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Clinical and bacterial study of urinary tract infections patients in Thi-qar province

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Abstract

Urinary tract infection (UTI) is a common problem diagnosed and treated in urgent care medicine practice. The study included 100 patients suspected to have UTI from their from primary signs and symptoms, in Shatrah hospital and private clinics.

After clinical examination of patients signs and symptoms estimated then urine samples taken for bacterial diagnosis depend on culture colony characters and biochemical tests included epi20. Main signs and symptoms were burning or scalding sensation or lower abdominal discomfort when passing urine (80% of patients), Frequently urination than usual (75%), Feeling an urge to urinate and scatter urine may be only little drops (65%). Study revealed that female suffering from UTI more than male (70 female compare to 30 male including in study)

Bacterial identification exhibit that *Escherichia coli* was the common performed (13%) of isolates, followed by *Proteus mirabilis* and *Klebsiella oxytoca, other isolates were Pseudomonas aeruginosa*, *Stphylococcus aurus, staphylococcus saprophytics* and *Sterptococcus pyogen.*

Keywords: UTI, Shatrah, bacteria, Iraq

الخلاصة

التهاب المجاري البولية هي مشكلة شائعة يتم تشخيصها وعلاجها في ممارسة الرعاية الطبية العاجلة. وشملت الدراسة 100 مريض يشتبه في إصابتهم بمرض التهاب المسالك البولية من علاماتهم وأعراضهم الأولية في مستشفى الشطرة والعيادات الخاصة.. بعد تقدير الفحص السريري لعلامات وأعراض المرضى ثم اخذ عينات البول لغرض التشخيص البكتيري بالاعتماد على خصائص المستعمرات المزروعة والاختبارات البيوكيميائية شملت اختبارات ال Api20E و كانت الأعراض والأعراض الرئيسية هي حرقة و الاحساس بعدم الراحة في البطن عند التبول في (80٪ من المرضى)، التبول اكثر من المعتاد بنسبة (75٪) قد يكون البول النازل قطرات قليلة فقط في (65٪)وكشفت الدراسة أن الإناث اللواتي يعانين من التهاب المجاري البولية أكثر من الذكور (70 أنثى مقارنة إلى 30 ذكر حسب هذه الدراسة) الكشف البكتيرية اظهر ان الاشريكية القولونية كانت شائعة في (13٪) من العزلات، تليها بروتيوس ميرابيليس و كليبسيلا أوكسيتوكا، وكانت العزلات الأخرى سيودوموناس أيروجينوسا، ستافيلوكوكوس أوروس، ستافيلوكوكوس سابروفيتيكش و ستريبتوكوكوس بيوجين

Introduction

The urinary tract (UT) is a normally sterile system that is protected from the nearby colonic microflora by non-specific defences including the epithelial barrier, the antibacterial properties of the bladder mucosa and the flow of urine. Nevertheless, urinary tract infections (UTIs) are among the most common infectious diseases, affecting a wide range of individuals including preschool girls, women of childbearing age and the elderly (1).

These infections usually result from the entry of periurethral microorganisms through the urethra into the bladder lumen. The bacteria may ascend further via the ureters into the kidneys and even breach the kidney parenchyma to enter the lymphatic system or the bloodstream. Therefore, the manifestations of UTIs can range from asymptomatic bacteriuria to urethritis, cystitis, pyelonephritis, bacteraemia and sepsis (1).

Urinary tract infections are also common, resulting in more than 6 million doctor office visits annually, two-thirds by women.(2). Several studies suggested that sexual intercourse affects development of bacterial vaginosis. Bacterial vaginosis might be sexually transmitted, but therapeutic trials, in which male partners were treated, did notshow a reduction in bacterial vaginosisrecurrence rates.(3,4).

Urinary tract infections are a serious health problem affecting millions of people each year (5). Despite the widespread availability of antibiotics, it remains the second most common bacterial infection in the human population, UTI in women more frequent than in men (6,7).

