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Original Research Article

URINARY TRACT INFECTION AND PPROM: A CROSS-SECTIONAL STUDY

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Abstract: *During pregnancy, urinary tract infections (UTIs) are a common issue that can have severe short- and long-term fetal morbidity and death linked to premature membrane rupture and preterm birth. This cross-sectional study aimed to determine the frequency of UTIs in patients with preterm rupture of membranes (PPROM). The study was conducted at the Gynae B unit of Mardan Medical Complex, Dardan, and lasted six months, from January 1, 2023, to August 1, 2023. After obtaining permission, the study included 103 patients with verified PPROM and singleton pregnancy who were hospitalized from the outpatient department or emergency room and had a parity 37 weeks before. Patients with intrauterine mortality, antepartum hemorrhage, or infection that needed immediate treatment were excluded from the study. A midstream urine specimen was obtained from each patient, and information was gathered on the midstream urine specimen outcomes for sensitivity and culture. In our study, the frequency of UTIs in PPROM patients was 20.4% (21 patients). The mean age of patients was 28.922±2.54 years, and the age range was 18 to 35. The mean gestational age was 31.718±1.37 weeks, and the mean parity was 1.534±1.37. Women who were multiparous (18.3%, p=0.00) and older than 30 (17.4%, p=0.00) had higher rates of UTI. Based on our study's findings, we conclude that there is a strong link between urogenital infections and premature birth, with 20.4% of patients with PPROM having a UTI. As a result, we recommend routine urine testing throughout pregnancy to promptly treat UTIs, mainly asymptomatic UTIs. To reduce the prevalence of PPROM and the resulting morbidity and death in mothers and fetuses, repeated culture monitoring must be conducted.*

Keywords: Preterm Rupture of Membranes, Preterm Delivery, Urinary Tract Infection

Introduction

A baby delivered before 37 full weeks of gestation is referred to as preterm. It is among the main factors contributing to prenatal death and morbidity (Wang et al., 2017). It is linked to persistent neurodevelopment.

Impairment. Preterm premature rupture of membranes (PPROM) accounts for forty percent of preterm births. The range of PPROM incidence is 3% to 5%. (Kuba and Bernstein, 2018). A pathological condition known as PPROM causes the fetal membranes to burst and prematurely weaken before labour even begins (Cunningham et al., 2014). The causes of PPROM are complex. The cause of preterm labor is poorly known, but a multifactorial etiology has been proposed. A substantial body of Studies indicates that inflammation and infection mediate between PPROM and premature labour. One of the main contributing factors to the avoidable causes of early labour is urogenital infections (Vrishali et al., 2017). Numerous clinical and demographic variables have been linked to premature births in the past, including membrane stretching, connective tissue abnormalities, smoking, poor socioeconomic level, prior cervical surgery, and choriodecidual infection (Faucett et al., 2016; Hackenhaar et al., 2014). Early amniotic fluid leaking exposes the fetus to intrauterine infection, hypoxia from the umbilical cord's compression or prolapse, placental abruption, and postnatal problems associated with preterm (Cunningham et al., 2014; Genovese et al., 2016).PPROM is still one of the most difficult obstetric problems to treat. Several therapeutic and preventive approaches to enhance perinatal outcomes have not had the desired effects, and PPROM requires aggressive management in cases of placental abruption, evidence of maternal-fetal infection, active labour, and intrauterine death.

Infection, short cervix or cervical malfunction, antepartum hemorrhage, low body mass index, lower socioeconomic position, idiopathic uterine contractions, multiple fetal pregnancies, and spontaneous rupture of the fetal membranes are among the maternal factors linked to spontaneous preterm labour and delivery (Georgiou et al., 2015). A frequent health issue among expectant mothers is urinary tract infection. Asymptomatic bacteriuria increases the risk of PPROM and premature birth (Kalinderi et al., 2018). The anatomical, physiological, and hormonal changes that occur during pregnancy increase a woman's risk of both symptomatic and asymptomatic urinary tract infections (Rahman et al., 2019). Asymptomatic UTIs occur in 5-7% of pregnant women.20% who go untreated will develop symptoms of a UTI (Vrishali et al., 2017). Untreated UTIs will result in pyelonephritis and premature labour.

Methodology

From January 1, 2023, to August 1, 2023, a cross-sectional Study was carried out in the Obstetrics and Gynecology department of the Mardan Medical Complex in Mardan. The estimated sample size, with a 95% confidence interval and an 8% margin of error, was 103. Patients with premature rupture of the membranes were projected to have a 22%

higher prevalence of urinary tract infections.12 non-probability consecutive sampling was the method used for sampling. The study included women between the ages of 18 and 35 who had an ultrasound-confirmed singleton pregnancy and a gestational age of fewer than 37 weeks with ruptured membranes; patients who had an intrauterine death, antepartum hemorrhage, congenital anomalies, or chorioamnionitis that required immediate medical attention were excluded. If any of the following conditions appeared on an ultrasound before 37 weeks of gestational age, a diagnosis was made: Sudden outflow of fluid from the vagina, persistent wetness or leakage of alcohol seen on the pad or undergarment, and A speculum examination shows alcohol collecting in the upper vagina or trickling down the cervical os, and this will intensify when you cough or stretch (Valsalva maneuver).

