A Study on Drug of Choice for the UTI Patients in Al-Khoms, Libya

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Abstracts: *Urinary tract infection (UTI) is a common bacterial infection known to affect the different parts of the urinary tract and the occurrence is found in both males and females. This study is aimed to study drug of choice for the UTI cases in Al-khoms area, Libya. A total 50 cases (Male and female of different ages) were enrolled for this study. UTI was diagnosed using mid-stream urine culture on standard culture media and the drug of choice was studied using Kirby-Bauer method. Present study in Al-khoms area, Libya shows that female has higher UTI frequency than male. Drug of choice for E. Coli is Ciproflaxacin and Cephalexin, for Klebsiella sp. is Ciproflaxacin, Cloxacilin, Nitofurantoin, Cefoxitin and Augumentin and for Staphylococcus sp. is Cefoxitin.*

Keywords: *UTI, Bacteriuria, Antibiotic resistance, Drug of choice, Al-khoms.*

I.   Introduction

Urinary tract infection (UTI) is a common bacterial infection known to affect the different parts of the urinary tract and the occurrence is found in both males and females. Despite the fact, that both the genders are susceptible to the infection, women are mostly vulnerable due to their anatomy and reproductive physiology. The infection is usually caused as a consequence of bacterial invasion of the urinary tract including the lower and the upper urinary tract (Vasudevan, 2014). Urinary tract infections (UTI) are the most common bacterial infections during pregnancy. Untreated UTI can be associated with serious obstetric complications. UTI is defined as the presence of at least 100,000 organisms per milliliter of urine in an asymptomatic patient, or as more than 100 organisms/ml. of urine with accompanying pyuria (>5 WBCs/HPF) in a symptomatic patient. Particularly in asymptomatic patients, a diagnosis of UTI should be supported by a positive culture for a uropathogen (Emilie and Edward, 2011). Resistance to antimicrobial agents is a major health problem that affects the whole world. The problem is still worse in developing countries where lack of antimicrobial-resistance surveys and control policies are the norm. In Libya, misuse of antimicrobial agents by the public is widespread. As in many developing countries antimicrobials can be purchased from pharmacies without prescription in Libya. Providing information on the past state of antimicrobial resistance in Libya may assist the health authorities in addressing the problem more effectively in the future. The problem of antibiotic resistance is very serious in Libya. The health authorities in particular and society in general should address this problem urgently (Khalifa et al., 2013). A study carried out on self-medication with antibiotics in the ambulatory care setting within eight countries of the Euro-Mediterranean region between 20042005 found 19.1% (range 50.1% in Cyprus to 37% in Lebanon) of total interviewed healthy individuals admitting selfmedication and in Libya the percentage was 24% (Scicluna et al., 2009). The aim of the present study is to find the drug of choice for UTI among the Al-khoms population, Libya and to avoid the alarming level of drug resistance in the same area.

Materials And Methods

This study on UTI cases and drug of choice were conducted in Urology Department, Al-khoms teaching hospital, Libya for one year between January 2015 and January 2016. 50 UTI cases of male and female with different ages were included in this study. Patients consent was taken by informing verbally. Socio-demographic data were collected and the mid-stream urine samples were collected at early morning in a sterile wide-mouth labelled container. The collected samples were inoculated in various special media (OXOID, UK) like MacConkey agar, Mannitol salt agar and Crystal violet agar for an isolation and identification. Then the selected bacteria were studied for their drug of choice using Mueller Hinton agar with various antibiotics (OXOID, UK) by Kirby-Bauer method in accordance to the National Committee for Clinical Laboratory Standards (NCCLS, 2003).

II.   Results and discussion

UTI is a serious health problem worldwide affecting millions of people each year and the leading cause of gram negative bacteria (Ayoade et al., 2014 and Okonko et al., 2010). Over 8 million cases of UTI reported annually and more than one million were hospitalized, for an over-all annual cost of more than $1 billion (Clani et al., 2013 and Foxman, 2002) and responsible for 35% of the cases where Bacteraemia is the most common

cause in the hospitalised patients (Macejko and Scheaffer, 2007; Obinkorang et al., 2012 and Kolawole et al., 2009). Diagnosis of UTI causing organism is the major work load in medical laboratories where Escherichia coli reveal the highest predominate rate although, other reports showed that the causative organism of UTI is changing over the year and other microorganism responsible for UTI (Aiyagoro et al., 2007 and Macejko and Scheaffer, 2007). Many reports showed that UTI is common in patients with different symptoms (Macejko and Scheaffer, 2007).

UTI study in different ages of male and female are reported in the table 1. It reveals that the female has the highest percentage of cases (38%) between the age group of 41 and 60 years old. This result is similar to the study of Macejko and Scheaffer, 2007 and Obinkorang et al., 2012). By nature women are more susceptible to UTI because accessibility of organism to invade urethra and bladder easier than men (NIH, 2008). This is partially due to the short and wider female urethra and its proximity to anus. Bacteria from the rectum can easily travel up the urethra and cause infections (Amin et al.,2009). Other factors reported to increase rate of infection are pregnancy and sexual intercourse (Masinde et al., 2009), due to vaginal trauma which enhance access of bacteria to urethral into bladder (Lane and Takhar, 2011). Other factor found to increase rate of infection is using diaphragms during intercourse forming residual urine and hence increase rate of UTI in pregnant women (Amin et al., 2009). Therefore UTI in pregnant women is of great concern practically in developed countries (Rane and Dasgupta, 2013), where rational prescribing of drugs by the member of health practitioner is very difficult to control (NIH, 2005 and Karlowsky et al., 2006).

