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ANALYSIS OF CLINICAL PROFILE OF URINARY TRACT INFECTIONS IN PEDIATRIC PATIENTS

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Abstract:

Introduction: *Urinary tract infections remain one of the most common infections and a leading cause of morbidity in human population. The rate of UTI usually depends on age and sex. The incidence of UTI is greater in girls as compared to boys, which may be either due to anatomical structure or physiologic mechanisms.* ***Objectives of the study:*** *The main goal of the study is to analyze the clinical profile of urinary tract infections in pediatric patients.* ***Material and methods:*** *This prospective study was conducted at hospitals of Rawalpindi during 2018. During the study period, children less than 18 years of age of both sex presented to the pediatric Nephrology inpatient ward with a clinical diagnosis of UTI were included. Neonate were excluded from this study. The clinical diagnosis of UTI was made by the presence of fever and/or any of the symptoms such as painful micturition, increased frequency, burning micturition, or suprapubic pain/flank pain.* ***Results:*** *Out of the 100 urine samples that were processed in this study, 81 samples showed no UTI while 20 patients showed significant UTI, giving rise to the total incidence of 6.87%. The most common associated disease with UTI in children was the nephrotic syndrome 38 (37.25%) out of 985 NS, followed by obstructive uropathy 29 (28.43%) out of 20 obstructive uropathy (OU), glomerulonephritis 8 (17.64%) out of 10 GN and chronic kidney disease 02.* ***Conclusion:*** *It is concluded that UTI varies with age and gender and, therefore, extensive evaluation is required in boys under one year of age with UTI. The isolated organisms showed resistance to a large number of oral and parenteral antibiotics.*

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INTRODUCTION:

Urinary tract infections remain one of the most common infections and a leading cause of morbidity in human population. The rate of UTI usually depends on age and sex. The incidence of UTI is greater in girls as compared to boys, which may be either due to anatomical structure or physiologic mechanisms. Worldwide, an estimated 8% of girls and 2% of boys experience at least one episode of UTI by the age of seven years and recurrence occurs in 12% to 30% of them within a year. Renal disease is a major cause of morbidity and mortality [1]. Pediatric patients especially younger ones with renal disease may present with nonspecific signs and symptoms unrelated to the urinary tract. Therefore, should be familiar with the modes of presentation of different renal conditions and should have a high index of suspicion of renal disease. Accurate diagnosis and appropriate use of antimicrobials for treatment and prevention of urinary tract infections (UTIs) is vital to reduce the burden and also to prevent the possible long-term consequences like renal scarring, hypertension and eventually end-stage renal disease [2].

In children most often urinary tract infection (UTI) manifests as fever of unknown origin. The clinical presentation of UTI in infants and young children can vary from occult and undiagnosed fever to gastrointestinal manifestations as well as upper and lower urinary tract symptoms whereas, in older children symptoms referring to the urinary tract may be observed. Incidence of UTI varies with age of the child. Five per cent of children below two years with fever have UTI. In the first year of life, especially in the first three months, UTI is seen more commonly in boys (3.7%) than in girls (2%) [3]. Thereafter, the UTI has been reported to be among three per cent girls and 1.1 per cent boys. Children are at risk of developing UTI due to certain anatomic and physiologic factors among which vesicoureteric reflux (VUR) is the most common. VUR leads to repeated infections and other complications like chronic pyelonephritis and eventual renal scarring which are components of reflux nephropathy. Hence, it is important to diagnose this condition at the appropriate time as it is a preventable cause of renal damage [4].

Theoretical background

Bacteria are common causes of UTI in children with *Escherichia coli* being the most commonly isolated pathogen. Susceptibility patterns of the bacterial isolates vary with geographic region and act as a reference for guiding the empirical therapy. The aetiology of paediatric UTI and the antibiotic susceptibility of urinary pathogens in both the community and hospitals have been changing, and drug resistance has become a major problem [5].

Objectives of the study

The main goal of the study is to analyze the clinical profile of urinary tract infections in pediatric patients.