UTIs are generally classified as: uncomplicated or complicated. Nevertheless, there are two types of UTI presentations: lower UTI which is an infection of the bladder and the urethra known as cystitis and urethritis, respectively. The other type is upper UTI; an infection of the kidneys and the ureters known as pyelonephritis and urethritis, respectively. Upper UTIs are potentially more serious than lower UTIs because there is a possibility of kidney damage (8).

Methods

1-Sample collection

One hundred of urine samples had been collected at period from April 2016 till August 2016 patients were in different ages and sex. The patients included in the study examined in private clinics and hospital of Shattra city in Thi-Qar province. During collection of samples, an information sheet was prepared which designed to estimate the signs and symptoms of patients of patients, then laboratory examine of urine has been done.

2- Sample culture

All samples were cultured directly on different medium including Blood agar, Eosin methylene blue (EMB) and MacConkey aga ,The collected specimens were streaked directly on MacConkey agar for purification of strains then incubated in an aerobic conditions at 37C° for 24 hr. Then biochemical tests had done to determine the type of bacteria.

3- Identification of bacterial strain

Morphological and some biochemical tests were applied according to (9).

Microscopic examinations

The isolates were stained by Gram stain to detect their response to stain, shapes and their arrangement by examining under light microscope (10).

Biochemical tests

Catalase test, Oxidase test,Indole test, Citrate Utilization test , Triple-sugar iron agar, Urease Test and API. System.The API was an identification system for isolates. This test applied according to the supplied company instructions.

Results

Clinical signs and symptoms of urinary tract infections obtained after examination of all patients including in the study

- burning or scalding sensation or lower abdominal discomfort when passing urine (80% of patients)
- Frequently urination than usual (75%)
- Feeling an urge to urinate, scatter urine may be only little drops (65%)
- Feeling the bladder is still full after urination (44%)

- Foul smelling urine (40%)
- urine that is cloudy, bloody or dark (40%)
- fever. (38%)

Other signs occur in little percentage of patients (22%) included :

- chills
- fever
- loin (lower abdominal) pain
- back pain.

One hundred of urine specimens were collected from patients suffering from urinary tract infectionfrom various age groups in both gender (30 male and 70 female). Thirty six isolates of differents bacteria(36%) were obtained from 100 clinical specimens included urine from patients of both sex. ,and table (1) explain the details.

Table 1: The number of positive isolated bacteria from urine samples and percentage

Number of Samples	Positive Samples	Negative Sample
Female 70	26(%)	44(%)
Male 30	10(%)	20(%)
Total	36(%)	64(%)

It was found that *Escherichia coli* was the common performed (13%) of isolates, followed by *Proteus mirabilis*and *Klebsiellaoxytoca*,
table (2) expaine the detailes .

Table 2: Show the types ofisolated bacteria from urine samples

Types of bacteria	Subjects		Total
	Male	Female	
Escherichia coli	3	10	13
Enterobacter cloacae	2	2	4
Klebsiellaoxytoca	2	4	6
Proteus mirabilis	1	5	6
Pseudomonas aeruginosa	1	1	2
Staphylococcus saprophyticus		2	2
Staphylococcus aureusaccounts	1	1	2
Streptococcus pyogen		1	1
Total	10	26	36

Identification:

The isolates were identified according to growth characteristics including the shape of colony ,color, texture, odor and volume on the medium, lactose -fermenter on MacConkey agar and biochemical tests ,*Escherichia coli* appeared on EMB agar colonies have a characteristic green sheen and production of strong acids**,** whereas on MacConkey agar showed pink colonies because its rapid fermentation of lactose, dry, medium-sized, convex regular and negative for oxidase test. On the other hand *Klebsiella* was appeared pink colonies because its fermentation of lactose and irregular mucous shaped because its formation capsule. *Enterobacter cloacae* have features similar to isolates previously mentioned but different in the size of colonies which appeared smaller and semi-mucous. Isolates which were identified as *Proteus* appeared as small pale colonies, little convex and

circular with smooth edges on MacConkey's agar plates and were lactose non fermenter, so they turned the media to yellow (Figure 3). MacConkey agar was used for growing *Proteus* strains because it differentiates it from other gram negative species and it contains all required nutrients for *Proteus* growth. In addition, *Proteus* culture has a special smell (fish smell). On blood agar *Proteus* isolates showed swarming motility.

