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Prevalance of Extended Spectrum Beta Lactamases (ESBL) Producing Escherichia Coli Isolated From Clinical Samples at Tertiary Care Hospital Peshawar

Raiz Muhammad*, Abdul Latif And Mubeen Khan

Department of Microbiology & Biotechnology, Faculty of life sciences, Abasyn University Peshawar, Pakistan.

***Corresponding author**
Riaz Muhammad, Department of Microbiology& Biotechnology, Faculty of life sciences, Abasyn University Peshawar, Pakistan.

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Abstract

Escherichia coli is Gram negative, facultative and non sporulating rod shaped bacteria. It is commonly inhabitant of the gastrointestinal tract of humans and animals. E. coli cause diseases like urinary tract infection cholecystitis, cholangitis and traveler's diarrhoea and the UTI which is more prevalent worldwide. E. coli cause complication like Hemolytic Uremic Syndrome which leads to renal failure, Thrombotic Thrombocytopenic Purpura, septicemia and peritonitis. Extend spectrum beta lactamase enzyme produce by E. coli which capable of hydrolyzing first and third generation cephalosporin, and is inhibited by beta lactamase inhibitor. A total of 150 clinical samples (blood, urine, wound swab, body fluids) were collected from Post Graduate Lady Reading Hospital Peshawar. Different media used were Nutrient agar, MacConky agar and Cysteine, Lactose and Electrolyte-Deficient agar. E. coligive pink colonies on MacConky agar because it is lactose fermenter. For further confirmation different biochemical tests were performed like triple sugar iron, Indole, and citrate utilization tests. The antibiotics susceptibility and resistivity was checked by disk diffusion method and different antibiotics were used. For ESBL detection combined disk method was performed. In the clinical samples the percentage of Gram positive bacteria in blood was (20%), urine (14.2%), wound swab (83.3%), and body fluids (8%), and the Gram negative in urine was (80%), blood (7%), wound swab (10%), and body fluids (0%). E. coli was more prevalent in urine which was 25(35.71%) and ESBL producing E. coli was 5(20%). The ESBL producing E. coli was resistant to ciprofloxacin (100%), amikacin (40%), amoxicillin+clavulanic acid (40%), levofloxacin (80%), tazobactum+pipracilline (20%), gentamycin (100%), trimethoprim (60%), cefotaxime (100%) and meropenem (0%). Sensitivity toward levofloxacin (20%), tazobactum+pipracilline (80%), gentamycin (0%), trimethoprim (40%), cefotaxime (0%) and meropenem (100%), ciprofloxacin (0%), amikacin (60%), amoxicillin+clavulanic acid (60%). The most effective antibiotic against ESBL producing E. coli was Meropenem while least effective antibiotics against ESBL producing E. coli were Gentamycin and Ciprofloxacin.

Introduction

Escherichia coli is a Gram-negative, none sporulating and facultative anaerobic rod shape bacteria. It is about 2.0 µm in length and its diameter is 0.25-1.0 µm, [1]. *E. coli* have flagella and that is why they are motile. Structurally flagella have peritrichous arrangement [2]. E.coli is a common inhabitant of the gastrointestinal tract of humans and animals. There are *E. coli* strains that are harmless commensals of the intestinal tract, and others are major pathogens of humans and animals [3].

E. coli are common inhabitants of the terminal small intestine and large intestine of mammals. They are often the most abundant facultative anaerobes in this environment. They can occasionally be isolated in association with the intestinal tract of non-mammalian animals and insects. The presence of *E. coli* in the environment is usually considered to reflect fecal contamination and not the ability to replicate freely outside the intestine. There is evidence however to suggest that *E. coli* may freely replicate in tropical fresh water [4].

Major route of transmission for *E. coli* is oro-fecal after which bacterial pathogenic strains cause disease. *E. coli* cells can only survive outside the body for a limited period of time so they can be considered as ideal indicator organisms in order to test samples from environment for fecal contamination [5]. However, research work carried out in this regard has showed that environmental samples may have *E. coli* strains that can survive for relatively long period of time even outside the host [6].

One of the most notable features of *E. coli* is broad diversity of disease-causing genotypes. As mentioned above, the diseases can encompass different symptoms and gastrointestinal tract pathologies, but there are also diseases at extra intestinal sites. These different genotypes and their disease-causing abilities lead to categories of *E. coli* often referred to as pathotypes. There are six intestinal and two extraintestinalpathotypes currently recognized [7].

