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ORIGINAL RESEARCH

First trimester urinary tract infection and risk of preterm labour pain

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Abstract

Introduction - Preterm labour refers to the initiation of labour prior to 37 weeks and after 28 weeks of gestation, characterised by consistent uterine contractions that result in gradual cervical modifications. Urinary tract infection (UTI) is one of the several causes of preterm labour. The aim of this study is to evaluate first trimester urinary tract infection and risk of preterm labour pain.

Material and methods- The present cross-sectional hospital based study was conducted at department of obstetrics and gynecology among 100 women with preterm labour pain during the study period of one year. Midstream urine samples were collected from all and culture test was performed. Results were analyzed using SPSS version 25.0

Results- Maximum patients were in the age group of 25 to 29 years (50%). 92% of them live in rural area. 70% of patients had normal urine examination and 30% were suffering from UTI. 3% of women had pyleonephritis and 97% had no complications. Organisms isolated from urine culture and sensitivity were : E.coli (68%) , cogaulase negative staph (11%), S.aureus (10%) , Klebsiella (6%) and GBS (5%).

Conclusion – Untreated urinary tract infection (UTI) can be linked to obstetric problems and lead to preterm birth. The predominant bacterial illness that occurs during pregnancy is urinary tract infections (UTIs). It is recommended that all women undergo screening for urinary tract infections (UTIs) during their initial antenatal appointment. Upon diagnosis, it is crucial to rapidly administer an appropriate antibiotic that is both effective and safe.

Keywords – first trimester, labour, pain, preterm, risk , UTI

Introduction

Urinary tract infections (UTIs) are common occurrences during pregnancy, impacting up to 8% of pregnant women.[1] Pregnancy can lead to physical changes that raise the risk of a urinary tract infection (UTI). These changes include an increase in bladder volume, a decrease in bladder tone, and a shift in the vaginal flora.[1,2] The infection typically starts as asymptomatic bacteriuria, which then develops into acute cystitis (a lower tract infection) in 30% of patients. In up to 50% of patients, it can further advance to acute pyelonephritis (an upper tract infection).[1] UTI is diagnosed by clinical findings of bacteriuria (bacteria in midstream urine in counts of > 105 colony forming units (cfu)/mL) along with symptoms reported by the patient. [3] Current guidelines advise conducting bacteriuria testing in early pregnancy.[4-7] It is advisable to administer an antibiotic suitable for pregnancy, regardless of the presence of symptoms.[8]

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UTIs in pregnancy lead to poor outcomes in both the mother and child, including preterm labour.[9] Preterm labour is the initiation of labour prior to 37 weeks of gestation after the time of viability. Among the numerous challenges in obstetrics, preterm labor presents a distinct burden to obstetricians, mostly due to its detrimental impact on perinatal outcomes. The perinatal morbidity and mortality rate is 2-7 times higher in comparison to term pregnancy. A preterm neonate experiences numerous problems both during and after delivery. Therefore, it is essential to promptly identify and address the underlying causes of a condition.[10]

In pregnant women UTIs are classified either as asymptomatic bacteriuria (ASB), or symptomatic infections such as acute cystitis, acute pyelonephritis, when bacteria invade urinary tract tissues, inducing an inflammatory response.[11] Asymptomatic bacteriuria is present in 2 to 10% of pregnant women, but symptomatic urinary tract infections, such as cystitis and pyelonephritis, may occur in approximately 4% of pregnancies. Significantly, a notable proportion of asymptomatic patients, ranging from 25 to 40%, will eventually experience symptoms if they do not receive treatment.[12,13]

Therefore, promptly identifying and treating urinary tract infections can successfully minimize complications associated with preterm labor, such as preterm birth. Hence the present study will be done to evaluate first trimester urinary tract infection and risk of preterm labour pain.

Material and methods

The present cross-sectional hospital based study was conducted at department of obstetrics and gynecology, GMC, Jammu among women with preterm labour pain during the study period of one year. Ethical clearance was taken from institutional ethics committee before commencement of study. Patients were asked to sign an informed consent form after explaining them the complete procedure.

