JOBS
مجلة العلوم الأساسية
Journal of Basic Science
Print -ISSN 2306-5249
Online-ISSN 2791-3279
العدد الثاني والعشرون
٢٠٢٤م /١٤٤٥هـ
العدد الثاني والعشرون
(٤٠٣)- (٤١١)

# حساسية بكتريا الايشيريشا القولونية المعزولة من التهاب المسالك البولية ضد المضادات الحيوية

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**المستخلص:**

هدفت هذه الدراسة الى تحديد انتشار بكتريا *E.coli* بالنسبة المصابين بالتهاب المجاري البولية ودراسة حساسية البكتريا للمضادات الحيوية على ٥٠ عينة ادرار، جمعت من ٥٠ مريض بمختلف الفئات العمرية , يراجعون مشفى الصويرة العام في واسط للمدة من تشرين الأول ٢٠٢٣ –ولغاية شباط ٢٠٢٤ حيث تم الحصول على ١٤(٢٨%) عزلة من بكتريا *E.coli* من مجموع العزلات البكتريا التي عزلت وشخصت اعتمادا على الزرع البكتيري ونظام الفايتك .

أظهرت عزلت بكتريا الايشيريشا القالونية حساسية مختلفة ضد (٥) مضاد حيوي شائع مستعمل باستخدام طريقة انتشار القرص . أظهرت كشف عن عوامل الضراوة المرتبطة بالبكتريا*E.coli* قابليتها جميعا وبنسبة ١٠٠% لانتاج انزيم الكاتليز واتسمت اغلب العزلات بمقاومة متعددة للمضادات الحيوية ، بالإضافة إلى أن كل العزلات هذه البكتريا كانت مقاومة (جنتاميسين , نيتروفورانتوين ) بينما كانت حساسة (اميكاسين , سيبروفلوكساسين , سيفيبيم ) .

**كلمات المفتاحية:** الايشريشا القالونية ،التهاب المسالك البولية ، المضادات الحيوية

# Susceptibility of Escherichia coli Isolated from Urinary Tract Infection Against Different Types of Antibiotics

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**Abstract:**
Urinary tract infections (UTIs) are among the most common bacterial infections, so our study has been aimed to determine the commonness of *E.coli* bacteria in patients with urinary tract infections, to study the sensitivity of the bacteria to antibiotics on 50 urine samples, collected from 50 patients in different age groups, They visited the Essaouira General Hospital in Wasit for the period from October 2023 to February 2024, where 14 (28%) isolates of E.coli bacteria were obtained from the total number of bacterial isolates that were isolated and diagnosed based on bacterial culture and the VITEK2 System.
Isolates of *E.coli* bacteria showed different sensitivity against (5) common antibiotics using the disk diffusion method. Detection of the virulence factors associated with the *E.coli* showed that all of them were 100% capable of producing the enzyme catalase, and most of the isolates were characterized by multiple resistance to antibiotics, in addition to that all of the isolates of these bacteria were resistant to (Gentamicin and Nitrofurantoin) While it was sensitive against (Amikacin , Ciprofloxacin , Cefepime ) .
**Keywords:** *E.coli* , urinary tract infection, antibiotics.

**Introduction:**
*Escherichia coli* belong to the One word which includes other genera.(Reddy,2010) This bacteria was first described by The oder *Echerich* in 1885 in Germany and *Bacterium coil* was called at that time . It is now known as *Escherichia coli* because it was isolated from the stool of healthy children . Therefore, it was considered a non-pathogenic bacteria at that time (Raouf, 2013). this bacteria are gram-Negative facultative anaerobic , coccobacillus .(Overman *et al* .,2014). Bacteria size is small bacillic (1.3_0.5 Microns ) and move by meas of circumferential flagella .It's optimum temperature for growth is 37ºc ,but it can grow in wide temperature ranges from 15-45ºc (Jawetz *et al* .,2004) So in human is found naturally in intestine as an opportunistic pathogen when is transported diseases such as urinary tract infections and meningitis, pneumonia, hemolytic uremic sydrome. (Sharma *et al* ., 2007)

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Nowadays, one of the most significant threats to human health is antimicrobial resistance (Baquero.2021). There is adearth of effective antibiotics for treating AMR bacterial infections (Baker *et al.,*2018). Interest in antibiotics has increased since their first use until the present time, due to their great importance in treating various simple and complex bacterial infections, either by inhibiting their Bacteriostatic growth or killing Bacteriocidal bacteria ( Mims , *et al .,*1998)

