FREQUENCY OF URINARY TRACT INFECTION IN CHILDREN AND THEIR SENSITIVITY PATTERN IN SWAT

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ABSTRACT

BACKGROUND: Urinary tract infection (UTI) is most common bacterial infection that affects the urinary system. UTI can cause sizeable morbidity and can also lead to kidney damage when associated with urinary impediment.

OBJECTIVE: The principal aim of the study was to examine the causative agents of urinary tract infection in children of swat area and their sensitivity pattern against several Antibiotics.

MATERIAL & METHODS: Total 132 samples of mid-stream urine were collected in clean universal bottles from the children having UTI symptoms at the age of 0-14 years in children unit Saidu teaching hospital(STH) and tested at Amreek clinical laboratory. Specimen with positive cultures were isolated and recognized by standard microbiological techniques while sensitivity pattern was obtained by using standard antibiotic discs.

RESULTS: Incidence of UTI in children was identified in 80 out of 132 patients, among them 74 were female and 6 were male, showing that UTI most commonly affects females as compared to male. The most frequent isolates obtained were Escherichia coli (50%), E. faecalis(22.5%), P. aeruginosa(12.5%), S.aureus (10%) and Klebsiella (5%).

CONCLUSION: Sparfloxacin was the most sensitive in (100%) and Tazobactam was sensitive to (82%) of UTIs while Amoxillin+Clavnate and Fortum were almost intermediate antibiotics and Amoxillin was resistance to almost all pathogens. Moreover Fosfomycin and Linezolid showed 100 % sensitivity pattern, in patients with E.coli and E. faecalis induced UTIs, respectively.

***Key Words**: Urinary Tract Infection, Cystine Lactose Electrolyte Deficient agar, Nutrient Agar*

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INTRODUCTION

Urinary tract infection (UTI) is most common bacterial infection that affects the urinary system. When affecting upper part (kidneys) then it is pyelonephritis and lower tract (urinary bladder and urethra) then called cystitis and urethritis respectively. The symptoms may include urination, need of having empty bladder, fever and flank pain, abnormal crying, change in skin color and unpleasant urine smell[1]. UTI can cause sizeable morbidity and can also lead to kidney damage when associated with urinary impediment. UTI developing risk factors may include structural or functional abnormality (blockage in urine tract and deformed kidney), vesicoureteral reflux (back ward flow of urine), poor hygiene and family history[2]. Millions people of all age groups (both sexes) are affected by UTI annually[3], the symptoms may not be specific in old and very young age. In most cases the causative agent is Escherichia coli (80 to 85%)[4,5], while Staphylococcus saprophyticus (5 to 10%) in a community. In another study broader range of pathogens involved in UTI include, E.coli up to 27%, Klebsiella and Pseudomonas up to 11%, Candida albicans up to 9% and Enterococcus species up to 7% along with many others[6]. UTI caused by staphylococcus aureus is usually blood born infection[1]. These pathogens usually enter the bladder through urethra, by blood or lymph, get attached to the bladder walls forming biofilms and weaken the immune response[6] Its occurrence vary in early formative years, being more frequent in male children in 1st three months of life while in later upbringing ages the ratio of male decreases and UTI becomes more common in female[7]. In children the significant source of morbidity is associated with abnormalities. The clinical feature of UTI in children are fever, failure to thrive, pain abdomen, vomiting and dysuria. At times UTI with fever in children is considered to be an upper urinary tract infection[8]. UTIs are entirely treatable in early stages but if left untreated or undiagnosed can lead to serious kidney/ renal damage especially in children below the age of 6 years[9]. Its diagnosis usually requires positive urine culture and is mostly treated with antibiotics;[10] in addition. Cranberry products are also advised for UTI but there is no enough good evidence for its use[11]. This study is based on the analysis of the common causative pathogens for Urinary tract infections in

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children and antibiotics sensitivity pattern against those pathogens.

MATERIALS AND METHODS

Patients: All children younger than 14 years who attended children OPD or were indoor at Children unit of STH, with clinical features suggestive of UTI were included in the study. The duration extended from 30th March 2015 to 30th April 2016. Urine specimen were received at Amreek Clinical Laboratory Microbiology section. Urine samples were collected from 132 children. On the basis of their age they were divided into three groups: i:e Neonates and Infants (0 to 1 year), Pre- school going (1 year to 5 years) and school going children (5 years to 14 years), shown in table 1.

