



## Resistance of *E.coli* isolate from patient suffering from UTI toward Tri/sulfamethoxazole drug

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### Abstract

Pathogenic bacteria of *Escherichia coli* (35 isolates) had been obtained from persons suffered from UTI from Baghdad Medical City hospital among the time between first December/2015 until first April. The samples had been detection by growth on MacConkey medium and blood agar, then identification by doing some morphology and biochemical parameters. In current study 22/35 (62.8%) of the samples were taken from patient woman and 13/3 (37.1%) take from patient man. Antimicrobial sensitive test for 2 antimicrobial was achieved by using disc diffusion method. The persistence isolates of *E.coli* was highest percentage 28.5% (10/35) to Ciprodar® while it was 14.2% (5/35) of Trimethoprim & sulfamethoxazole. determined the resistance rates in relation to the gender patients showed great different for resistant to Ciprodar® in male 17.1% (6/35) in comparison with 14.2% (5/35) in patient woman and for Co-tri in also female 5.7% (2/35) in comparison with 8.5% (3/35) in patient man.

**Keywords:** *E.coli*, patient of UTI, Tri/sulfamethoxazole drug

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### INTRODUCTION

Urinary tract infections (UTIs) are single of the extreme rife problem seen both in community therefore in hospital environment (Ajantha et al. 2011). UTI may include just the lower urinary tract (UT) or both the upper and the lower tracts (Al-Gherawi 2009). The urinary bladder and urethra are the predominant sites of infections inside the urinary tract (Al-jubori 1997). The urinary tract successful attack relates to bacterial virulence, inoculum size, and the host's munity (Alo's et al. 2009, Atlas 1984).

All women have approximately sixty percent life-time risk of rising bacterial cystitis, that development frequently previous to the old of tawny four. On other hand, men have a life-time possibility of just 13% (Atlas 1994). A lot of cases, women are manage inefficiently and securely by experimental antibiotic treatment and with no require to urine culture (Barret et al. 1999). So, physicians were confirmed that experimental antimicrobial drug with no cultured suitable in this case. The experimental drug was very broadly using just a little (UTIs) are routine culture (Boucher et al. 2009). Universal data showed a raise to resist predictable treatment -among-pathogens (within UTI) (Brenner et al. 2005, Brooks et al. 2007). So UTI drug may different depended on patient sex, age, Pathogen involve, time of disease, and the urinary tract anatomic area included (Burman et al. 2003).

UTIs are mostly causing via bacteria. The more return microbes concerned as causative factor of urinary tract infection commonly initiate in the intestine but not restricted to (*E. coli*, *Proteus (spp.)*, *Pseudomonas (spp)*, *Klebsiella (spp.)*, *Staphylococcus spp.*, *Streptococcus spp*, *Neissirea gonorrhoea*, (*chlamydia trachomatis*, *candida) spp.*, (*mycoplasma* are also other causative organisms (Brooks et al. 2007) . However, *E.coli* is first of the pathogenic that caused of UTI and it's highly trending in female, with elevated incidence & frequency (Brooks et al. 2007, Vincent et al. 2010, Ciprofloxacin-Hydrochloride 2011).

*Escherichia coli* bacteria belong into Enterobacteriaceae and consider large various group of G-ve bacilli whose natural environment in the) GIT of human then animals (CLSI 2011). These types of bacteria were named by the odor Escherich, who isolated these sorts of the genus (López-Banda et al. 2014). *E. coli* is widely used in experimental studies of evolution (CLSI 2011). This bacteria is consider straight, cylinder G-ve rod at curved ends and also (1.1-1.5 µm) consider in diameter with (2.0-6.0 µm) consider in length, fund single or pair and consider motile or non-

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motile & consider are non-spore formation bacteria (Jain et al. 2011).

So can swiftly identify for this bacterium as *E. coli* by its  $\beta$ -hemolysin on blood agar medium and its consider typical colonies and see "sheen" on Eosin Methylene Blue (EMB) agar. Grow WAS well on McConkey agar and gave circular, smooth convex colonies with distinct edges beside giving pink color as induction for lactose ferment (El-Mahmood 2009). *E. coli* strains stay alive and it can growth up the depended mid-range almost 15-45C (El-Mahmood 2009), nevertheless, Fotadar et al. (2005) reported that *E. coli* can growth consistent at a temperature as high as 49 centigrade. This bacteria (*E.coli*) considers a normal microbiota in the GIT of human and animal (El-Mahmood 2009, Fronzes et al. 2008). This normally commensal need only acquired a combination adapting element to covered greatly adapted pathogen tolerant of cause a range of diseases, from gastroenteritis in GIT to extraintestinal infection of urinary tract, central nervous system and bloodstream (Gupta et al. 1999).