A frequent cause of diarrhea in both humans and animals, enterotoxigenic *E. coli* (ETEC) are estimated to cause 600 million cases of human diarrhea and 800,000 deaths worldwide principally in children under the age of 5 [8]. One of the principal virulence factors for this pathogen is the heat-labile enterotoxin (LT), which interestingly shares structural and functional similarity to the *Vibrio cholera* cholera toxin [9].

Enteropathogenic *E. coli* (EPEC) were historically recognized on the basis of serotypes such as O55:H6 and O127:H6. They are currently defined as those diarrheagenic *E. coli* strains that cause attaching and effacing (A/E) lesions on intestinal epithelium but which lack Shiga toxins (verotoxins). There is a great diversity of the *E. coli* serotypes that possess these features. This makes the serotype classification scheme ineffective and indicates that there may be a diversity of pathogenic mechanisms and evolutionary lineages. EPEC disease is generally the result of growth of EPEC in the small intestine. EPEC cause a watery diarrhea that may contain mucus but typically does not have blood in it. Vomiting, fever, malaise and dehydration are also associated. The symptoms may last for a brief period of several days, although instances of long, chronic EPEC disease have been noted. Some of the mechanisms of EPEC pathogenesis are well understood. For example, the A/E lesion is the result of a complex system of EPEC proteins that are injected into the host intestinal epithelial cell. The A/E lesion represents a dramatic rearrangement of the epithelial cytoskeleton where there is an accumulation of act indirectly below the attached EPEC cell. This is often described as an actin pedestal for the attached bacterial cell. There is a specific pathogenicity island, termed the "locus of enterocyte effacement" (LEE) that encodes the genes responsible for the A/E lesion (McDaniel et al., 1995). The LEE encodes a type III secretion system that provides the intimate adhesion, its receptor(which is injected into and then presented on the surface of the host cell), and the injected proteins responsible for changes in host cell signaling mechanisms including actin pedestal formation [10]. Common to most EPEC strains are plasmids, termed "EAF" ("EPEC adherence factor") plasmids, which encode an adherence factor, the bundle forming pilus [11,12]. Results of human volunteer studies indicate the EAF plasmid is necessary to cause disease [12]. Although the A/E characteristic is critical for causing EPEC disease, probably through destruction of microvilli, the precise mechanism for the diarrhea is not completely understood and may reflect the diversity of EPEC strains. For example, some but not all EPEC produce an enterotoxin, [13,14]. These organisms share the ability to cause A/E lesions with EPEC but enterohemorrhagic *E. coli* (EHEC) are set apart from EPEC by possession of Shiga-like toxins and the clinical presentation of their disease. EHEC cause disease of the large intestine that may present as simple watery diarrhea and then progress to bloody stools with ulcerations of the bowel. In a small subset of diseased individuals there is onset several days later of severe, life-threatening hemolytic-uremic syndrome (HUS). HUS involves a triad of hemolytic anemia, thrombocytopenia and renal failure. The transmission of EHEC disease in humans is through ingestion of contaminated beef or foods contaminated with cattle feces. In cattle, the EHEC strains are transient members of the intestinal micro flora where they do not apparently cause disease. One of the remarkable features of EHEC is its low infection dose of 10-100 organisms. Clearly this microorganism has special acid-tolerance ability when compared to many other enteric bacterial pathogens. Children under the age of five are the major victims of EHEC disease, although the elderly may also exhibit bloody diarrhea and HUS. Epidemiologically in the United States, Japan, and Great Britain, a single serotype O157:H7 is the most common EHEC strain. In other parts of the world, this strain can be observed causing disease, but other serotypes (e.g., O26 and O111) cause a similar disease as well [3].

These organisms are pathogenetically so closely related to *Shigella*species that the nomenclature distinction is questionable. There are a few biochemical traits that can be used to distinguish enteroinvasive *E. coli* (EIEC) from *Shigella*, but the principal virulence genes are shared. The diagnostic confusion between *Shigella* and EIEC is evident in that EIEC isolates are non-motile and 70% are non-lactose fermenters [15]. In addition, EIEC share with *Shigella* the inability to decarboxylate lysine, a trait common to other *E. coli.* The traits that EIEC share with *E. coli* but not *Shigella* are the ability to produce gas from glucose and fermentation of xylose.

