bacteriuria than reinfection. Common organisms causing urinary tract infection in our study population are E. coli followed by Klebsiella, proteus and pseudomonas.

Keywords: urinary tract infection, UTI, Gaya

Introduction
Urinary tract infections (UTI) are a common cause of febrile illness in young children. Due to lack of overt clinical features in children less than two years, inappropriate collection of urine samples and absence of basic diagnostic tests at firstlevel health facilities in developing countries, UTI are not generally reported as a cause of childhood morbidity. UTIs are not included in the current Integrated Management of Childhood Illness (IMCI) algorithm as the main focus has been preventing mortality and severe morbidity by identifying children at risk of serious diseases including malaria, measles, meningitis, pneumonia, diarrhoeal diseases and malnutrition. Some countries have included assessment and management of dengue or streptococcal sore throat in the IMCI algothrim. However, in many countries without malaria and with a high measles vaccine coverage, the fever box of the IMCI algorithm provides limited guidance for health workers in first-level health facilities. Several years ago, South Africa suggested inclusion of UTI identification in IMCI based on dipstick urinalysis for leucocytes and nitrites but this approach has been largely discarded. Oman, with basic laboratory facilities at primary health care level decided to include UTI management in its IMCI adaptation through screening febrile or symptomatic children with urine microscopy and referring those with urine white cells of 20 per cubic mm or more for paediatric consultation [1].
Symptoms in children younger than 2 to 3 years are often nonspecific and may occur in the setting of fever of unknown etiology. An inherent challenge in diagnosis occurs with children who are not toilet trained. Guidelines differ on the recommended method for obtaining urine; bladder catheterization is recommended by the American Academy of Paediatrics (AAP). Other guidelines recommend either clean catch midstream void or bladder catheterization [2]. The recommended capture method may differ depending on whether the sample is to be used for urinalysis or urine culture. Urinalysis is not recommended for all patients because the level of false-negative results increases when the bladder is emptied frequently or if bacteria are Gram-positive [3]. The definition of a significant level of bacteriuria in a urine culture varies, which may result in a missed diagnosis if a guideline proposing a higher level is followed. An analysis of existing guidelines suggesting a lower level ($\geq 10^3$ to 10^5 CFU/mL with catheterization, and with clean voided urine, $>10^4$ CFU/mL with symptoms or $>10^5$ without symptoms) proposed by the European Association of Urology and the European Society for Pediatric Urology (EAU/ESPU) may be the most appropriate guide [2].
"It is important not to over diagnose UTIs as we know that overuse of antibiotics increases cost, leads to antibiotic resistance [4]. And alters the microbiome of the patient," according to Dr Robinson. Children with febrile UTI may require additional diagnostic procedures to ensure a correct diagnosis. Voiding cystourethrogram (VCUG) and dimercaptosuccinic acid (DMSA) scintigraphy are the primary methods to identify congenital anomalies of the kidney and urinary tract (CAKUT) [2]. VCUG can be used to visualize the urethra and bladder and is the primary method to assess for vesicoureteral reflux (VUR). Negative consequences of missing VUR have not been firmly

established, and several studies have demonstrated that mild or moderate VUR does not increase the risk of either renal scarring or recurrent UTI [2, 5]. Furthermore, prophylactic antibiotics do not affect renal scarring, nor are they significantly effective in preventing further UTI [6].

A DMSA scan, though it can detect acute pyelonephritis and renal scarring, likely does not affect immediate clinical management and has several downsides, including cost and exposure to radiation. DMSA scans are generally limited to children instead of adults [7]. Taking into account the variations in guideline recommendations, a recent analysis proposed that VCUG should be performed in those with recurrent febrile UTI, abnormal ultrasound, or other CAKUT risk factors, and all children should undergo a DMSA scan if they are at high risk for renal scarring, recurrent pyelonephritis, or VUR stages III to V [2].

Studies have demonstrated a small increase in the risk of renal scarring if treatment is delayed by ≥3 days. However, systematic literature reviews and a meta-analysis have demonstrated that there is no association between treatment delay in febrile children and renal scarring.

The previous reported data suggesting that preventive antibiotics decrease urinary tract infections in children is questionable. However recurrent UTIs are a rare cause of further kidney problems if there are no underlying abnormalities of the kidneys, resulting in less than a third of a percent of chronic kidney disease in adults. Many risk factors are responsible for initial urinary tract infection and recurrent urinary tract infection.

This study aims to analyse the risk factors associated with urinary tract infection and analyse the clinical and demographic profile of urine culture positive urinary tract infection patients coming to our hospital.

Methodology

The 50 children diagnosed with the symptoms of the urinary tract infections were enrolled in the present study. The study was planned in children referred to IPD and OPD department of Anugrah Narayan Magadh Medical College, Gaya, Bihar. The age of the children enrolled in the present study was ranging from 1 to 10 years.

The approval of the institutional ethical committee was taken prior to conduct of the study. All the patients were informed and consent was taken. The aim and the objective of the study were conveyed to patients as well as their parents.

Following was the inclusion and exclusion criteria for the present study.

Inclusion criteria

- Children positive for UTI and patients found with positive urine culture with significant colony count.

