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Bacteriological Study of Urinary Tract Infections with Antibiotics Susceptibility to Bacterial Isolates among Honeymoon Women in Al Qassim Hospital, Babylon Province, Iraq

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Authors' contributions

This work was carried out in collaboration between all authors. Author NKKH was designed this study, performed the statistical analysis, managed the analyses of the study and wrote the protocol. Author SKKH was collected the urine sample, isolation the bacteria and identification the Bacterial Isolates. Author SOH was performed Antibiotics Susceptibility of Bacterial Isolates wrote the first draft of the manuscript and managed the literature searches. All authors read and approved the final manuscript

Research Article

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ABSTRACT

Urinary Tract Infections (UTIs) is an infection caused by the presence and growth of microorganism anywhere in the urinary tract. This study aims at determining the most common microorganism that causes UTI in honeymoon women, detection the most effective antimicrobial agents that causative agents of UTI and select the best antibiotics for treated UTI. One hundred and thirty specimens were collected from women suspected with UTI {honeymoon (95) and other women (35)} in al-Qassim hospital; during the period (January 2012 to 30th September 2012).The bacterial isolates were identified tested for antibiotics sensitivity test6. Honeymoon women were showing higher rate of UTI than

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other women in (87 from 95) (91.5 %) and (19 from 35) (54.3%) respectively. *E. coli* (46%) and *Staphylococcus aureus* (42%) were predominant isolate in honeymoon. Regarding Antibiotics sensitivity test, *E. coli* and *Staphylococcus aureus* showed highly sensitive to Nitrofurantoin (100%), (94.5%) followed by Amikacin (90%), (85%), Gentamicin (88.2%), (75%) and ciprofloxacin (80.7%) (88%) respectively, while Oxacillin were not effective against tested isolates. In summary, Honeymoon women were showing higher rate of UTI than other women. *E. coli* was isolated more than other bacteria that causing UTI in honeymoon women. Most bacterial isolates was showed highly sensitive to Nitrofurantoin and resistance to Oxacillin.

Keywords: Urinary tract infections; honeymoon women; antibiotics.

1. INTRODUCTION

Urinary Tract Infections (UTIs) is an infection caused by the presence and growth of microorganism anywhere in the urinary tract and is perhaps the single commonest bacterial infection of mankind [1,2].

It is an extremely common condition that occurs in both males and females of all ages. The prevalence and incidence of UTI is higher in women than in men, which is likely the result of several clinical factors including anatomic differences, hormonal effects, and behavior patterns [3].

The population at risk of UTI includes newborn (including the premature), mature girls, sexually active females and elderly females. About 3% of all women in the United States visit a physician at least once each year for UTIs, and at least 50% of women report at least one UTI in a lifetime [4]. Honeymoon women have recently engaged with their first sexual activity or have had a new sexual partner.

The majority of these infections occurs in the females and is related to sexual activity. Clearly one elements in this condition is personal hygiene, whilst it is possible for women to attend to their own personal hygiene and some do so, obsessionally occasionally with unpleasant and unwanted results such as Irritant Urethritis or Vaginitis from caustics soaps, bubble baths [5].The genitourinary system is one of the portals of entry for many pathogens [6].This study aims at determining the most common microorganism that causes UTI in honeymoon women, detection the most effective antimicrobial agents that causative agents of UTI and select the best antibiotics for treated UTI.

2. MATERIALS AND METHODS

2.1 Collecting of Samples

This study was carried out in Al-Qassim Hospital in Babylon province, during January to 30th September 2012. One hundred thirty urine samples {honeymoon women in (95) and other women in (35)} were collected from them who were presented to the outpatient with signs and symptoms of UTI. Midstream urine samples were collected in sterile containers by using clean and sterile catch method recommended by (37). Then culture on nutrient agar, blood agar and MacConkey agar plates, using sterile standard loop (1ml) then incubated at 37ºC for 24 hours.

2.2 METHODS

After positive results of growth were appear, only honeymoon women samples were identified with Gram stain and Biochemical test.

2.2.1 Biochemical test

Gram negative isolates were identified by standard biochemical tests.

