European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 09, Issue 03, 2022

Original Research Article

Study of Antibiotic sensitivity pattern of Escherichia coli isolated from clinical urine samples of the patients attending a tertiary care hospital from (C.G.)

SanjibKumar Panda

Department of Microbiology,LSLAM.GOVT.Medical College,Raigarh(C.G.)[1]

First & Corresponding Author: Sanjib Kumar Panda

Abstract: This research project is conducted between February 2019 To July 2021in the Department of Microbiology. A total of 1000 various clinical samplesreceived in the microbiology laboratory from the OPD & IPD Patients. Out of 1100 various clinical samplesculture, were found total 450(45%) gram negative bacilli (Escherichia coli) from urine samples.

Keywords: Urine Samples, Gram negative bacilli(Escherichia coli) isolates and antimicrobial sensitivity pattern.

1. INTRODUCTION:

E.coli is a Gram-negative bacteria,straight rod measuring 1-3 x 0.4-0.7**µm**. arranged singly or in pairs. It is motile by peritrichate flagella, though some strains may be nonmotile. Capsules and fimbriae are found in some strains. Spores are not formed(1) .

Antibiotic resistance of urinary tract pathogens has increased worldwide. Knowledge of the antibiotic resistance patterns of uropathogens in specific geographical locations is an important factor for choosing an appropriate empirical antimicrobial treatment (4).

Urinary tract infection (UTI) can be caused by Gram-negative rod shaped bacteria .Urinary tract infection(UTIs) are characterized as being either upper (U-UTI) or lower (L-UTI) based primarily on the anatomic location of the infection.The lower urinary tract encompasses the bladder and urethra, and the upper urinary tract encompasses the ureters and kidneys.upper urinary tract infections affect the ureters(ureteritis) or the renal parenchyma(pyelonephritis) lower urinary tract infections may affect the urethra(urethritis), the bladder(cystitis), or the prostate in males (prostatitis).The hospital environment plays an important role in determining the organisms involved in UTIs. Hospitalized patients are most likely to be infected by E.coli ,klebsiellaspp, proteusspp,staphylococci, other Enterobacteriaceae, pseudomonas aeruginosa, Enterococci, and candida spp. This microorganisms are the concealed enemies to the mankind and cause a very profound damage in human body as well as other living organism. The agents,which have the capacity to kill the microbes or arrest the multiplication, are called the antimicrobial agents or drugs.

Such multiple drug resistant strains present the greatest clinical challenge. The purpose of this study is to identify Escherichia coli as etiological agent of UTI in persons of different age groups and to investigate their responses against locally available antibiotics commonly prescribed by the physicians.

2. MATERIAL AND METHODS:

A total of 1000 clinical various samples received in the microbiology laboratory from the

OPD & IPDPatients . Out of 1000 various clinical samples culture, were found total 450(45%) gram negative bacilli (Escherichia coli) from urine samples .
CCMSU(Clean - catch mid stream urine) should be collected in a wide mouth screw capped sterile container or, catheter tube or, syringe and it was labelled with the patients name, age, sex,etc.

Sample processing:- Urine sample should be inoculated on to MacConkey agar,Blood agar and CLED(cysteine lactose electrolyte deficient)agar.It was incubated at 37^{O} C for 24-48 hours.Observe the growth on MA,BA &CLED.A count of 10^{5}colony forming units(cfu)/ml of urine is considered as significant- indicates infection(referred to as significant bacteriuria). The coloneal morphology and identification was done by Gram stain.

Biochemical testsuses:-**i :- Catalase test (+)ve**
ii :- Oxidase test (-)ve
iii :- Glucose test (AG) Acid & gas
iv :- Lactose test (+)ve
v :- Mannitol test (+)ve
vi :- Sucrose test (-)ve
vii :- Indole test (+)ve
viii :- Urease test (-)ve
ix :- Citrate test (-)ve
x :- Methyl red (MR) test (+)ve
xi :- Voges – proskauer(VP) test (-)ve

