

Original Article

“MICROBIOLOGICAL PROFILE OF URINARY TRACT INFECTION AT A TERTIARY CARE HOSPITAL IN KANPUR”

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ABSTRACT: Urinary tract infection (UTI) is one of the most common bacterial infections in humans and a major cause of morbidity. UTI has become difficult to treat because of appearance of pathogens with increasing resistance to antimicrobial agents. **Objective:** We aimed to study the antibiotic resistance pattern of the urinary pathogens isolated from patients in our tertiary care hospital. **Methods:** A prospective study was done during Dec 2016 – May 2017 at Rama medical college hospital, Kanpur. The study included all the adult patients of OPD & IPD, with symptoms of UTI, urine culture and sensitivity was carried out by standard microbiological procedures. **Results:** Out of 450 urine samples significant bacteriuria was seen in 34.66%. Female were 96(61.5%) and male were 60(38.4%) the incidence of UTI was more in patients in the age group of 20-40 years. E coli (42.3%) was the most common organism, followed by Klebsiella sps(23.1%), Staphylococcus(15.3%), Proteus mirabilis(7.6%), Citrobacter(3.8%), Enterococcus (3.8%), Candida albican(3.8%). E coli and Klebsiella were resistant to Amikacin (75.7% & 83.3%) respectively. More than 90% of strains were resistant to Ampicillin. GNB showed better sensitivity to Nitrofurantoin and Imipenem. All the isolates were 100% sensitive to polymyxins. 15.15% and 33.3% of E.coli and Klebsiella sps were ESBL producers. 50% of the S.aureus were methicillin resistant. **Conclusion:** In this study, female were mostly affected and the most common organism were E.coli and Klebsiella sps, These isolates are sensitive to nitrofurantoin, imipenem and polymyxins, and resistant to the most commonly used drugs like ampicillin, amikacin used in UTI. Regular monitoring are required to establish reliable information about resistance pattern of urinary pathogens for optimal empirical therapy of patients with UTIs.

Key words: Urinary tract infection, Antibiotic resistance, E.coli.

INTRODUCTION:

Urinary tract infection (UTI) is one of the most common bacterial infections in humans and a major cause of morbidity. UTI has become difficult to treat because of appearance of pathogens with increasing resistance to antimicrobial agents. Etiological agents of UTI are variable and usually depend on time, geographical location and age of patients [1]. *Escherichia coli* (*E. coli*) is the most common etiological agent, approximately isolated from 75 to 90% of uncomplicated patients, while complicated ones show a broader bacterial spectrum as the cause of infection. In comparison with men, UTI is reported more in women [2]. Women are more susceptible than men, due to several clinical factors including anatomic difference, hormonal effects and behavioural pattern [3]. In almost all cases of UTI, empirical antimicrobial treatment initiates before the laboratory results of urine culture are not available; thus, antibiotic resistance may increase. [4] In almost all cases there is a need to start treatment before the final microbiological results are available. Area-specific monitoring studies aimed to gain knowledge about the type of pathogens responsible for UTIs and their resistance patterns may help the clinician to choose the right empirical treatment. In spite of the availability and use of the antimicrobial drugs, UTIs caused by bacteria have been showing increasing trends in recent years. Much of the increase has been related to the emerging antibiotic resistance among urinary tract pathogens. We aimed to study the antibiotic resistance pattern of the urinary pathogens isolated from patients in our tertiary care hospital.

