Journal Homepage: -www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI:10.21474/IJAR01/8472
DOI URL: http://dx.doi.org/10.21474/IJAR01/8472

RESEARCH ARTICLE

STUDY OF URINARY TRACT INFECTIONS IN TERTIARY CARE HOSPITAL EMPHASIZING ON BACTERIOLOGICAL PROFILE WITH ANTIBIOGRAM.

Swathi Kuna, P. Ratna Kumari and R.Lakshmi Kumari.
Department of Microbiology ,Siddhartha Medical College,Vijayawada-520008.

Manuscript Info

Manuscript History
Received: 02 December 2018
Final Accepted: 04 January 2019
Published: February 2019

Key words:-
Infection, Escherichia coli, empirical antibiotics.

Abstract

The present study was carried out to analyse the culture reports 470 urine samples collected from symptomatic patients between 18 to 80 years from department of medicine, surgery and gynaecology from May 2017 to 0ctober 2017. All the samples collected during the above period were subjected for culture sensitivity as per standard methods. The most common infection encountered in clinical practice is urinary tract infection. Urinary tract infection can be caused by different microorganisms including bacteria, parasites, fungi and viruses which are the major causative organisms. Among these, bacteria account for more than 95% of Urinary tract infection cases. Escherichia coli is the commonest urinary pathogen accounting for over 80% of community acquired infection. In this study the most common pathogenic organism isolated was Escherichia coli 44(55.69%) followed by Staphylococcus aureus 20(25.31%) and Klebsiella species 11(13.92%) in both males and females. Escherichia coli were sensitive to nitrofurantoin, amikacin and piperacillin tazobactam in 35 (79.4%), 25(56.81%) and 18(40.95%) respectively. Similarly 16(80%) of Staphylococcal isolates were sensitive to nitrofurantoin 11(55%) to amikacin and 5(25%) to piperacillin tazobactam. Klebsiella isolates also showed highest sensitivity to nitrofurantoin and piperacillin tazobactam 7(63%) followed by ceftriaxone 6 (54%.) This study will help clinicians to choose the right empirical antibiotics, and they should take into account the local sensitivity and resistance patterns while prescribing empirical oral or intravenous antibiotics.

Introduction:-

Urinary tract infections (UTIs) are one of the most common bacterial infections in humans, both in the community and hospital setting, and it is one of the leading hospital acquired infections. UTI can be caused by different microorganisms including bacteria, fungi, parasites, and viruses, of these bacteria account for more than 95% of cases. Normally, natural commensals protect us from infections. In case of UTI, Lactobacillus species is the commensal. But these natural commensals get destroyed by antibiotics. UTI can be symptomatic or asymptomatic. UTI are classified into complicated and uncomplicated. Uncomplicated UTI is said to be present if there are no functional and anatomical anomalies in the urinary tract or no renal functional impairment. A lower UTI (Acute Uncomplicated Cystitis) is taken to be present when symptoms are restricted to the lower urinary tract, (dysuria,

Corresponding Author:-Dr.P.Ratna Kumari
Address:-M.D,Professor, Department of Microbiology ,Siddhartha Medical College,Vijayawada-520008.

urgency or pain) above the symphysis. An upper UTI (Acute Uncomplicated Pyelonephritis) is present when symptoms also include, flank pain, and/or fever (>38 °C). Complicated UTI include infection in persons with anatomical abnormalities, obstruction, hydronephrosis, renal tract calculi, or colovesical fistula, in patients with an immune compromised state, atypical organisms causing UTI, in pregnancy and UTI are occurring after instrumentation, surgeries and radiotherapy. Complicated one's may not be controlled with single antibiotic but may need multi drug therapy which may be usually IV antibiotics. The quantitative criteria of at least 10^8 colony forming units (cfu)/L (at least 10^5 cfu/mL) is generally appropriate for the microbiological identification. Distribution of uropathogens and their susceptibility to antibiotics is variable regionally, so it becomes necessary to have knowledge of distribution of uropathogens and their susceptibility to antibiotics in a particular setting. Antibiotic resistance in the treatment of UTI and other bacterial infections constitute a major public health problem especially in the developing countries as irrational and indiscriminate use of antibiotics is common. In view of these and attendant tendency for changes in bacteriological profile, it is worthwhile that the degree of susceptibility and resistance of these uropathogens to various antibiotics be known to clinicians for effective treatment of infections they cause and to avoid antibiotics misuse.

