Antimicrobial Susceptibility Pattern of Bacterial Isolates from Urine Specimen of Patient with Complain of Urinary Tract Infection at A Tertiary Care Teaching Hospital in Solapur, Maharashtra.

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Abstract- Background: Urinary tract infections (UTIs) account to one of the major reasons for hospital visits by patients, it remains to be one of the commonest infectious diseases diagnosed in developing countries, emergence of antibiotic resistance in uropathogens due to misuse or overuse of antibiotics and has led to limited therapeutic options for treatment which is serious concern for clinicians. Material and method: Clean catch mid-stream urine from each patient was collected instructions were given to the patient about method of urine collection, specimen was labelled and transported to the laboratory and analysed within 2 hours of collection. Sample was subjected to wet mount and gram stain for pus cells & evaluation of any bacteria in sample for provisional report and cultured on blood agar and MacConkey medium. Only patients with clinical symptoms of UTI and positive urine culture were included in the study. Study was conducted for a period of 3 months from September- November 2018. Results: A total 656 samples were received in Microbiology department from patients suspected of UTI, out of which growth was seen in 164(25%) so the urine culture positively rate is 25%, sterile samples were 363 (55.33 %) Candida species were seen in 36 (5.48%) samples, insignificant bacteiria was seen in 57(8.63%) samples, polymicrobial flora was seen in 36 (5.48%) samples. Females 87(53.04%) were more commonly affected by UTI as compared to males 77 (46.95%), in females most common age group affected was from 15-30 years (50.57%) followed by 31-45 years (23.4%). Most common uropathogens isolated from suspected cases of UTI were gram negative bacteria 141 (85.97%) out of which most common was E--coli 45 (27 %) followed by Klebsiella pneumoniae 41 (25%), Citrobacter Koseri 24 (14.6%), Enterobacter aerogens 17 (10.36%), Pseudomonas aeruginosa 10 (6.09%), Acinetobacter baumanii 4 (2.4%). Among gram positive bacteria Staphylococcus species were 159(9.01%) out of which MRSA were 5 (33.33%) Staphylococcus saprophyticus 9 (60%) and Staphylococcus epidermidis 01(6.66%) isolate was seen. Streptococcus pyogens 8 (34.78%).Antibiotic susceptibility in gram negative bacteria showed high resistance among urinary isolates was seen with sensitivity to Imipenem (37.2%) followed by Amikacin 37 %, Cefotaxime 36%,Norfloxacin 36 %, Nitrofurantoin 31.70%, Among gram positive bacteria 100% sensitivity was seen for Vancomycin and Linezolid.

Index Terms- UTI- urinary tract infection, culture positivity rate.

I. INTRODUCTION

Urinary tract infection (UTI) is commonest bacterial infectious disease encountered in clinical practice which has led to increase in morbidity and financial burden on patient. It has been estimated that 150 million people are infected with UTI per annum worldwide. UTI can be classified into uncomplicated and complicated on the basis of their choice of treatment. UTI is more common in females as compared to males due to anatomical factors like short urethra, proximity of the genital tract & urethera. Other physiological factors may include pregnancy where the plasma volume increases and decrease in urine concentration occurs which may lead to bacterial growth in urine. Sexual activity in females also increase risk of urethral contamination during coitus. UTI is most commonly caused by bacteria but may also occur due to fungal and viral infection. Gram negative bacteria causes up to 90% of UTI cases while gram positive bacteria cause only 10 % of cases. Most common uropathogens encountered includes E. coli which accounts to 60-90 % of all UTIs. Emergence of antibiotic resistance especially MRDO has made treatment of UTI difficult, which is a serious public health issue. The present study is conducted with aim to know the bacteriological profile and antibiotic sensitivity pattern to commonly use antibiotic agent among patients with complaints of UTI at a tertiary care teaching hospital in Solapur, Maharashtra.