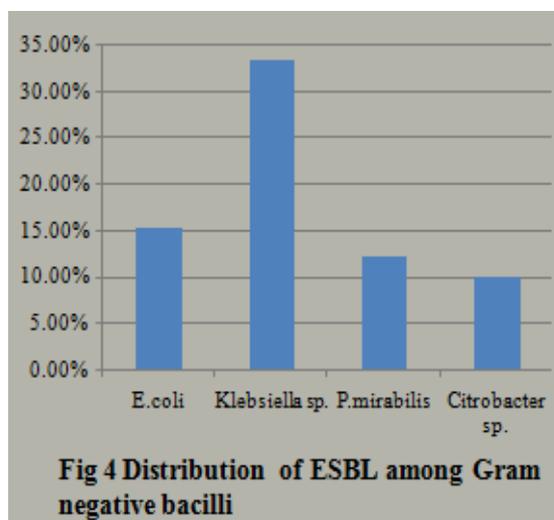
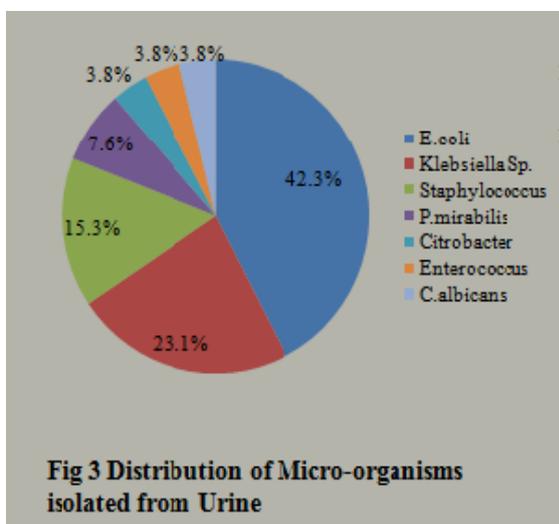
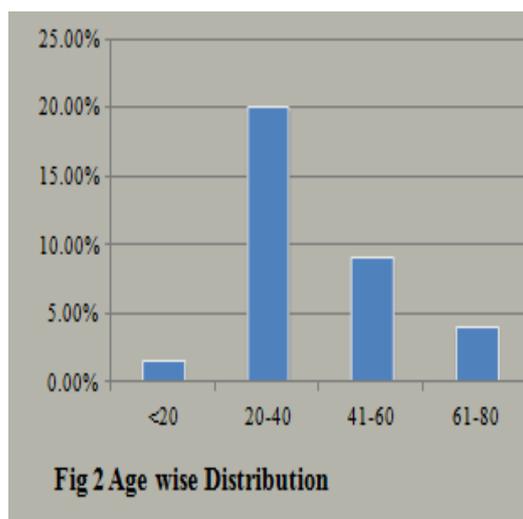
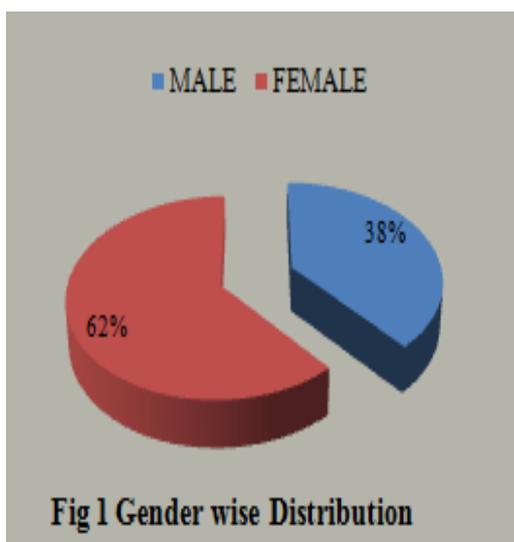
MATERIALS & METHODS

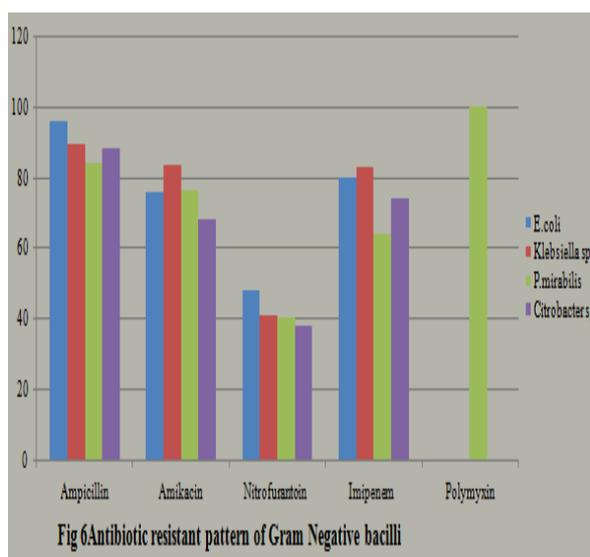
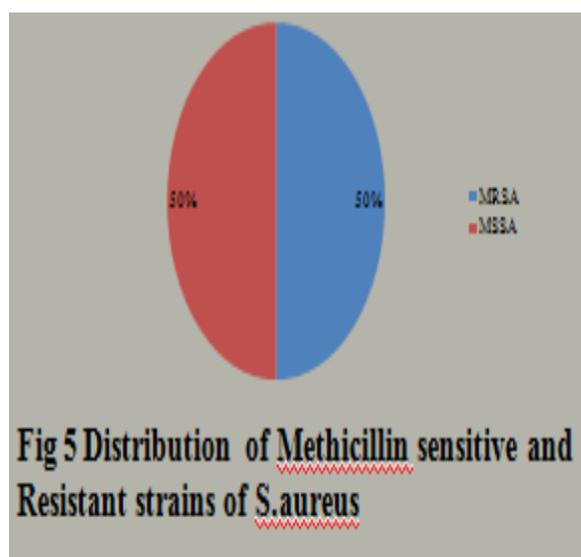
A prospective study was done during Dec 2016 – May 2017 at Rama medical college hospital, Kanpur. The study included all the adult patients of OPD & IPD, with symptoms of UTI. The clean-catch technique of midstream urine was used and 10-20ml of sample was obtained. Urine culture and sensit antimicrobial sensitivity tests were performed on bacteria considered significant. Was carried out by standard microbiological procedures according to CLSI guidelines [5]. The inclusion criteria are people who are willing. We collected samples from patients presenting with the symptoms of UTI in the age group of 1-100. The exclusion criteria is people who are not willing. We also did not take samples from pregnant women, breast feeding women and women on oral contraceptives. The sampling

