Complications of overtreatment among UTI cases in Al-khoms teaching hospital, Al-khoms, Libya

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Abstract

Urinary tract infections (UTIs) are a severe public health problem and are caused by a range of pathogens, but most commonly by *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Enterococcus faecalis* and *Staphylococcus saprophyticus.* The incidence of UTIs in adult males aged less than 50 years is low, with adult women being 30 times more likely than men to develop a UTI. Simple uncomplicated cystitis responds very well to oral antibiotics, but complicated UTIs may require early imaging, and referral to the emergency department or hospitalisation to prevent urosepsis may be warranted. This study is aimed to reduce the over treatment taken for UTI cases and to reduce the dosage levels. This study is aimed to reduce the over treatment taken for UTI cases and to reduce the dosage levels. Female and age interval between 31–40 years old and 61-70 years old were highest number of cases were observed. *Escherichia coli* remain the predominant uropathogen in acute community-acquired uncomplicated UTIs and amoxicillin-clavulanate is useful as a first-line antibiotic. Family physicians are capable of managing most UTIs if guided by appropriate history, investigations and appropriate antibiotics to achieve good outcomes and minimise antibiotic resistance.

Keywords: comorbidity, overtreatment, antibiotics, UTI, Al-khoms

Introduction

Urinary tract infection (UTI) is a collective term that describes any infection involving any part of the urinary tract, namely the kidneys, ureters, bladder and urethra. The urinary tract can be divided into the upper (kidneys and ureters) and lower tract (bladder and urethra) (Tan, 2016) [11]. Urinary tract infections (UTIs) are some of the most common bacterial infections, affecting 150 million people each year worldwide. UTIs are a significant cause of morbidity in infant boys, older men and females of all ages (Foxman, 2010) [3].

Clinically, UTIs are categorized as uncomplicated or complicated. Uncomplicated UTIs typically affect individuals who are otherwise healthy and have no structural or neurological urinary tract abnormalities, these infections are differentiated into lower UTIs (cystitis) and upper UTIs (pyelonephritis) (Hooton, 2012) [6]. Patients suffering from a symptomatic UTI are commonly treated with antibiotics; these treatments can result in long-term alteration of the normal micro-biota of the vagina and gastrointestinal tract and in the development of multidrug-resistant microorganisms (Kostakioti and Hultgren, 2012) [7]. The availability of niches that are no longer filled by the altered microbiota can increase the risk of colonization with multidrug-resistant uropathogens. Importantly, the 'golden era' of antibiotics is waning, and the need for rationally designed and alternative treatments is therefore increasing (Hannan, 2012) [4].

Recent studies have used RNA sequencing to directly analyse uropathogens from the urine of women experiencing symptomatic UTIs.

These studies, together with basic science and improved animal models, have been crucial in enabling us to understand the molecular details of how uropathogens adhere colonize and adapt to the nutritionally limited bladder environment; evade immune surveillance; and persist and disseminate in the urinary tract (Subashchandrabose, 2014) [10]. Successful interventions can reduce inappropriate treatment of asymptomatic bacteriuria while improving value and patient safety outcomes (Daniel *et al*., 2018) [2]. Unnecessary tests and treatment may increase the Medical expenses. Current antibiotic treatments, antibiotic resistance mechanisms, new combination therapies and future therapeutic interventions are that use vaccines and small molecules to target virulence factors. The aim of the present study is to reduce the overtreatment for UTI cases among the Al-khoms population, Libya and to treat the UTI by self – meditation.

Materials and methods

The study was conducted in the Urology Department, Al-khoms teaching hospital in Libya from January 2019 to December 2019. 63 patients presented with symptoms of UTI during the study period. Urine culture is the gold standard for detection of urinary tract infection (Chu and Lowder, 2018) [1]. Bacterial growth was determined by standard microbiology techniques on freshly voided mid-steam urine samples collected from recruited patients. Patients demographic data, urine culture results, resistance rates to antimicrobial agents and prescribed empiric antimicrobial therapy were analyzed.

The sample inoculated for semi-quantitative culture on Cystine-Lactose-Electrolyte-Deficient (CLED) media using a calibrated loop. The culture plated was incubated at 37°C for 18-24 hours under aerobic conditions. Identification of bacterial growth was determined by Grams staining and standard microbiology techniques.

Result and discussion

The prevalence of UTI was 32.1%; majority (67.9%) of the symptomatic did not have UTI based on culture report. Gram-negative bacteria constituted the largest group with a prevalence of 84.1% with *Escherichia coli* being the most common (70%) uropathogen (Rowe and Juthani-Mehta, 2014) [8].

The results observed in the table 1 are that Female has the more UTI (74.60%) than the male (25.39%). Regarding age study, More UTI cases (23.81%) has observed in the age interval between 31 – 40 years old and 61-70 years old and followed by 41 – 60 years old people (14.28%) in the study area. This result is in favour of Harrington and Hooton (2000) [5].