This *E. coli* contain types that cause urinary tract infection are known (uropathogenic *E. coli* UPEC). The UPEC isolates are considering heterogeneous group in common and have multi virulence factors (VFs) that essential to stay available also colonized of the bacteria in UT, overcome host defense, and extra-intestinal disease (Grabe et al. 2010, Holt et al. 1994).

The virulence of strain in a given infection is determined by the real genetic expression of the virulence genes (V.G) present in them and also by the ecological conditions in the host. V.G of *E. coli* include the capability to adhere to uro-epithelial cells, haemagglutination, haemolysin, siderophore, also this bacteria have cell surface that consider hydrophobic, serum resistance, persistence to engulf by phagocytosis, and have got N.F (cytotoxic necrotizing factor), K1 antigen and this bacteria consider lyses gelatin because have gelatinase enzyme that act creation etc. (Johnson et al. 2002, Lexi-Comp 2009). The recent search show there are large groups of antimicrobial-drug (AMD) available of the management of through extra-intestinal *E. coli* caused UTIs (Mandelle et al. 2005), and often need more complication treatment regimen. The evolution of antimicrobial resistance in (community acquired *Escherichia coli*) however, requires continuing reevaluation of empiric antimicrobial therapy (Manges et al. 2001).

For instance, in 2001, Manges *et al* were report that 11% of whole *E. coli* also 49% of every trimethoprim/sulfamethoxazole-resistant *E. coli* in California community (upon 4 month period). It caused AMD-persist UTIs within Michigan, Minnesota, and Colorado (Croxen et al. 2010), and pyelonephritis in numerous states (Moreno et al. 2006, Mulvey 2002).

### Antibiotics Usage in This Study

1. **Trimethoprim-sulfamethoxazole** "Co-tri" in range 160/800 mg: Co-tri contain a better effect collectively on inverse after administration distinctly, this back to; inhibit sequential procedure in the folate synthesis pathway.

2. **Ciprofloxacin (1000 mg days) (cip):** It is a good choice to treat the patients which suffered of complicated and pyelonephritis caused by *Escherichia coli* (Nicole and Jon 2008), but no such as first-choice drug. Recent recommended via the American Academy of Pediatrics showed a systematic usage of ciprofloxacin in kids must limited to contagions bring about by multidrug-resistant pathogens or give rise to side effect (Niranjan and Malini 2014). Also utilized via patients and because used not required hospitalization where the frequency of resistance of community uropathogens is not known to exceed 10% (Rahal 2009). In some cases use ciprofloxacin in mixture with metronidazole is one of the first-drug programs in treat guidelines for patient suffering from acute pyelonephritis, and hospital-acquired UTI (Renata 2004).

## MATERIAL AND METHODS

### Antibiotic Discs

All from Bioanalyse (Turkey) company.

### Sterilization- Methods

Used moist heat sterilized had usage to sterilized some solutions after that media, these not influence via heating, usage autoclave underneath 15 bar-in<sup>2</sup> pressure at 121 centigrade for 15 minutes, whilst dry sterilized had use to sterilize multi-glassware at 160-180 centigrade for 2-3 hours.

### Preparation of Cultural Media

**Readymade media:** Readymade media inclusive: Eosin methylene blue agar that term (EMB), MacConky agar then Muller Hinton agar were equipped in relation to the prescript of the manufacturing corporation.

### Preparation Laboratory Media

**Prepared blood agar:** Blood agar media was preparation depended on the instructions of the manufacturing companies.

**Samples collection:** Thirty five of *Escherichia coli* consigns had been obtained from persons sufferance from UTI within Baghdad Medical City hospital (period between 1<sup>st</sup> December/2015 till 1<sup>st</sup> April). The urine specimen possessed by mid-stream kind then culturing on EMB agsr, MacConkey then blood agar to establish these consign by morphological also biochemical trial. The bacterial identification as *Escherichia coli* was examin for antimicrobial susceptibility depending on the CLSI (2011). Whole patients at this research income data about them from hospital records such as, age & sex of them.

