

Bacterial Urinary Tract infection in adults, Hit District Anbar Governorate, west of Iraq.

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ABSTRACT

Background:

Urinary tract infection (UTI) is one of the health problems in the community in all ages and both sexes. Many organisms are involved particularly enteric bacteria in females. Antimicrobial resistance of bacterial pathogen are complaining treatment and recovery of infected individuals. So UTI become more complicated and recurrent trouble maker infection for community.

Aims of the study

This study was devoted to focus on the main bacterial pathogens causing UTI in adult patients from both sexes in Hit District as well as to show the Antibigram of the predominant bacterial isolate from patients.

Patients and methods

Mid- stream urine specimens were collected from adult males and females, each specimen was cultivated on blood agar and Mac Conkey agar and incubated at 37C aerobically for 24 hours. Bacterial isolates were identified with Gram stain and biochemical tests. Predominant bacterial isolate, *E. coli* was tested for antimicrobial sensitivity test by disk diffusion test (Kerby-Bauer Technique).

Results

Adults females were showing higher rate of UTI than adult males (77.8 %), (263) and (59.6%), (37) respectively. *E. coli* took first rank of isolation in both sexes, 26.5 % in males and 40.8% in females. *Staphylococcus* became next (73), (25.26%) while *proteus mirabilis* was showing third rank of isolation in both sexes. Regarding Antibigram, *E coli* showed high sensitivity for imipenium (95.5%) followed by Amikacin (90.2%) while studied *E coli* isolate showed high tare of resistance to Ampicillin and Cotrimasol-Methprim.

Conclusion:

We can conclude from this study that UTI is an important infection in community and enteric bacteria particularly *E. coli* is an important causative agent. So precautions must be taken by people to prevent infection. Community education in self hygiene and social status must be done. Physicians must care of multi drug resistant *E. coli* during manipulation UTI

Keywords: UTI, Antibigram, *E. coli*, Hit city

INTRODUCTION

Urinary tract infection (UTI) is defined as an inflammatory response of the urothelium to bacterial invasion (Stam and Norrby 2001 Tomas 2003).¹

It occurs far more commonly in women than in men, except at the

extremes of age, After 50 years of age, the incidence of UTI is almost as high in men as in women, presumably because of obstruction from prostatic hypertrophy. In persons between 1 and about 50 years of age, UTI is predominantly a disease of

females. (Tomas, 2003, Kalpana and Walter, 2005).

Different classification was devoted for UTI to help treatment, like upper and lower UTI, (Schaeffer, 2003). An increased rate of antimicrobial resistance was found to different antimicrobial agents due to abuse of antibiotics (Shafaq *et al.* 2011) and the emergence of resistance factors in bacteria through different mechanisms of resistance (Nasreen *et al.* 2009 Shafaq *et al.* 2011). This study was done to show the rate of UTI and the type of bacteria imposed in this infection in adults in Hit District, West of Ramadi, Anbar Governorate, IRAQ

Patients and methods:

Midstream urine specimens were collected from (400) adult patients from both sexes using clean catch method recommended by (Vandepitte *et al.* 2003). Patients were attending private Clinics of Urologists and senior physicians in Hit District, Anbar Governorate, West of IRAQ.

Urine specimens were processed as soon as possible (within 30 minutes) in Hit Central Private Lab licensed by Iraqi Ministry of Health.

Urine samples were tested using direct and direct bacteriological

investigations, direct smear stained with gram stain was employed to each specimen. Urine were cultivated on sterile culture media using blood agar and MacConkey agar and incubated aerobically under 37C for 24 hrs. Results of urine cultures were interpreted quantitatively and qualitatively following (Vandepitte *et al.* 2003).

Bacterial isolates were identified and diagnosed using morphological and cultural criteria. Necessary confirmative tests were done to reach final diagnosis for each bacterial isolate following (Vandepitte *et al.* 2003, Forbes *et al.* 2011). Bacterial isolates were kept frozen in Brain Heart infusion broth containing 10 % Glycerol.