Table 1: UTI in different ages of male and female cases:

S. No	Age	Male		Female		Total	
		Nos.	%	Nos.	%	Nos.	%
1	1-20	00	00	02	04	02	04
2	21-40	06	12	13	26	19	38
3	41-60	10	20	19	38	29	58
	Total	16	32	34	68	50	100

Table 2 indicates the various bacterial isolates from both male and female cases. In this study E. Coli is predominantly (60.61%) present most of the cases. Here also E.coli prevalence is more in female (45.45%) than male (15.15%).

Table 2: **Bacterial isolates from UTI cases:**

S. No.	Bacteria	Male		Female		Total	
		No. Of isolates	%	No. Of isolates	%	No. Of isolates	%
1	E.coli	05	15.15	15	45.45	20	60.61
2	Klebsiella sp.	03	9.09	07	21.21	10	30.30
3	Staphylococcus sp.	01	3.03	02	6.06	03	9.09
	Total isolates	09	27.27	24	72.72	33	100

Battikhi and Battikhi (2015) have reported in their study that the high incidence rate 19 (35. 8%) for Escherichia coli and low efficacy rate of antibiotic in pregnant women reported in this study should be of great concern, as not only a threat to health of pregnant women and infants, but they also create an economic and social problems due to stigma associated with this infection.

Antibiotic susceptibility test on E. Coli in the present study (Table 3) shows that it has more susceptible to Ciproflaxacin and Cephalexin (100%) and least to Nitrofurantoin (70%).

Table 3: Antibiotic susceptibility pattern of *E. Coli:*

S. No.	Antibiotics	Sensitive		Resistant	
		No.	%	No.	%
1	Ciproflaxacin	20	100	00	00
2	Cloxacilin	18	90	02	10
3	Nitrofurantoin	14	70	06	30
4	Nalidixic acid	18	90	02	10
5	Cefoxitin	18	90	02	10
6	Augumentin	17	85	03	15
7	Cephalexin	20	100	00	00

Escherichia coli is the predominant causative agent of acute UTI worldwide. A study from Benghazi in the early 1980s reported 22% resistance to ampicillin among E. coli from UTI (Karaui and Hanna, 1981). The rate of resistance to ampicillin increased nearly three-fold from 1990 to 1999. High rates of resistance to trimethodprim-sulfamethoxazole were also observed during the same period for E. coli from UTI in Tripoli and

Benghazi. Ciprofloxacin and other fluoroquinolones are drugs of choice in the treatment of UTI in adults, particularly in areas where resistance to ampicillin and trimethoprimsulfamethoxazole among uropathogens are high (Gupta, 2003). The use of ciprofloxacin in recent years may lead to a reduction in the use of ampicillin and trimethoprim-sulfamethoxazole for the treatment of UTI in Libya. This may in turn have resulted in the increased resistance to the former antibiotic and reduced resistance to the latter drugs.

Table 4: Antibiotic susceptibility pattern of *Klebsiella sp.*:

S. No.	Antibiotics	Sensitive		Resistant	
		No.	%	No.	%
1	Ciproflaxacin	10	100	00	00
2	Cloxacilin	10	100	00	00
3	Nitrofurantoin	10	100	00	00
4	Nalidixic acid	06	60	04	40
5	Cefoxitin	10	100	00	00
6	Augumentin	10	100	00	00
7	Cephalexin	08	80	02	20

Klebsiella sp. is the next largest percentage (30.30%) of prevalence among the UTI cases (Table 2) of this study. This genus is highly susceptible (Table 4) to most of the drugs (Ciproflaxacin, Cloxacilin, Nitofurantoin, Cefoxitin and Augumentin). But it shows some resistance to Nalixic acid. But in some cases, Klebsiella sp. show high resistance may be due to Extended-spectrum b-lactamases (ESBLs) which are enzymes produced by bacteria, mostly E. coli and Klebsiella species, rendering them resistant to cephalosporins including cefotaxime, cefuroxime, and ceftazidime (Khalifa et al., 2013).

Table 5: Antibiotic susceptibility of *Staphylococcus sp.:*

S. No.	Antibiotics	Sensitive		Resistant	
		No.	%	No.	%
1	Ciproflaxacin	01	33.33	02	66.66
2	Cloxacilin	02	66.66	01	33.33
3	Nitrofurantoin	02	66.66	01	33.33
4	Nalidixic acid	01	33.33	02	66.66
5	Cefoxitin	03	100	00	00
6	Augumentin	02	66.66	01	33.33
7	Cephalexin	03	100	00	00

Gram positive bacteria like Staphylococcus sp. with less infection in UTI with more dangerous effect (Table 2). Table 5 indicates the drug of choice study for Staphlococcus sp. isolates from this study patients. Cefoxitin give 100% effect without any resistance. But Ciproflaxacin shows higher resistant effect for this isolate. This resistance to Ciproflaxacin is due to the frequent usage of the same drug.

Conclusion and recommendation:

Present study in Al-khoms area, Libya shows that female has higher UTI frequency than male. Drug of choice for E. Coli is Ciproflaxacin and Cephalexin, for Klebsiella sp. is Ciproflaxacin, Cloxacilin, Nitofurantoin, Cefoxitin and Augumentin and for Staphylococcus sp. is Cefoxitin. The author recommends that Patients should be treated when bacteriuria is identified with appropriate antibiotic therapy based on sensitivity test so as to avoid the complications. Resistance to antibiotics should be avoided by establishing monitoring systems based on the routine testing of antimicrobial sensitivity and education of healthcare workers, pharmacists, and the community on the health risks associated with the problem and benefits of prudent use of antimicrobials are some steps that can be taken to tackle the problem in the future.

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