(Enterobactericeae pathogens) identified by:

1. IMVIC test (indol production, methyl red, vogas-proskauer and citrate utilization).
2. TSI (triple sugar iron).
3. Gelatin liquefaction.

- Gram positive isolates were identified by:

1. Catalase test.
2. Coagulase test (tube and slide method).
3. Mannitol salt agar (for *S. aureus*). All the tests above done according to [7].

2.2.2 Antimicrobial susceptibility testing

Antibiotic sensitivity test was performed for each isolate utilizing the method of Kirby-Bauer (disc diffusion method) [8]. This was performed on Mueller–Hinton agar with the following antibiotic discs (Ampicillin AMP 10µg, Amikacin AK 30µg, sulfamethaxole-trimethprim SXT 5µg, Cefotaxime CTX 30µg, Ceftazidim CAZ 30µg, Ceftraxon CTR 30µg, Ciprofloxacin CIP 5µg, Chloramphenicol C 30µg, Clindomycin CD 30µg, Gentamicin CN 10µg, Nalidixic acid NA 30µg, Nitrofurantoin NIT 300µg, Oxacillin OX 1µg, Tetracycline TE 30µg, Vancomycin VA 30µg, Erythromycin E 15µg). Sensitivity was read after incubation for 24 hrs. at 35ºC. The bacteria isolates were regarded as sensitive or resistant according to CLSI criteria [9].

3. RESULTS AND DISCUSSION

Among 130 suspected infected women with UTI we found that rate of UTI in honeymoon as following 95 honey moon women 87(91.5%) have UTI while 35 other women(control), have UTI in 19 (54.3%).

Table 1. Bacterial isolates from urine of UTI Honey moon women

Bacterial Isolates	No. (%)
E. coli	40 (46)
S. aureus	37 (42.5)
S. epidermides	4 (4.6)
Klebsiella spp.	2 (2.3)
S. faecalis	1 (1.1)
Pseudomonas spp.	1 (1.1)
Mixed	2 (2.3)
E. coli+klebsiella	
E. coli+ S. epidermies	
Total	87 (100)

Table 2. Bacterial isolates from urine of UTI in others women (control)

Bacterial Isolates	No. (%)
S. aureus	10 (52.7)
E. coli	5 (26.3)
S. epidermides	3 (15.8)
Pseudomonas spp.	1 (5.2)
Total	19 (100)

In this study found that the honeymoon women more infections rate in UT than other women (control). This can be explained by the fact that women in this period of increased reproductive activity are most prone to sexual activity which predisposes to introduction of microorganism to the urinary tract that lead infection [10]. So Sexually active women were greater risk for UTI than women who do not engage in sexual intercourse (3). Scholes *et al.* who improve that the most important risk factors for UTI in young women is a recent sexual activity [11] and that confirmed by [12]. UTI frequently occurs within 48hrs after sexual intercourse [13,14], intercourse is associated with transient bacteriuria [15].

Furthermore, Furthermore, the bacterial isolates of UTI in Honey moon women and others women were studied (Table 1 and Table 2). *E. coli* was most predominant which was similarly reported in UTI female patients elsewhere in our country; Al- Mosul [16], Al-Anbar [17], Tikrit [18], Baghdad [19] and Karballa [20] and in other countries Ethiopia [21] and USA [22]. The odds to honey moon women and others women show low rate of *E. coli* in (26.3%).

Klebsiella spp. and *E. coli*, *S. faecalis* greater bacterial isolates that related to the bacteria most often seen in UTIs are of fecal origin [23,3] represented by fecal organisms of Enterobacteriaceae [24,25]. These bacteria may be often spread from the rectum or vagina to the urethra then to the bladder or kidneys.

The most virulent strains of *E. coli* possess toxins and adhesions, pili, or fimbriae to allow adherence to uroephithelium [26]. These protect the bacteria from urinary lavage and allow bacterial multiplication and renal tissue invasion [27], while fimbriae aid in adherence to vaginal and renal epithelium and causes upper UTI [28].