Antimicrobial sensitivity test was done for the predominant bacterial isolate using Kirby-Bauer disc diffusion technique (Vandepitte *et al.* 2003). Standard *E. coli* strain employed as control, results were reported and analyzed using SPSS .

RESULTS

Adult females were showing higher rate of urinary tract infection than adult males, 263 (77.8%) and 37 (59.6) respectively (P< 0.05) Table1.

Table 1: Rate of UTI in both sexes

Sex	Positive (+ve)		Negative (-ve)		Total	
	No.	%	No.	%	No.	%
Male	37	59.6	25	40.4	62	15.5
Female	263	77.8	75	22.2	338	84.3
Total	300	75	100	25	400	100

E. coli took the first rank of isolation, 113 isolates with the ratio (39.1%) Out of 289 total *E. coli* isolates, 104 (92.14 %) were in females and the rest of isolates 9 (7.96) were in males.

Staphylococci became next to *E. coli*, 73, (25.2%) and majority of them were coagulase negative staphylococci particularly *Staphylococcus saprophyticus* in females 47, (16.2 %) (Table 2).

Table 2: Bacterial types, single isolated.

Bacterial isolate	Male		Female		Total	
	No.	%	No.	%	No.	%
<i>E.coli</i>	9	26.5	104	40.8	113	39.1
<i>Klebsiella</i>	1	2.9	20	7.8	21	7.3
<i>S.fecalis</i>	1	3.0	12	4.7	13	4.5
<i>Proteous</i>	5	14.7	30	11.8	35	12.2
<i>Pseudomonas</i>	2	5.9	10	3.9	12	4.1
<i>Enterococcus</i>	Zero	Zero	1	0.4	1	0.3
<i>Staf.aureus</i>	3	8.8	23	9.0	26	9.0
<i>St.epidermes</i>	6	17.6	21	8.2	27	9.3
<i>St.saproph.</i>	2	5.8	18	7.1	20	6.9
<i>Actinobacter</i>	Zero	Zero	Zero	Zero	Zero	Zero
<i>Enterobacter</i>	5	14.8	13	5.1	18	6.3
<i>Salmonella</i>	Zero	Zero	Zero	Zero	Zero	Zero
<i>Nisseria go.</i>	zero	zero	Zero	Zero	Zero	Zero
<i>Candidia spp.</i>	zero	zero	3	1.2	3	1.0
<i>Total</i>	34	11.7	255	88.3	289	100

Proteus mirabilis was the third bacterium among isolated bacteria, 35 (12.2%) and all bacterial isolates were showing higher rate of isolation in females than males (P< 0.05) Table 2.

Regarding mixed bacterial isolation, it was found that eleven (11) patients were showing positive urine cultures with mixed growth of more than one organism and majority of them were in females also (Table 3).

Table 3: Bacterial types, mixed isolates.

Bacterial isolate	Male NO.	Female NO.
<i>E.coli + Proteous</i>	1	1
<i>E.coli + Pseudomonas</i>	1	1
<i>Pseudomonas + Staf.aureus</i>	1	Zero
<i>E.coli + St.epidermes</i>	Zero	1
<i>Klebsiella + Staf.aureus</i>	Zero	1
<i>Klebsiella + Proteous</i>	Zero	1
<i>Pseudomonas + Proteous</i>	Zero	1
<i>S.fecalis+ Proteous</i>	Zero	1
<i>E.coli +Enterobacter</i>	Zero	1
Total No.11	3	8
Total % 3.6	8.1	0.4

The Antibiogram for the dominant isolated bacterial type (*E. coli*), it was found that 95.5 % of *E coli* isolates were sensitive to Imepimen and majority of them were from females (104) and the rest number (9)

were from males. Amikacin became next (90.2 %) followed by Ciprofloxacin. *E coli* isolates were showing high resistance to Ampicillin and Methiprim (Table 4).

Table 4: Antibigram of *E. coli* isolated from UTI.

