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Isolation and Identification and Antibiotic Sensitivity of Bacterial Caused that Urinary Tract infection in Female in Najaf province

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ABSTRACT

Background: *The present study aimed to investigate 117 patients by medical signs of UTI referred to Al-Haidariya General Clinic, Al-Sadr and Al-Hakim Hospital in Al Najaf Governorate. The age group for women choice to (16-45years). Clean- midstream urine of the patients was together in the sterilized tube (3-5 ml), directly transmitted to the research laboratory). depended on the time of life distribution of the women in UTI. The age groups of (26 – 35 ages) that higher record with infection of UTI to n=39 (51.31%). E.Coli and Klebsiella pneumoniae isolates were the highest recorded infection in UTI with 33 (42.30 %) ,17 (21.79 %).The main bacterial types isolated were identified according to cultural, morphological, microscopic report and bio chemical tests. The resistant of bacteria to different type of antibiotic, Ceftriaxone, Amoxicillin and Tetracycline is the most sensitive antibiotic to E. coli and Klebsiella pneumoniae this is related to the fact that tetracycline is active against both gram-positive and gram-negative bacteria.*

Keywords: **UTI Urinary Tract Infection, Gram Positive, Gram Negative, Antibiotic Sensitivity, Biochemical Test.**

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INTRODUCTION

Infection of Urinary tract (UTI) is one of the record prevalence pathogens productions in public health practice. International, The UTI categorized to complicated and uncomplicated. (Stamm WE, Norrby SR. 2001). UTIs of uncomplicated found in lively well womanly patients with functionally, structurally ordinary urinary regions. UTIs Complicated that are with regard to common disease pathological conditions that extend the require for treatment or raise the probability treatment dud. This cases contain in natural to the urinary region that hinder urine flowing, the presence of the weird form (e.g., stone, indwelling catheter,) or contagion to drug resistant pathogenic factor. (Hooton TM,. 2000; and Stapleton AE 2003.) contagion of Urinary tract may include only the lower urinary region otherwise together that top and lower duct . The word cystitis has been described to characterized the condition included of dysuria, frequency, sometime suprapubic pain. Severe pyelonephritis characterized the medical condition describes by flank ache. (Mandell GL, Bennett JE Dolin R. 2005).

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Staphylococcus saprophyticus plus *Escherichia coli* counting for around 80% of community-acquired uncomplicated urinary contagions, mainly in females below 50 ages. (Ronald A. Dis Mon. 2003; Hummers-Pradier E, Kochen MM. 2002). UTI that word that encompasses asymptomatic bacteriuria and symptomatic contagion to bacterial invasion and infection in the urinary duct. But about to 89% of the patients in UTIs grumble of urinary duct signs, one third or other of the patients with these signs do not have bacteriuria (Medina-Bambardo D, *et al*, 2003). The most specific signs for the patients seeking treatment are dysuria and rate. Together Dysuria and rate that increase the chance of UTI up to 90%, effectively ruling in the identification via individual history. (Bent S, Nallamothu BK, Simel DL, Fihn SD, Saint S. 2002). The frequency of antimicrobial resistance in patients to UTI is accumulative and can vary due to topographical and regional location. (Karlowsky JA, Kelly *et.al* 2002). *E.coli* that highest etiologic cause in UTI, which accounting for up to 90% of cases. *Klebsiella* species, *P.mirabilis,* , and *Enterobacter* species are less common offenders. Less normally, Enterococci, organisms of Gram-positive organisms are even less frequent in which Group B *Streptococcus*, *S. aureus*, *S. saprophyticus* and *S. haemolyticus* are known bacteria (Loh KY, Sivalingam N, 2007).

MATERIALS AND METHODS

Sample group

The total of 117 patients with medical signs of UTI referred to Al-Haidariya General Clinic, Al-Sadr and Al-Hakim Hospital, in Al Nagaf Governorate, were investigated. There were in females with an age choice in (16-45) ages. Clean- midway urine of the patients was together to the sterilized pipe (3-5 ml) transfer directly to the test center. (Forbes BA. Sahm DF, Weissfeld AS, 2007).

Determination of Staphylococcus Spp.

Staphylococcus spp. that recognized according to the form structures, biochemical test, culture media (Holt, JG. *et al*., (1994), MacFaddin, JF. (2000).

Examination of Microscopic

Isolates were stained by Gram stained to identify to reaction of forms pigment, plus arrangement (Benson, J H. (2002).

Growth on Mannitol Salt Agar media

A clean colony of the tested bacteria were Streaking on the plates, and incubated at 37°C for 24 hr, used for identify isolation of *staph. aureus* (Bairly and Scott', 2007).

Biochemical Tests

Catalase Test

(3% H2O2) one drop of catalase reagent was place on a slide. A colony of bacteria was mixed to the reagent on the slide, optimistic results were showed by creation air bubbles (Harley, JP. and Prescott, LM. (2007).