Staphylococcus was the second most common cause of UTIs in young women, this study is agrees with [29]. *S. aureus* was an actual pathogen because it possesses virulence factors like protein A, many toxins, and microcapsule in some strains which enable its binding on host tissue and causes UTI [30], while in other women *Staphylococcus spp* were predominant isolates in (52.7%). Recent studies have reported the increasing prevalence of *Staphylococcus aureus* in UTIs, due to *Staphylococcus aureus* have many virulence factors (damaged enzymes and exotoxins against host cells) and resistance to many antibiotics that enable this bacteria causes UTI [38,39,40]. *Staphylococcus* spp. is opportunistic pathogens can causes disease when the bacteria change the location (from skin to urinary system), when number increased, and when the immunity of human was decreased. *E. coli* showed more mixed growth with other bacteria *Staphylococcus* species, this was due to the compatibility of such organisms to grow due to their physiological and growth features [30].

3.1 Antimicrobial Sensitivity against Bacterial Isolates

Antibiotics sensitivity test to all bacterial isolates were study, only *S. aureus* and *E. coli* results show (because it's predominant isolates) as figures below.

The sensitivity tests for bacterial isolates of honeymoon women were study (Fig. 1). *E. coli* and *S. aureus* were highly sensitive to Nitrofurantoin (100%), (94.5), ciprofloxacin (80.7), (88), gentamicin (75), (88.2), and amikacin (90), (85) respectively. Nitrofurantoin is important for treating many infections, including severe infections of the urinary tract and other sites in the body [4].

Also it achieves therapeutic concentration only in urine. Therefore, it is only indicated for the treatment of uncomplicated UTIs [4]. The low level of resistance to Nitrofurantoin among uropathogens at approximately 2% in USA, it remains an ideal therapeutic agent [31,32]. So recommended Nitrofurantoin as drug of choice for the immediate empirical therapy of UTI [21].

Moreover, the result in this study of ciprofloxacin and Gentamicin and Amikacin sensitivity against UTIs isolates were similarly to studies found in Karbala study [33] and Al-Anbar study [17].

On the other hand, the most isolates showed high susceptibility to Ciprofloxacin. Ciprofloxacin have antibacterial activity due to the Ciprofloxacin interferes with nucleic acid synthesis by enzyme which inhibiting the bacterial isolates, it has several binding sites on the enzyme and thus decrease the probability of resistance [6]. Ciprofloxacin have frequently been a reliable therapeutic intervention in UTIs because of its broad spectrum activity as well as strong action on Gram-negatives. However it is advocated that they should be used as a last line (not a first line Antibiotic) due to its serious side effects profile especially younger patients and it's cost [34].

Furthermore, *E. coli* and *S. aureus* were completely resistance to oxacllin, that agree with Karbala studies (20 and 33) that indicate low activity of this antibiotics in treatment of UTI in several countries recently.

E. *coli* reveals completely resistance to sulfamethaxole-trimethprim, while *S*. *aureus* were resistance (57.2%). This results agree with Karkuk study which obvious completely resistance to sulfamethaxole-trimethprim (35).

sulfamethaxole-trimethprim resistance is probably due to continuous use of it for many years, so the long exposure of bacteria to this antimicrobial agent trough uses (36).
The widespread use and more often the misuse of antimicrobial drugs has led to a general rise in the emergence of resistant bacteria. Higher resistant strains were reported in USA to Ampicillin and sulfamethaxole-trimethprim (37).

On the other hand, in compare to antibiotics sensitivity test of others women (control) (Fig. 2) found that same antibiotics were more effect like nitrofurantion, Gentamicin with little low effect and completely resistance to oxacillin.

