STUDY OF ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF ESCHERICHIA COLI ISOLATED FROM NOSOCOMIAL INFECTIONS IN HILLAH CITY, IRAQ

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ABSTRACT

   Escherichia coli is a Gram-negative , rod-shaped organism it present as commensal in the gut of human's alsoits isolates from many different types of animals as well as this kind of bacteria presence in water provides, so it's considered as an index of stool contamination .in addition this organism can causes diseases in the alimentary tract ,urinary tract includes urethra, bladder, otitis media and respiratory system. The current study aims to identify of antimicrobial agents use in the treatment E. coli that it's acquired by nosocomial infections. The E. coli has been isolated and then exposure to different classes of antibiotics by using Vitek2 technique method. The total number of E. coli was isolated is 45. the findings have appeared so resistance to Ticarcillin with in 45 (100%), Piperacillin 45 (100%), Ceftazidime 42 (93.4%), Cefepime and Aztreonam 43 (95.6%). On the other hand the samples was showed high sensitivity with Amikacin 44 (97.8%), Imipenem 43 (95.6%), Meropenem 43 (95.6%) and Gentamicin 37 (82.2%) , while of Piperacillin\Tazobactam 12 (26.7 %) and Tobramycin 7 (15.5%) has intermediate susceptibility to antibiotics study .finally found the high frequency of resistance to Ticarcillin, Piperacillin,Ceftazidime,Cefeoime and Aztreonam was seen among E. coli isolates. As a result they were not recommended the last drugs used for treatment of E. coli infections as optimal therapy. Keywords : E. coli, Antimicrobial susceptibility, Nosocomial infections, Vitek2 technique.

INTRODUCTION:

 Nosocomial infections, also termed healthcare-associated infections .on the other meaning these sort of infections acquired by patients as a result of treatment in a hospitals, clinic or healthcare service center. According previous researches disease generally seewith in 30 days n 48 hours or more after hospital admission or within 30 days after discharges. They occurrences because of contaminated instrumentation , increased use of chemotherapeutic and antimicrobial drugs ,as well as lack or obscene of hand hygiene . E. coli makes up as much as 90 % was acquired from human community compare with 50 % considered as UTIs nosocomial (1). The information of antibiotics resistance by E.coli is important because this pathogen associated with urinary tract infection, which is selecting as a guide for antimicrobial therapy. The infections caused by microorganisms are major problems militating against successful organ transplantation, which can cause high morbidity and mortality among drug induced immuno suppression in patients with organ transplants also with autoimmune diseases , and with cancer patients who are receiving chemotherapy (2). In spite of bacterium is the commensal bacteria but it's plays essential role of causes of community-acquired disease and hospitals illnesses . This agent has importance in the treatment and and can be isolated from various clinical (1,2). Other microbial agents can causes

urinary tract infections (UTI) beside E. coli are Proteus, Klebsiella, Streptococcus and Staphylococcus epidermis. The enteropathogenic E. coli most commonly associated with UTI in Saudi Arabia are Gram negative bacteria with highly resistant for using of oral agents (3). This Genus, alone or in combination with other stool pathogens , may be involved in abdominal or pelvic illnesses . Pathogen present in lower intestines and faecal found in many animals. The bacterium when enter into urinary system, it multiplies and move up to urinary tract. The E. coli attached to the lining of the urinary tract, which causes inflammation and irritation for long wayn (4).

MATERIALS AND METHODS

Isolation and identification: The swab culture media and antibiotic supplements which were used in the present study were procured from Hi-Media Laboratories. A number total of 45 clinical specimens was collected from wound, ear, diarrhea, urine and abscess cases in AL- Hashmiya Hospital. The samples were collected under sterile conditions include sterile test tubes and swabs then transported immediately to the Microbiology laboratory to do cultural tests on the selective media for E.coli such as MacConkey agar and Eosine methylene blue agar media, after that we have done microscopically, morphologically and biochemical tests were involved IMVIC, catalase, oxidase, urease and coagulase tests (5,6) also were

identified the bacterial Colonies with green metallic sheen clearly, this phenomenon considered as indicator to diagnose of Escherichia coli. Moreover, colonies were stained by Gram stain .finally Vitek2 technique has done for knowledge sensitivity of bacteria to antimicrobial agents according to the product Company (BioMeriux). Antibiotic susceptibility testing: Antibiotic suscep-tibility testing was performed by Vitek2 technique. Different antibiotics, i.e., Ticarcillin, Piperacillin, Piperacillin, Tazobactam, Ceftazidime, Cefepime, Aztreonam, Imipenem, Meropenem, Amikacin, Gentamicin, Tobramycin, Ciprofloxacin, Mino-cycline and Trime thoprime sulfament were used to determine the antibiotic sensitivity of E. coli isolated.

RESULTS AND DISCUSSION

A total number of 45 specimens were checked for isolation, identification of E. coli and antimicrobial susceptibility testing. The highest (66.8%) for isolation, identification of E. coli and antimicrobial susceptibility testing. In this study 24.4% samples were isolated from Diarrhea, 4.4% from Otitis media, 2.2% from wound swab and 2.2% from Abscesses as shown in Table 1. Prevalence and antibiotic susceptibility studies need to be conduc-ted regularly, which will help in developing guidelines for treatment of UTI Acquired bacterial resistance is common in isolates from healthy individuals and from patients with community acquired infections, more especially in developing countries where the need for antibiotics is driven by the high incidences of infectious diseases (6). The wide spread and inappropriate use of anti-biotics is recognized as a significant contributing factor to the spread of bacterial resistance and the development of resistance to antimicrobial agents (7). The12drug resistant phenomenon is being worldwide concern especially in the last 20 years (8). Increasing rates of resistance among E. coli is a growing concern in both developed and non - developing countries (9). Some study showed that E. coli is one of the most frequently isolated bacteria in urinary tract infection (10).