Exclusion criteria

- Children with polyuria and children with positive urine cultures with suspected contamination.
- Children above the age of 1 years,
- Any child who has received antibiotics 48 hours prior to evaluation,
- Parents/guardians not willing to enroll the child in the study.

Results & Discussion

The data from the 50 Children were collected and presented as below. The Table 1 indicates the Age & Sex of the child's. Table 2 indicates the Symptoms observed in the selected cases. Table 3 indicates the Microorganism Patterns of Isolates.

Table 1: Age & Sex of the children.

Age	Number of Cases
1 – 4 years	13
4 – 8 years	24
8 -10 years	13
Total	50
Sex	
Girl	15
Boys	35
Total	50

Table 2: Symptoms observed

Symptoms	Total Cases
Fever	35
Chills and rigor	42
Burning micturition	43
Increased frequency	39
High coloured urine	2
Cloudy urine	2
Abdominal pain	23
Vomiting	15
Preputial bulging (males)	7
Enuresis	5

Table 3: Microorganism Patterns of Isolates

Isolates	Total Cases
E.coli	13
Klebsiella	9
Pseudomonas	7
Proteus	5
Acinetobacter	6
Enterobacter	1
Streptococcus	1
S. pyogenes	2
Staphylococcus aureus	1
Enterococcus	2
CoNS	1
Yeast	2
Total	50

Urinary tract infection is a common problem in the paediatric age group and has significant risk for long term sequelae. The clinical signs and symptoms of UTI are nonspecific and vague in the first 6 years of age. It may be present in febrile children with other illnesses, without clinical evidence of UTI. Such infection, if untreated can lead to subsequent renal scarring and is an established risk factor for end stage renal disease. Recent studies from abroad as well as from India have shown that, the routine urine culture in such patients give high positive yields, particularly in infants and young children

In this study, urinary tract infection occurred more in male children than in female children. Studies done elsewhere, and literature do not support this. The probable reason for this difference is that the study being hospital based the proportion of male and female children attending our hospital may be different. In this study majority of children belonged to low socioeconomic status and were from urban area and the analysis is targeted to this group of the community.

On analysing the clinical profile of the study group, fever was the most common presenting symptom. This is followed by

increased frequency of urination. The third common symptom was abdominal pain. This is similar to other study by Sharma A *et al.* which included children from two months to fifteen years conducted in Nepal except that the second common presentation was abdominal pain [8], Malla KK *et al.*, Islam MN *et al.* and Brkic S *et al.* showed fever as most common presenting complaint in their studies [9-11]. Suprapubic tenderness was the most common clinical finding. Majority of children presented as fever without focus in correlation with literature. All children with suprapubic tenderness dint have cystitis in USG and all children with cystitis didn't have supra pubic tenderness.

Bacteria were identified by Gram's stain and standard biochemical procedures. Susceptibility of isolates to antimicrobial agents of different classes was assessed by the disk diffusion technique on Mueller-Hinton agar as described by the National Committee for Clinical Laboratory Standards (presently called Clinical Laboratory Standard Institute).

E.coli was the commonest organism isolated in both sex (male) from UTI cases in this study. Second most common isolates was klebsiella which was well correlating to other study [12]. Prevalence of E.coli and Klebsiella was high in girls; similar result was reported by study conducted by Spahiu L in 2010 [13]. Although E. coli, Klebsiella were the principal uropathogens in our study, there were other pathogens of our interest due to their resistance pattern like, Pseudomonas, Proteus, Staphylococcus, Acinetobacter and Enterobacter. Resistance in these pathogen was as high as E.coli and klebsiella. Proteus was the third most common isolates in our study all isolates. Which was well justified by other study [14].

A study by Kaushal RK *et al.*, found urinary symptoms (pertaining to the urinary tract) including dysuria, burning micturition, increased frequency, and malodorous and turbid urine in 11.5% of cases only [15]. A few other studies have found that the presenting symptoms of UTI are uncommon and generally non-specific. On contrary, Messi *et al.*, Nayir *et al.*, in their studies to know about signs and symptoms of UTI in febrile children up to 14 years of age found the features of dysuria and increased frequency of urination [16].

Similar parameters were evaluated in a case-control study by Hoi LV *et al.* to know the correlation of UTI with the poor hygienic practices. They also found no significant association of such practices with risk of developing UTI [17]. On the other hand, data from another study suggested bathing habits less than daily, holding of urination during daytime and washing habit after defecation might have risk effects on UTI. Significant correlation of encopresis with recurrent UTI was found in a Swedish study [18].

Mother's educational status came out to be a major predisposing factor for UTI as evident from the significant p value. Similar observations were noted by Hashemiparast *et al.*, in a study done on children for prevention of UTI in Iran which stated that well educated mothers are more confident and equipped with better knowledge in prevention UTI by practicing hygiene, thus leading to a definite decline in morbidity [19].

Conclusion

The study group in which the risk factors were analysed had a male preponderance and belonged to low socioeconomic class. In our study population fever and increased frequency are two important symptoms followed by abdominal pain. Recurrent infection was most often due to unresolved bacteriuria or persistent bacteriuria than reinfection. Common organisms causing urinary tract infection in our study population are E. coli followed by Klebsiella, proteus and pseudomonas.

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