Original Article

SPECTRUM OF ORGANISMS CAUSING URINARY TRACT INFECTION (UTI) IN CHILDREN IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Urinary tract infection (UTI) is among the top causes of bacterial infections in children of younger age groups. There is a variety of microorganisms causing UTIs; among them, the more common causative organisms are from intestinal flora 80-90% of cases.

Material and Methods: Study was conducted using urine samples of 205 children of both gender who presented for the first time with UTI in children hospital Lahore from Dec 1, 2020 to 30th may 2021. Urine samples were tested for causative microorganisms with the use of CLED agar.

Result: The mean age of children in this study sample was 2.4 years from 0 to 5 years.

Out of 205 samples 64.9% Escherichia coli, 14.6% Klebsiella spp,12.2% Gram positive urine pathogens, 6.8% Gram negative uropathogens were observed.

Conclusions: In children age <5years, Escherichia coli tops the list of UTI causing organisms followed by klebsiella spp, gram positive and gram negative uropathogens.

Key Words: Urinary tract infection, urinalysis, Escherichia coli

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INTRODUCTION

Urinary tract infection (UTI) is among the top causes of bacterial infections in children of younger age groups.

Children of less than 1 year old are affected in larger proportion 26%.[1] Females were more predisposed to UTIs in older age groups (73% females compared to 27% males) as compared to first year of life during which there is male preponderance.Fecal and perineal colonization, urinary tract anomalies can cause UTI. [2,3]

Throughout infancy symptoms and indications lack specificity. The most typical UTI symptom in first 2 years of life is unexplained fever.

Complications ensue after 2nd year of life. When UTI is suspected, urinalysis and urine culture should be done. The most appropriate and least invasive tests should be preferred in children. Based on clinical findings and a positive urinalysis, early antibiotic therapy is advised while waiting for results of the cultures to improve clinical outcomes.[4-6]

MATERIAL AND METHODS

After approval from Institutional Review Board study was conducted using urine samples of 205 children of both gender who presented for the first time with UTI in children hospital Lahore from Dec 1, 2020 to 30th may 2021. Urine samples were tested for causative microorganisms with the use of Cystine-Lactose-Electrolyte-Deficient-Agar CLED agar.

RESULTS

Mean age of children in the study was 2.424 with a deviation of 1.14 years as given in table I.

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70.7% subjects were female and 29.3% were males.

Table-1: Mean ± SD of patients according to age. n=205

Demographics	Mean ± SD
Age(years)	2.424±1.14

Table-2: Frequency and %age of patients according to gender. n=205

Gender	Frequency	%age
Female	145	70.7%
Male	60	29.3%
Total	205	100%

Out of the 205 samples, more than half cultured E.coli (n=133, 64.9%), followed by Klebsiella (n=30, 14.6%).

Table-3: Frequency and %age of patients according to E-coli. n=205

E-coli	Frequency	%age
Yes	133	64.9%
No	72	35.1%
Total	205	100%

Table-4: Frequency and %age of patients according to Klebsiella spp. n=205

Klebsiella spp	Frequency	%age
Yes	30	14.6%
No	175	85.4%
Total	205	100%

Gram positive uropathogens were causative agents in n=25 subjects, 12.2%, as shown in table V.

Table-5: Frequency and %age of patients according to Gram Positive uropathogens. n=205

Gram Positive uropathogens	Frequency	%age
Yes	25	12.2%
No	180	87.8%
Total	205	100%

Table-6: Frequency and %age of patients according to Gram Negative uropathogens. n=205

Gram Negative uropathogens	Frequency	%age
Yes	14	6.8%
No	191	93.2%
Total	205	100%

DISCUSSION

In urinary tract infections, the urethra, bladder and kidneys may get infected leading to inflammatory states and secondary complications. UTI typically arises in children due to ascending infections due to poor hygiene or weak immune system. Hematogenous spread may occur although rare. It is one of the most frequently encountered infections in young children.it is challenging to diagnose. Hence, we correlate the clinical picture with the laboratory findings.[7,8] For quick recovery and to prevent problems appropriate antimicrobial therapy must be administered. Inadequate and delayed therapy may lead to complications or recurrence.

Pyelonephritis symptoms, fever, chills, rigidity, flank discomfort and costovertebral angle tenderness indicate development of complications which could either be self resolving or lead to disseminated infection that could escape the body's ability to fight illness. To prevent this, empirical therapy must be initiated to treat the infection. The severity of infection can be assessed by suprapubic pain, dysuria, urinary frequency, urgency, cloudy urine, malodorous urine and tenderness. The spectrum of causative organisms must be obtained to initiate treatment.[9-11]

In the present study, the results were in line with previous research indicating gram negative organisms as leading cause of UTI with E.coli topping the list with 64.9% positive cultures followed by Klebsiella 14.6% and other gram negative organisms making up only 6.8% of the cultures.[12-14]

An article published in 2019 complied the data on UTI in children in the past and stated

the gram negative organisms as the major bacterial group at the forefront of the disease and contributing to 90% of the disease burden.[15,16] So a second or third generation cephalosporin and amoxicillin-clavulanate are drugs of choice to eradicate the ailment.[17,18]

On the other hand gram positive organisms made up only 12.2% of the bulk of the burden which is according to the trend of the disease.[19] The study's results add to the previously gathered data to improve disease outcomes according to epidemiology of uropathogens in children.