technique is systematic and random sampling... Institutional ethical committee clearance was obtained.. Data was entered in Microsoft Excel Version 2016.

RESULTS:

Out of 450 urine samples significant bacteriuria was seen in 34.66%. Female were 96(61.5%) and male were 60(38.4%) the incidence of UTI was more in patients in the age group of 20-40 years. E coli (42.3%) was the most common organism, followed by Klebsiella sps(23.1%), Staphylococcus(15.3%), Proteus mirabilis(7.6%),Citrobacter(3.8%), Enterococcus (3.8%), Candida albican(3.8%). E coli and Klebsiella were resistant to Amikacin (75.7% & 83.3%) respectively. More than 90% of strains were resistant to Ampicillin. GNB showed better sensitivity to Nitrofurantoin and Imipenam. All the isolates were 100% sensitive to polymyxins.15.15% and 33.3% of E.coli and Klebsiella sps were ESBL producers. 50% of the S.aureus were methicillin resistant.





DISCUSSION

In the present study, out of 450 sampled processed, 140(34.66%) were found to be culture positive which is in agreement with the [6,7] study done by Baral P et al (30.8%) and Singh RK et al (34%). In our study, the occurrence of urinary tract infection is higher in females (61.5%) than in males (38.4%). This is in accordance with the [7] study reported by Singh RK et al where the percentage of organisms causing UTI was 83.59% from women and 16.1% from men. Other studies are also correlated with these data (Das RN et al [8,9,10] al, Moue A et al and Aryal B et al). Mainly women are more prone to get UTIs than men because of short urethra and closer to anus. In the present study, the highest percentage of culture positivity was found within the age group of 20-40years which is [7] similar to the study done by Singh RK et al (20-49 years), Khadka [11] KS et al (21-40 years) In the present study, *Escherichia coli* (42.3%) was found to be the most predominant cause of UTI followed by *Klebsiella* species(23.1%). This is in accordance with the study done by G MN et al, [12, 8, 13, 10] Das RN et al, Kaur N et al, Sujatha R et al Aryal B, and Gupta [17] S et al. Our study revealed that *E.coli* and *Klebsiella* were 75.7% and 83.3% to Amikacin, 85% sensitive to imipenem was the most effective antibiotic followed by Nitrofurantoin (79.9%). Similarly Ampicillin was found to be the least effective antibiotic with sensitivity percentage of (10%). This is comparable with the [16] documentation of Thapa P et al whereas the study done by [14] Sujatha R et al expressed that ampicillin was the most sensitive antibiotic with 61% sensitivity. The antimicrobial sensitivity and resistance pattern vary from community to community and from hospital to hospital. This is because of

emergence of resistant strains, caused by indiscriminate use of antibiotics. In our study, the percentage of ESBL among E.coli and Klebsiella species are 15.15% and 33.33% 50% of the S. aureus were MRSA which is [17] in contrast to the study of Parajuli NP et al .All the strains including MDR were 100% sensitive to Polymyxin B.