Most bacteria sensitive to antibiotics when used they were first, the resistance of most pathogenic bacterial species to these antibiotics has increased because of the situation has changed in recent years. Laboratories have begun to attach to the list of indications containing warnings and side effects resulting (Derakhshan *et al.,*2022) Also, health organizations and research centers are constantly providing new revelations about the serious side effects that result from them and the hidden role that these antibiotics play. due to the use of each antibiotic. Given this, medical conferences have begun to call for the necessity of limiting their circulation and returning to natural materials for therapeutic purposes, (AL-Shamaa .1989)The action of antibiotics on bacteria is focused on two main aspects: obstructing structural integrity or impairing functional metabolism (Molan,P.C.2002)( Bong *et al* .,2022) The goal of this study was investigating prevalence of *E.coli* in urinary tract infection and addition to their antibiotics susceptibility profiles.

**Materials and Methods:**

Totally, 50 specimens of Urine. Collected from 50 persons pathogens who admitted at AL-Sauwar Hospital in period (January-June.2024). Bacteria had been isolated and identified depending on bacterial culture with utilize blood agar and Hemolysis on blood agar was also performed to identify these isolates, with MacConkey agar, bacteria were diagnosed according to the color, shape and size of the bacterial colony and were performed followed by Gram stain, Vitality index of traditional environmental knowledge within Vitek systems (Baily&and Scott.2014). Many biochemical tests were also performed including the Catalas test and Oxidase test. (Atlas *et al.*,1995).

**Antimicrobial susceptibility testing :**

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Table (1) Antibiotics used in the study, used method (kirby &Bauer ,1986) to test the antimicrobial resistance and sensitivity of bacterial isolates to susceptibility antibiotics was executed for five varied antibiotics discs diffusion method, which were obtained from Bioanalyze, Turkey as stated by Clinical Laboratory Standards Institute (CSLI,2013).

**Table (1): Types of antibiotics used in the study**

| T | Antibiotics tablets | Code | Concentration Mg -disk |
|---|---|---|---|
| 1 | Amikacin | AK | 30 |
| 2 | Gentamicin | CN | 10 |
| 3 | Ciprofloxacin | CIP | 5 |
| 4 | Nitrofurantoin | F | 300 |
| 5 | Cefepime | FEP | 30 |

**Results and Discussion :**

In the current study 50 sample isolated and identified . Results for the diagnostic of the isolates that showed bacterial growth using biochemical diagnostic methods for the bacterial isolates. The presence of (14) (28%) belonging to the *E.coli* type appeared were distributed showing in Table( 2) . Vitek 2 systems identification the bacterial isolates (which were diagnosed by traditional biochemical methods)using (64) biochemical tests .

*E.coli* bacteria were identified culturally based on their phenotypic, the diagnosis was made based on phenotypic and microscopic examinations and biochemical tests, and as a preliminary diagnosis, as the shape and texture of the colony and its structure, as well as its ability to ferment the sugar lactose, were based on the MacConkey medium. The isolates of the *E.coli* bacteria under study were characterized when grown on the MacConkey medium by the fact that their colonies were small, circular in shape, with a raised edge. Smooth and dry, with a pink color as it is a fermentation of the sugar lactose. MacConkey medium is considered a selective media because it contains crystal violet dye and bile salts. Therefore, positive bacteria and yeasts do not grow on it (Setia *et al.* (2009). *Escherichia coli* were characterized when

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they were cultured on blood agar medium, and some strains showed the ability to analyze blood. Likewise, *E coli* bacteria showed widespread growth around the stab area. This is evidence that the bacteria are motile. It was noted when examined with an optical microscope and stained with Gram stain that they were short bacilli that were Gram-negative (Chees, 2012).

As for biochemical tests, they were negative for oxidase tests and positive. For catalytic tests (Reddy 2010).

Another bacteria associated with *E.coli, Klebsiell as spp*, was also identified, as its colonies in the center of the MacConkey were large, circular in size, with regular, pink edges, and had a mucous consistency due to their possession of a capsule (Magesh *et al.*, 2011). As for staphylococcal bacteria, they showed phenotypic characteristics represented by relatively large, circular colonies that were slightly raised on the basic blood medium, while the *Proteus* spp bacteria were identified based on the phenomenon of swarming, their colonies were pale yellow on the MacConkey medium because they did not ferment the sugar lactose, and the colonies of Staphylococcus aureus and

**Table 2**: Numbers &percentages of bacterial isolated from patients Urine by Vitek system.

| T | Bacterial types | No. | % |
|---|---|---|---|
| 1 | *E.coli* | 14 | 28 |
| 2 | *Klebsiell* | 10 | 20 |
| 3 | *Staphylococcus aureus* | 8 | 16 |
| 4 | *Staphylococcus epdermidis* | 6 | 12 |
| 5 | *Pesudomonas aeruginosa* | 12 | 24 |

In table (3), the results of antimicrobial resistance test has been explained, all isolates (n:14) showed resistant to Ampicillin ,Ciprofloxan and Cefepime (100%) while the resistance for Gentamicin and Nitrofuration 42 and 85 % respectively.