Shiga toxin producing Escherichia coli (STEC), also known as "verocy totoxin producing *E. coli*", are zoonotic pathogens that cause potentially fatal and often epidemic food- or waterborne illness with a clinical spectrum that includes diarrhea, hemorrhagic colitis, and the hemolytic-uremic syndrome [16].

Shiga toxin is thought to be released while the organism is growing in the large bowel, where it gets disseminated systemically to cause damage to renal endothelial cells and release of inflammatory mediators that eventually damage the kidney. EIEC cause invasive inflammatory colitis and dysentery with a clinical presentation (blood and mucous stools accompanied by fever and severe cramps) identical to the disease caused by *Shigella*species [3].

Antibiotic resistance in *E. coli* has been globally identified in isolates from environmental, animal and human sources. Mechanisms of resistance include the alteration of receptor-binding sites of drugs, a decreased intake of drugs by altering the entry or active efflux of the drug, the destruction or inactivation of the drug, and development of resistant metabolic pathways [17].

There are reports of resistance of *E. coli* to antibiotics with associated treatment failure [16]. Included in the list of affected antimicrobials are penicillin, cephalosporin, sulpha drugs and fluoroquinolones [18].

Fluoroquinolone resistant *E. coli* strains often show resistance to other drugs such as ampicillin, tetracycline, chloramphenicol, trimethoprim, sulphamethoxazole and Gentamycin [8]. And there has been a significant increase in fluoroquinolones resistant *E. coli* in many countries over the last few decades [8].

Beta-lactamases are enzymes that hydrolyze beta-lactam antibiotics, and the most common mode of action for beta-lactam resistance in Gram-negative bacteria. They do this by breaking up the nitrogen-carbonyl bond in the beta-lactam ring [19].

Beta-lactamases are enzymes capable of hydrolyzing beta-lactam antimicrobials, thereby inactivating them. There are hundreds of different beta-lactamase enzymes which differ in terms of the specific beta-lactam antimicrobials they are able to inactivate. Extended-spectrum beta-lactamases (ESBLs) are beta-lactamase

enzymes capable of hydrolyzing extended-spectrum/third generation cephalosporins (ceftriaxone and/or ceftazidime).They do not hydrolyze carbapenems and are susceptible, in turn, to inhibition by conventional beta-lactamase inhibitors (clavulanate). ESBL-producing Escherichia coli typically demonstrate resistance to penicillins, cephalosporins (first, second, and third generation), and monobactams. They remain susceptible to carbapenems and may or may not be susceptible to beta-lactam/beta-lactamase inhibitor combinations [20].

Resistance to penicillin's and other Beta-lactams is due to one of the fourth general mechanism like; inactivation of antibiotic by Beta-lactamase, modification of target Penicillin-Binding protein (PBPs), impaired penetration of drug target PBPs and efflux. These resistant organism produce Penicillin-Binding protein that have low affinity for binding beta lactam antibiotics; consequently they are not inhibited except at relatively high drug concentration. Chromosomally mediated beta-lactamase are inducible and are not inhibited by clavulanic acid. Resistance due to their enzymes is non-transferable. The second type of enzyme is plasmid-mediated beta-lactamases which are inhibited by clavulanic acid. These enzymes are more important clinically. These can be transferred between various species of *Enterobacteriaceae*. These enzymes are called Extended Spectrum Beta Lactamase (ESBLs). ESBLs can confer resistance against all beta-lactam drug except carbapenems and cephamycin [21].

There are three main types of ESBLs Temoniera (TEM), Sulfohydryl Variable (SHV) and cefotaxime hydrolyzing capabilities (CTX-M). The TEM and SHV ESBLs have evolved from broad-spectrum β-lactamases of the same type, specifically TEM-1, TEM-2, SHV-1 and SHV-11. Often the ESBL derivative differs by only one amino acid from the parent enzyme, but the difference is sufficient to confer an extended spectrum of activity. Almost all cefotaxime hydrolyzing capabilities (CTX-M) type β-lactamases described to date are ESBLs. The total number of ESBLs now characterized exceeds 200 [2].