Examination of Coagulase

Citrated rabbit plasma diluted 1:5 was mixed to an identical volume of BHI broth culture then incubated at 37°C. A tube of plasma together with sterilized a broth is involved as a control. For reproducing clots in 1-4 hr. appearances that the optimistic test. The undesirable result is re-examined for for 24 hr. (Forbes, A. *et al.*, (2007).

Identification of Enterobacteriaceae

determination and isolation of bacterial was done due to the standard bacteriological methods. Colony morphology, hemolytic pattern, and Gram reaction, microscopic structures that used to identification criteria. Biochemical tests, namely indole, citrate, H2S production, catalase, oxidase, lactose fermentation, urea hydrolysis and gas production that used for identifiy of Gram-negative bacteria (Cockerill FR, Wikler MA, Bush K, *et al*.,2010, Cockerill FR, Wikler MA, Bush K, *et al*.2006).

Bacterial colony calculation of bacteria in UTI

Bacteria present in the measured amount of urine were inoculated into urinary tract infection, using the loop technique onto the nutrient medium (Merck, Germany) to colony total. The same or other than 10 4 CFU/ml of a particular potential pathogen or for both of 2 pathogens due to positive UTI, a result of 10 2 -10 4 CFU/ml was frequent. A smaller amount than 102 CFU/ml was interpreted as negative UTI. (Schneider PF, Riley TV. 1996). The sample of urine were cultured for identified of the pathogens UTI on MacConkey medium, blood agar (Himedia, India & Merck, Germany). In this study, totally of the bacteria identified as of urine were recognized by using biochemical tests. (Mandell GL, Bennett JE Dolin R. 2005, Forbes BA. Sahm DF, Weissfeld, AS, 2007, MacFaddin JF, 2000).

Antimicrobial susceptibility testing

In this study the antimicrobial sensitivity test was used to Mueller Hinton agar (Merck, Germany) on disk diffusion method (Kirby Bauer's). This method was done due to Clinical and Laboratory Standards Institute (CLSI) guidelines to identify sensitivity of UTIs agents. (Clinical and laboratory standards institute,2002). The antibiotic disks, Amoxillin (10µg), ciprofloxacin (5µg), Tetracycline (250µg), Nalidixic acid (30µg), Nitofurantoin (300µg), Erythromycin (30µg), (10µg), ceftriaxone (30µg), Gentamicin (10µg) .Cefotaxim(30µg) (Forbes BA. Sahm DF, Weissfeld AS, 2007).

RESULTS AND DISCUSSIONS

Study Samples

As shown in table (1) study of urinary tract infection according to age group for women. (48.83%) of 21 women old in the midst (16, 25) years were recognized with UTI. (37.5 %) of 12 women between (36 and 45) years and (30.0%) of 6 women more from (45) years of UTI. Result expect that UTIs come in three primary varieties in women at younger age . Urethritis is caused by bacteria that exclusively infect the urethra, small duct that carries urine starting the bladder to the external of the body. Cystitis, a bladder contagion, can also be brought on by bacteria (Wei-Hung Lin, *et al* ,2021). Pyelonephritis, a more serious form of UTI, is an infection of the kidney itself. Cystitis is the most prevalent kind of UTI that caused by *E. coli* bacteria and *proteus.* spp Most of these just result in pain and annoyance. Treatment for bladder infections is quick and simple. Additionally, it's critical to seek treatment right away to prevent a more serious infection from spreading to the kidneys (J H Lee *et al*,2022).

Table (1): Cases with urinary tract infection according to age group for women.

Age	Complete no. of women Surveyed (n= 171) NO.%	NO. of women recognized with UTI (n =78) NO%
16 – 25y	43 (25.14 %)	21 (48.83 %)
26 – 35y	76 (44.44 %)	39 (51.31 %)
36 – 45y	32 (18.71 %)	12 (37.5 %)
> 46 y	20 (11.69 %)	6 (30 %)

Study of bacterial isolation from urinary tract contagion.

As shown in table (2) all of 78 bacterial were recognized (Table 2). *E. coli* was the most main pathogen with above all isolation rates of 33 (42.30 %) , followed by *Klebsiella pneumoniae* were the second main pathogen with general isolation rate 17 (21.79 %) , *Staph saprophytics* with isolation rate of 14 (17.94%) . *Staph aureus* with isolation rate of 11 (14.10%). *Streptococcus* with isolation rate of 2 (2.56%) and *Pseudomonas* with isolation rate of 1 (1.28%) respectively.