Infections of the urinary tract: It was characterized as having a culture-proven infection with a single organism (defined as ≥5 × 104 CFU/mL) and having pyuria on a urinalysis (defined as ≥10 white blood cell count/mm3 or ≥5 white blood cell count/HPF).

The hospital ethics committee approved the study, and information was gathered from all patients who had been diagnosed with preterm rupture of membranes (according to the operational definition) and who had presented to the obstetrics and gynecology emergency room and outpatient department at the Mardan Medical Complex in Mardan. We acquired informed permission from the individuals. The goal and advantages of the study were described, along with how anonymity would be protected before informed consent. A thorough history, obstetrical, and systemic examination were performed on all the women. Using a prenatal ultrasound from the first trimester, gestational age was determined. Duty staff collected clean midstream urine specimens from each patient and promptly delivered them to the hospital laboratory for urine analysis, culture, and sensitivity testing. Information on UTIs was recorded on the prepared proforma.

Statistical analysis software (IBM-SPSS version 23) was used to examine the data. Calculations were performed on frequencies and percentages for categorical variables such as urinary tract infections. For quantitative characteristics, including age, gestational age, and parity, mean ±SD was computed. Age, parity, and gestational age were used to stratify urinary tract infections. The chi-square post-stratification test was used. It was deemed statistically significant when $p < 0.05$.

Results

Table 1 displays the age range of the Study participants: 18 to 35 years, with a mean age of 28.922±2.54 years; the mean gestational age ranged from 30 to 36 weeks, with a mean gestational age of 31.718±1.37 weeks; and the mean parity was 1.534±1.37. Urinary tract infection frequency was 21(20.4%) in PPROM Table 2 participants. Table 3 showed a significant connection (p-value: 0.00) between multiparous women and patients older than 30.

Table- 1: Mean ± SD of patients according to age, gestational age, and parity.(n=103)

Demographics	Mean±SD
Age (years)	**28.922±2.54**
Gestational age (weeks)	**31.718±1.37**
Parity	**1.534±1.37**

Table- 02: Frequency of Urinary Tract Infection (%)

Urinary tract infection	Frequency	Frequency percentage
Yes	21	**20.4%**
No	82	**79.6%**
Total	**103**	**100%**

Table 03: Stratification of Urinary Tract Infection with Age, Gestational age, and parity.

Variables	URINARY TRACT INFECTION		P VALUE
	YES	NO	
Age			
18-30yrs	4(5.2%)	73(94.8%)	**0.000**
31-35yrs	17(65.4%)	9(34.6%)	
Gestational Age			
28-30wks	5(29.4%)	12(70.6%)	**0.321**
31-35wks	16(18.6%)	70(81.4%)	
Parity			
0-2	3(4%)	72(96%)	**0.000**
>2	**18(64.3%)**	**10(35.7%)**	

Discussion

Ayob S., Tasneem M. et al.'s Study found that 4.46% of women with PPROM had a urinary tract infection (UTI), but our study found that 20.4% of patients with PPROM experienced a UTI. In our study, the prevalence of UTI with PProm was noteworthy (Ayoub et al., 2023). Similar to a Study by Ayob S et al., prom with urinary tract infection was seen in a multiparous woman in our study. In contrast to our findings, a study by Rahman MN et al. revealed that the frequency of urinary tract infections was 62.5% in patients with premature rupture of membranes. In contrast to our analysis, which demonstrated a significant connection between multiparity and age >30, there was no significant association between UTI in PProm patients and age, parity, or gestational age at presentation. Another Study by Vrishali G. et al. found that 34% of cases had urogenital infections. According to statistical analysis, (Rahman et al., 2019) (22%) preterm labour patients had an infection detected by a urine culture test for microorganisms, with a p-value of less than 0.01, which was clinically significant. According to a study by Hackenhaar et al., 3.4% of women

with PROM get UTIs (Hackenhaar et al., 2014). According to a different Study by de Vasconcelos-Pereira et al., women with PROM had a 6.7% prevalence of UTI (de Vasconcelos-Pereira et al., 2013; Sheiner et al., 2009). A study by Sheiner E. Mazor et al. also revealed a 13.3% patient connection between premature birth and UTI (Byonanuwe et al., 2020; Sheiner et al., 2009). This was similar to our findings, which showed that 18.6% of UTI patients gave birth between 31–35 weeks. They demonstrated the independent relationship between preterm birth and maternal UTI. However, when compared to women without UTI, it is not linked to higher risks of perinatal death.

Conclusion

We have found that there is a substantial correlation between urogenital infections in PProm and preterm labour. Specifically, women with preterm rupture of membranes had a prevalence of urinary tract infection of 20.4%. Because there is a high chance of recurrence, standard management calls for repeated urine cultures throughout the pregnancy. Early treatment may also help to avoid unfavorable pregnancy outcomes. Most individuals with positive cultures are asymptomatic and are only identifiable by regular monitoring cultures.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared absence of conflict of interest.

Authors Contribution

Nabila Khan
Conception of Study, Development of Research Methodology Design, Review of Literature, Drafting article, Review of manuscript, final approval of manuscript
Ayesha Iqbal
Conception of Study, Final approval of manuscript

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