Their study revealed that Urinary tract infections (UTIs) are more common among women than men, although the prevalence in elderly men and women is similar. Most of the research on UTI has focused on young, sexually active women who are at high risk for developing an infection. The predominant UTI risk factors in young women are sexual intercourse and the use of spermicidal contraceptives. Other important UTI risk determinants in selected age groups include anatomic and physiologic factors, such as obstructing lesions and estrogen deficiency; genetic factors, such as blood group secretor status; antibiotic exposure; functional status; and possibly receptive anal intercourse and HIV infection. But there was no difference regarding age and gender in the study of Sadeghi Bojd *et al*., (2018) [9].

Table 1: UTI and associated factors.

Parameter	Categories	UTI Present		95% confidence interval	p- Value
		Numbers	%		
Gender	Male	16	25.39	±5.68	0.01
	Female	47	74.60	±6.84	
	Total	63	100		
Age	20-30	03	04.76	±6.93	0.07
	31-40	15	23.81	±6.31	
	41-50	09	14.28	±6.12	
	51-60	09	14.29	±6.54	
	61-70	15	23.81	±6.88	
	71-80	05	07.94	±5.44	
	>80	07	11.11	±6.71	
		63	100.00		
Co-morbidity	Present	21	33.33	±6.78	0.397
	Absent	42	66.67	±6.42	
	Total	63	100.00		

Bacterial isolates from the urine samples of UTI cases revealed that the *E. coli* is the most predominant microbes in the present study (Table 2). It is followed by *Klebsiella sp.* around 7.93%. Other microbes like *Enterococus sp*., gram positive *Staphylococcus sp*., *Streptococcus sp.* etc., are observed from the UTI cases in this study. Similar results observed in the study of Vasudevan (2014) [12] in South India.

Uropathogen distribution among females and males varied significantly (Table 2). In females, *E. coli* was responsible for most (78.7%) of the cases whereas in males *E. coli* (43.8%), *Klebsiella* sp. (12.5%) and *S. viridans* (12.5%) were the major causative agents. Among the culture-positive diabetic patients, *E. coli*, *S. viridans*, MRSA and *Klebsiella* were the common organism.

Table 2: Distribution of Bacteria among culture-positive samples.

Bacteria	Overall		Males N=16		Females N=47	
	Nos.	%	Nos.	%	Nos.	%
E.coli	44	69.84	7	43.8	37	78.7
Klebsiella sp.	5	7.93	2	12.5	3	6.4
Enterococcus sp.	3	4.77	1	6.3	2	4.3
Coagulase - Ve *Staphylococcus sp.*	3	4.77	2	12.5	1	2.1
Streptococci viridans	3	4.77	1	6.3	2	4.3
Pseudomonas sp.	3	4.77	3	18.8		0.0
MRSA	1	1.58	0	0.0	1	2.1
Non-fermenting gram-negative bacilli	1	1.58	0	0.0	1	2.1
Total	63	100.0	16	100.0	47	100.0

Out of the 63 patients, 23(36.51%) were prescribed an antibiotic. The criteria for prescribing antibiotic were different for different physicians. Fever and dysuria were considered as an indication to prescribe antibiotic by the physicians.

Table 3: Factors associated with overtreatment

Parameters	Overtreatment Present		Overtreatment Absent		Total		p-Value
	Nos.	%	Nos.	%	Nos.	%	
Age							0.782
<60	18	28.57	30	47.62	48	76.19	

>60	05	07.93	10	15.87	15	23.81	
Gender							0.0403
Male	06	09.52	10	15.87	16	25.40	
Female	11	17.46	36	57.14	47	174.60	
Co-morbidities							0.373
Present	07	11.11	14	22.22	21	33.33	
Absent	12	19.05	30	47.62	42	66.67	

According to overtreatment study criteria, 18 cases with less than 60 years of age were over treated with Antibiotics (28.57%). 6 males and 11 females and 7 co-morbid cases were also over treated (Table 3). Narrow-spectrum antibiotic with the safest side effect profile are recommended to avoid the development of Antibiotic resistance. Decrease of an inappropriate treatment of asymptomatic bacteriuria can reduce preventable harm from unnecessary antimicrobial exposureand in turn decrease the complications among the patients.

Conclusion and recommendations
Almost one third of the patients were managed inappropriately in spite of the availability of a culture report. Female and age interval between 31–40 years old and 61-70 years old were highest number of cases were observed. E, coli is the most predominant microbes noted in this study. Ciprofloxacin and Cotrimoxazole was preferred drug, with one fifth of patients being started on parenteral antibiotics with no apparent rationale. Periodic surveillance of antimicrobial resistance of uropathogens, re-evaluation of empirical therapy, pre-therapy counseling for delayed antibiotic initiation and short-course antibiotic therapy with sensitive antibiotics are vital in an era of emerging antimicrobial resistance.

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