Antibiotics	Female		Male		Total Sensitive	
	R No.	S No.	R No.	S No.	No	%
<i>Imipenium</i>	4	100	1	8	108	95.5
<i>Amikacin</i>	9	95	2	7	102	90.2
<i>Ciprofloxacin</i>	25	79	3	6	85	75.2
<i>Nitrofuraltedon</i>	30	74	4	5	79	70
<i>Refadin®</i>	55	49	7	2	46	40
<i>Gentamicin</i>	51	53	5	4	57	50
<i>Naladixic Acid</i>	39	65	6	3	65	57.5
<i>Pencillin</i>	100	4	9	0	4	3.5
<i>Methiprim</i>	96	8	9	0	8	7

DISCUSSION

Increased rate of urinary tract infection (UTI) in females was in accordance with the findings of (Nasreen *et al.* 2009., Manges, R.A *et al.* 2008, Khaled *et al.* 2010) The higher rate of urinary tract infection in females was ought to the feature of female urogenital tract (short female urethra) which makes it easy to be contaminated with fecal flora (¹¹Naber 2000).

Aged males (particularly above 50 years old) tend to show an increased urinary tract infection (UTI), This was predisposed by the prostate infection and hypertrophy which leads to incomplete evacuation of urinary bladder due to urethral stenosis there leading to a residual volume of urine in the urinary bladder and this residual urine acts a good medium for bacterial growth in males (Stamm and Hooton 1993, Kalpana *et al.* 2005). Enteric bacteria particularly *E. coli* showed the first rank of isolation in females and this was in accordance with the findings of (Nasreen *et al.* 2009, Shafaq *et al.* 2011 ⁹Manges, R.A *et al.* 2008), this was due to the above mentioned explanation for the feature of female urogenital tract exposed to sepsis with fecal contents in which *E. coli* showed high count, 1×10^5 cell /gr. Of stool (Brooks *et al.* 2007). *E. coli* is an important pathogen in for the urinary tract, particularly uropathogenic strains through possessing adhesion pili and other adhesins that predispose bacterial binding to the urothelium (Jasmina *et al.* 2005, ¹⁶SOdernm 2011, Jacobson *et al.* 1985). In addition to that *E. coli* possess many other tools make it potent pathogen to urinary tract and other sites of the body (Jacobson *et al.* 1989 Brooks *et al.* 2007). So for the above mentioned criteria *E. coli* took the first rank of isolation from urinary tract infection in this study.

Staphylococcus, particularly *Staphylococcus saprophyticus* was showing a high rate of isolation in females and this was in agreement with the findings of (Anderson 2010, Wallmark *et al.* 1978, Roland A., 2002. This was attributed to the ability of *Staphylococcus saprophyticus* to reside urinary tract of virgin females and so imposed in the UTI among them (Mark *et al.* 1992, Brooks *et al.* 2007).

Staphylococcus aureus is an actual pathogen because it possesses virulence factors like protein A. and microcapsule in some strains which enable its binding on host tissue (Brook *et al.* 2007).

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 (Brook *et al.* 2007).

Antibiogram of bacterial isolates:

Regarding the Antibiogram results of *E. coli* studied isolates showed Imipenem, up on my knowledge this was ought to the reason that imipenem is newly used in Iraq as treating antibiotic so the local isolates still are not showing resistance to it , in addition to that imipenem is a carbapenem antibiotics which is highly active against Enteric bacteria producing ESBL(Ko *et al.* 2007). Our findings were in accordance with the findings of Nasreen *et al.* 2009 Shafaq *et al.* 2011).

Amikacin became next to imipenem, it showed high efficiency against *E. coli* isolates though it is available in Iraq before imipenem Many years ago, this was might be due to low resistance rate of bacterial isolates to Amikacin.

High rate of resistance of *E. coli* to cotrimazol- methprim and ampicillin in this study and this was in agreement with the findings of Shafaq *et al.* 2011, Nasreen *et al.* 2009) the ampicillin and Cotrimazol-methprim resistance is probably due to continuous use of it fro many years her, so the long exposure of bacteria to these antimicrobial agents trough use and the *E. coli* found the tool of resistance like beta lactame enzymes for ampicillin (Shafaq *et al.* 2011, Nasreen *et al.* 2009) who proved multidrug resistance plasmids for ESBL in *E. coli.* and folic acid alternatives for methiprim resistance (Brook *et al.* 2007) resistance Antimicrobial resistance was predisposed by increased exposure to antimicrobial agents through recurrence of infection and abuse and uncontrolled drug intake of patients through buying drugs without doctors prescription (self prescription).