Methods:-

The present study was conducted in the Department of Microbiology, Government General Hospital, Vijayawada. Urine samples collected from symptomatic patients between 18 to 80 years from different departments of hospital were analysed for culture and sensitivity between May 2017 to Oct 2017. Urine specimens received in the department of microbiology were cultured on nutrient agar and Macconkey agar for 18 to 24 hours at 37^0 c. Then colonies were counted and colonies with more than 10^5 CFU/ml were considered as culture positive .The positive samples were processed using biochemical tests and identification of micro organisms were done according to standard procedure. The standard disc diffusion method (kirby bauer's disc diffusion) on Muller Hinton agar was utilized for all the isolates to assess the antibiotic resistance using antibiotic discs according to recent CLSI guidelines 2017.

Figure 1:-Total number of samples (n=470)

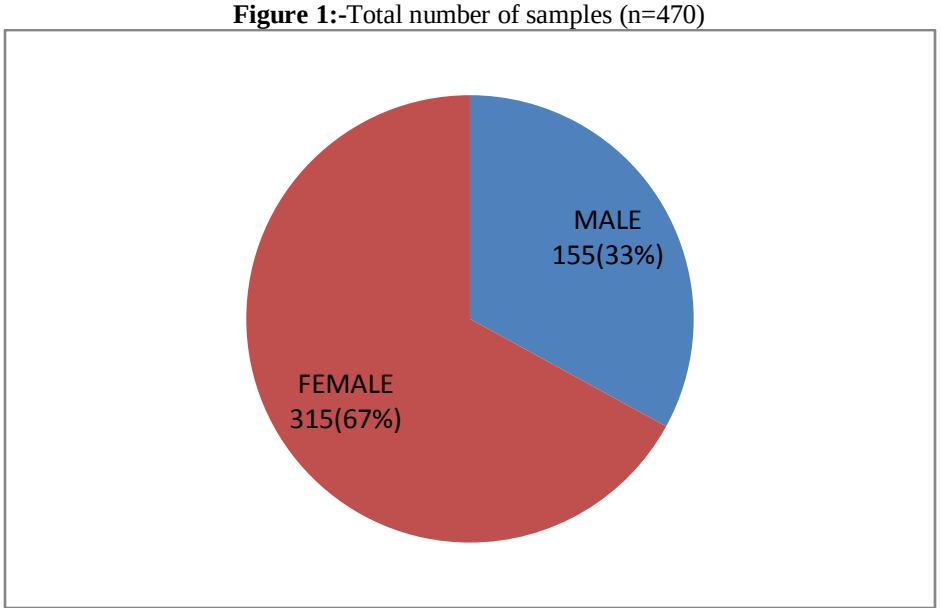

Figure 2:-Age and gender wise distribution Male (n=155) Female (n=315)