Under light microscope, all isolates previously mentioned reacted negatively with Gram stain and appeared as red color coccobacilli that mostly occurred singly or in short chains.

Biochemical tests were supported with Api-20E system which gave the same results as shown in table 2.

Discussion

The results of the present study were similar to the finding of Al-Jamaly (2005) who was found that *Escherichia coli* was the most common of infectious isolates, but there was a disparity in the rates of infections due to bacteria belonging to the family of *Enterobacteriaceae* due to a variation in conditions of analysis and the method of taking the treatment. Also some bacteria was appeared as gram positive bacteria ,which undergo to further biochemical tests. The gram positive bacteria was grew only on blood agar and did not grew on EMB and MacConkeya gar .*Staphylococcus aures* was showed as Gram positive cocci occur singly or grouped in pairs, short chains or grape-like clusters when examined under light microscope. Whereas *Streptococcus* was appeared as as Gram positive cocci occur singly or grouped in pairs but like streptococci.

E. coli is predominant type of bacteria for 85% of community acquired and 50% of hospital acquired urinary tract infections. Within the *E.coli* species a number of subgroups (O1, O2, O4, O6, O7, O8, O18,O25, O68 and O75) are frequently isolated from patients with UTI (12,13). Gram negative bacteria such as *Klebsiella* and Proteus; and Gram positive *Enterococcus faecalis* and *Staphylococcus saprophiticus* are causative agents for the remainder of community acquired infections (14). The remainder of hospital acquired infections usually occur after colonization with *Klebsiella, Enterobacter, Citrobacter, Serratia, Pseudomonas aeruginosa, Providencia, E. faecalis,* or *S. epidermidis* (15).

A study in Kirkuk city, Iraq, Alsamarai et al. [2016] revealed that in a total of 563 urine samples, 234 [41.6%] were culture positive and E. coli was the predominantly [57.7%] isolated bacteria, followed by Staphylococcus aureus [17.5%], Klebsiella [14.5%], and Proteus{10.3}.

Kirecci et al. [2015] study in Erbil using VITEK 2 system for identification of microorganisms found that E. coli was the predominant isolates (58.57%) from the cases of UTI, followed by Staphylococcus aureus (14.29%), Klebsiella pneumonia (8.57%), Staphylococcus epidermidis (7.14%) and Pseudomonas aeruginosa (5.71%), Proteus mirabilis (2.86%), Klebsiella oxytoca (1.43%), Proteus morganii (1.43 %). Other study conducted in Erbil city and included 300 children with sign and symptoms of urinary tract infection found that E. coli (33.8%) the predominant cause of UTI.[18] Another study found that E. coli was isolated from 53% of patients with UTI in Baghdad city.[19

Most of patients suffering from UTI concluded in this study were females about 70 person while males were 30 only that is agreement with many studies previously done which revealed that female are more infected with

UTI. Taneja and colleagues (20) found that recurrent UTI among children was 71.6%. Barroso and coworkers18 stated that recurrent UTI is frequent and occurs in approximately 40% in females and 32% in males.

Conclusion

Urinary tract infection main signs and symptoms including pain and burn during micturition with frequently urination and scanty urine. Predominant bacteria isolated was E. coli.

References

1-Warren, J.W. (1996) Clinical presentations and epidemiology of urinary tract infections. In *Urinary Tract Infections: Molecular Pathogenesis and Clinical Management.* Mobley, H.L.T., and Warren, J.W. (eds). Washington, DC: American Society for Microbiology Press, pp. 3– 27.

2-Tullus, K., Hörlin, K., Svenson, S.B., and Källenius, G. (1984) Epidemic outbreaks of acute pyelonephritis caused by nosocomial spread of P fimbriated *Escherichia coli* in children. *J Infect Dis* 150: 728–736.