**Table 1.** The outcomes of some biochemical tests for *E.coli*

Biochemical tests	<i>E.coli</i>
Oxidase test	=
Catalase test	+
Indol test	+
MR test	+
VP test	=
Citrate utilization test	=
TSI test	=
Slant/bottom	A/A
H <sub>2</sub> S	-
Gas production	+
Urease test	-

+: Positive result; -: Negative result; A: Acid production; K: Alkaline; NG: No change

## RESULTS AND DISCUSSION

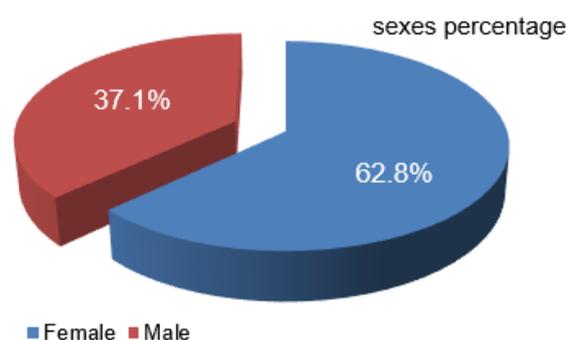
### Collection and Diagnosis of the Isolates

Current study shows, thirty five isolates had been diagnosed as *Escherichia coli* collected from patients suffering from urinary tract infections. G-ve (gram negative) pathogens as the common of problematic bacterial challenges recognized by infectious disease society of America (Russo and Johnson 2000). It represents the mainly pathogens specifically at a hospitals setting caused multi problem for their broadly distribution (Santo et al. 2007).

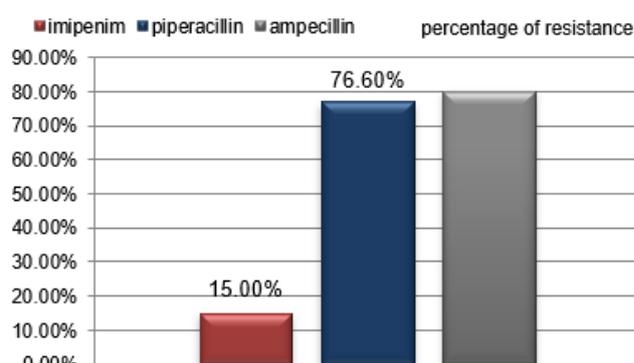
Total of 35 obtain consign were spotted as *E.coli* foundation UTI. To settle this detection, bacterial isolates initially growth on MacConkey agar then blood agar with aerobic conditions, after those differential diagnostic tests were performed. On MacConkey agar, consign performed pink in color by reason of lactose fermentation with small in size also steady edge. On blood agar, a few cells formed a clear translucent zone close the colonies as an end result for β-hemolysine making, whilst on EMB agar seen as dark colonies with greenish-black metallic sheen (Asadi et al. 2014). Microscopic observation appears these bacteria as gram negative rods arranged single or aggregates in pairs.

*E.coli* had been identification (at a hospital) as a negative outcome in the oxidase and urease, whilst it provided positive outcome in catalase examine. For IMViC examine, it gave a positive result in indole test then methyl red test, while a negative result appeared with VP in addition it was incapable to employ citrate as a focal source for carbon (Table 1). Culture *E.coli* in TSI media show this bacteria produced acidic reaction on the slant and the bottom with gas production due to the fermentation of the three sugars (lactose, glucose, and sucrose), with no H<sub>2</sub>S production (Satish et al. 2013).

So it could be said that *E.coli* embraces the chief cause of UTI as related to others bacteria then about 90% of cases is allied to this bacteria as AL-Gerawi, had talk about it. This is perhaps be owed to that UT are a commons for assault of numerous G-ve pathogens then this definition was experimental by Al-Jubori, who illustrated that UTIs have amongst the furthestmost



**Fig. 1.** The percentage of sex patients in UTI samples



**Fig. 2.** The percentage rate of resistance to two antibiotic against *E.coli* isolates

frequently predominant infections via *E.coli* pathogens in scientific training. Thus, the recent study only *E.coli* was isolated from patient's pains from UTI.

### Correlation between UTI with Patient's Sex

Total of 35 *E. coli* urinary consigns were (22 female and 13 males) (variety 29-80 years then one female with age 2 years). Our finding of the recent learning analogous with the outcome of Alo's et al. (2009) showed 164 isolates of *E.coli* (68.2% of female & 31.7% male). Nonetheless Jain et al. (2011) was realized *E.coli* is shared female (65.09%) as well as in male (67.25%). So could be said "UTI is frequently among women than men."

