Observational Study

Prevalence of urinary tract infection among pregnant women in a tertiary care hospital in West Bengal

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Urinary tract infection is one of the most commonly diagnosed infections in pregnancy. Common causative organisms are Gram Negative Bacilli like Escherichia coli, Klebsiella sp. or Gram-positive bacteria like Enterococcus and Staphylococcus. Identification of uropathogens and their treatment is necessary for the viability of fetus.

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Key words : **UTI, Pregnancy, Renal failure, antibiotics.**

Urinary Tract Infection (UTI) is one of the most commonly diagnosed infections. It can be defined as isolation of an organism from urine culture in quantitative or semi-quantitative counts of $\geq 10^5$ cfu/ mL or as more than 100 organisms per 100 mL of urine with accompanying pyuria in a symptomatic patient[1]. Clinical manifestation of UTI depends upon the anatomic area involved, causative organism, and severity of infection, host immune response etc. Common symptoms are pain or burning sensation during micturition, increased frequency of micturition, feeling of urgency, passage of blood in urine or cloudy urine, lower abdominal pain and fever. Common causative agents of UTI are Gram negative bacilli like Escherichia coli, Klebsiella sp, or Gram positive bacteria like Enterococcus and Staphylococcus[2-4]. Incidence of UTI is higher in women than men, 40% to 50% of whom will suffer at least one clinical episode during their lifetime[5]. Pregnant women are prone to develop UTI than non-pregnant. During pregnancy due to compression of ureters by gravid uterus, ureteral dilation leads to stasis of urine. Bladder tone also reduces in pregnancy. Vesico-Ureteric reflux, past UTI, diabetes mellitus, hyperuricemia also are important predisposing factors for UTI[6-8].

The aim of the study is to detect prevalence of UTI among pregnant women attending this tertiary care center and its distribution in relation to age, parity and gestational age of pregnant women and identification of uropathogens and their antibiotic sensitivity pattern for effective treatment.

MATERIALS AND METHODS

Study site and period — the study was conducted at

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Medica super specialty Hospital, Kolkata between Feb 2018 to Sept 2018.

Sample size — total 422 pregnant women who have delivered their baby in this hospital during the specified period with or without symptoms of UTI were included in this study.

Exclusion criteria — who were already on antibiotics and improperly collected or stored sample.

Isolation and identification of uropathogens — clean cached urine samples were collected in sterile container and processed within 2 hours, where delay more than 2 hours anticipated samples were stored in 2-80 C for maximum 6 hours. Samples were inoculated in CLED agar with calibrated loops following standard inoculation methods. Cultures were read after 24 hours of aerobic incubation at 370 C, only cultures with 105 colony count or above were further processed for identification. Identification of the isolated organism was done using automated system BD Phoenix 100.

Antimicrobial sensitivity data — Isolated organisms further processed to obtain the antibiotic sensitivity pattern. Antibiotic sensitivity done by using automated system BD Phoenix 100. Antibiotic sensitivity of Group B Streptococcus was done by modified Kirby Bauer method using MHA containing 5% sheep blood.

RESULTS

• Out of 422 pregnant women evaluated, prevalence of UTI was found to be 21.80%, Table 1 showing the prevalence rate.

• Prevalence of UTI in relation to age of the pregnant women has been shown in Table 2. Highest incidence has been found in the age group of 25 to 30 years.

• Table 3 showing relationship of UTI with number ofgravida. Highest incidence of infection is seen in primigravida.

• Incidence of UTI in relation to gestational age has

been shown in Table 4. Women in their last trimester has greater incidence of UTI 52.17%.

• Among the 92 bacterial isolates majority are Gram negative bacilli, only 10.87% Gram positive cocci was isolated as a causative agent of UTI in pregnant women. Among the Gram negative bacteria Escherichia coli was the most frequent isolate 59.81%, followed by Klebsiella pneumonia 18.47% and Proteus mirabilis 10.86%. Gram positive cocci isolated were Enterococci 8.69% and Group B Streptococcus 2.17% as shown in Table 5.