CONCLUSION

In the study, the spectrum of uropathogens obtained on culture was in trend with the previous studies, with E.coli being the cause in most cases, followed by Klebsiella and gram positive uropathogens.

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Conflict of interest: None

AUTHOR CONTRIBUTIONS:

HA: Manuscript writing and data collection
AY: Manuscript writing
HK: Manuscript writing
SC: Manuscript writing
AB: Manuscript drafting
MT: Manuscript drafting

REFERENCES

1. Sharef SW, El-Naggari M, Al-Nabhani D, Al Sawai A, Al Muharrmi Z, Elnour I. Incidence of antibiotics resistance among uropathogens in Omani children presenting with a single episode of urinary tract infection. J Infect Public Health. 2015 Sep 1;8(5):458-65. https://doi.org/10.1016/j.jiph.2015.01.005
2. Mishra MP, Sarangi R, Padhy RN. Prevalence of multidrug resistant uropathogenic bacteria in pediatric patients of a tertiary care hospital in eastern India. J Infect Public Health. 2016 May 1;9(3):308-14. https://doi.org/10.1016/j.jiph.2015.10.002.
3. Aghamahdi F, Hashemian H, Shafiei M, Akbarian Z, Rostam Nejad M, Fallah Karkan M. Etiologies and antibiotic resistance patterns in infants with urinary tract infections hospitalized in children medical center, Rasht, Iran Iran. J. Neonatol. 2013 Jul 1;4(2):21-5.
4. Kaur N, Sharma S, Malhotra S, Madan P, Hans C. Urinary tract infection: aetiology and antimicrobial resistance pattern in infants from a tertiary care hospital in northern India. JCDR. 2014 Oct;8(10): doi: 10.7860/JCDR/2014/8772.4919.
5. Kline KA, Lewis AL. Gram-positive uropathogens, polymicrobial urinary tract infection, and the emerging microbiota of the urinary tract. Microbiol Spectr. 2016; 4 (2). doi: 10.1128/microbiolspec. Urol Res. 2005;33(3):220.
6. Leung AK, Wong AH, Leung AA, Hon KL. Urinary tract infection in children. Recent patents on Inflamm Allergy Drug Discov. 2019 May 1;13(1):2-18. https://doi.org/10.2174/1872213X13666181228154940
7. Schmidt B, Copp HL. Work-up of pediatric urinary tract infection. Urologic Clinics. 2015 Nov 1;42(4):519-26. doi:https://doi.org/10.1016/j.ucl.2015.05.011
8. Larcombe J. Urinary Tract Infection in Children. Am Fam Physician . 2010 Nov 15;82(10):1252.
9. Robinson JL, Finlay JC, Lang ME, Bortolussi R. Urinary tract infection in infants and children: Diagnosis and management.
10. Schlager TA. Urinary tract infections in infants and children. Microbiol. Spectr. 2016; 4 (5). doi: 10.1128
11. Shaikh N, Hoberman A, Mattoo TK. Urinary tract infections in children: Epidemiology and risk factors. UpToDate. Waltham, MA.(Accessed on August 10, 2018). 2019.
12. Roberts KB, Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. Pediatrics. 2011 Sep;128(3):595-610. https://doi.org/10.1542/peds.2011-1330
13. Takemaru M, Aramaki-Hattori N, Tsue C, Kishi K. Labial adhesions causing recurrent urinary-tract infections in an elderly woman. Case Reports in Medicine. 2019 Dec 16;2019.

14. Sharef SW, El-Naggari M, Al-Nabhani D, Al Sawai A, Al Muharrmi Z, Elnour I. Incidence of antibiotics resistance among uropathogens in Omani children presenting with a single episode of urinary tract infection. J Infect Public Health. 2015 Sep 1;8(5):458-65. https://doi.org/10.1016/j.jiph.2015.01.005.
15. De Francesco MA, Ravizzola G, Peroni L, Negrini R, Manca N. Urinary tract infections in Brescia, Italy: etiology of uropathogens and antimicrobial resistance of common uropathogens. Medical science monitor. 2007 May 31;13(6):BR136-44.
16. Stein R, Dogan HS, Hoebeke P, Kočvara R, Nijman RJ, Radmayr C, Tekgül S. Urinary tract infections in children: EAU/ESPU guidelines Eur Urol. 2015 Mar 1;67(3):546-58. https://doi.org/10.1016/j.eururo.2014.11.007
17. Roberts KB, Downs SM, Finnell SM, Hellerstein S, Shortliffe LD, Wald ER, Zerin JM, Okechukwu K. Reaffirmation of AAP clinical practice guideline: the diagnosis and management of the initial urinary tract infection in febrile infants and young children 2–24 months of age. Pediatrics. 2016 Dec 1;138(6):e20163026. doi: 10.1542/peds.2016-3026.
18. Stephens GM, Akers S, Nguyen H, Woxland H. Evaluation and management of urinary tract infections in the school-aged child. Prim. Care - Clin. Off. Pract. 2015 Mar 1;42(1):33-41. doi:https://doi.org/10.1016/j.pop.2014.09.007
19. Schlager TA. Urinary tract infections in infants and children. Urinary Tract Infections: Molecular Pathogenesis and Clinical Management. 2017 Feb 15:69-77. https://doi.org/10.1128/9781555817404.ch4