II. MATERIAL AND METHOD

Clean catch mid-stream urine from each patient was collected in 20 ml sterile screw cap container instructions were...
given to the patient about method of urine collection, specimen was labelled and transported to the laboratory and analysed within 2 hours of collection. Sample was subjected to wet mount and gram stain for pus cells & evaluation of any bacteria in sample for provisional report and cultured on blood agar and MacConkey medium. Antibiotic susceptibility testing was done by Kirby Bauer disc diffusion method as per CLSI guidelines. Only patients with clinical symptoms of UTI and positive urine culture were included in the study while urine samples with 3 or more types of colonies were reported as poly-microbial flora and advised to send repeat sample. In case of insignificant bacteriuria was reported only after ruling out various conditions where low count is also considered to be significant. Extended beta lactamases (ESBL) detection was done using combined disc test, Metallo-beta- lactamases (MBL) detection was done on isolates resistant to Imipenem using Modified Hodge test, Amp-C production was detected using Amp-C disc test as per CLSI guidelines. Study was conducted for a period of 3 months from September- November 2018 in Microbiology department at tertiary care hospital in Solapur, Maharashtra.

III. RESULTS

A total 656 samples were received in Microbiology department from patients suspected of UTI during September to August 2018. Out of which growth was seen in 164(25%) so the urine culture positively rate is 25%, sterile samples were 363 (55.33 %) Candida species were seen in 36 (5.48%) samples, insignificant bacteriuria was seen in 57(8.63%) samples (after ruling out various conditions where low count is also considered significant), poly-microbial flora was seen in 36 (5.48%) samples. Females 87(53.04%) were more commonly affected by UTI as compared to males 77 (46.95%), in females most common age group affected was from 15-30 years (50.57%) followed by 31-45 years (17-24) however in case of, males most common age group was from 1-4 years (28.57%) followed by age group > 60 years (23.4%). Most common uropathogens isolated from suspected cases of UTI were gram negative bacteria 141 (85.97%) out of which most common was E –coli 45 (27%) followed by Klebsiella pneumoniae 41 (25%), Citrobacter Koseri 24 (14.6%), Enterobacter aerogens 17 (10.36%), Pseudomonas aeruginosa 10 (6.09%), Acinetobacter baumanii 4 (2.4%). Among gram positive bacteria Staphylococcus species were 15(9.01%) out of which MRSA were 5 (33.33%) Staphylococcus saprophyticus 9 (60%) and Staphylococcus epidermidis 01(6.66%) isolate was seen. Streptococcus pyogens 8(34.78%). Antibiotic susceptibility in gram negative bacteria showed high resistance among urinary isolates with sensitivity to Imipenem (37.2%) followed by Amikacin 37 %, Cefotaxime 36%,Norfloxacin 36 %, Nitrofurantoin 31.70%, in case of Pseudomonas aeruginosa high sensitivity was seen for ceftazadime 80 % and Piperacillin-tazobactam was 70 %. Among gram positive bacteria 100% sensitivity was seen for Vancomycin and Linezolid, while sensitivity to other antimicrobials were as follows Clindamycin 73%, Erythromycin 40 %, Gentamicin 13.6 %, Norfloxacin 40.4 %. Nitrofuratoin 53.3 %, Penicillin and Nitrofurantoin showed 50 % sensitivity. In case of Streptococcus pyogens sensitivity for tetracycline and Norfloxacin 37.5% was seen respectively.

IV. DISCUSSION

In present study prevalence of UTI was found to be about 25%. Studies done by Devandan Prakash et al reported prevalence of UTI 53.82 % among patients. Studies done by Wabalem Desta Seifu et al reported overall prevalence of UTI in the area was 90.1%, in our study the prevalence of UTI is found to be less which may be attributed to the fact that it is institution based study so variation may exist, also socioeconomic status & other demographical factors may vary and may lead to variation in prevalence rate of UTI.