The Clinical and Laboratory Standards Institute (CLSI) advocates use of cefotaxime (30 µg) or ceftazidime disks (30 µg) with or without clavulanate (10 µg) for phenotypic confirmation of the presence of ESBLs in *Klebsiellae* and *E. coli*. A difference of >5 mm between the zone diameters of either of the cephalosporin disks and their respective cephalosporin/ clavulanate disk is taken to be phenotypic confirmation of ESBL production. It should be emphasized that both cefotaxime and ceftazidime with and without clavulanate should be used. One reason for this is that the use of ceftazidime alone has resulted in the inability to detect cefotaxime hydrolyzing capabilities producing organisms. The CLSI has proposed these for *Klebsiellae*, *Escherichia coli*, and *Proteus mirabilis*. Laboratories using disk diffusion methods for antibiotic susceptibility testing can screen for ESBL production by noting specific zone diameters which indicate a high level of suspicion for ESBL production. Cefpodoxime, ceftazidime, aztreonam, cefotaxime, or ceftriaxone are used. However, the use of more than one of these agents for screening improves the sensitivity of detection. If any of the zone diameters indicates suspicion for ESBL production, phenotypic confirmatory tests should be used to ascertain the diagnosis [22].

Within the β-lactamase family, ESBLs comprise the largest and most prevalent group of enzymes. Detecting ESBLs can be particularly challenging for a number of reasons, ranging from clinical and infection control to laboratory issues. Clinical or infection control issues can include lack of hospital or national infection control protocols that recommend active screening; incomplete evaluation of which patients should be actively screened or cultured, and resource-poor settings where implementation of infection control measures is difficult once presence of ESBL is suspected or confirmed. The spread of ESBL within hospitals has been shown to lead to hospital outbreaks especially where there are breaches in infection control. The emergence and spread of ESBL is a public health threat since infections with these Multi Drug Resistant Organisms (MDROs) are associated with worse outcomes, prolonged hospitalization and higher mortality rates. Carbapenems are the antibiotics of choice for treating infections with ESBL (European Centre for Disease Prevention and Control (ECDC) 2014).

Aims and Objectives

1. Collection and isolation of pathogenic bacteria from clinical samples.
2. Antibiotic susceptibility testing using various antibiotics against isolated *E. coli.*
3. Phenotypic detection of ESBL producing *E. coli* among isolated *E. coli*.

Significance/Socioeconomic Importance

Antibiotic resistance increasing in hospital setting with alarming rate. This project will help the physician and public to know about the existing pattern of resistance towards different types of antibiotics tested against E. col. This study also revealed the major pathogenesis clinical samples. We also be able to know about the prevalence of ESBL producing *E. coli* which is the major cause resistance towards many antibiotics.

Materials and Methods

This study was conducted at the Microbiology Laboratory of Abasyn University Peshawar from September, 2016 to December, 2016. The relevant demography of the patient like age, name, sex and hospitalization status were obtained. All the samples were collected according to the standard protocols of Microbiology.

Samples collection

A total 150 clinical samples including 70 urine, 30 wound swab, 25 body fluids, and 25 blood were collected aseptically from the patients admitted in different wards at post graduate Lady Reading Hospital.

i. Blood specimens

Aseptic blood collection techniques were used to avoid contamination of the specimen and culture medium. The blood samples were collected in a sterile disposable syringe and dispensed into blood culture bottles.

ii. Urine samples

About 10-20 ml of mid-stream urine (MSU) samples were collected in a sterile, dry, wide-necked and leak proof container. The container were labelled with the date, name and number of the patient and also noted the time of specimen collection.

iii. Wound swabs

The sterile cotton wool swabs were used for collection of pus discharge from infected site. In case of wound discharge, about 5 ml of discharge was collected aseptically in a sterile leak proof container. In case of deeply ulcerated and necrotic site, a sterile disposable syringe was inserted in the wall of ulcer and collected the pus specimen. Labelled all the swabs and containers with patient names, age, sex and date of samples collection.

iv. Body fluids

All fluid specimen were collected by well-trained medical officer under a standard aseptic technique. About 5-10 ml of fluid samples were collected and transported to Microbiology Laboratory of Abasyn University Peshawar.

Samples processing

All the samples were collected aseptically and were brought to the Microbiology Laboratory of Abasyn University Peshawar for further processing, the samples were inoculated on blood agar, MacConky agar, Cysteine Lactose Electrolyte Deficient (CLED) and incubated aerobically at 37°C for 24 hours.

Identification of Microorganism

Identification of the organism was done on the basis of gram staining, and biochemical test including triple sugar iron (TSI), Indole, citrate utilization test and pink colony production on MacConky agar. Positive samples of *E. coli* were further processed for determination of antibiotic susceptibility profile and detection of Extended Beta-lactamase.

