

INCIDENCE OF URINARY TRACT INFECTION IN PREGNANT WOMEN: OBSERVATIONS FROM A TERTIARY CARE HOSPITAL

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Received: 16 Jan, 2018/Revision: 28 Jan, 2018/ Accepted: 18 March, 2018

ABSTRACT: BACKGROUND: Urinary tract infection (UTI) is a common problem among the pregnant women, which can complicate the outcome of the pregnancy. The objective of this study was to identify the most common pathogens causing UTI in pregnant women and their antimicrobial susceptibility pattern METHODS: This was a retrospective study and was carried out checking in to the medical records for one year (January 2016 to December 2016). The incidence and drug resistance pattern for various clinically used antibiotics against these isolated bacteria were analyzed. RESULTS: Data on a total of 117 pregnant women with UTI were retrieved and classified. Majority of the women were primi (52.13%, 61/117), and it found that UTI was common in IIIrd trimester (66.66%, 78/117). Among Gram negative pathogens, E coli and Klebsiella sp were the most common and among gram positive organisms, Streptococcus was seen only around 5% of the study population. Some women were infected by Candida albicans (2.6%) also. The isolates were resistant to commonly prescribed antibiotics like Ampicillin, amoxyclav. Low level of resistance to Norfloxacin/Ciprofloxacin and Ceftriaxone in the study population makes them drug of choice for empirical antibacterial therapy by oral and intravenous route, respectively CONCLUSIONS: These results indicate that UTI was high in the third trimester and that gram negative organisms were more common. The isolates were resistant to commonly prescribed antibiotics like Ampicillin, amoxyclav. Low level of resistance to Norfloxacin/Ciprofloxacin and Ceftriaxone in the study population makes them drug of choice for empirical antibacterial therapy by oral and intravenous route, respectively.

KEY WORDS: Urinary tract infection; pregnancy, antibiogram, third trimester.

INTRODUCTION:

Pregnancy is biologically, physiologically, and psychologically stressful, even for healthy women¹

Various conditions like bleeding, hyperemesis gravidarum, hypertensive disorders, anemia, gestational diabetes mellitus, epilepsy, infections

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etc. will complicate the outcome of the pregnancy¹. Among these, UTI is the most common complication of pregnancy occurring in approximately 4-7% of pregnant women². Incidence of UTI during pregnancy in India is 8.8%³. UTI will usually begin in at the 6th week and peaks during 22 to 24th week⁴. Asymptomatic bacteriuria occurs in 4% to 8% of all pregnancies⁵; pyelonephritis occurs in 1% to 2% of pregnancies, 1% of pregnant women will have acute cystitis⁶.

Urinary Tract infection is defined as “the presence of pathogenic microorganisms within the genitourinary tract with concomitant symptoms and is the most common bacterial infection⁷. The factors which make a pregnant women more susceptible to UTI are anatomical structure of female urinary system that is, short length of urethra and its close proximity to the vagina, anus and rectum⁸, influence of oestrogen and progesterone, which induce dilatation of the urethras, bladder and renal pelvis, ureteral and vesicular smooth muscle relaxation, increased bladder capacity, hydroureter, decreased ureteral peristalsis and vesico ureteral reflux⁹. A change in kidney - size, a relative change in the bladder position, glycosuria and aminoaciduria¹⁰ also contribute to UTI.

UTI elevates the risk of pyelonephritis, premature delivery, fetal mortality, anemia, pregnancy induced hypertension/pre-eclampsia among pregnant woman and recent research also suggest that UTI during pregnancy may increase the risk of cerebral palsy or mental retardation or developmental delay as well as fetal death¹¹. UTI can be very well prevented by drinking at least 8 glass of water every day, wearing cotton undergarments on a daily basis, urinating on a frequent basis, wiping from front to back after a bowel movement, urine analysis in prenatal visits etc. These measures will help to avoid the occurrence of UTI in pregnancy⁶⁻¹⁰. UTIs during pregnancy are a common cause of serious

maternal and perinatal morbidity. The incidence of UTI is increasing day by day during pregnancy⁵⁻¹³. The present study was initiated to understand the pattern of UTI infection in pregnant women and study the antibiotic sensitivity pattern