CONCLUSION

The most common isolates in this study are E.coli and Klebsiella spp, These isolates are sensitive to imipenem and polymyxins, and resistant to the most commonly used drugs like ampicillin, amikacin used in UTI. Regular monitoring are required to establish reliable information about resistance pattern of urinary pathogens for optimal empirical therapy of patients with UTIs

REFERENCES

1. Jubina Bency A. T., Priyanka R., Ponnu Jose A study on the bacteriological profile of urinary tract infection in adults and their antibiotic sensitivity pattern in a tertiary care hospital in central kerala India Int J Res Med Sci 2017.Feb ;5(2):666-669.
2. Angoti G, Goudarzi H, Hajizadeh M, Tabatabaai Z. Bacteria isolated from urinary tract infection among patients and determination of the antibiotic susceptibility patterns of the gram negative bacteria in Iran. Novelty Biomed. 2016;1:1-4.
3. Yasmeeen BHN, Islam S, Uddin MM, Jahan R. Prevalence of urinary tract infection, its causative agents and antibiotic sensitivity pattern. Northern Int Medi Colle J. 2015;7(1):105-9.
4. Maji SK, Mandal PK, Panja C, Dolai TK, Samanta A, Kundu PK, et al. Studies on drug sensitivity and bacterial prevalence of UTI in tribal population of Paschim Medinipur. Int J Curr Microbiol App Sci. 2016;5(6):406-12.
5. CLSI. Performance standard for Antimicrobial susceptibility testing; twenty third informational supplement. M100-S26. 2016; Vol 33No.1.
6. Baral P, Neupane S, Marasini BP, Ghimire KR, Lekhak B. High bacterial uropathogens from Kathmandu, Nepal. BMC Research Notes. 2012;5:38

7. Singh RK, Dewasy B, Mallick RL, Kafle TK. Prevalence of antibiotic sensitivity pattern of uropathogens in patients of different age-groups from western region of Nepal. *International Journal of Medical Research and Health Sciences*. 2016;5(9):1-7
8. Das RN, Chandrashekhar TS, Joshi HS, Gurung M, Shrestha N, Shivananda PG. Frequency and susceptibility profile of pathogens causing urinary tract infections at a tertiary care hospital in western Nepal. *Singapore Med J*. 2006;47(4):281
9. Moue A, Aktaruzzaman SAQM, Ferdous N, Karim MR, Khalil MMR, DasAK. Prevalence of urinary tract infection in both outpatient department and in patient department at a medical college setting of Bangladesh. 2015;7(5):146-152
10. Das AK, Aryal B, Mandal PK, Tripathi PD. Microbiological Spectrum and Susceptibility Patterns of Clinical Isolates from Children Suspected of Urinary tract Infection, Visiting Kanti Children' s Hospital, Maharajung. *Global Journal of medical Research*. 2014;14(7):1-5
11. Khadka KS, Khadka J, Lekhak B, Shrestha P, Tiwari BR. Incidence of Urinary Tract Infection among the Patients Visiting Western Regional Hospital, Pokhara , Nepal. *JHAS*. 2012;2(1):35-37
12. G MN, Math GC, Patil SA, Gaddad SM, Shivannavar CT. Incidence of Urinary Tract infections and its Aetiological Agents among Pregnant Women in Karnataka Region. *Advances in Microbiology*. 2013;3:473-478
13. 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. *Journal of Clinical and Diagnostic Research*. 2014;8(10):1-3
14. Sujatha R, Nawani M. Prevalence of Asymptomatic Bacteriuria and its Antibacterial Susceptibility Pattern Among Pregnant Women Attending the Antenatal Clinic at Kanpur, India. *Journal of Clinical and Diagnostic Research*. 2014;8(4):1-3
15. Gupta S, Agareal R, Bhooshan S, Agrawal A, Goyal A. Urinary tract infections in pediatric patients in north India. *Journal of Dental and Medical Sciences* 2013;11(3):58-62
16. Thapa P, Parajuli, Thapa A, Manandhar B, Laudari D, Malla HB, Katiwada R. Causative Agents and Susceptibility of Antimicrobials among Suspected Females with Urinary Tract Infection in Tertiary Care Hospitals of Western Nepal *Journal of Chitwan Medical College*. 2013;3(4):16-19

17. NP, Maharjan P, Parajuli H, Joshi G, Paudel D, Sayami S, Khanal PR. High rates of multidrug resistance among uropathogenic Escherichia coli in children and analyses of ESBL producers from Nepal. Antimicrobial Resistance and Infection Control. 2017;6:9

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