RESEARCH

PREVALENCE AND OUTCOME OF PRETERM PREMATURE RUPTURE OF MEMBRANE (PPROM) IN PREGNANCY

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Abstract

Background: Prelabour rupture of membranes (PROM) is an obstetric conundrum; it has been poorly defined with an obscure etiology, difficult to diagnose and associated with significant maternal, fetal and neonatal risks and management strategies that are often diverse and controversial. Under normal circumstances, the fetal membrane ruptures during the active phase of labor. Premature rupture of membrane (PROM) occurs when the membrane ruptures before the initiation of labor. Preterm premature rupture of membrane (PPROM) is defined as rupture of fetal membrane before the onset of labor at less than 37 completed weeks of gestation. Approximately 60-80% of cases of PROM occur in term patients and is called term PROM. **Materials and Methods:** This is a Hospital-based, prospective and observational study conducted in the Department of Obstetrics and Gynaecology, S.C.B. Medical College, Cuttack. Data has been collected from all patients admitted to antenatal or Labour room of Department of Obstetrics & Gynaecology, SCB Medical College, Cuttack with complaint of leaking per vaginum between 28 to 37 completed weeks of gestation after considering inclusion and exclusion criteria. **Result:** Out of 120 patients studied 46.7% of women were in the age group 21-25Yrs, 30% of women in the age group of 26-30Yrs. Out of 39 patients, 46.2% had C-Section due to malpresentation most common was breech presentation) and 18% had fetal distress, 15.4% had failed induction, 10.2% had chorioamnionitis, previous LSCS and oligohydramnios both were 5.1%. Out of 120 newborns, 21 died. So, perinatal mortality was 17.5%. 57.2% newborns had RDS, 33.3% had sepsis and 9.5% died due to birth asphyxia. 80% newborns weighing ≤1000 grams, 40.7% weighing between 1001-1500 grams, 15.6% between 1501-2000 grams, 2.3% between 2001- 2500 grams and none weighing above 2500 grams died with a p-value of<0.001 which is highly statistically significant. **Conclusion:** A important obstetric issue is PPROM. Despite extensive investigation, many PPROM-related issues remain obscure. It is one of the major factors that contribute to premature birth and can increase both maternal and perinatal morbidity and mortality. Therefore, thorough prenatal surveillance, infection identification, and quick treatment are required. In the prevention and management of PPROM, strict aseptic precautions, adequate therapy, and routine follow-up are crucial.

INTRODUCTION

Prelabor rupture of membranes (PROM) is a medical enigma that has a murky origin, is challenging to diagnose, and is linked to serious dangers for the mother, the fetus, and the newborn, as well as management techniques that are frequently inconsistent and contentious.[1]

The fetal membrane normally bursts during the active stage of labor. When the membrane ruptures before to the start of labor, this condition is known as premature rupture of membrane (PROM). Preterm premature rupture of membranes (PPROM) is the term for fetal membrane rupture occurring before the start of labor at a gestational age of fewer than 37 weeks. Term PROM, which affects 60 to 80 percent of patients who are pregnant, is a common form of PROM. The remaining 20–40% was provided by PPROM. Three percent of pregnancies are complicated by preterm PROM, which also

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causes one-third of preterm births. Amniotic fluid infection has been thought to be prevented by the fetal membrane remaining intact.[2,3]

PPROM is at risk for a number of causes, including intrauterine infection at a young gestational age, pregnant women's poorer socioeconomic position, inadequate prenatal care and nutrition, STDs, vaginal bleeding, and smoking during pregnancy. After PPROM, the risk of infection increases for both the mother and the fetus. The etiopathogenesis of PROM is not fully known, and it is thought to be a syndrome brought on by a number of different mechanisms. Practically speaking, a decrease in membrane strength is what causes PROM.[4]

The impact of bacterial proteases may cause the membranes to lose their tensile strength. additional byproducts of bacterial metabolism or repetitive uterine contraction-induced stretching Under the influence of normal pressure, the membrane will rupture. Vitamin C, zinc, and copper deficiencies are further influencing factors. infection or multiple causes working together. Heavy cigarette smoking increases the risk of PPROM earlier in pregnancy than it does later on in pregnancy. Despite the fact that the exact cause is unknown. Alpha 1 antitrypsin activity is diminished in human amnion in early rupture of the fetal membranes, particular collagen deficit in the membrane, or potential genetic influences could all contribute to PROM.[5,6,7]

In the present state, India is a developing country preaching for small family norm having a high IMR and MMR. The first step reducing the neonatal morbidity and mortality is the prevention and better management of PROM and PPROM. In this part of Odisha where most people live in rural areas, patients with PPROM reach the hospital when it is practically late.

This study is designed to evaluate the prevalence, associated risk factors and analyze the maternal and fetal outcome of Preterm premature rupture of membrane (PPROM) in pregnant women between 28 to 37 completed weeks (36 weeks+6days) of gestation and try to provide information of public health value to help in preventing the PPROM within the context of existing health care system.[8]

MATERIALS AND METHODS

This is a Hospital-based, prospective and observational study conducted in the Department of Obstetrics and Gynaecology, S.C.B. Medical College, Cuttack. Data has been collected from all patients admitted to antenatal or Labour room of Department of Obstetrics & Gynaecology, SCB Medical College, Cuttack with complaint of leaking per vaginum between 28 to 37 completed weeks of gestation after considering inclusion and exclusion criteria.

