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Abstract

Background: The present study analyzes the clinical profile, identifies the pathogenic distribution and their antimicrobial susceptibility pattern in childhood urinary tract infections in order to provide standard reference for the optimal use of antibiotics in Nepal. Methods: A hospital based cross section study was conducted among children suspected of urinary tract infection in Kanti Children's Hospital over a period of six months from August 2012 to November 2012. A total of 1890 both sexes, ranging from post natal period to 14 years of age were studied. The modes of presentation, laboratory investigation reports, which included urine routine microscopy, bacterial isolation with colony count from urine culture, antibiotic sensitivity pattern and multidrug resistant profile, were documented. Data were analyzed by the Chi Square Test. Results: Among 1890 urine samples, 300 (15.88

Index terms—**1 Introduction**

Urinary tract infection (UTI) is common in pediatric practice and an important cause of morbidity and mortality in children. However, UTI is a common problem throughout the world, the microbial isolates and their sensitivity pattern need to be analyzed at regular interval to monitor the changing pattern of microbial flora and the development of resistance to drugs, which may help the physician to treat UTI in better way and to prevent further complications.

2 II.**3 Materials and Methods**

We conducted the prospective analysis of the cases attending pediatric OPD and those admitted in the ward of Kanti Children's Hospital, Kathmandu, Nepal. Study period was six months from August 2012 to November 2012. Children of both sexes up to the age of 14 years were included in the study. Their clinical presentation with associated condition and risk factors were noted. Approximately 1890 urine samples were screened and 300 urine samples showed positive culture result. Parents were explained about the study and professional care was taken to collect the urine sample for routine culture and sensitivity by sterile technique. Urine was sampled for culture by aseptic supra pubic bladder aspiration in infants. Sterile plastic receptacles were used for collection of urine in younger patients to avoid contamination with stool. Clean catch mid-stream urine was sampled in older children and adolescents after proper cleansing of urethra and under supervision. The samples were then processed for routine microscopy. Only samples with more than 5 WBC per high power field (hpf) were subjected for culture and antimicrobial susceptibility testing in the bacteriology laboratory of Kanti Children Hospital. Receptacle sample and mid-stream urine sample with culture with >10⁵ colony forming units of bacteria/ml of urine in young infants and adolescents. Any colony count with supra pubic count in infants.

4 III.

5 Observation and Result

Among the 1890 urine samples included in the study, 300(15.88%) showed positive culture result (fig. 1). Since, the study includes newly born babies up to 14 years of age. The high frequency of UTI was found in 0-2 years of age followed by 8-10 years of age. Among the 300 culture positive cases, 114(38%) were males and 186(62%) were females (Table 1). Among the antibiotics used, Nitrofurantoin was found to have the highest sensitivity (71.67%) amongst most bacteria. Amikacin, Norfloxacin and Gentamicin had sensitivity of 69%, 61.71% and 61.67% respectively.

Pseudomonas aeruginosa was 100% sensitive to Tobramycin, Piperacillin and Imipenem. Though sensitivity to Vancomycin was tested to 44 cases and it showed no resistance and it was 100% sensitive to *Staphylococcus aureus* and *Streptococcus fecalis*.

Highest degree of resistance was noted with Ceftazidime(64%), Ofloxacin(61.33%), Ampicillin(60%) , ciprofloxacin (55.67%), Cotrimoxazole (52%), Gentamicin (38.33%), Amikacin (28%) and Nitrofurantoin (23.67%). The sensitivity pattern of various organisms was also studied. *E.coli* responded better with Nitrofurantoin, Aminoglycosides and Fluroquinolones but displayed a highresistance with most of the beta lactams. Resistance was also noted with Ofloxacin, Nalidixic acid and Ciprofloxacin. IV.

6 Discussion

Urinary tract infection (UTI) is common cause of febrile illness in young children. In the first year of life. Urinary tract infection(UTI) is one of the most important causes of morbidity in the general population and the second most common cause of hospital visits ??Das et al., 2006). Urinary tract infection(UTI) is not uncommon cause of bacterial illness in children, 4-8% of children have had an UTI from a population-based study(Suresh kumaret al., 2009). The prevalence and incidence of is higher in female than in male children, which are likely the result of several clinical factors including anatomical differences, hormonal effects and behavior pattern(Griebing, 2009). The prevalence of UTIs is quite different between two gender and age with high incidence in girls (1% in male and 3% in female), except the male infants with an incidence of 0.7% compared to the 0.1-0.4% of female infants (Foxman, 2002), which is due to bacteria harboring in prepuce of young infants.