Biochemical test

i. Indole test

Indole is a component of amino acid tryptophan. Some bacteria have the ability to break down tryptophan for nutritional need using the enzymes tryptophanase. When tryptophan is broken down, the presence of indole can be detected through the use of kovac's reagent, which is yellow, react with indole and produce a red color on the surface of the test tube. This test is commonly used for identification of Enterobacteriaceae. *E. coli* is an indole positive.

ii. Citrate utilization test

Simon's citrate agar was prepared in glass tube in slanted position. Stored at 2-8c, using sterile rod first I streaked the sloop with a saline suspension of the test organism and then incubated the butt. These tubes were incubated at 37 °c for 48 hours, a bright blue color in the medium show positive result. While no changed in color showed negative result.

iii. Triple sugar Iron fermentation test

In this test triple sugar iron agar was used. The important component of this medium were ferrous sulfate and three sugar, glucose, lactose and sucrose. The medium in the tube has solid, poorly oxygenated area on the bottom. The test organism were cultured in a medium which contain urea and the indicator phenol red. The strain was urease producing enzyme were beaked down the urea to give ammonia and carbon dioxide. With the release of ammonia, the medium become alkaline as showed by the change in color of the indicator present in medium.

Susceptibility testing towards various antibiotics

In this study total nine antibiotics were used including tazobactum+pipracilline (TZP), cefotaxime (CTX), amikacin (AK), ciprofloxacin (CIP), amoxicillin+clavulanic acid (AMC), meropenem (MEM), levofloxacin (LVX), trimethoprim (TMP), gentamycin (GEN). All *E. coli* isolates were subjected to in-vitro testing for determination of their susceptibility to various antibacterial agents using disc diffusion method (KiryBaur's method) on nutrient agar according to CLSI, (2014). Measuring the zones of inhibition diameter around the discs and interpretation were made according to CLSI, (2014).

Detection of ESBL producing Escherichia coli

Extend spectrum beta-lactamase was detected by combined disc diffusion test. The test containing disc cephalosporin alone (cefotaxime, ceftazidime, cefepime) and in combination with clavulanic acid are applied. The inhibition zone around the cephalosporin disc combined with clavulanic acid is compared with the zone around the disc with the cephalosporin alone. The test is positive if the inhibition zone diameter is ≥ 5 mm larger with clavulanic acid than without.

Results

Total 42 Gram positive and 70 Gram negative bacteria were isolated from 150 clinical samples collected from Post Graduate Medical Institute Peshawar. The percentage of Gram positive and negative microorganism from urine Gram positive was (14.2%) and Gram negative was (80%), wound swab Gram positive was (83.3%) and Gram negative was (10%), blood Gram positive was (20%) and Gram negative was (28%) and in body fluids Gram positive was (8%) and Gram negative was (0%).

Table 4.1: Percent prevalence of Bacterial pathogen isolated from various clinical samples.

Specimen	Sample Number	Gram Positive	Percentage	Gram Negative	Percentage
Urine	70	10	14.2%	60	80%
Wound swab	30	25	83.3%	3	10%
Blood	25	5	20%	7	28%
Body Fluids	25	2	8%	0	0

Table 4.2: Percent prevalence of *E. coli* ESBL producing in clinical samples.

Specimen	Sample Number	Number of *E. coli*	ESBL Positive	Parentage
Urine	70	25	5	20%
Wound swab	30	0	0	0
Blood	25	0	0	0
Body fluids	25	0	0	0

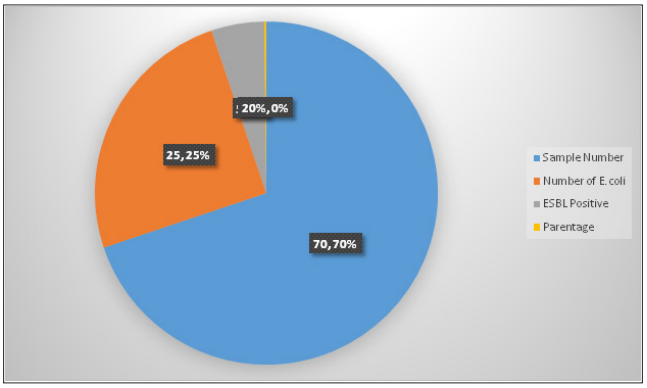

Fig 4.1: Pie chart showing the percentage of *E. coli* in clinical samples Out of 150 clinical samples the *E. coli* was more prevalent in urine 25 (35.71%). ESBL producing *E. coli* in urine was 5 (20%) as shown in table 2 and Figure 1.