In the past era, increasing resistance of the gram-Negative bacteria as the *E.coli* and *P.aeruginosa* to class B-lactams , which genes en coding class D

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B-Lactamases, as they play an important role in the innate resistance of phenotypes (Niel *et al* ., 2006).

Table 3: Resistance of *E.coli* to Antibiotics.

| Antibiotic | Resistance | | Sensitive | |
|---|---|---|---|---|
| | No. | Percent % | No. | Percent % |
| Amikacin | 7 | 100 | - | - |
| Gentamicin | 4 | 57 | 3 | 42 |
| Ciprofloxacin | 7 | 100 | - | - |
| Nitrofurantoin | 1 | 24 | 6 | 85 |
| Cefepime | 7 | 100 | - | - |

Bacterial culture and Vitek system results has been showed in(table-2)

*E. coli* the most bacteria types that were isolated in current study group as 28%, that supports the detecting in others studies which showing predominance of *E.coli* UTIs. (EJrnaes.2011)

In present *klebsiella* with 20% was the next most common bacteria isolated, while *S. aureus*, *S. epidermides*, with 16%, 12% respectively, *P. aruginosa* it had a 24% percentage due to, *P. aeruginosa* is multidrug resistance and widespread in hospital population, in additional to being an opportunistic bacterial causing various nosocomial diseases as including UTI (Wang *et al* .,2007).

Fig 1 : the showing efficiency of 7 antibiotic *E.coli* isolation was tested by the proliferation of antibiotic effective antibiotics for resistance and sensitive. Isolation sensitive to F ١٤mm in diameter, 12 mm lower Gentamicin and, the rest of the insulation in no anti- sensitive.

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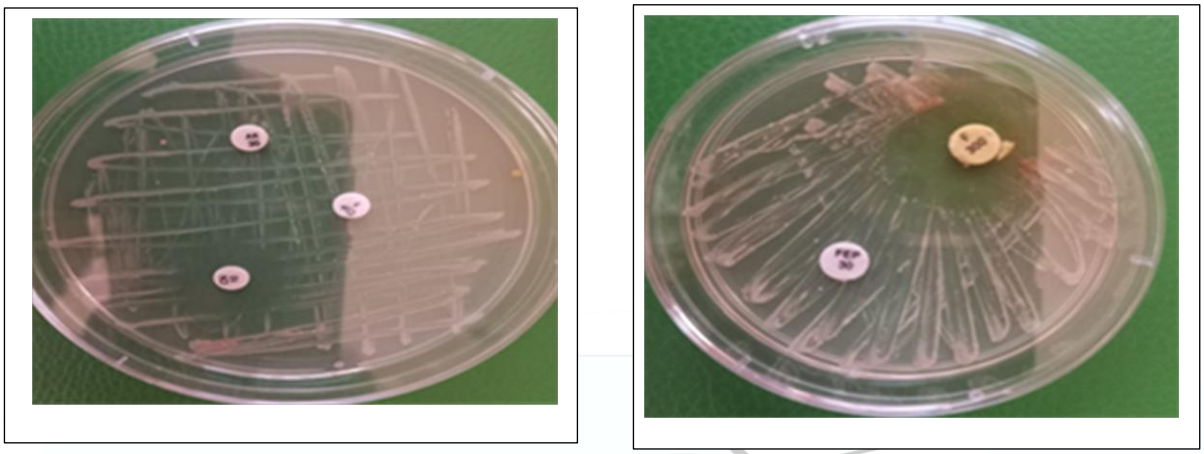
**Figure (1):** The effectiveness of antibiotics on coli.



Testing sensitive is important in determining the effectiveness of antibiotics, as well as reducing the use and random use of it, which is one of the important reasons for the emergence of resistance in bacteria (Carmeli *et al.*,1999)

**Conclusion:**

Current study showed highest of UTI were patient, and this infection was recorded in all both genera, as well, the UTI s by *E.coli* was predominant among were 28 whilst 24 for *P. aeruginosa* ,the last concludes is that all strain were resistant for (Gentamicin , Nitrofurantoin) in addition to, some isolates were sensitivity to both antibiotics (Amikacin , Ciprofloxacin , Cefepime).



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