• Antibiotic sensitivity pattern to commonly used drugs were determined from the isolated organisms. All the Gram-negative isolates were sensitive to Amikacin and Carbapenoms. Sensitivity to Nitrofurantoin was high in E. coli than Klebsiella. Sensitivity to Fluroquinolones is altogether low in Gram negative bacteria isolated. Antibiotic sensitivity result has been shown in Table 6 & 7.

• Table 8 showing relationship of UTI cases with birth weight of baby. Incidence of UTI is little more 25.64% in women who have given birth to low birth weight babies.

• During the specified study period there were 5 twin deliveries. Among which 2 mothers had developed UTI, making the percentage of UTI in twin pregnancies higher 40% as shown in Table 9.

DISCUSSION

In this study we have found that the prevalence of UTI is considerably significant among individuals with last trimester pregnancy. *E coli* has been detected as the most common causative organism. Other organisms include gram negative Klebsiella, Proteus and gram positive Enterococcus and Streptococcus. Fluoroquinolones has been evidenced the less sensitive drug and nitrofurantoin possible the drug of choice in case of infection of *E coli*. It

has also been observed that incidences of UTI among pregnant women who has twin pregnancy is considerably higher than single which again supports the pathophysiological events causing UTI in pregnancy.

Other studies have also shown that predominant uropathogen is *E coli* and the infection rate if higher in the last trimester due to progressive obstruction, stasis of urine due to ureteral dilation, reduced bladder tone, Vesico-Ureteric reflux, history of past UTI, diabetes mellitus and hyperuricaemia.

Table 1 — Prevalence rate of UTI

Total no of pregnant	Total no of positive UTI
422	92 (21.80)

Table 2 — Distribution of UTI according to age

Age	No of patients	No of positive cases
<20 years	12(2.84)	1(1.08)
20-25 years	168(39.81)	38(41.30)
25-30 years	208(49.28)	50(54.34)
>30 years	34(8.05)	3 (3.26)

Table 3 — Distribution of UTI according to gravida

Gravida	No of patients	No of positive cases
Primi gravida	208	55(26.44)
Second gravida	196	35(17.85))
Third gravida and above	18	2(11.12)

Table 4 — Distribution of UTI according to gestational age

Trimester	No of cases
1st	30(32.6)
2nd	14(15.22)
3rd	48(52.17)

Table 5 — Frequency of Bacteria causing UTI among pregnant women

Etiological agent	No of cases
Escherichia coli	55(59.81)
Klebsiella	17(18.47)
Proteus	10(10.86)
Gr B streptococcus	2(2.17)
Enterococcus	8(8.69)

Table 6 — Antibiotic sensitivity pattern – Gram negative bacilli

Antimicrobials	E coli	Klebsiella	Proteus
Penicillin	1(1.82)	0(0)	-
Cephalosporin	18(32.73)	5(29.41)	8(80)
Amikacin	55(100)	17(100)	10(100)
Meropenum	55(100)	17(100)	10(100)
Ciprofloxacin	12(21.82)	7(41.17)	8(80)
Levofloxacin	12(21.82)	7(41.17)	8(80)
Nitrofurantoin	54(98.2)	12(70.59)	-
Co- trimoxazole	28(50.9)	15(88.23)	9(90)

Table 7 — Antibiotic sensitivity pattern – Gram positive cocci

Antimicrobials	Enterococci	Gr B Streptococci
Penicillin G	2(25)	2(100)
Amoxy-clav	-	2(100)
Vancomycin	8(100)	2(100)
Teicoplanin	8(100)	2(100)
Linezolid	8(100)	2(100)
Erythromycin	5(62.5)	2(100)
High load Gentamicin	8(100)	-

Table 8 — Distribution of UTI according birth weight of baby

Birth weight	No of deliveries	No of positive cases
<2.5 kg	117	30(25.64)
2.5-3 kg	301	62(20.6)
>3 kg	4	0

Table 9 — Relation of UTI with type of pregnancy

Type of pregnancy	No of positive UTI cases
Twin pregnancies - 5	2(40)
Single pregnancies - 417	90(21.6)

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