As these result can be indicates that *E. coli* possess a number of virulence factors, such as the ability to evade host immune responses, attach, move, produce toxins, acquire metal, and form intracellular bacterial communities (IBCs), all of which can be used to understand the pathophysiology of infection (Gloria Luz, *et al*,2018). Furthermore, the managing of urinary tract infections (UTIs) is discussed, encompassing both conventional and complementary and alternative medicine. The article also discusses the emergence of antibiotic resistance, the immense promise of vaccinations, and the use of medicinal plants (Honda H *et al* ,2020). While the second percentage of infection with *Klebsiella pneumonia*, *Staphlococcus saprophytics and staphylococcus aureus* refer to that antimicrobial resistance (AMR) significantly restricts treatment choices for infections caused by *Staphylococcus aureus* and *Klebsiella pneumoniae*, which are regularly linked to healthcare-associated infections (HAIs) (Podschun and Ullmann 2020). According to our research, these two bacteria's previous colonization was linked to UT patients' later infections. Conventional microbiological methods, however, failed to clarify the connections between bacteria that colonize and those that infect. It is possible to determine the genetic relatedness of *K.* pneumoniae and S. aureus that colonize and infect certain patients using molecular approaches (Thuy DB *et al*, 2018).

Table (2): The Rate of bacterial isolated from females (N = 78).

Bacterial isolates	Total %
E. Coli	33 (42.30 %)
Klebsiella pneumoniae	17 (21.79 %)
Staphlococcus saprophytics	14 (17.94 %)
Staphylococcus aureus	11 (14.10 %)
Streptococcus spp	2 (2.56 %)
Pseudomonas	1 (1.28 %)

Study of Antimicrobial sensitivity

As shown in (table 3) the resistant of bacteria to different type of antibiotic and the Ceftriaxone, Amoxicillin and Tetracycline is the most sensitive antibiotic to *E.coli* and *Klebsiella pneumoniae* this is related to the fact that tetracycline is active against both gram-positive and gram-negative bacteria, and that resistance is frequently brought about by the acquisition of additional genes. Tetracycline works by inhibiting the creation of proteins by blocking the attachment of amino acyl -tRNA to the ribosomal acceptor (A) site. (erlizzi ME *et al*, 2017). While ceftriaxone is more effective against gram-negative bacteria than first- or second-generation cephalosporin's, it is less effective against S. *aureus* that is susceptible to methicillin (Hunt M *et al*, 2017). Because of its strong effectiveness compared to Enterobacteriaceae that are resistant to many drugs and its relatively mild adverse effect profile, ceftriaxone is a frequently used antibiotic. Because amoxicillin has a bactericidal function and works against together Gram-positive and Gram-negative bacteria by inhibiting the bacterial muco peptide wall from being bio synthesized and repaired, it is used in cases when sensitivity to the antibiotic occurs. Within its class, it is typically the preferred medication due to its high absorption rate after oral administration. (Thai Son N *et al*, 2020). When compared to other aminopenicillins, amoxicillin has a number of not able benefits, including improved intestinal absorption, increased ability to reach effective concentrations at the sites of action, and a quicker amount of cellular wall penetration by Gram-negative bacteria (Bonten MJM, 2021).

Table (3): Antimicrobial sensitivity of bacterial that cause UTI.

Number of Bacterial types (%) Resistant to Antibiotics tested										
Bacterial isolates (N0)	**CTX**	**CN**	**F**	**CIP**	**TET**	**CRO**	**AML**	**AMC**	**E**	**NA**
***E.Coli* (n=33)**	2 (6.0%)	10 (30.3%)	3 (9%)	15 45.45%)	27 81.81%	33 (100%	30 (90.9%)	12 (36.36%)	11 33.33%	15 45.45%
***Klebsiella pneumoniae* (n=17)**	1 (5.8%)	14 82.35%	0 0%	9 52.94%	17 100%	4 23.52%	16 94.11%	7 41.17%	1 5.88%	13 76.47%
***Staph saprophytics* (n=14)**	1 (7.14) %	4 21.42%	0 0%	1 7.14%	2 14.28%	3 21.42%	1 7.14%	5 35.71%	2 14.28%	8 57.14%
***Staph aureus* (n=11)**	0 0%	1 9.09%	1 9.09%	4 36.36%	3 27.27%	4 36.36%	0 0%	0 0%	1 9.09%	10 90.9%
***Streptococcus* (n=2)**	0 0%	0 0%	0 0%	0 0%	0 0%	1 50%	0 0%	0 0%	0 0%	2 100%
***Pseudomonas* (n=1)**	0 0%	1 100%	0 0%	0 0%	1 100%	0 0%	1 100%	1 100%	0 0%	1 100%

CONCLUSION

The following of the research are arrived at:

1- Urinary tract infection (UTI) is one of the record prevalence contagions productions in public health practice.

2- The results revealed that *E.Coli* and *Klebsiella pneumoniae* isolates were the highest infection in UTI in females.

3- Results to antibiotics, Ceftriaxone, Amoxicillin and Tetracycline is the most sensitive antibiotic to *E.coli* and *Klebsiella pneumoniae*.

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