Among the growth positive samples, 144(48%) were male patients and 156(52%) were female patients. Among 1890 urine samples, 1094(57.88%) were symptomatic, in which 166(15.18%) was culture positive. Urinary symptoms like dysuria, burning urine, increased frequency, haematuria, oliguria, bed wetting, chills and rigors, abdominal pain, vomiting, loose stool, etc. The first and the most critical step in establishing the diagnosis of UTI in infants and young children is the method by which the urine is collected. In the young infants care must be taken to prepare carefully the perineum and periurethral area for placement of sterile plastic receptacle for collection of urine. In the infants, the purest way to obtain urine for culture aseptically is by precutaneoussuprapubic aspiration. Older children and adolescents can be instructed to collect the midstream urine specimen after proper cleansing of the urethral area. These steps were strictly followed for collection of urine in our study. The presence of 10⁵ organisms or more per ml of urine is diagnostic of UTI. If 10³ to 10⁵ colony forming units of a single genus and species per ml are recovered from two successive urine culture of a child, a diagnosis of UTI should be made.

In our context, such cases were not included in our study as it was difficult to call the patient for repeated urine culture though they were empirically (2012); Beyene and Tsegaye (2011); ??aoud 1%. Yet in another study, the findings were consistent with ours where the pathogens were *E.coli* (47%), *Klebsiella* spp (18%), *S.aureus* (13.4%), *Proteus* spp (9%), *E.fecalis* (5.3%), *P.aeruginosa* (5%), and others 2.3%.

In our study, Nitrofurantoin was found to have the highest sensitivity (71.67%) amongst most bacteria whereas *Proteus*, *Salmonella paratyphi B* and *P. aeruginosa* was resistant to the same. Amikacin, Norfloxacin and Gentamicin had sensitivity of 69%, 6

1.71% and 61.67% respectively. *Pseudomonas aeruginosa* was 100% sensitive to Tobramycin, Piperacillin and Imipenem. Though sensitivity to Vancomycin was tested to 44 cases it was 100% sensitive to *Staphylococcus aureus* and *Streptococcus fecalis*. Highest degree of resistance was noted with Ceftazidime (64%), Ofloxacin (61.33%), Ampicillin (60%), Ciprofloxacin (55.67%), Cotrimoxazole (52%), Gentamicin (38.33%), Amikacin(28%) and Nitrofurantoin (23.67%).

In this study, 69% (207/300) were found to be Multidrug resistant (MDR) i.e. they were resistant to treated as suspected UTI. The suprapubic bladder aspiration or by catheterization contain fewer than 10⁵ organisms because the organisms have not had sufficient time to multiply before the removal of urine from the bladder(Griebing TL.,2009).

In this study, 300(15.88%) resulted a positive culture in urine with significant colony count of ?10⁵rest 1590(84.12%) were culture negative or they had colony count <10⁵ (fig. 1). *E.coli*(52.33%) was found to be predominant organism in this study which resembles with the study done by Raiet al., (2008); Maliangoet al., more than two drugs which is similar to the result of Pokhrelet al., 2006 in which 60.40% were MDR. The MDR in *E.coli* was found to be 66.87% (105/300). Although multidrug resistance was shown 100% by *P. aeruginosa*, *Enterococcus fecalis* and *S. paratyphi B*, these were low in number and considered insignificant. In a

study done by Tuladharet al., 2003 at TUTH, MDR bacterial strains were detected in 35.2% cases in which the most predominant was E.coli(22.2%) followed by Klebsiellaspp (6.1%) and Staphylococcus aureus (2.2%).