3-Phillips, I., Eykyn, S., King, A., Gransden, W.R., Rowe, B., Frost, J.A., and Gross, R.J. (1988) Epidemic multiresistant *Escherichia coli* infection in West Lambeth health district. *Lancet* 1: 1038–1041.

4-Kunin, C.M., Hua, T.H., Krishnan, C., Van Arsdale White, L., and Hacker, J. (1993) Isolation of a nicotinamide-requiring clone of *Escherichia coli* O18:K1:H7 from women with acute cystitis: resemblance to strains found in neonatal meningitis. *Clin Infect Dis* 16: 412–416.

5- Manges, A.R., Johnson, J.R., Foxman, B., O'Bryan, T.T., Fullerton, K.E., and Riley, L.W. (2001) Widespread distribution of urinary tract infections caused by a multidrugresistant multidrugresistant *Escherichia coli* clonal group. *N Engl J Med* 345: 1007–1013.

6- Johnson, J.R., Russo, T.A., Scheutz, F., Brown, J.J., Zhang, L.X., Palin, K., *et al.* (1997) Discovery of disseminated J96-like strains of uropathogenic

Escherichia coli O4:H5 containing genes for both papGJ96 (class I) and prsGJ96 (class III) Gal(a1–4)Gal-binding adhesins. *J Infect Dis* 175: 983–988.

7- Zhang, L.X., Foxman, B., Tallman, P., Cladera, E., Le Bouguenec, C., and Marrs, C.F. (1997) Distribution of *drb* genes coding for Dr binding adhesins among uropathogenic and fecal *Escherichia coli* isolates and identification of new subtypes. *Infect Immun* 65: 2011–2018.

8- Stamm WE, Hooton TM. Management of urinary tract infections in adults. N Engl J Med 1993;329:1328 –34.

9- Gardner JL, Dukes CD. *Haemophilus vaginalis* vaginitis: A newly defined specific infection previously classified "nonspecific" vaginitis. Am J Obstet Gynecol 1955;69:962–76.

10- Vejtorp M, Bollerup AC, Vejtorp L, Fanoe E, Nathan E, Reiter A, et al. Bacterial vaginosis: A double-blind randomized trial of the effect of treatment of the sexual partner. Br J Obstet Gynaecol 1988;95:920–6.

11- Corona, A. (2003). Urinary Tract Infections and Urinary Incontinence. FNP-Student University of Phoenix.

12- Valiquette, L. (2001). Urinary tract infections in women. Can. J. Urol. 1:6-12.

13- Tambekar, D.H.; Dhanorkar, D.V.; Gulhane, S.R.; Khandelwal, V.K. and Dudhane, M.N. (2006). Antibacterial susceptibility of some urinary tract pathogens to commonly used antibiotics. Afr. J. Biotechnol. 5(17): 1562-1565.

14- Franz, M. and Horl, W.H. (1999). Common errors in diagnosis and management of urinary tract infection. Nephrol. Dial. Transplant. 14:2746-2753.

15- Sobieszczyk, M.E. (1994). Urinary Tract Infections. M. I. D. 11.

16- Baron, S. (1996). Medical Microbiology. 4th ed. Introduction to Infectious Diseases, microbiology of the Ginitourinary system. Mycology, Antifungal Agents. The University of Texas, USA.

17-Brooks, H. J., Benseman, B. A., Peck, J. and Bettelheim, K. A. (1981) 'Correlation between uropathogenic properties of Escherichia coli from urinary tract infections and the antibody-coated bacteria test and comparison with faecal strains', J Hyg (Lond), 87(1), 53-61.

18-Gruneberg, R. N. (1969) 'Relationship of infecting urinary organism to the faecal flora in patients with symptomatic urinary infection', Lancet, 2(7624), 766-8.

19- Kennedy, R. P., Plorde, J. J. and Petersdorf, R. G. (1965) 'Studies on the Epidemiology of Escherichia Coli Infections. Iv. Evidence for a Nosocomial Flora', J Clin Invest, 44,193-201.