MATERIALS AND METHODS:

This was a medical record-based study and was conducted with the support of Medical Records department and Clinical Microbiology of Father Muller Medical College Hospital Mangalore. The study was approved by the institutional ethics committee and the data were collected from January 2016 to December 2016. The inclusion criteria were pregnant women who were confirmed to have urinary tract infection as per microbiological culture. The exclusion criteria include women who were not pregnant. All the files were thoroughly reviewed by the student investigator and the details on the age, pregnancy and domicile were collected. The organism/s and the antibiotic sensitivity were recorded from the Microbiology department. The necessary details were entered in a proforma sheet. The data were then entered in Microsoft excel program and imported in to statistical program (SPSS version 23) for analysis. Descriptive statistics was done and the frequency and percentage was calculated.

RESULTS:

The A total of 117 pregnant women, who were diagnosed with UTI were included in the study. More than 75% of the pregnant women with UTI were of the age group of 21-30 years. Majority of the women were primi (52.13%, 61/117), followed by secundigravida (29%, 34/117). The UTI was common in the III rd trimester (66.66%, 78/117) and no UTI was diagnosed in first trimester (Table 1). A total of 149 uropathogens were isolated, among which *Escherichia coli* and *Klebsiella* sp accounted for 59%. Some women were infected by

Candida albicans (2.6%) also. Group B β hemolytic *Streptococcus* was isolated in around 5% of pregnant women (Table 2). The antibacterial susceptibility pattern of the gram negative and gram positive uropathogens as shown in Table 3 and 4, respectively. Among the uropathogens isolated, there was no resistance observed in high end antibiotics in both gram positive as well as gram negative pathogens.

Table 1: The details of age, parity and gestational age of the study group

N = 117		Frequency	Percentage
Age	Less than 20	8	6.83
	21-30	91	77.77
	31-40	18	15.38
Parity	Primi	61	52.13
	One	34	29.05
	Two	11	9.40
	Three and more	5	4.27
Gestational age	I st trimester	0	0
	II nd trimester	39	33.33
	III rd trimester	78	66.66

Table 2: List of Organisms isolated from pregnant women suffering from UTI

	Total	
	Freq.	%
<i>Escherichia coli</i>	66	43.33
<i>Klebsiella sp</i>	22	14.67
<i>Pseudomonas sp</i>	16	10.67
<i>Citrobacter sp</i>	11	7.33
<i>Enterococcus sp</i>	8	5.33
<i>Acinetobacter sp</i>	7	4.67
<i>Streptococcus sp</i>	7	4.67
<i>Proteus sp</i>	6	4
<i>Candida species</i>	4	2.67

<i>Chryseobacterium sp</i>	1	0.67
<i>Citrobacter sp</i>	1	0.67

Table 3: Antibiotic resistance of various gram-negative organisms to some important antibiotics

Gram negative pathogens	Antibiotic	Total (131)	
		Freq.	%
Beta Lactum	Ampicillin	110	83.97
	Amoxycylav	79	60.31
	Cefuroxime	92	70.23
	Ceftriaxone	35	26.72
	Co-trimoxazole	24	18.32
Amino glycosides	Nitrofurantoin	22	16.79
	Gentamicin	21	16.03
	Amikacin	13	9.92
Fluoro quinolones	Ciprofloxacin	19	14.5
	Levofloxacin	18	13.74
High end antibiotics	Piperacillin Tazobactam	2	1.53
	Cefaperazone -sulbactam	0	0
	Meropenem	0	0
	Imipinem	0	0
	Aztreonam	0	0

Table 4: Antibiotic resistance of various gram-positive organisms to some important antibiotics