MATERIAL AND METHODS:

This prospective study was conducted at hospitals of Rawalpindi during 2018. During the study period, children less than 18 years of age of both sex presented to the pediatric Nephrology inpatient ward with a clinical diagnosis of UTI were included. Neonate were excluded from this study. The clinical diagnosis of UTI was made by the presence of fever and/or any of the symptoms such as painful micturition, increased frequency, burning micturition, or suprapubic pain/flank pain. Present study included 100 urine samples collected from the suspected cases of UTI. It included all inpatients irrespective of their age groups or genders presenting with symptoms of UTI (burning micturition, fever, hematuria, dysuria etc.). Identification of the isolated bacterial pathogens was done on the basis of gram staining, morphological characteristics and biochemical reactions by standard methods.

Analysis

Student's t-test was performed to evaluate the differences in roughness between groups. Two-way ANOVA was performed to study the contributions. A chi-square test was used to examine the difference in the distribution of the fracture modes (SPSS 19.0 for Windows, SPSS Inc., USA).

RESULTS:

Out of the 100 urine samples that were processed in this study, 1381 samples showed no UTI while 102 patients showed significant UTI (significant bacterial growth 62; and pyuria 40), giving rise to the total incidence of 6.87%. The most common associated disease with UTI in children was the nephrotic syndrome 38 (37.25%) out of 985 NS, followed by obstructive uropathy 29 (28.43%) out of 80 obstructive uropathy (OU), glomerulonephritis 18 (17.64%).

Table 01: Number and percentage of culture positive UTI.

Organisms	Culture positive (62)	
	Frequency	Percentage (%)
E. coli	32	51.6
Pseudomonas	11	17.7
Klebsiella	9	14.5
Enterococcus	5	8
Proteus	2	3.2
Streptococcus spp.	3	4.8

Table 02: Different associated disease in study group.

Associated disease (n)	Culture positive UTI (%)	Culture negative UTI (%)	Total
Nephrotic syndrome (NS) (985)	24 (38.7%)	14 (35%)	38 (37.25)
Glomerulonephritis (GN) (238)	09 (14.5%)	09 (22.5%)	18 (17.64)
Obstructive uropathy (OU) (120)	18 (29%)	11 (27.5%)	29 (28.43)
Chronic kidney disease (CKD) (140)	11 (17.7%)	6 (15%)	17 (16.66)
Total	62 (100%)	40 (100%)	102

DISCUSSION:

Any part of the urinary tract can be infected during UTI including kidneys (pyelonephritis), bladder (cystitis) and urethra. Usually UTI in children occurs due to ascending infection but in the first year of life hematogenous spread may be more common. It is one of the common infections in children but difficult to diagnose because symptoms are nonspecific [6]. Particularly children with renal diseases are more susceptible to UTI due to the disease process and drugs causing immunosuppression and also some congenital abnormalities causing obstruction.

Majority of the *E. coli* and *Klebsiella* isolates were sensitive to nitrofurantoin, followed by cefoperazone-sulbactam, aminoglycosides and meropenem. Our findings were different from an earlier study from north India[4] but similar to others. The sensitivity patterns of the most commonly isolated pathogens indicated that the isolates obtained from the OPD were more susceptible to most of the antibiotics than in the ward followed by the paedric intensive care unit (PICU). Both *E.coli* and *K. pneumoniae* were sensitive to nitrofurantoin, amikacin, cefoperazone-sulbactam followed by meropenem [7]. Among the Gram-positive organisms, Enterococcus faecalis was the most frequently isolated pathogen. Vancomycin resistant enterococci were isolated from seven children who were admitted to the PICU, three of whom had posterior urethral valve (PUV), one had catheter induced UTI, one had undergone surgical intervention for PUV, while in the remaining two children no risk factor could be ascertained. Amongst the staphylococci, 33.3 per cent were MRSA (methicillin resistant *Staphylococcus aureus*). Most of the children with UTI associated with VUR had significant bacteriuria with counts above 100,000 cfu/ml, similar to earlier reports [8].

CONCLUSION:

It is concluded that UTI varies with age and gender and, therefore, extensive evaluation is required in boys under one year of age with UTI. The isolated organisms showed resistance to a large number of oral and parenteral antibiotics.

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