After convenience sampling a total of 100 women admitted for preterm labour pain were selected on the basis of inclusion and exclusion criteria.

Inclusion criteria

Individuals experiencing preterm labor are those who are less than 37 weeks gestation and beyond the viable gestation period, and who have regular contractions in their uterus occurring once every 5-8 minutes or less, accompanied by one or more of the following symptoms:

1. Cervical alterations that occur gradually.
2. A cervical dilatation of two centimeter or greater.
3. A cervical effacement of 80% or higher.

Exclusion criteria

1. Patients involving congenital fetal abnormalities and uterine anomalies.
2. Fetal deaths that occur within the womb.
3. Patients with decompensated cardiac lesions, diabetes, nephritis, uncontrolled hypertension, and other chronic systemic disorders.
4. Preterm labor induced.
5. Patients who were on antibiotic therapy.

A comprehensive clinical history was obtained, which included the patient's age, level of education, duration of antenatal care, parity, and obstetrical history. Gestational age was determined by considering the menstrual history, namely the starting day of the last menstrual period in a 28-day cycle, and/or an early ultrasound examination. A comprehensive assessment was conducted, including a general examination, systemic examination, and

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obstetric examination. Various investigations including Haemoglobin (Hb), Total Leukocyte Count, Blood Sugar, Blood Grouping, HIV, Hbs Ag, and VDRL were conducted. Midstream urine samples were collected from all patients using a sterile container. Two samples were collected: the first sample for microscopic examination and the second sample for culture and sensitivity testing.

Data collected was noted in excel sheets. Results were analyzed using SPSS version 25.0 keeping level of significance $p < 0.05$. Continuous variables were summarised using means and standard deviations. Categorical variables were summarised using frequencies, proportions and percentages.

Results

Maximum patients were in the age group of 25 to 29 years(50%) and least was above 34 years (3%). 90% of them were illiterate and 72% belong to lower class. 92% of them live in rural area and 8% live in urban area as shown in table 1.

Table: 1. Socio-demographic characteristics of patients

Variable		Percentage
Age (in years)	20-24	4
	25-29	50
	30 -34	43
	>34	3
Educational status	Illiterate	90
	Literate	10
Socioeconomic status	Lower	72
	Middle	24
	Upper	4
Residential area	Urban	8
	Rural	92

4% patients were in the gestational age of 28 to 30 weeks , 81 % were in the gestational age of 30 to 34 weeks and 15% were in the age of 34 to 37 weeks. 35% of patients were in G2 parity and least 17% were in primi. 70% of patients had normal urine examination and 30% were suffering from UTI. 3% of women had pyleonephritis and 97% had no complications as shown in table 2.

Table: 2. Maternal characteristics

Variable		Percentage
Gestational age	28 to 30	4
	30 to 34	81
	34 to 37	15
Parity	Primi	17
	G2	35
	G3	18
	G4	30
Urine examination	UTI	30
	Within normal	70
Complications	No	97
	Pyleonephritis	3

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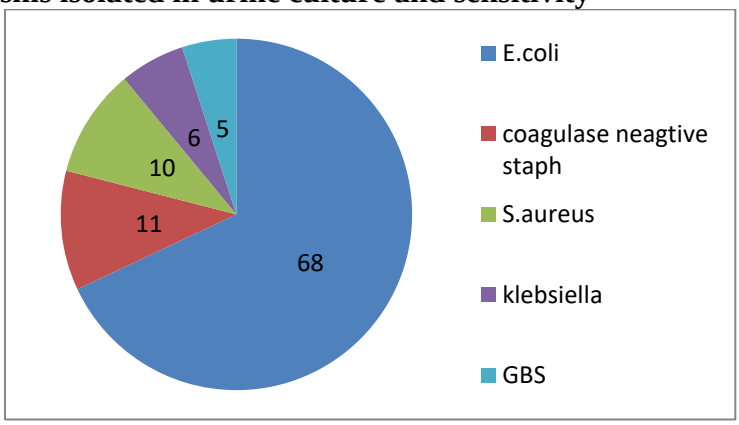
Organisms isolated from urine culture and sensitivity were : E.coli (68%) , cogaulase negative staph (11%), S.aureus (10%) , Klebsiella (6%) and GBS (5%) as shown in figure 1.