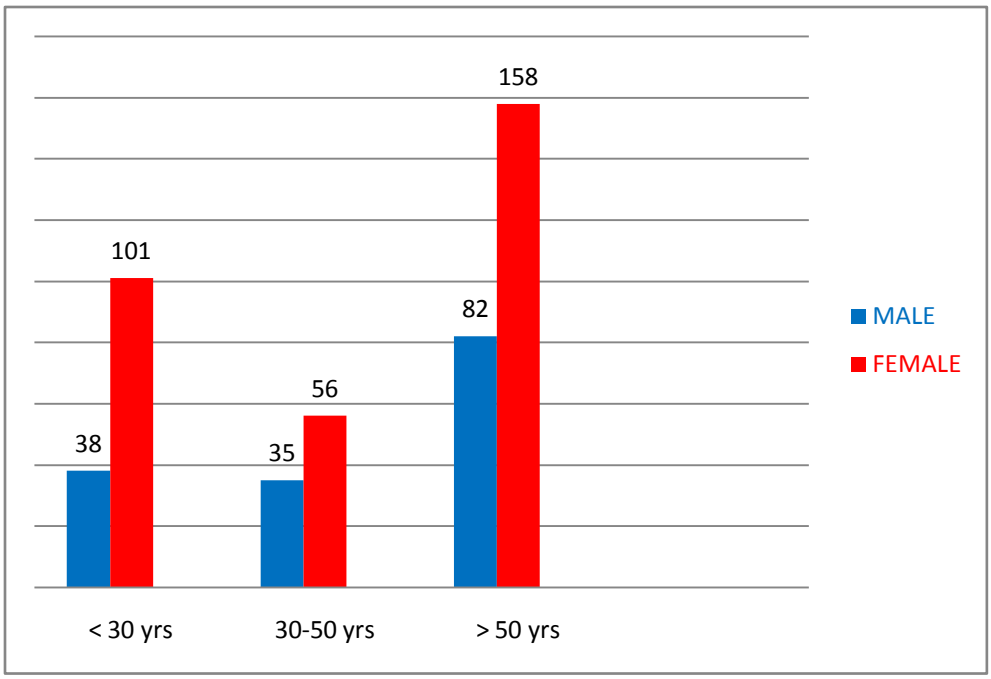

Figure 3:-Organisms isolated (n =106)

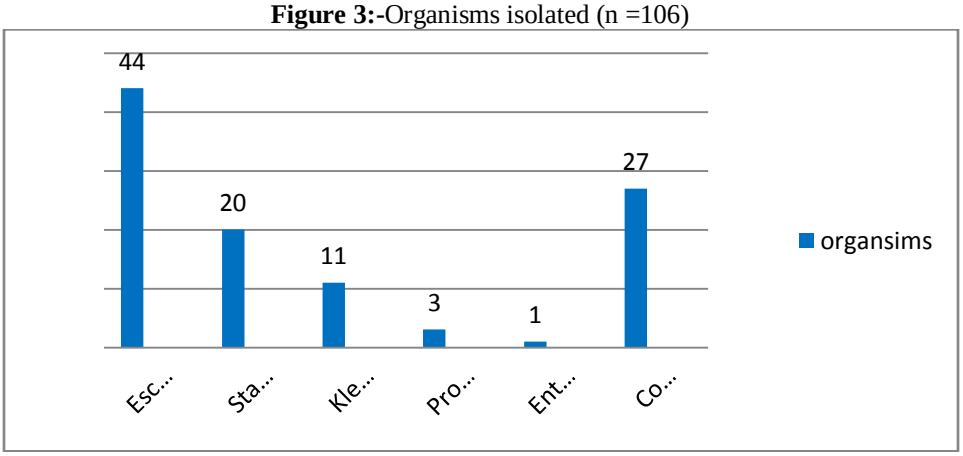

Table 1:-Antibiotic susceptibility pattern of isolates

	E.coli (44)	Staphylococcus (20)	Klebsiella (11)	Proteus (3)	Enterococcus(1)
Nitrofurantoin	35(79.54%)	16 (80.00%)	7 (63.00%)	1 (33.33%)	1 (100.00%)
Amikacin	25 (56.81%)	11 (55.00%)	4 (36.36%)	2 (66.66%)	1 (100.00%)
Gentamycin	20 (45.45%)	6 (30.00%)	3 (27.27%)	-	1 (100.00%)
Piperacillin tazobactam	18 (40.90%)	5 (25.00%)	7 (63.00%)	3 (100.00%)	1 (100.00%)
Norfloxacin	13 (29.54%)	3 (15.00%)	4 (36.36%)	3 (100.00%)	1 (100.00%)
Cotrimoxazole	11 (25.00%)	4 (20.00%)	3 (27.27%)	-	-
Ciprofloxacin	8 18.18%)	4(20.00%)	-	1 (33.33%)	-
Cefaparazone sulbactam	7 15.90%)	-	4 (36.36%)	1 (33.33%)	-
Ceftriaxone	5 (11.36%)	5 (25.00%)	6 (54.54%)	2 (66.66%)	-