TABLE 1: Age and gender distribution, No of patients having Bactriuria.

Age	Female	Male	Total	Percent %
0-1	8	4	12	15
1-5	34	2	36	45
5-14	32	0	32	40
Total	74	6	80	100

Sterilization of media and material: On standard procedures Cystine Lactose Electrolyte Deficient agar and Nutrient agar were used for inoculation of urine specimen. All glassware were washed with detergent and rinsed with water. The glassware were wrapped in aluminum foil and sterilized in hot air oven at 160°C for 3 hours. 20 grams of Cystine Lactose Electrolyte Deficient agar was add to 400 ml distal water and 14 grams of Nutrient agar to 200 ml distal water shake it well and closed with corks tightly. Media were sterilized by autoclaving at 121°C for 15 minutes. The media were then poured in Petri dishes avoiding contamination.

Urine culture: Clean voided mid-stream urine specimens were collected from patients in sterile bottles which were given to their parents for collections and transported to the laboratory immediately for urinalysis and culture.

Culturing of Urine sample: The wire loop was sterilized and then almost 2 micro liter each of specimen were poured on Nutrient agar (NA) and Cystine Lactose Electrolyte Deficient agar (CLED) media rotted gently to mix. Plates were then incubated at 37°C for 24 hours; bacterial colonies were present after incubation period. A loopful of each colony was also streaked on NA for Anti-biotics sensitivity assessment.

Biochemical Identification: Initially the isolates were identified by Gram staining. Furthermore the Biochemical tests like Catalase, Coagulase, Oxidase, Triple Sugar Iron Agar (TSI) etc. were performed for final identification of the isolates.

Antibiotic Sensitivity test: Antibiotic susceptibility tests were carried out using the Kirby-Bauer Disk Diffusion method, where the organism grown on Nutrient agar medium were exposed to small paper disk antibiotics. The zone of the inhibition is efficiency of antibiotic against the organism. Antibiotic discs were soaked in appropriate quantity, inoculated in pure medium. A clear zone appeared where the antibiotic concentration was enough for killing the organisms. Antibiotics and their concentration used were as;Ceftazidime (CAZ=30 µg) Ceftriaxone (CRO=30 µg) ,Cefuroxine sodium (CXM=30 µg), Sparfloxacin (SPX=5 µg) , Sulzone (SCF=105 µg), Tazobactam (TZP=110 µg), Levofloxacine (LEV=5 µg), Ciprofloxacin (CIP=5 µg), Cephradine (CE=30 µg), Meropenem (MEM=10 µg), Amoxicillin (AMC=30 µg), Linezolid (LZD=30 µg), Cefepime (FEP=30 µg), Gentamycin (CN=10 µg), Amikacin (AK=30 µg)), Fosfomycin (FOS=50 µg), Ticarcillin (TIM=85 µg), Nitrofurantoin (F=300 µg) and Moxifloxacin (MXF=5 µg).

RESULTS

Total 132 patients between the age of 0-14 years visited Amreek Clinical Laboratory Saidu Sharif Swat in the period March 2015 to April 2016. Among them 60.61% have symptomatic bactriuria, and 39.39% having symptoms of urinary tract infection but no growth of bacteria found after 24 hours incubation.

Five organisms have been isolated from 80 cases (60.60%). Positive cultures,were of Escherichia coli, Enterococcus faecalis, Pseudomonas aeruginosa, Staphylococcus aureus and Klebsiella. E.coli was identified in 40 cases (50%), E. faecalis in 18 cases (22.5%), followed by P. aeruginosa in 10 cases (12.5%), S. aureus in 8 cases (10%), Klebsiella in 4 cases (5%).

Sensitivity Pattern: The following sensitivity patterns were observed in more than 70 % cases of different isolates.