Table -1: Distribution number of testing bacteria was isolated from different clinical cases

Nosocomial infection	Frequency	Percentage
Urinary Tract Infection	30	66.8%
Diarrhea	11	24.4 %
Wounds	1	2.2%
Abscesses	1	2.2%
Otitis Media	2	4.4%
Total	45	100%

Antimicrobial susceptibility: Antimicrobial sensitivity patterns was varied with time and region. The experimental results was showed that Escherichia coli found highly resistance to most common antibiotics that is used in the treatment of infectious disease. Mostly bacterial resistance was observed by more than four antibiotics and prevalence of multiple durg resistant. It is important to develop antibiotics resistance, which is due to the prescription of overuse and misuse of antibiotics. Iraq is the developing country where all types of antibiotics are sold over the counter and this attitude encourages self-medication. Resistance of E. coli continues to be an important clinical therapeutic problem, such that which can be found in an increasing multiple drug resistance to treat ofE. coli showed different susceptibility towards antibiotics used in this study as shown in Table (2). Very high rates of resistance was appeared with Ticarcillin 45 (100%) Piperacillin 45 (100%), Ceftazidime 42 (93.4%), Cefepime and Aztreonam 43 (95.6%). Increases in rates of resistance to different antimicrobials have been reported from previous studies conducted in different parts of the world (2). High percentage of sensitive was seen with Amikacin 44 (97.8%), Imipenem43 (95.6%), Meropenem 43 (95.6%) and Gentamicin 37 (82.2%). In this study, Amikacin , Imipenem, Meropenem and gentamicin 1were found to be the most effective antimicrobials against E. coli isolated, so, can be considered the best drugs in treatment of bacterial current study . The sensitivity to Imipenem (95.6%) in our results were similar to another study of Gautametal (11) which 100%, while the sensitive to Amikacin (97.8%) was higher percent than this study (82.1%).

Sex Distribution: In this study, the nosocomial infections patients consisted of 14:45 (31%) males and 23:45 (69%) females as shown in Figure 1. This difference is due to the fact that humans has less access to diagnostic facilities in some settings, but the broader pattern also reflects real epidemiological differences between men and women, both in exposures to infection and in ability to disease (12). In this study, number of cases have collected from females (69%)was more than males (31%). Its approximately percentage to the another study which showed that female infected more male at ratio (52.7/47.2%)(13). Some studies showed more common in females than males by virtue of the shortened urethra (10,14).

Table 2. The resistant percent of *E. coli* to antibiotics study.

| Antibiotics	Resistance		Intermediate		Sensitive	
	No.	%	No.	%	No.	%
Ticarcillin	45	100	00	00.0	00	00.0
Piperacillin	45	100	00	00.0	00	00.0
Piperacillin\Tazobactam	07	15.5	12	26.7	26	57.8
Ceftazidime	42	93.4	03	06.6	00	00.0
Cefepime	43	95.6	01	02.2	01	02.2
Aztreonam	43	95.6	02	04.4	00	00.0
Imipenem	02	04.4	00	00.0	43	95.6
Meropenem	02	04.4	00	00.0	43	95.6
Amikacin	00	00.0	01	02.2	44	97.8
Gentamicin	08	17.8	00	00.0	37	82.2
Tobramycin	05	11.2	07	15.5	33	73.3
Ciprofloxacin	17	37.8	02	04.4	26	57.8
Minocycline	19	42.3	03	06.6	23	51.1
Trimethoprime\Sulfament	33	73.3	00	00.0	12	26.7
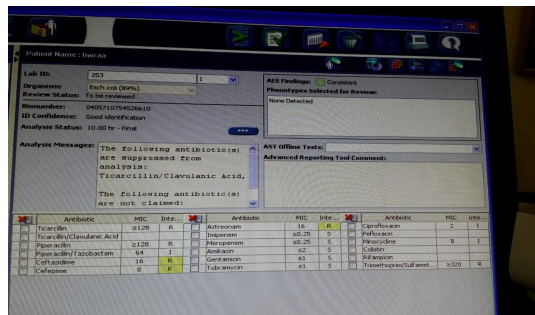
Figure1: The resistant results of *Escherichia coli* isolates to the antibiotics
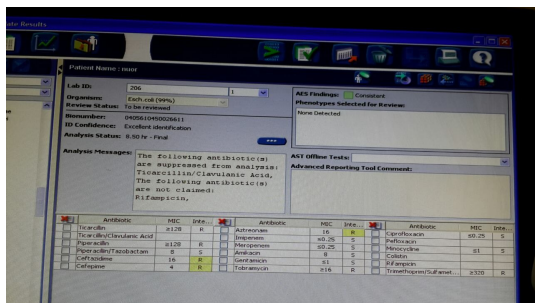

Figure2: The resistant results of *Escherichia coli* isolates to the antibiotics
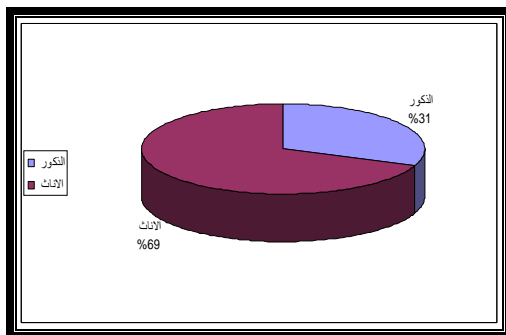

Figurer 3: Sex Distribution for clinical specimens

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