

Физиологические исследования

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URINARY TRACT INFECTION IN COMMUNITY: AGE AND GENDER RELATIONSHIP

This study was conducted to evaluate and determine the incidence of urinary tract infections (UTIs) in community and their relationship with the gender and age of the patients. To achieving this goal, midstream urine (MSU) specimens were collected from 325 patients with clinical symptoms suspected to be UTI. Specimens were cultured on MacConkey's ager and blood ager media, and then incubated aerobically overnight at 37°C. The identification of the isolated bacterial colonies was done by standard and conventional microbiological techniques, as well as the using of analytic profile index (API 20E) biochemical identification system. The antibiotic susceptibility testing was carried out by Kirby-Bauer's technique (disc diffusion method) using Muller-Hinton agar medium. Our results demonstrated that only 200 specimens exhibited positive urine cultures, and these specimens were belonged to patients, 85 (42.5 %) of them were males and 115 (57.5 %) were females. The mean age was 38.8 years, and the male to female ratio was 1:1.4. The highest rate of infection was recorded in patients aged between 27 to 46 years, 97 (48.5 %). *Escherichia coli* (*E. coli*) appear to be the most predominance bacterial causative agent of UTI with the highest number of isolates, 111 (55.5 %). All *E. coli* isolates were completely sensitive to imipenem and amikacin (100 %) for each, and (91 %) sensitivity toward nitrofurantoin, whereas (96 %) and (79 %) of the isolates were resistant to ampicillin and trimethoprim-sulfamethoxazole, respectively. We can conclude that UTI appears to be higher among the adults, with a significant incidence in females than males.

Keywords: urinary tract infections (UTI), *Escherichia coli*, age-gender and UTI, antibiotic susceptibility.

Urinary tract infections are among the most frequent bacterial infections worldwide. They frequently occur in both genders and across all age groups [1]. The urethra and urinary bladder are prevalent sites of infection [2]. Many substances, such as feminine products, stool, or clothing can cause soreness of urethra, making it easier for bacteria to invade and get into the bladder [3]. Women are more prone to have UTIs than men, with an incidence rate of 50–60 % for females and 13 % for males [4]. Enterobacteriaceae, in general and *E. coli*, in particular are the most common causes, accounting for 75–90 % of all UTIs in both inpatients and outpatients [5]. Antimicrobial agents substantially shorten the recovery time. The increased utilization of antibiotics has contributed to greater resistance among urinary pathogens to many antibiotics that are typically used in the treatment of UTIs [6].

Materials and Methods

A total of 325 midstream urine specimens were collected from patients with various ages, presented with clinical symptoms suspected to be UTI. Specimens were transported in sealed plastic bags, and then cultured on MacConkey's agar and blood agar media plates. Incubation was done aerobically overnight at 37°C [7]. Identification of the isolates was done by standard methods, as well as the using of API 20E. the antimicrobial sensitivity testing was performed by Kirby-Bauer's technique using Muller-Hinton agar plates. The tested antibiotic discs were selected as they were drugs of choice in the treatment of UTI [7].

Results and Discussion

The current study assesses the incidence of UTIs and the relationship of gender and age of patients. Of the 325 tested specimens, 200 showed growth of pathogens, and among which the most prevalent were *E. coli* 111 (55.5 %). Such higher rates of were also documented in other studies mentioned the predominance of *E. coli* among the other urinary pathogenic isolates, with an isolation rate ranged between 40 % to 69 % [8; 9]. This may be due to the fact that strains of *E. coli* affecting the urinary tract possess a variety of virulence factors that facilitate their carriage, persistence, ascension, and invasion of the anatomically normal urinary tract [10-13].

The susceptibility pattern of *E. coli* isolates was demonstrated in tables 1. The isolates exhibited wide difference in their susceptibility toward the tested antibiotics. Full sensitivity (100 %) was seen toward

imipenem and amikacin; whereas a resistance rate of 96 % was seen toward ampicillin. Other tested antibiotics were effective only for less than half of the isolates. Our findings were in agreement with other studies [14-16]. This observation may be due to the irrational use of first line antibiotics at primary health care level which was the leading cause of increasing resistance to these commonly used drugs.