7 V.

8 Conclusion

As UTI is the significant problem in the children and still continues to be a major threat for morbidity and mortality in subtropical parts of the world, larger scale studies must be carried out at a regular intervals in order to identify the changing trend in the pathogenic organisms and update on its changing antibiotic susceptibility. Based on the sensitivity patterns we recommend empirical use of Nitrofurantoin, Amikacin, Norfloxacin and Gentamicin for patients with UTI. Vancomycin showed 100% sensitivity to grampositive bacteria. Gram-negative bacteria like Proteus spp, P. aeruginosa and S.paratyphi B was 100% resistant to Nitrofurantoin. P.aeruginosa was 100% resistant to Imipenem, Piperacilin and Tobramycin. So, Vancomycin should be kept as reserve drug for gram positive organisms and Tobramycin, Imipenem and Piperacilin for P. aeruginosa.¹



Figure 1: Figure 1 :

1

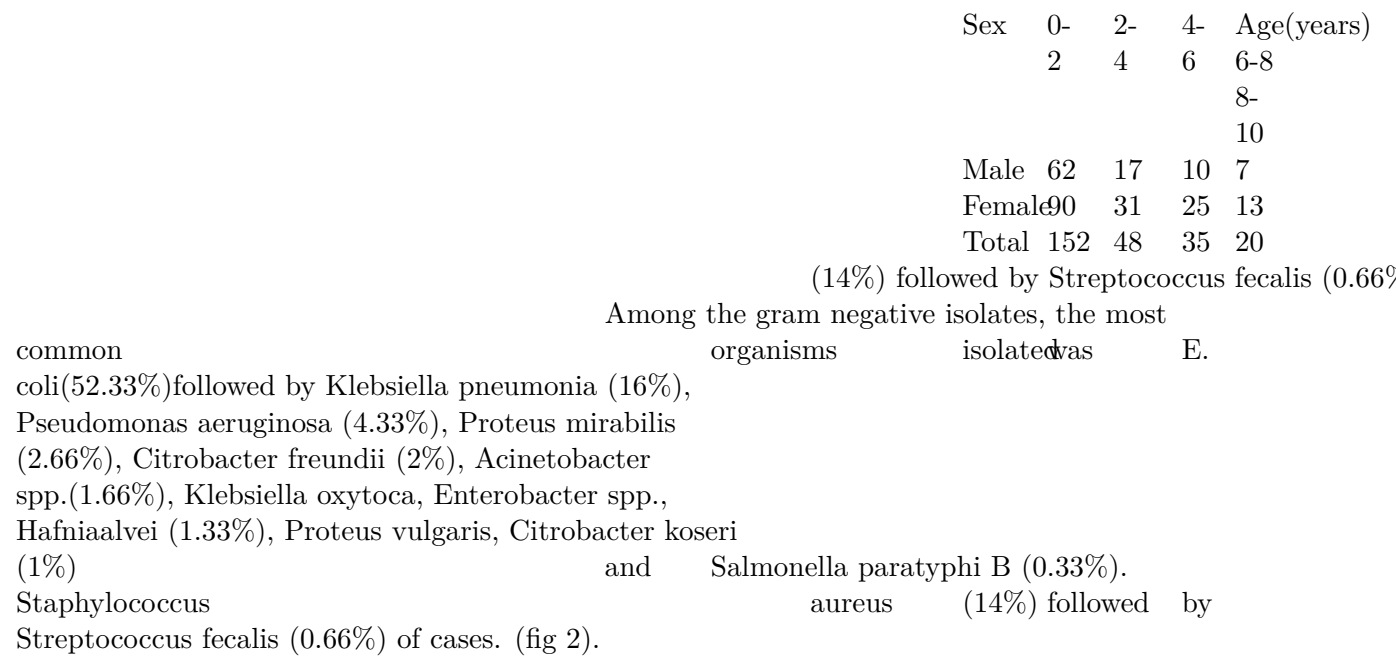


Figure 2: Table 1 :