Table 4.3: Antibiotics susceptibility result of *E. coli* (n=25)

Antibiotic Name	Sensitive	Resistant	%Sensitive	%Resistant
Amoxicillin+clavulanic acid	20	5	80	20
Cefotaxime	6	19	24	76
Meropenem	22	3	88	12
Tazobactum+pipracilline	19	6	76	24
Ciprofloxacin	7	18	28	72
Levofloxacin	9	16	36	64
Gentamycin	4	21	16	84
Trimethoprim	10	15	40	60
Amikacin	18	7	72	28

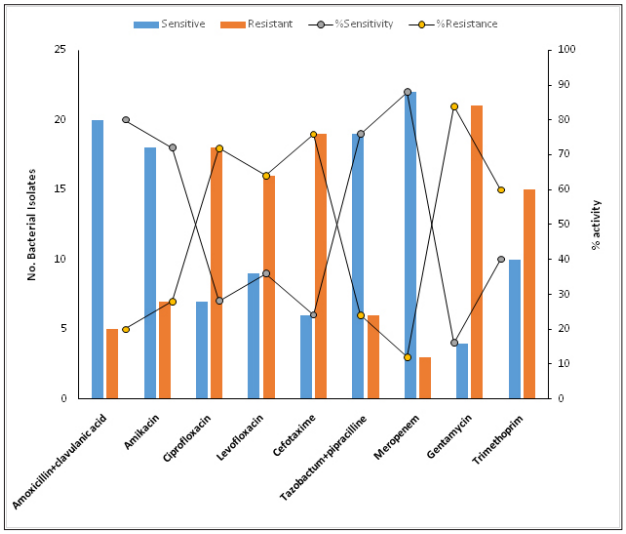

Fig 4.2: Bar graph for susceptibility and resistant pattern of *E. coli* The sensitivity pattern of *E. coli* towards Amoxicillin+clavulanic acid was (80%), Amikacin (72%), Ciprofloxacin (28%), Levofloxacin (36%), Cefotaxime (24%), Tazobactum+pipracilline (76%), Meropenem (88%), Gentamycin (16%), and Trimethoprim (40%). The more potent antibiotics against *E. coli* were Meropenem (88%) and Tazobactum+pipracilline (72%), while least potent antibiotic was Gentamycin (16%) as showing in the Fig 2.

Table 4.4: Antibiotics Susceptibility pattern of ESBL positive *E. coli* (n=5)

Antibiotic Name	Sensitive	Resistant	%Sensitive	%Resistant
Amoxicillin+clavulanic acid	3	2	60	40
Cefotaxime	0	5	0	100
Meropenem	5	0	100	0
Tazobactum+pipracilline	4	1	80	20
Ciprofloxacin	0	5	0	100
Levofloxacin	1	4	20	80
Gentamycin	0	5	0	100
Trimethoprim	2	3	40	60
Amikacin	3	2	60	40

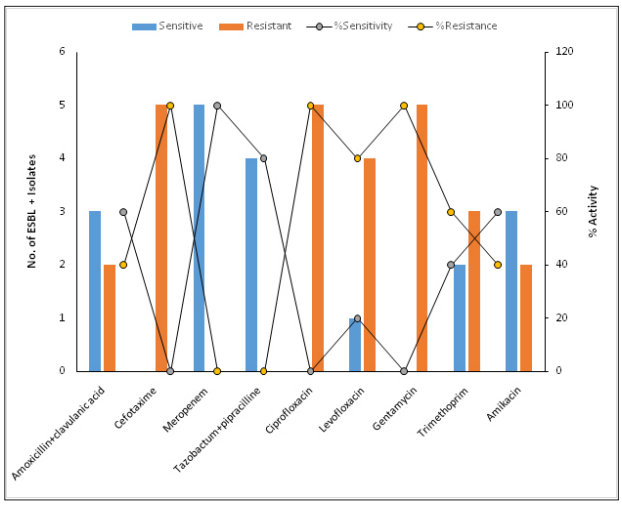

Fig 4.3: Bar graph for susceptibility and resistant pattern of ESBL producing *E. coli* Total 5 (20%) ESBL producing *E. coli* were detected out of 25 isolates from urine. The ESBL positive *E. coli* was observed when the inhibition zone diameter of Amoxicillin+clavulanic acid was ≥ 5mm greater than Cephalosporin zone of inhibition.