Antibiogram Testing:
Antimicrobial susceptibility testing of isolates was performed by standard Kirby Bauer disc diffusion methods according to CLSI protocol. Depending on the isolate, antibiotic discs were selected from among the following:Amikacin(AK),Ampicillin(AMP),Co-Trimoxazole(COT), Ciprofloxacin (CIP), Nitrofurantoin (NIT), Gentamycin (GEN), Cefotaxime (CTX), Ofloxacin(OF), Doxycycline(DO),Norfloxacin(NX),Pipercillin-Tazobactum(PIT)and Imipenem (IPM) .
The antibiogram testing was done as per as CLSI guidelines using modified Kirby-
Bauer disc diffusion method. Few colonies from the culture plate were inoculated into 2ml of peptone water.Incubated at 37^{0}c for 2 hrs. A cotton swab was immersed and rotated in this inoculums, the swab was then pressed to the side of the tube so as to remove excess inoculums. It was then used for carpet streaking on Mueller Hinton agar plate. The required antibiotic discs were then placed aseptically on this medium using sterile forecep. The plate was then incubated 24 hrs at 37^{0}c Next day the zone size was recorded and reported as sensitive or resistant by comparing the zone size to the Kirby-bauerchart (2,3).

3. RESULTS:

Out of 1000 various clinical samples culture, were found total 450(45%) gram negative bacilli (Escherichia coli) from urine sample culture.A Total of 450(45%) Escherichia coli Number of positive cases falls in the age group Following tables are showing results:

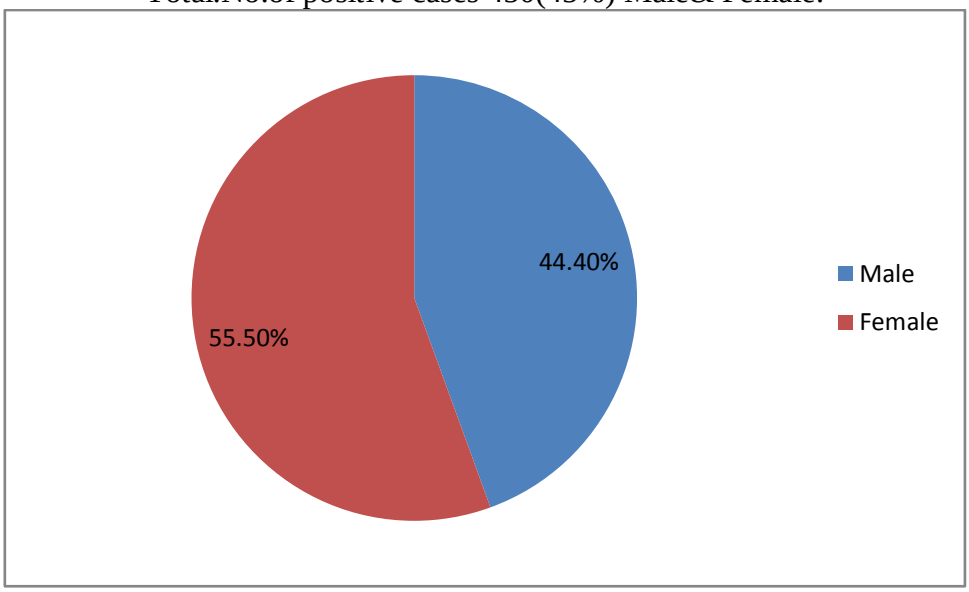
Table.No. 1:- Age Distribution

Age	**Case.No.**	**No.of (%)**
01-20	20	4.4
21-40	95	21.1
41-60	200	44.4
61-80	125	27.7
More than 85	10	2.2

Table.No.2 :- Total.No.of positive cases 450(45%) Male&Female .

Total No. Of Positive cases Urine Culture	**Male**	**% of Male**	**Female**	**% of Female**
450	200	44.40%	250	55.50%

Total.No.of positive cases 450(45%) Male& Female.



Antibiotic sensitivity testing (According to CLSI Guidelines).

TABLE NO. 3 :- Total.No.of positive cases 450(45%) E.coli& Antibiotic sensitivity pattern:

S.NO.	Antibiotic Disc	S	R
1	AK(30**µg)**	200	250
2	AMP(10**µg)**	150	300
3	CTX(30**µg)**	175	275
4	COT(1.25/23.75**µg)**	210	240

5	GEN(10**µg)**	200	250
6	DO(30**µg)**	200	250
7	NX(10**µg)**	225	225
8	NIT(300**µg)**	400	50
9	IMP(10**µg)**	150	300
10	OF(5**µg)**	350	100
11	PIT(100/10**µg)**	210	240

4. DISCUSSION:

UTI is one of the most widespread infections worldwide . *E. coli* is considered as the most frequent uropathogen involved in community-acquired UTI (being implicated in more than half of all the UTI cases) . The prevalence of UTI varies according to gender, age, geographical and regional locations, previous use of antibiotics, hospitalization, and catheterization (5).