Table 1

Antibiotic susceptibility profile of *E. coli* isolates

<i>E. coli</i> isolates (N=111)	Antibiotics								
	IPM	AK	F	CRO	CAZ	GM	CTX	SXT	AMP
Sensitive № (%)	111 (100)	111 (100)	101 (91)	81 (73)	73 (66)	48 (43)	59 (53)	23 (21)	4 (4)
Resistance № (%)	0 (0)	0 (0)	10 (9)	30 (27)	38 (34)	63 (57)	52 (47)	88 (79)	107 (96)
IPM = imipenem; AK = amikacin; F = nitrofurantoin; CRO = ceftriaxone; CAZ = ceftazidime; GM = gentamycin; CTX = cefotaxime; SXT = trimethoprim-sulfamethoxazole; AMP = ampicillin									

This study was only limited to 200 patients who show presence of urinary pathogens in their urine specimens. The patients age was ranged between 6 to 76 years (the mean age was 38.8 years); 115 (57.5 %) were females and 85 (42.5 %) were males. The males to females ratio were 1:1.4. The highest rate of infection was noticed in patients aged between 27 to 46 years, 97 (48.5 %). The results were shown in table 2.

Table 2

Distribution of UTI according to gender and age

№	Age groups (years)	Gender of patients		Total № (%)
		Male	Female	
1	6–26	32	33	65 (32.5)
2	27–46	34	63	97 (48.5)
3	47–76	20	18	38 (19)

Our findings were in accordance with other studies mentioned that UTIs are common among the female population with an incidence of 25-30 %, and the female to male ratio between 20–40 years of age was 30:1 [17-20]. Women are particularly at risk of developing UTIs because of their short urethra, and certain factors which include delay in micturition, sexual activity, the use of diaphragms, spermicides, and feminine products, pregnancy, medical conditions, personal hygiene, and menopause [21; 22].

Conclusions

Based on the findings of this study, it was concluded that UTI affected females more than males and adults were the target of infection. The main organism implicated was *E. coli*, who exhibited wide difference in its susceptibility toward the tested antibiotics. A high percentage of resistance was seen toward ampicillin. Therefore, in blind therapy of suspected UTIs, imipenem and amikacin were the drugs of choice.

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ИНФЕКЦИИ МОЧЕВЫВОДЯЩИХ ПУТЕЙ: ВОЗРАСТНЫЕ И ГЕНДЕРНЫЕ ОСОБЕННОСТИ

Целью настоящего исследования являлось определение поло-возрастной структуры инфекций мочевыводящих путей, выявление возбудителей бактериальной природы и их чувствительности к антибиотикам. Образцы мочи были собраны от 325 пациентов с клиническими симптомами инфекций мочевыводящих путей. Пробы культивировали на агаре МакКонки и кровяном агаре, инкубировали в аэробных условиях в течение 24 ч при температуре 37°C. Идентификацию выделенных бактериальных изолятов проводили с помощью стандартных микробиологических методов, а также с использованием биохимических тест-систем API 20E. Определение чувствительности к антибиотикам осуществляли диско-диффузионным методом на агаре Мюллер-Хинтона. Результаты показали, что из 200 образцов мочи были выделены бактериальные культуры. 85 положительных проб (42,5 %) были зарегистрированы среди мужчин, 115 (57,5 %) – среди женщин. Соотношение числа заболеваний инфекциями мочевыводящих путей среди женщин и мужчин составил 1 : 1,4. Средний возраст больных составил 38,8 лет. Самый высокий уровень заболеваемости был зарегистрирован у пациентов в возрасте от 27 до 46 лет (48,5 %). Доминирующими среди возбудителей являлись бактерии *E. coli*, которые были изолированы из 55,5 % проб. Все штаммы *E. coli* оказались чувствительны к имипенему и амикацину (100 %), 91 % выделенных изолятов - к нитрофурантоину, в то время как 96 и 79 % штаммов были устойчивы

к ампициллину и триметоприм-сульфаметоксазолу соответственно. Другие используемые в работе антибиотики также оказались малоэффективными для подавления изолятов *E. coli*. Анализ проведенных результатов показал, что инфекции мочевыводящих путей наиболее часто встречаются среди женщин в возрасте от 27 до 46 лет.

Ключевые слова: инфекции мочевыводящих путей (ИМП), *Escherichia coli*, половые и возрастные особенности ИМП, чувствительности к антибиотикам.

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