

DETERMINATION OF THE BACTERIAL TYPES THAT CAUSE URINARY TRACT INFECTION IN DIYALA PROVINCE

By

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ABSTRACT

Urinary tract infection (UTI) is a very common confusion a physician must deal with both in outpatient and hospitalized patients. U.T.I. is important because it may involve the urethra, the bladder, ureter and kidneys. UTIs cause considerable discomfort and inconvenience to the patient and are occasionally responsible for protected symptoms or more serious manifestation, such as sepsis, and death. To determine the important species of bacteria species that cause the U.T.I in Diyala province and other statistical information's. A total of 150 patient with signs and symptoms of UTI, and 150 randomly sampled as controls from out-patient clinicals with no signs or symptoms of UTIs were enrolled in this study. Urine specimens were subjected to general urine analysis for bacteria, pus, and renal casts, and then these specimens were cultured on blood, MacConkey & nutrient agar using loop method to differentiate the bacterial species. Only 39(26%) patients were positive for significant UTI. UTIs are less common in females than males (6% and 20%) respectively. The higher prevalence found in older cases (more than forty years). *Escherichia coli* is the predominant organism to be isolated (56%). From the total patients and throughout the general urine analysis examination, it seems that only 111(74%) excreted pus cells.

Keywords: UTI, bacteriuria, *E. coli*

Introduction

Urinary tract infection (UTI) is a very common problem in clinical practice, yet it is still little understood. It is diagnosed by the finding of significant bacteria, a pure growth of more than 100 000 organisms/ml of urine from two consecutive specimens ^[1,2]. The terms urinary infection and significant bacteria are used here as in most recent publications.

Community-acquired UTI occur in four major risk groups throughout life in school – age girls, in young women in their sexually active years, in males with prostatic obstruction, and the elderly about 6 to 7 million office visits annually in the United States are made because of acute pyelonephritis, which often necessitates hospitalization and initial parenteral antimicrobial therapy. In 20% of women, frequent (3-6 per year) recurrences of infection follow the initial episode, producing additional morbidity and time lost from work ^[3]

U.T.I. are important because they may involve the urethra, the bladder, urethras and kidneys ^[4] they are more common in females than males in ratio about 6:1 with exception of the neonatal period when the sexes are equally affected ^[5]. UTI cause considerable discomfort and inconvenience to the patient and are occasionally responsible for protracted symptoms or more serious manifestation, such as sepsis and death ^[6]

Moreover, nosocomial UTIs are an important source of Gram – negative septicemia and associated mortality ^[7]. Epidemiological studies showed marked variation in the prevalence of bacteriuria among different populations ^[8, 9, 10]. The most frequently encountered organisms were *E.coli* which accounted for 75% of the isolates. A total of 302 cases suggestive of UTI were studied in Erbil only 211 (69.8%) patients were positive for significant bacteriuria. This study deals with causative pathogens among patients admitted at two hospitals in Diyala proven ^[11].

Subjects and methods:

Mid stream urine specimens were collected aseptically from 150 patients admitted to Baquba general hospital with signs and symptoms suggestive of UTI for the period from June to October 2008, Another 150 urine samples were collected from patients attending outpatient clinics without signs and symptoms of UTI and considered as control. Identification of etiological microorganisms was performed according to Stokes & Ridgway ^[12]. UTI was diagnosed whenever there were pure growth of more than 100 000 bacteria /ml of urine or mixed



infection with significant growth and pyuria the urine analysis for bacteria, pus and renal casts according to Rubin & Shapiro [13] and quantitative urine cultures using loop method [14]. Urine specimens were cultured on blood macConkey & nutrient agar and incubated aerobically at 37 C For 24-48 hours. Methods of data collection depend mainly on the interviews with patients. The relevant informations such as age, sex and educational status, were obtained prospectively by face to face interviews using special questionnaire [15].

Result

The sex distribution in positive cases with UTI is shown in table 1. The number of positive cases was higher in females than the males (76.93% and 23.07% respectively). The prevalence of bacteriuria among different age groups was shown in table 2 .The higher prevalence was within the age group of 1-10 years, 51-60 and 61-70 years in both sexes (25.6%, 12.8% and 15.38% respectively).

Table (1): The sex distribution of UTI cases positive

sex	cases			control		
	No. EXAMINATION	POSITIVE CASES	%	No. EXAMINATION	POSITIVE CASES	%
FEMALS	111	30	76.93	116	9	75
MALE	34	9	23.07	34	3	25
TOTAL	150	39	100	150	12	100

Table2: prevalence of UTIs. In different sex and age group

AGE GROUP (YEARS)	CASES			CONTROL		
	NO.	FEMALES %	MALES %	NO.	FEMALES %	MALES %
1-----10	10	25.6	5.12	3	26.67	6.67
11----20	2	5.12	0	1	8.89	0
21-----30	3	7.69	2.56	0	0	5
31-----40	1	2.56	0	0	0	0
41-----50	3	7.69	2.56	0	0	0
51-----60	5	12.8	5.12	2	17.77	6.67
61-----70	6	15.38	7.69	3	26.67	6.67
	30	76.9	23.05	9	80	20.01

From the total patients and throughout the general urine analysis examination, it seems that only 111(74%) excreted pus cells. Further, the majority of cases with UTIs had positive renal casts and epithelial cells table (3).