Figure: 1 Organisms isolated in urine culture and sensitivity



Discussion

Preterm labour is a primary contributor to newborn illness and death on a global scale. The World Health Organisation (WHO) has calculated that around 9.6% of all births, totaling around 13 million, were classified as pre-term in recent year. Africa and Asia collectively represented a total of nearly 11 million. Research indicates that infection contributes to the development and occurrence of preterm labour and delivery.[14] Lockwood stated that approximately 50% of spontaneous preterm deliveries were linked to urinary tract infections (UTI).[15]

The majority of patients in our study fell within the age range of 25-29 years. The most common parity seen was gravida 2, which aligns with the findings of the study conducted by Pandey et al.[15] The majority of our patients came from rural backgrounds, which is in contrast with the study conducted by McPheeters et al.[16] The total no patients found positive for UTI were 30% which is comparable to the findings of the Davidson et al. study.[17] The most often seen bacteria in urine culture was Escherichia coli (68%), similar to the findings of Chhabra and Patil.[18]

In our study it was found that Urinary tract infection (UTI) raises the likelihood of a pre term birth, especially a spontaneous preterm birth (PTB). The risk of complications was increased regardless of the stage of pregnancy. However, women who were hospitalised with a urinary tract infection (UTI) during their first trimester had the highest risk. This indicates that more severe infections further raise the risk at this specific phase. After making modifications, it was shown that women who were hospitalised with a urinary tract infection (UTI) during their second trimester of pregnancy had a threefold increased risk of giving birth. The diagnosis of pyelonephritis did not exhibit a greater propensity for preterm birth (PTB) compared to the diagnostic of a urinary tract infection (UTI).

Additional epidemiological research have discovered that pregnant women who experience a urinary tract infection (UTI) are twice as likely to have a preterm birth (PTB). Our findings indicate that women who had a urinary tract infection (UTI) during pregnancy were more likely to experience a preterm birth (PTB), even after accounting for other maternal variables. Research investigating preterm birth has yielded inconsistent results. A community-based study conducted in Israel by Mazor-Dray and colleagues revealed that women with a urinary tract infection (UTI) had twice the likelihood of giving birth before 34 weeks of gestation.[19] However, a study conducted in Taiwan by Chen and colleagues did not find any association between UTI and preterm birth in their population. Only a limited number of population-based studies have investigated the correlation between the timing of urinary tract

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infections (UTIs) and the likelihood of preterm delivery.[20] Morken and colleagues found no correlation between a urinary tract infection occurring before 17 weeks of gestation and preterm birth. In our study, we found that women who had urinary tract infections (UTIs) during the early stages of pregnancy had a higher risk of preterm birth (PTB).[21] Furthermore, only a small number of researchers have investigated the correlation between urinary tract infections (UTIs) and preterm birth (PTB), whether it occurs spontaneously or is started by a healthcare provider. According to the Cardiff Birth Survey, women with asymptomatic bacteriuria had twice the likelihood of experiencing a medically advised preterm birth, but not a spontaneous one.[22] Additionally, we found that women with a UTI throughout pregnancy were more likely to experience a provider-initiated PTB.
Small sample size and limited time period to conduct the study serve as a limitations to our research.

Conclusion

It is recommended that all pregnant women undergo screening for urinary tract infection (UTI) and receive appropriate antibiotic treatment if the culture confirms the presence of infection. Subsequently, they should be retested to ensure that the infection has been successfully cured in order to prevent any consequences. Furthermore, providing health education to pregnant women, particularly those from low socio-economic backgrounds, will aid in the prevention of urinary tract infections.

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