Inclusion Criteria

All women with singleton pregnancies between 28 to 37 completed weeks (36weeks+6days) of gestation with PPROM attending labor room.

Exclusion Criteria

1. Any patient refused to participate in study
2. Leaking before 28wks of gestation and after 37 completed wks of gestation
3. Fetal congenital anomalies
4. Intrauterine death
5. Multiple pregnancies
6. Hypertensive disorders and pregnancy-induced hypertension
7. Gestational diabetic Mellitus
8. Antepartum hemorrhage
9. Medical disorder complicating pregnancy (pregnancy with chronic hypertension, heart diseases, thyroid disorders, liver diseases, SLE, jaundice, hematological disorders, and other comorbid conditions)
10. Chronic renal failure
11. Uterine anomalies
12. Tumour complicating pregnancy (fibroid, ovarian tumor)

Method of Data Collection

After admission to antenatal ward or labor room detail history was taken from each patient regarding age, parity, LMP, duration of pregnancy, no of ANC, history of previous PPROM, socioeconomic status (by Modified BG Prasad's socio-economic classification 2019 based on per Capita monthly income using latest CPI regional values).

History is recorded on the timing of the leak's commencement, the volume of fluid leaked, its color and smell, its connection to pain or vaginal bleeding, and the perception of fetal movements. The following things were noted during the obstetric examination. Height of the uterine fundus, circumference of the abdomen, volume of amniotic fluid, lie, presentation and positioning of the fetus, engagement of the presenting part, and state of the uterus, whether contracted or relaxed. We looked for uterine tenderness as a sign of chorioamnionitis. The rate, rhythm, and tone of the fetal heart sound were recorded.

Amniotic fluid pooling in the posterior fornix was seen during a sterile speculum examination. The fluid's color and smell were noted. If no fluid was visible, the patient was instructed to cough, and any fluid drainage was checked. A high vaginal swab was taken, and it was sent for culture sensitivity and gram staining. To determine the Bishop's score, whether the fetal membrane was intact, whether the pelvis was adequate, to assess the CPD, and to rule out cord prolapse, a single gentle per vaginal examination was performed.

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RESULTS

Out of 120 patients studied 46.7% of women were in the age group 21-25Yrs, 30% of women in the age group of 26-30Yrs, 10% of women in the age group of 31-35Yrs, 9.1% of women under 21Yrs old and 4.2% of women above 35Yrs old. [Table 1]

Out of 120 patients, 30.9% had a history of sexual intercourse during pregnancy, 20.8% had genital tract infection, 8.3% had travel history and 40% with unknown factors. [Table 2]

Out of 120 patients, 78.4% presented with late PPROM and 21.6% presented with early PPROM. [Table 3]

53.8% of early PPROM (28 week-33weeks 6days) and 22.3% of late PPROM (34 week-36weeks 6days) had a prolonged latency period. [Table 4]

Out of 39 patients, 46.2% had C-Section due to malpresentation (most common was breech presentation) and 18% had fetal distress, 15.4% had failed induction, 10.2% had chorioamnionitis, previous LSCS and oligohydramnios both were 5.1%.[Table 5]

Out of 120 newborns, 21 died. So perinatal mortality was 17.5%. 57.2% newborns had RDS, 33.3% had sepsis and 9.5% died due to birth asphyxia. [Table 6]

80% newborns weighing ≤1000 grams, 40.7% weighing between 1001-1500 grams, 15.6% between 1501-2000 grams, 2.3% between 2001-2500 grams and none weighing above 2500 grams died with a p-value of<0.001 which is highly statistically significant. [Table 7]

Table 1: distribution of study population by age

Age group in years	No. Of mother	Percentage (%)
<21	11	9.1
21-25	56	46.7
26-30	36	30
31-35	12	10
>35	5	4.2
Total	120	100

Table 2: Distribution of Study Population in Relation to Risk Factors

Risk factors	No. Of Cases	Percentage (%)
Genital tract infection	25	20.8
History of sexual intercourse during Pregnancy	37	30.9
Travel history	10	8.3
Unknown	48	40
Total	120	100

Table 3: distribution of study population in relation to period of gestation

Period of gestation	No. Of cases	Percentage (%)
early PPROM	26	21.6
Late PPROM	94	78.4
Total	120	100

Table 4: distribution of study population according to latency period

Latency period	Early pprom		Late pprom	
	Cases	%	Cases	%
<24 hrs	12	46.2	73	77.7
>24 hrs	14	53.8	21	22.3
Total	26	100	94	100

Table 5: Indication of Cesarean Section

Indication	No. Of cases	Percentage (%)
Fetal distress	7	18
Chorioamnionitis	4	10.2
Malpresentation	18	46.2
Previous lscs	2	5.1
Oligohydramnious	2	5.1
Failed induction	6	15.4
Total	39	100