### Prevalence of *E. coli* persist against Trimethoprim- Sulfamethoxazole and Fluoroquinolones

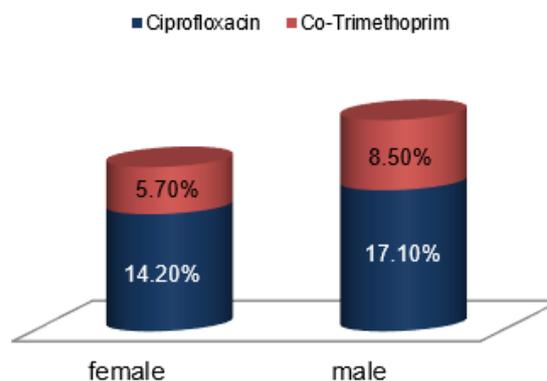
The antimicrobial susceptibility test was performed for whole consign usage disc diffusion test against two antibiotic under to Fluoroquinolones "ciprofloxacin" then Sulfonamides drugs (trimethoprim-sulfamethoxazole) The outcomes (recorded in Table 2) has explanted affording to the CLSI reference (2011). In general trimethoprim-sulfamethoxazole (Co-Tri) was the more efficient one since the amount of persist was 14.2% while 28.5% of the consign showed their resistance to ciprofloxacin Fig. 2 shows a comparison between the percentage and the range of persist to all *E.coli* isolates in research (El-Gali 2018).

**Table 2.** Results of isolates to drug susceptibility test with gender of patients

Samples	Sex	ciprofloxacin	Co-trimethoprim
1	F	S	S
2	M	S	S
3	F	S	R
4	F	S	S
5	M	R	R
6	F	S	S
7	M	R	R
8	M	S	S
9	F	S	S
10	F	R	S
11	F	R	S
12	M	S	S
13	F	S	S
14	M	S	S
15	F	S	S
16	M	R	S
17	M	R	S
18	F	S	S
19	M	S	S
20	M	S	R
21	F	S	S
22	F	S	S
23	F	S	S
24	M	S	S
25	F	S	S
26	F	S	S
27	M	R	S
28	F	S	S
29	F	S	S
30	F	R	S
31	M	R	S
32	F	S	S
33	F	S	S
34	F	S	S
35	F	R	R

F: Female, M: Male, R: Resistance, S: Sensitive

To discuss these results of antibiotic susceptibility for this bacteria, it was appeared that, the resistance ratio of *E.coli* isolates were 14.2% (5/35) for Co-Tri thus the best activity goes to this bacteria, while it increased to 28.5% (10/35) for Ciprodar which represent the highest resistance rate in this isolates as shown in **Fig. 2**. Research carried by Jain *et al*, they showed that the ratio of stand to Co-Tri drug had been reached to 81.85% whilst extended to 86.48% against Ciprodar and this result is much highest than the proportion of this study.

**Fig. 3.** Commonness of persist in sex of patients

Joshi *et al.* (2011) appear that the ratio of resistance to Cip is 30.44% which agreement with recent research. In a research carried by Satish *et al.* (2013) and Joshi *et al.* (2001), the rate reached to (64.2%-75%) for each Co-Tri and Cip respectively, which is also disagreement with the recent study. In current study to comprise the resistant ratio in relation to the gender of the patients appear important different of resistance to Cip in male 17.1% (6/35) compared with 14.2% (5/35) in female and for Co-tri in female 5.7% (2/35) in comprise with 8.5% (3/35) in male as showed in **Fig. 3**.

This result is relatively close with study done by Alo's *et al*, they showed 25% in man and 9% in woman resistance for fluoroquinolones but, not acceptable for Co-tri; who determined resistance rates for Co-tri in male 8.5% (3/35) and in female 5.7% (2/35). Three isolates UTI<sub>5,7</sub> of male and UTI<sub>35</sub> of female were resistance to 2 Cip and Co-tri. According to the show data from this study, Co-tri is now a good choice to experimental treatment of urinary tract infection (UTI), and must carefully in use is recommend to prevent the selective and prevalence of strains that become resistant or can use others types of drugs like Imipenem and others (Tiba *et al.* 2008).

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