In the present study females (n=87)53.04% were more commonly affected by UTI as compared to males 46.95 %, similar results have been reported by Devandan Prakash et al and wabalem Desta Seifu et al, this is attributed to anatomical differences of urogenital organs between two sexes and sexual activity may lead to urethral contamination during sexual intercourse which often results into UTI.

In the present study age group in females most commonly affected is 15-30 years (50.57%) followed by 31-45 years (17.24%) this is due to the fact that females in the age group are sexually active and physiological activity like pregnancy may predispose patients to UTI. In the present study age group in males commonly affected is 1-14 years (29 %) followed by age group > 60 years (23.4%). Males have bimodal frequency for UTI, one peak in childhood and other peak in elderly patient. In elderly patients especially in male’s risk of UTI increases due to genitourinary atrophy.

In early childhood prevalence of UTI in more often due to congenital malformations and uncircumcised genitalia which is often contaminated and may lead to increase prevalence of UTI in early childhood.

In the present study most common uropathogens isolated were gram negative bacteria 141 (35.97%) followed by gram positive bacteria 23 (14.02%) studies done by S.B. Salek et al,A.S.Kolawale et al, F Khorvash et al in concordance with our findings in our study among negative bacteria E .coli contributes to about 27% of UTI while Staphylococcus spp contributes to 15 % of UTI, these findings are in concordance to various studies done by Devandan Prakash et al & wabalem Desta seifu et al, where E.coli and Staphylococcus species are predominantly isolated among gram negative and gram positive bacteria respectively.

Overall antibiotic susceptibility pattern among gram negative uropathogens were found to be multi drug resistant organism (MDRO) with sensitivity to Imipemen (37.2%) followed by Amikacin (37%),Cefotaxime (36%),Norfloxacin (36%) and Nitrofurantoin 31.70%. Among Pseudomonas aeruginosa isolates high sensitivity was seen for ceftazadime (80%) followed by Pipercillin-tazobactam (70%).

Among gram positive bacteria 100 % sensitivity was seen for Vancomycin & linezolid followed by Clindmcyin 73 %, Nitrofuratoin 53.3%, Norfloxacin 40.4%, Gentamicin 13.6%, Among GAS (Group –A streptococcus) sensitivity was seen for tetracyclin and Norfloxacin 37.5 % respectively. Among gram negative bacteria 141 (85.97 %), 75 (53.2%) isolates were ESBL while 50 (35.5%) isolates were MBL producers. And 10(7.09%) isolates were Amp –C producers. Klebsiella pneumoniae 35 (85.4%) isolates were ESBL producer, while among E.coli 30(66.66%) where MBL producers and
5(3.54%) isolates of *E.coli* were Amp-C producer. Amp-C producers were only seen among 3 (2.12%), *Citrobacter Koseri* and 2 (1.41%) isolates among *Klebsiella pneumonia*.

In the present study we see high level of resistance among gram negative bacteria with 53.2% of uropathogens were ESBL producers 35.5% of uropathogens were MBL producers and 7.09% of uropathogens were Amp-C producers among gram positive bacteria MRSA were 33.33 %.

Variation in antibiotic resistance may be between different countries, among different groups even between different institutions this may be attributed to the local antibiotic prescribing habits, patient group under study, socioeconomic status of the patients, hygiene practices and awareness among patients about drawbacks of using over the counter drugs or self-medication.

V. CONCLUSION

UTI is most common problem worldwide; emergence of resistant strains is a widespread phenomenon. There is need to keep vigilance on misuse/overuse of antibiotics. There is need to increase awareness among patient on the adverse effects of misuse/use of drugs and also discourage them to procure over the counter drugs. Hospital should also revise antibiotic policy annually according to local trends of antibiotic sensitivity patterns there is also need to adhere to strict antibiotic stewardship policies. This study has highlighted the bacteriological profile and antibiotic susceptibility patterns among uropathogens from patients visiting tertiary care hospital in Solapur this study will help in guiding for formulation of antibiotic policy and to know local antibiotic sensitivity patterns among population.

REFERENCES


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