Table (3): The deposit finding of general urine examinations

FINDINGS	CASES		CONTROLS	
	NO.	%	NO.	%
PUS CELLS	111	74	18	12
RBCs	59	39	6	4
CALCIUM OXALATE	82	55	4	2.67
EPITHELIAL CELLS	128	85.5	102	68
AMORPHOUS URATE	69	46	30	20

Table (4) demonstrates the relation between the residence area and prevalence of UTIs .The distribution of cases where 71.8 % of them were from the rural areas.

TABLE (4): The residence area distribution in cases and controls UTI

SEX	CASES				CONTROL			
	URBAN		RURAL		URBAN		RURAL	
	NO	%	NO	%	NO	%	NO	%
FEMALE	9	23.64	23	58.97	3	25	6	50
MALE	2	5.25	5	12.83	1	8.3	2	16.67
TOTAL	11	28.2	28	71.8	40	33.33	8	66.67

Microorganisms isolated from 33 culture-proven bacteriurics are shown in table (5). The most frequently encountered organism was Escherichia coli accounting for 56.4% of the isolates. However, among control groups, the bacteriurics was noticed in 12 cases only.

TABLE (5): The distribution of various microbial etiological agents in clinical isolation

ORGANISMS	CASES		CONTROL	
	NO.	%	NO.	%
<u>E COLI</u>	22	56	7	58.1
<u>KLEBESILLA SP.</u>	4	10	1	8.3
<u>STAPH. AUREUS</u>	4	10	2	17
<u>PROTEUS SP</u>	2	5	0	0
<u>PSEUDOMONAS SP.</u>	2	5	0	0
<u>CANDIDA ALBICANS</u>	1	2	1	8.3
MIXED	4	10	1	8.3
TOTAL	39	100	12	100

Discussion

- UTIs are more common in females than in males due to predisposing factors (e.g. pregnancy. Short urethra, absence of prostatic, secretion easy colonization of certain serotypes of causal agents in vaginal introitus and priurethral area from intestinal flora causing ascending UTIs [16].

The prevalence rate of UTIs in this study is comparable to other reports: 5.5% and 6.6% in United Kingdom [17], 6% in Australia [18] and 7.2% in Saudi Arabia [19] in Iraq; other many reports concerning UTIs among pregnant women [11,12]. In this study only 39/150 (26%) patients were associated with significance growth.

The remaining 111/150 (74%) patients were abacteriuric in spite of the presence of signs and symptoms which evidenced UTI; this might be due to the presence of antibacteriuric substances in urine [20, 21].

The conventional pathogens in lower number considerable significant of infection with typical pathogens must be not neglected. Also the mid-stream urine specimens are not usually examined for anaerobic micro-aerophilic bacteria [23]. This study demonstrated that increasing in prevalence of bacteriuric except the age group 1-10 years. Similar findings has been reported by other studies [1,10, 24]. However negative correlation between increasing age and bacteriuria was found by Little [16] and Williams et al [25].

E. coli form the majority of strains isolates 56% while *Klebsilla sp.*; *staph. sp.* *protus sp.*; Represents 10%, 10%, 7% respectively. These findings are different from that of other works [16, 17, 23]. This study was corresponding with the other studies such as Al-heeti et al [11] reported that incidence of *E. coli* and *protus* were 27% and 11% respectively of the total isolates from Iraqi pregnant women with UTIs. Fihn et al [26] while that *Klebsilla sp.* was the commonest pathogen among of the other isolates 17.6%. They explained the different in the prevalence of pathogens causing UTIs to laboratory diagnosis, therapeutic and epidemiology approach.

The association between leukocyturia and bacteriuria is shown in this study. High leukocyturia was detected in 116 patients while 34 cases were negative. It was thought previously that the recovery of an excess of pus cells at recovery of pathogenic organism in culture were taken as a proof of UTIs. While in the absence of pyuria, the importance of positive urine culture

was suspected ^[10]. It is clearly established at the present that, there is poor correlation between the presence or absence of pyuria and significant bacteriuria in quantitative culture ^[27].

Bacteriuria therefore may possibly be present in the absence of pyuria and conversely there are many causes of sterile pyuria e.g. stone, papillary necrosis or tuberculosis apart from bacteriuria

As regards to the renal casts excretion, such finding is worthy as far as the patients are concerned; as the link between a symptomatic bacteriuria and acute pyelonephritis is well established ^[28] so it seems reasonable that all patients should be screened for bacteriuria early as part of routine clinical investigation. The significance of renal casts in the diagnosis of an underlying renal lesion like pyelonephritis is well established ^[22] and the long-term effects are so serious that meticulous attention must be paid to the details of diagnosis and treatment ^[29].

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