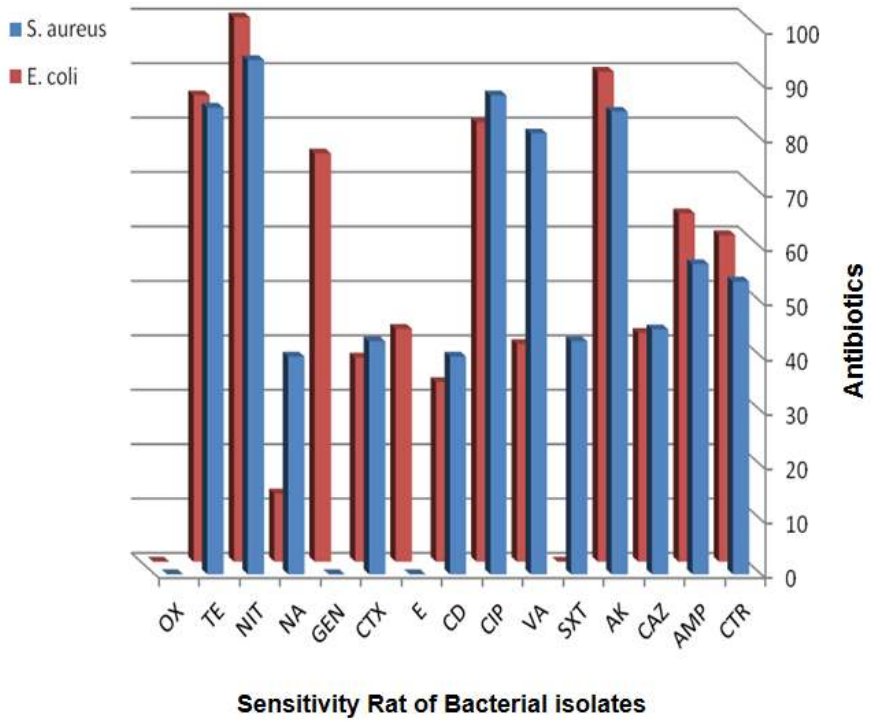

Fig 1: Sensitivity rat of UTI bacterial isolates in honeymoon women (*S. aureus* and *E. coli*) to different antibiotics

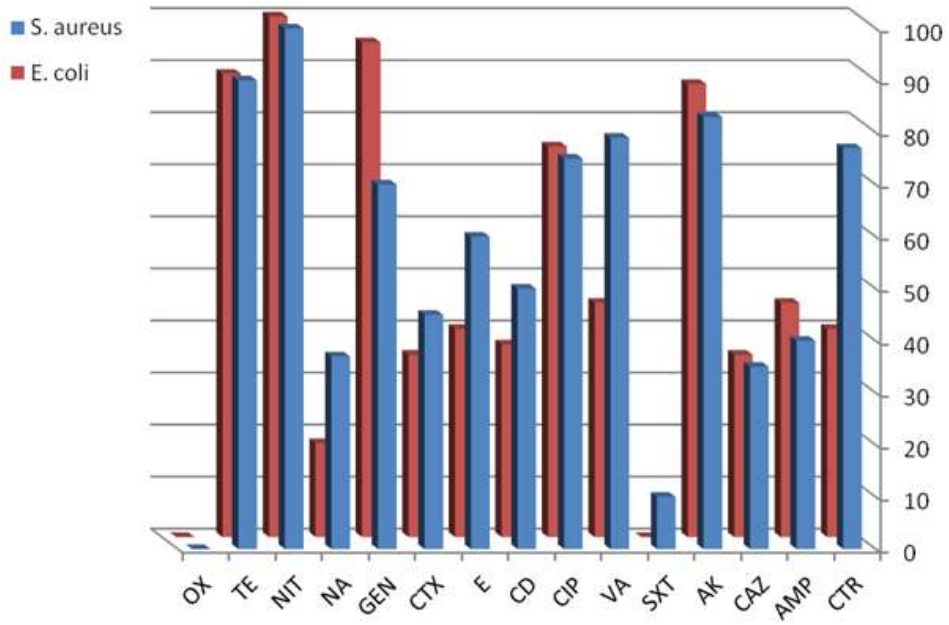

Fig 2: Sensitivity rat of UTI bacterial isolates in other women (*S. aureus* and *E. coli*) to different antibiotics

4. CONCLUSION

UTI in honeymoon were higher rating than others women. *E. coli* was isolated from UTI more than other bacteria that causing UTI in honeymoon women unlike to others women (control) which found that *S. aureus* predominant isolates and Nitrofurantoin is the most effective antimicrobial on bacterial isolates to both groups.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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