In the other hand majority of clinicians prescribe antibiotics without laboratory guidance (Wright *et al.* 2000).

We can conclude from this study that UTI is an important infection in community and enteric bacteria particularly *E. coli* is an important causative agent. So precautions must be taken by people to prevent infection. Community education in self hygiene and social status must be done. Majority of *E. coli* isolates were sensitive to imipenem and amikacin while they were showing high resistance to ampicillin and cotrimasol. So physicians must care of multi drug resistant *E. coli* during manipulation UTI, which showed the highest rate in UTI in HIT District. Restrictions must be taken against abuse of antibiotics through buying drugs without doctor's prescription from pharmacy and following laboratory guidance during antibiotic therapy by physicians.

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ARABIC SUMMARY

التهاب المجارى البولية في البالغين في مدينة هيت / محافظة الانبار / غرب العراق.

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ديباجة :

التهاب المجارى البولية هو احد المشاكل الصحية في المجتمع لمختلف الأعمار وكلى الجنسين وان الجراثيم وعلى الأخص الجراثيم المعوية منها سبب مهم للإصابة. إن مقاومة الجراثيم للمضادات تعقد العلاج والشفاء الأشخاص المصابين ولهذا أصبح التهاب المجارى البولية أكثر تعقيدا ويسبب مشاكل للمجتمع.

هدف الدراسة:

أجريت هذه الدراسة لتسليط الضوء على الجراثيم المرضية التي تسبب التهاب المجارى البولية في الأشخاص البالغين الذكور والإناث في مدينة هيت محافظة الانبار غرب العراق.

إضافة إلى ذلك هدفت الدراسة إلى حساسية الجرثومة الغالب عزلها من المرضى لبعض المضادات الجرثومية.

المرضى وطرائق العمل:

جمعت أربعمئة عينة إدرار من الذكور والإناث البالغين المصابين بالتهاب المجارى البولية وتم زراعة تلك العينات بالظروف الهوائية على وسط الدم ووسط ماكونكي وحضنت بدرجة 37 درجة مئوية لمدة 24 ساعة تم تشخيص العزلات الجرثومية باستخدام صبغة كرام والاختبارات البيوكيميائية اللازمة. تم إجراء فحص الحساسية لعزلات جرثومة الاشريكية القولونية بطريقة كربي باور.

النتائج:

كانت نسبة الإناث المصابات بالتهاب المجارى البولية أكثر منها في الرجال 77.8% و 59.6% على التوالي . جاءت الاشريكية القولونية بالمرتبة الأولى بنسبة العزل 26% من الذكور و 40.8% من الإناث ومن ثم تلتها المكورات العنقودية بأنواعها المثبتة بنسبة 25.26%.

أما بالنسبة إلى نتائج اختبار الحساسية للمضادات الجرثومية كانت نسبة العزلات الحساسة للمضاد الامينيم 95.5% ومن ثم الاميكاسين 90.2% وكانت جرثومة الاشريكية القولونية مقاومة للامبسلين ومركب السلفا المعروف بكوتريمازول بدرجة عالية جدا 96.5% للامبسلين و 93% لمركب كوتريمازول.

الخاتمة :

يمكن الاستنتاج من هذه الدراسة بان التهاب المجارى البولية يحصل بنسبة عالية في المجتمع وان جرثومة الاشريكية القولونية مسبب مهم له وعلى الناس الوقاية من الإصابة به وتثقيف المجتمع لرفع الوعي الصحي لديهم . على الأطباء كذلك العناية عند التعامل مع مثل هذه الإصابة التي تسببها جرثومة الاشريكية القولونية المقاومة للمضادات الجرثومية.