Table 6: distribution of perinatal mortality

Causes	No. Of newborns	Percentage (%)
RDS	12	57.2
Sepsis	7	33.3
Birth asphyxia	2	9.5
Total	21	100

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Table 7: Perinatal Mortality According to Birthweight

Birth weight in Grams	No. Of cases	Neonatal death	Survival rate (%)	Perinatal mortality (%)
≤1000	5	4	20	80
1001-1500	27	11	59.3	40.7
1501-2000	34	5	84.4	15.6
2001-2500	42	1	97.7	2.3
>2500	12	0	100	0
TOTAL	120	21	82.5	17.5
Chi-square=33.0; degrees of freedom = 4; p-value < 0.001				

DISCUSSION

In the present study, 76.7% of cases were in the age group of 21-30 years and 46.7% were between 21-25 years of age. So, the age group in my study was similar to the maximum studies cited above. The high frequency in this age range may be linked to genital infection and sexual activity.[9,10]

In our study 30.9% had a history of sexual intercourse during pregnancy, 20.8% had genital tract infection, 8.3% had travel history and 40% with unknown factors. According to Gunn et al., coitus (16%) and genital tract infection are the main risk factors (40%) for these conditions. Flood and Nayee evaluated 25,820 patients with PROM and used multivariate analysis to examine 14 risk factors, with recent coitus being one of the major risk factors. H/O recent coitus was discovered by Sahoo and Mohanty in 23% of cases, genital tract infection in 21%, and travel history 12%. In her study, Swati found that 14% of patients had recently had coitus. According to Rajan and Menon, 48% of respondents reported having sex while pregnant, 28% had anemia, 18% had a UTI, 3% had a cervical cerclage, and 43% had abnormal discharge pervaginum.[11,12,13]

In the research mentioned above, genital tract infections during pregnancy and sexual activity are the most often reported variables related with PPROM. The act of coitus during pregnancy was the risk factor that I found to be most prevalent. There has long been speculation that sexual activity may contribute to preterm birth, and a number of biological pathways may account for the negative impact of sexual activity on preterm birth. Oxytocin may be released and uterine contraction started during a maternal orgasm. Seminal fluid contains prostaglandins that also have oxytocic characteristics. Increased exposure to infectious pathogens due to coitus during pregnancy could lead to preterm birth.[14]

In our study, 78.4% presented with late PPROM (>34weeks to 36weeks +6days) and 21.6% presented with early PPROM (28weeks to 33weeks +6days). Both early and late PPROM were common among primigravida. All studies cited above except Shukla et al,[15] there is a higher prevalence of late PPROM which is in favour of our study.

In the current study, a prolonged latency period was seen in 53.8% of early PPROM (28 week-33 weeks 6 days) and 22.3% of late PPROM (34 week-36 weeks 6 days). 60% of early PPROM and 20% of late PPROM had longer latency periods, according to a study by V & Karunakaran. According to a study by Singhal S. et al., 20% of late PPROM and 56% of early PPROM both had prolonged latency. He said that the gestational age and the length of the latency phase were inversely related. 44% of late PPROM in a study by Kadikar et al. had a prolonged latency. According to Shukla et al., 6.8% of PROM instances at 28–30 weeks had latency of less than 24 hours, whereas 57.1% of cases at the same GA had latency of more than 72 hours. Similarly, 4.76% of instances at the same GA had delay greater than 72 hours, while 68.18% of cases at 34–36 weeks had latency less than 24 hours. According to Rajan and Menon, the mean latency varied between 24-28 weeks by 7.95 days, 29-33 weeks by 3.80 days, and 34-36 weeks by 3.25 days. As gestational age increased, the length of the delay lengthened. Along with the research described above, other investigations (Aziz et al.) also reported a substantial association between gestational age and latency period, which is consistent with our findings.[16]

In our study, 46.2% had C-Section due to malpresentation (most common was breech presentation) and 18% had fetal distress, 15.4% had failed induction, 10.2% had chorioamnionitis, previous LSCS and oligohydramnios both were 5.1%. Demol S. et al.'s study between 24 and 36 weeks revealed a prevalence of malpresentation of 13.8%. In comparison to newborns with vertex, higher perinatal mortality rates were seen in the non-vertex group. Additionally, there was a clinically significant link between breech presentation and infant mortality. Neonatal death rates were found to be protected by cesarean sections.[17,18]

In my study, 80% newborns weighing ≤1000 grams, 40.7% weighing between 1001-1500 grams, 15.6% between 1501-2000 grams, 2.3% between 2001-2500 grams and none weighing above 2500 grams died. In both studies cited above perinatal mortality decrease as the birth weight increases similar to our study. No neonatal death above 2500grams suggesting increasing birth weight survival rate also increases.[19,20]

CONCLUSION

A important obstetric issue is PPROM. Despite extensive investigation, many PPROM-related issues remain obscure. It is one of the major factors

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that contribute to premature birth and can increase both maternal and perinatal morbidity and mortality. Therefore, thorough prenatal surveillance, infection identification, and quick treatment are required. In the prevention and management of PPROM, strict aseptic precautions, adequate therapy, and routine follow-up are crucial.

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