Discussion

Resistant bacteria are emerging worldwide as a threat to favorable outcomes of treatment of common infections in community and hospital settings. Urinary tract, gastrointestinal, and pyogenic infections are the common hospital-acquired infections caused by members of *Enterobacteriaceae*. Among *Enterobacteriaceae*, *Escherichia coli* has been the most commonly isolated specie. *E. coli* are very well known to exhibit multidrug resistance. Prolonged antibiotic exposure, overstay in hospitals, severe illness, unprecedented use of third generation cephalosporin, and increased use of intravenous devices or catheters are important risk factors for infection with Multi Drug Resistant *E. coli*. B-lactamase production is perhaps the single most important mechanism of resistance to penicillins and cephalosporins. *E. coli* possess a naturally occurring chromosomally mediatedβ-lactamase or plasmid mediated β-lactamases. These enzymes are thought to have evolved from penicillin binding proteins [23].

In the present study the, overall percentage of Gram positive microorganism among different clinical samples found was (14.2%) in urine, blood (20%), wound swab (83.3%) and body fluids (8%) and Gram negative was (80%) in urine, wound swab

(10%), and body fluids (0%). The prevalence of *E. coli* among the clinical samples was in urine (35.71%) and the prevalence of ESBL producing *E. coli* was in urine (20%).

Our study has correlation with the previous study which showed ESBL producers *E. coli* were isolated 24(20%) out of 120 from different clinical samples (40 urine, 20 sputum, 20 blood, and 40 wound swabs) from different patients at different hospitals of Benghazi, Libya [24].

In our study the *E. coli* was more prevalent in urine (35.71%) and the antibiotic which was sensitive toward *E. coli* was ciprofloxacin (28%), levofloxacin (36%), gentamycin (16%), cefotaxime (24%), trimethoprim (40%), amikacin (72%), amoxicillin+clavulanic acid (80%), tazobactum+pipracilline (76%), and meropenem (88%). Our study has similarity with previous study which showed that *E. coli* was resistant amoxicillin+clavulanic acid (15%), amikacin (91%), tazobactum+pipracilline (65.5%), cefotaxime (79%), ciprofloxacin and levofloxacin (82%) [24].

In the current study the ESBL producing *E. coli* was resistant to ciprofloxacin (100%), levofloxacin (80%), gentamycin (100%),cefotaxime (100%), trimethoprim (60%), amikacin (40%), amoxicillinclavulanic acid (40%), tazobactum+pipracilline (20%), and meropenem(0%).The most potent antibiotic was meropenem (100%).Our study correlate with the previous study that isolated ESBL producing *E. coli* were highly resistant to ciprofloxacin (100%) and levofloxacin (100%) and the susceptible antibiotic was meropenem (100%) [25].

Conculsions& Recommendations

Conclusions

Out of 150 clinical samples (blood, urine, wound swab, body fluids) the *E. coli* was more prevalent in urine (35.71%) and the ESBL producing *E. coli* was (20%) which was isolated from urine. The *E. coli* which were resistant toward amikacin (28%), cefotaxime (76%), amoxicillinclavulanic (20%), ciprofloxacin (72%), levofloxacin (64%), gentamycin (84%), trimethoprim (60%), meropenem (12%), and tazobactum+pipracilline (24%). ESBL Producing *E. coli* was sensitive to trimethoprim (40%), meropenem (100%), tazobactum+pipracilline (80%) amikacin (60%), cefotaxime (0%), amoxicillinclavulanic (60%), ciprofloxacin (0%), levofloxacin (20%),and gentamycin (0%). The drug of choice for ESBL producing *E. coli* which causing the UTI was meropenem [26-33].

Recommendations

- It is recommended that culture sensitivity testing must be conducted before the prescription of antibiotics for the treatment of UTI to know the drug of choice.
- In this study showed that the situation regarding the antibiotics resistance is highly alarming especially in hospital settings. Measures must be required to prevent the misuse of antibiotics. Empirical therapy must have discourage. Low dose, over dose, ineffective antibiotics prescription must also discourage.

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