Cefotaxim	5 (11.36%)	1 (5.00%)	2 (18.18%)	-	-
Imepenam	3 (6.81%)	1 (5.00%)	2 (18.18%)	1 (33.33%)	-
Ceftazidime	2 (4.54%)	-	1 (9.09%)	-	-
Cefepime	1 (2.27%)	-	1 (9.09%)	-	-
Linezolid	-	5 (25.00%)	-	1 (33.33%)	-
Levofloxacin	-	3 (15.00%)	-	-	1 (100.00%)
Vancomycin	-	5 (25.00%)	-	1 (33.33%)	-
Ampicillin	-	1 (5.00%)	1 (9.09%)	-	-
Doxycillin	-	2 (10.00%)	-	-	-

Results:-

Total 470 samples were collected. Among 470 samples from patients, males were 155(33%) and females were 315(67.21%) (figure1). Females outnumbered males in all age groups (figure 2). Out Of 470, 106(22.55%) samples were culture positive. Out of which 79(74.52%) were pathogenic organisms, 27(25.47%) were commensals. The most common pathogenic organism isolated was Escherichia coli 44(55.69%) followed by Staphylococcus aureus 20(25.31%) and Klebsiella species 11(13.92%) in both males and females (figure 2, and 3). Escherichia coli was sensitive to nitrofurantoin, amikacin and piperacillin tazobactam in 35(79.4%), 25(56.81%) and 18(40.95%) respectively. Similarly 16(80%) of staphylococcal isolates were sensitive to nitrofurantoin 11(55%) to amikacin and 5(25%) to piperacillin tazobactam. Klebsiella isolates also showed highest sensitivity to nitrofurantoin and piperacillin tazobactam 7(63%) followed by ceftriaxone 6(54%.) (Table 1)

Discussion:-

The present study was done to find out the sensitivity pattern of bacteria which commonly cause UTI with an aim to provide clinicians with a choice of proper empirical antibiotics. Number of studies were done all over the world on the antibiogram of UTI with different percent of culture positivity, ranging from as low as 6% to more than 80%. Culture positive rate in our study is (22.55%) . Similar low culture positivity was obtained by Amarjit singh et al., where (27.10%) of samples were culture positive. In our study female to male ratio was 2.03: 1, similar to other studies which showed female preponderance. In our study, among pathogenic organisms isolated, Escherichia coli was the commonest organism in both males and females (55.69%). Study done by Monika yadav et al, showed that (61%) of their isolates were Escherichia coli and another study done in North India showed (68.7%)of their isolates were Escherichia coli. In our study (79.4%) of Escherichia coli isolates, were sensitive to nitrofurantoin, and (78%) Escherichia coli isolates in study done by Monika yadav et al were sensitive to nitrofurantoin. However study done by Swati talari et al, showed (100%) of Escherichia coli were sensitive to Nitrofurantoin. In our study (56.81%) of Escherichia coli , were sensitive to amikacin when compared to(46%) of Escherichia coli isolated in study by Avinash et al. In both our studies 40% of Escherichia coli isolates were sensitive to Piperacillin tazobactum. However , study done by Swati et al ., showed (100%) of Escherichia coli isolated were sensitive to amikacin and piperacillin tazobactam. In our study, all the organisms were resistant to ampicillin and amoxicillin sulbactam group of antibiotics . Similar high resistance to amoxicillin (> 85%) was found by Mulugeta Kibret et al.,. However, a different study done by Mohmoud et al., showed that Escherichia coli, Klebsiella and staphylococcal species were sensitive to amoxicillin in more than (70%) cases. In another study by Agnus N oli, levofloxacin was the most suitable empirical antibiotic with more than (75%) sensitivity against most bacterial isolates. In our study, only Enterococcus species were sensitive to levofloxacin, hence cannot be recommended for empirical therapy. Though Escherichia coli, Klebsiella species and staphylococcal species were the common pathogens isolated worldwide, sensitivity patterns were different in different studies. It is important to know the local sensitivity pattern while treating UTI to start empirical antibiotics and to prevent unnecessary and improper antibiotic usage. This study will help clinicians to choose the right empirical antibiotics, awaiting culture reports. Clinicians should take into account the local sensitivity and resistance patterns while prescribing empirical oral or intravenous antibiotics for urinary tract infections.

Acknowledgement:-

I am thank full to all the doctors, technical staff of Microbiology Department, Government General Hospital, Siddhartha Medical College, Vijayawada who cooperated us in carrying out this research work.

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