Escherichia coli is one of the most common causative agents of bacterial infections. Antimicrobial resistance patterns of *E. coli* continue to pose a great threat to public health worldwide and lead to serious health problems such as prolonged hospitalization and treatment failure . Therefore, this study aimed to detect the antibiotic susceptibility profile of *E. coli* isolates from clinical urine sample.

study it is quite clear that the incidence of *E. coli* is higher in urine samples and amongst females than males. The high prevalence and spread of infection in females can be reduced by proper hygienic and medical care. The use of broad-spectrum antibiotics should be avoided, if the isolate is susceptible to the older drugs, in order to prevent the increase in resistance and, if one drug is found to be ineffective against all isolates of *E. coli*, susceptibility tests of the isolates become necessary(7).

Studies from India have reported *E. coli* as one of the most common organisms causing UTI.[8,9&10]

This research project conducted between**January 2018 To July 2021.** During this period, observed total 450(45%) positive cases Escherichia coli. 55.5% females and 44.4% males .most positive cases were found under the age-group of 41-60 years.

In the current study, *E. coli* isolated from clinical urine specimens, showed differences in antibiotic sensitivity patterns. the antibiotic sensitivity profile showed that *E. coli* isolates highly sensitive to Nitrofurantoin&Ofloxacin.

5. CONCLUSION:

This study revealed the presence of urine infection causing bacteria,those are capable of causing various human illness, it is concluded that gram-negative bacilli (Escherichia coli) are responsible for urinary tract infections and most of the strains were multi-drugs resistant.The most common isolated bacteria from urinary tract infections was E.coli.

Antimicrobial susceptibility of microorganisms varies from time to time and from place to place.Hence regular monitoring of bacterial susceptibility to antibiotics is essential.Antibiograms should be prepared regularly and made readily available to the clinicians to guide them in therapy.There is a need for a central database in india where various laboratories can upload their antibiogram regularly and this data can be very useful in formulating guidelines for treatment of various infectious diseases.

High rates of antimicrobial resistance in community-acquired uropathogens have made antimicrobial sensitivity testing necessary even in a rural,primary- care settings (6).

6. REFERENCES:

[1] Ananthanarayan&Panikars Text book of microbiology8th Edition(Ananthanarayan,R.)
[2] Mackie & McCartney practical microbiology14th Edition(Collee,G)
[3] Diagnostic microbiology13th Edition(Bailey &Scotts)
[4] Kashef N, Djavid GE, Shahbazi S. Antimicrobial susceptibility patterns of community-acquired uropathogens in Tehran, Iran. *J Infect DevCtries*. 2010;**4**(4):202-6. doi: 10.3855/jidc.540. [PubMed: 20440056].
[5] Hussein NR, Daniel S, Salim K, Saleh Assafi M. Urinary Tract Infections and Antibiotic Sensitivity Patterns Among Women Referred to Azadi Teaching Hospital, Duhok, Iraq. *Avicenna J ClinMicrobiol Infect*. 2018;**5**(2):27-30. doi: 10.34172/ajcmi.2018.05.
[6] Chatterjee B, Kulathinal S, Bhargav A, Jain Y, Kataria R: Antimicrobial resistance stratified by risk factor among Escherichia coli strains isolated from the urinary tract at a rural clinic in central India. Indian J Med Microbiol. 2009, 27:329-334. 10.4103/0255-0857.55449
[7] Khan N, Noor us S, Abdus S, Qazilbash A. Incidence and Antibiogram Patterns of Escherichia coli Isolated from Various Clinical Samples from Patients at N.I.H. Islamabad. *Pakistan Journal of Biological Sciences*. 2002;**5**. doi: 10.3923/pjbs.2002.111.113
[8] Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in J N M C Hospital Aligarh, India. *Ann ClinMicrobiolAntimicrob*. 2007;6:4.
[9] Hasan AS, Nair D, Kaur J, Baweja G, Deb M, Aggarwal P. Resistance patterns of urinary isolates in a tertiary Indian hospital. *J Ayub Med Coll Abbottabad*. 2007;19:39–41.
[10] Kothari A, Sagar V. Antibiotic resistance in pathogens causing community-acquired urinary tract infections in India: A multicenter study. *J Infect DevCtries.* 2008;2:354–8.