Gram Positive pathogens	Antibiotics tested	Total (14)	
		Freq.	%
Beta Lactum	Ampicillin	9	64.29
	Amoxyclav	6	42.86
	Cefuroxime	0	0
	Ceftriaxone	0	0
	Co-trimoxazole	3	21.43
	Nitrofurantoin	5	35.71
Amino glycosides	Gentamicin	7	50
	Amikacin	1	7.14
Fuoro quinolones	Ciprofloxacin	10	71.43
	Levofloxacin	11	78.57
Macrolides and others	Erythromycin	0	0
	Clindamycin	0	0
High end antibiotics	Vancomycin	0	0
	Teicoplanin	0	0
	Linezolid	0	0

DISCUSSION:

Accurate identification of bacterial uropathogens and determining their drug susceptibility pattern are critical for efficient management of patients with UTI, especially in pregnant women. They are also associated with significant clinical and financial benefits, via the reduction of morbidity and mortality rates and overall hospitalization costs¹⁴. In view of this, identification and antimicrobial susceptibility testing of clinical isolates by means of fully automated systems have become a common practice in many laboratories. Various automated system designed to provide accurate identification and susceptibility testing

results for most clinical isolates of both Gram-positive and Gram-negative bacteria are available. Apart from accurate identification and susceptibility testing shortened turnaround times, improved specimen handling, enhanced quality control, reproducibility and the ability to track results are further advantages of the system¹⁵.

Urinary tract infection is caused by both Gram-negative and Gram-positive bacteria. However, the most commonly encountered bacteria are Gram negative in which *E. coli* consisting of the largest proportion of bacterial uropathogen worldwide^{16, 17}. This is evident by the present study where we observed that 149 bacterial isolates recovered, 130 were Gram-negative bacteria. Our finding of Gram-negative bacteria as the predominant species in patients with UTI was consistent with similar studies conducted before^{16, 18-23}. Previous reports indicate that *E. coli* is the main bacterial uropathogen accounting for 75 to 90% of bacterial isolates among patients with UTI^{24, 25}. *E. coli* as the predominant bacterial uropathogen in the present study was consistent with similar studies conducted locally¹⁸⁻²³. Unlike other studies,^{18, 20, 22} we have not encountered UTI with Coagulase Negative Staphylococcus during the study period. The prevalence of other predictable bacterial uropathogens varies from region to regions and from one study to another study²⁶⁻³⁰. In this study, the proportion of pregnant women with UTI was high in the third trimester. This has also been shown in other studies in the past^{28, 29}. This can be attributed to the stasis of urine due to the effect of progesterone causing relaxation of smooth muscle of urinary bladder and the enlarged size of uterus obstruction the bladder outlet. The most important aspect is that this study has helped the obstetrics department in formulating antibiotic policy for the pregnant women with uncomplicated UTI. Even though, UTI in pregnancy is mainly community acquired, the pathogens were resistant to commonly used antibiotics like ampicillin and amoxyclav. But, low level of resistance to Norfloxacin/ Ciprofloxacin and Ceftriaxone in the

study population makes them drug of choice for empirical antibacterial therapy by oral and intravenous route, respectively.

CONCLUSION:

UTIs are still among the most common pregnancy-related disorders in the vast majority of countries and in India in specific. Unfortunately, their incidence has not been on a decrease and unlike in the general population, asymptomatic infections during pregnancy require treatment in line with current practical recommendations. In our study it was observed that the UTI incidence was highest in the third trimester and that gram negative organisms were more common. Accurate diagnosis and adequate treatment of infections helps in mitigating the risk of maternal and fetal complications. Antibiotic treatment is indicated in recurrent infection provided the chosen drug should have a good maternal and fetal safety profile. Goals for future research should be on local epidemiology, as well as best preventive measures for recurrent infections with the judicious use of antibiotics.

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CONFLICT OF INTEREST: Authors declared no conflict of interest

SOURCE OF FINANCIAL SUPPORT: Nil

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Cite of article: D'souza SL, Jakribettu RP, D'cunha P, Bloor R, Palatty PL, Baliga MS. Incidence of urinary tract infection in pregnant women: observations from a tertiary care hospital. *Int J Med Lab Res*. 2018;3(1):15–20. <http://doi.org/10.35503/IJMLR.2018.0103>