2

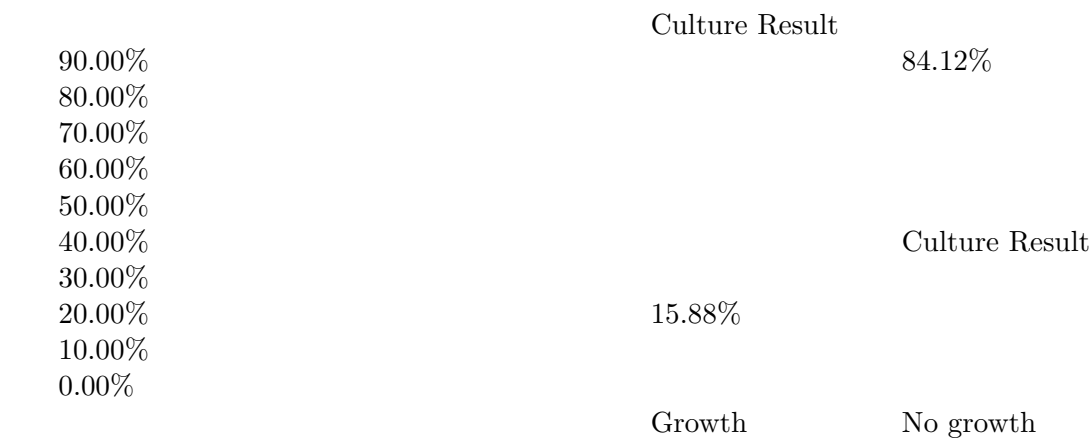


Figure 3: Table 2 :

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- [Tuladhar et al. ()] ‘Antimicrobial resistant bacterial strains from inpatients of Tribhuvan University Teaching Hospital’. N R Tuladhar , N Banjade , B M Pokharel , B Rizal , R Manandhar , S Shrestha , A Shah , S Chaurasia . *Kathmandu. J Inst* 2003. 25 p. .
- [Bayene and Tsegayew ()] ‘Bacterial uropathogens in UTI and antibiotic susceptibility pattern in Jimma University Specialized Hospital’. G Bayene , Tsegayew . 141:146. *Ethiopia J Health Sci* 2011. 21 (2) .
- [Rai et al. ()] ‘Causative agents of UTI in children and their antibiotic sensitivity pattern. A hospital based study’. G K Rai , H C Upreti , S K Rai , K P Shah , Shrestharm . *Nep Med Col J* 2008. 10 (2) p. .
- [Stamm et al. ()] ‘Diagnosis of Coliforms infection in acutely dysuric women’. W E Stamm , G W Counts , K R Running . *N Engl J Med* 2002. 307 p. .
- [Daoud ()] *E.coli isolated from Urinary Tract Infection of Lebanese patients between 2000 and 2009: Epidemiology and profile of resistance*, Z Daoud , Afic . 10.1155/2011/218431. 2011. Hindawi Publishing Corporation.
- [Aypak et al. ()] ‘Empiric antibiotic therapy in acute uncomplicated Urinary Tract Infection and fluoroquinolone resistance: a prospective observational study’. C Aypak , Adalet Aa , Duzgunn . *Ann ClinMicrobiol* 2009. 8 p. 27.
- [Foxman ()] ‘Epidemiology of UTI: incidence, morbidity, and economic costs’. B Foxman . *Am J Med* 2002. 113 p. .
- [Hawn et al. ()] T R Hawn , D Scholes , S S Li , H Wang , Y Yang , P L Roberts , A E Stapleton , M Janer , A Aderem , N Taneja , S S Chatterjee , M Singh , S Singh , M Sharma . *Pediatric Urinary Tract Infections in a tertiary care center from north India*, 2010. 131 p. .
- [Pokhrel et al. ()] ‘Multidrug resistance and extended spectrum beta-lactamase producing strains causing lower respiratory tract and UTI’. B M Pokhrel , J Koirala , S K Mishra , R K Dahal , KhadgaP , Tuladharnr . *J Inst Med* 2006. 28 (3) p. .
- [Sureshkumar et al. ()] ‘Risk factor for UTI in children: a population-based study of 2856 children’. P Sureshkumar , M Jones , R G Cumming , J C Craig . *J paediatr and Child health* 2009. 45 p. .
- [Stamm et al. ()] ‘Tolllike receptors polymorphism and susceptibility to UTI in adult women’. W E Stamm , L P Zhaa , T M Hooton . *PLOS one* 2009. 4 (6) p. e5990.
- [Elkehili et al. ()] ‘UTI in renal transplant recipients’. I M Elkehili , A B Kekli , A S Zaak , E L Salem . *Arab J Nephrol Transpl* 2010. 3 (2) p. .
- [Griebingtl ()] *UTI in women*, Griebingtl . 2009. Kansas City. p. . University of Kansas