Species	Sensitive	Intermediate	Resistant
E.coli	TZP,MEM,CXM,AK, CIP,SPX,F, FOS, LEV, SCF	TIM,CN, CAZ, CRO, MXF	AMC, FEP, CE
E. faecalis	AMC,TZP, TIM, MEM,SCF, CXM,MXF,SPX,LZD,AK	CAZ, CRO,CIP, CN, FOS,	LEV, CRO, F, CE
P. aeroginosa	TZP. MEM, TIM, SCF,CIP,SPX, LEV, FEP	CAZ, AK,F, FOS	AMC, CXM, CRO, CN, CE, MXF
Klebsiela	AMC+C, TZP, MEM, CXM, CAZ, CRO, TIM, SCF, FEP, AK, CIP, LEV, SPX	AMC, CE, CN, MXF	FOS, CRO, F
S. aureus	AMC, CXM, FOS,LZD,MXF,SPX, TZP, TIM, MEM, SCF,	CE, CAZ,CRO, AK,CIP, CLR	LEV, FEP, F

Discussion

The study was conducted to determine the causative pathogens of urinary tract infection in children and antibiotic sensitivity pattern against them. Out of 132 patients, 6 males and 74 female among the age of 0-14 years were having positive cultures. Incidence of UTI in female children is more frequent as compared to male children in swat, the higher prevalence of UTI in female might be the result of proximity of excretory organs or variation of vaginal microflora that plays a vital role in incidence of UTI[12], while in Hazara division it is more frequent in male may be due to their environmental conditions or male dominancy[13]. Five different types of pathogens were isolated, including E.coli, E.faecalis, P.aeroginosa, Klebsiella and S. aureus. E.coli is the most common bacteria involved in 50% of UTI in Swat area, frequently infecting both sexes that show resemblance to other studies. Another study reported that the commonest organism responsible for UTI is E.coli which was (27.05%) according to their results[14]. Second most familiar isolate of our study is E.faecalis 22.5% that is more infective/ endemic in comparison to others studies whose result shows that Klebsiella is the second commonest bacteria[2]. P.aeroginosa (12.5%), S.aureus (10%), and Klebsiella (5%) were other pathogens which are less commonly found in contrast to E.coli and E facalis in our study.

The antibiotic sensitivity in our research showed that the most effective antibiotic to UTI patients in swat is Sparfloxacin which is 100% sensitive, while Levofloxacin and Ciprofloxacin showed 72.5% sensitivity amongst the Quinolones/ Fouroquinolones, to all the species isolated from urine cultures of both male and female children. High sensitivity was also reported in other studies. They used ciprofloxacin from Quinolones/ Fouroquinolones class showed the highest sensitivity pattern.The second most effective antibiotic in our results is Tazobactam 82.5%, whereas it has been reported as sensitive 66.6% to Klebsiella in another study[15].Amikacin is 80.5% susceptible to bactriuria in our study that is more effective as compared to the results of an Northern Indian study, who reported it up to 32.5%[16]. The effectiveness of Fosfomycin was (77.5%) in our research. Fosfomycin and Linezolid showed 100% sensitivity pattern, in patients with E.coli and E. faecalis induced UTIs, respectively. Levofloxacin and Ciprofloxacin was (72.5%) while in another study of Ciprofloxacin 31.5% demonstrated excellent effectiveness against the organisms[17]. In the outcome a study conducted at Dehli, India, Meropenim susceptibility was up to 100 % but in our study sensitivity rate is 72.5% since misuse of these agents can lead to resistance[18].

Nitrofurantoin showed (50%) sensitivity that shows resemblance to other studies who reported that they found nitrofurantoin as the active antibiotic against organisms showing 50% sensitivity[19]. Sulzone revealed 45% of sensitivity that is comparably more effective to the result of other researchers who reported in Peshawar, only 10% or less than 10% sensistivity of the organisms to this antibiotic[20]. In the present study Amoxacillin/Clavulanic Acid, showed 27.5% where as another study shows 35.66% sensitivity for the Anti-biotic[21]. In case of S.aureus it shows more sensitivity and 45% for Moxifloxacin[22], cefepime susceptibility rate was 22.5% while according to the record of others its 83.7%[23]. The

least effective antibiotics in our study were Amoxicillin and Ceftazidime that showed sensitivity up to 15% which is less sensitive in comparison to the study that reveals 68.8%[18]. The variations seen, in obtaining different organisms and their sensitivity pattern, in different studies may be attributed to differences in age groups, environmental and social set ups and moreover bacteria may acquire resistance genes with passage of time, especially where misuse of Antibiotics is common.

Future Recommendations: Molecular studies are recommended for identification of Anti-biotic resistance genes.

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