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ASSESSMENT OF FETOMATERNAL OUTCOME IN PRETERM PREMATURE RUPTURE OF MEMBRANE

Obstetrics & Gynaecology

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ABSTRACT

Background: Preterm Premature Rupture of Membranes (PPROM) is clinically defined as the spontaneous rupture of the fetal membranes prior to the onset of labor in a pregnancy at less than 37 completed weeks of gestation. It represents a critical obstetric challenge, serving as a primary driver of maternal morbidity and neonatal complications, including prematurity, infection, and respiratory distress. This study aims to evaluate and optimize decision-making to balance the risks of expectant management against the necessity of immediate delivery, ultimately ensuring the safety of the maternal-fetal unit. **Materials and Methodology:** Type of study - Cross Sectional study, **Study Place:** Department of Obstetrics and Gynaecology, MGM Medical College and Hospital, Chhatrapati Sambhajinagar, Study Period: January 2024 to December 2024, Sample Size: 65 Patients with gestational age between 28 - <37 weeks presenting to the Labor Room with complaints of leaking per vaginum **Exclusion Criteria :** No explicit exclusion criteria. Results: The majority of women were 20 -29 years of age with 63.08% undergoing caesarean section. Most common indications for caesarean section were Prolonged PPROM, previous LSCS, Fetal distress. The majority of the babies weighed between 2 - 2.5 kg with 55.38% needing NICU.

KEYWORDS

Prolonged Pprom, Caesarean Section, Prematurity, Low Birth Weight (lbw)

INTRODUCTION

Preterm Premature Rupture of Membranes (PPROM) is defined as the spontaneous rupture of fetal membranes occurring before 37 completed weeks of gestation and prior to the onset of labor (1). It accounts for approximately 30–40% of all preterm deliveries. It complicates approximately 2% to 10% of all pregnancies.The etiology of PPROM is multifactorial and often unpredictable, frequently involving a complex interplay of biochemical and mechanical factors. It remains a leading cause of preterm birth and is associated with profound neonatal morbidity and potential maternal mortality. The clinical significance of PPROM lies in its association with increased risks of maternal chorioamnionitis and neonatal complications such as sepsis and Respiratory Distress Syndrome (RDS). The management of PPROM remains a subject of active clinical debate, centered on balancing the benefits of prolonging the pregnancy to achieve fetal maturity against the increasing risk of ascending infection associated with expectant management. However, as with other obstetric emergencies, prompt intervention and individualized management strategies are essential to reducing the burden of morbidity and improving long-term outcomes for both mother and child.

MATERIALS AND METHODS

A Cross sectional study was conducted at MGM Hospital, Chhatrapati Sambhajinagar from January 2024 to December 2024 where 65 patients with gestational age between 28 - < 37 weeks who presented to the Labor Room with complaints of leaking per vaginum were included, fulfilling the inclusion and exclusion criteria. Data was collected, including Demographic details, Parity, History of Preterm Premature Rupture of Membranes, Antenatal factors, Mode of delivery, Indication of LSCS, need of NICU for the neonate. Data was analysed to evaluate the fetal and maternal outcome.

The key objectives of this study are:
1. To Study Preterm Premature Rupture of Membranes (PPROM) with Antenatal Factors.
2. To Study the Maternal Outcome In PPROM.
3. To Assess Neonatal Outcome In PPROM.

Inclusion Criteria :
1. Gestational Age → 28 - 37 Weeks
2. Singleton Pregnancy

Exclusion Criteria: No explicit exclusion criteria.

RESULTS

Table 1 : Age Distribution

Age Group	No of subjects (n = 65)	Percentage
< 20 years	6	9.23%
20 -29 years	43	66.15%
30 -34 years	10	15.38%
> 35 years	6	9.23%

Majority of the patients i.e., 66.15% were in the age group 20 - 29 years while 9.23% and 9.23% were elderly gravidas (35 and above) and teenage pregnancies respectively.

Table 2 : Distribution according to parity

Parity	No of subjects (n = 65)	Percentage
Primigravida	32	49.23%
2nd gravida	16	24.62%
3rd gravida or more	17	26.15%

Nearly half of the study population (49.23%) were Primigravidas. This suggests that PPROM is a significant complication among first-time mothers in this study group.

Table 3 : Distribution according to Gestational Age

Gestational Age	No of subjects (n = 65)	Percentage
28.1 - 32 weeks	3	4.62%
32.1 - 34 weeks	13	20.0%
34.1 - 37 weeks	49	75.38%

The vast majority of cases (75.38%) occurred in the 34.1 - 37 weeks gestational age group that is in the late preterm period.

Table 4 : Distribution according to Duration of PPROM

Duration of PPROM	No of subjects (n = 65)	Percentage
< 6 hours	37	56.92%
7 - 12 hours	12	18.46%
13 - 24 hours	10	15.38%
> 24 hours	6	9.23%

Over half of the study population (56.92%) presented very early, within less than 6 hours of the membrane rupture and only a small but significant portion (9.23%) presented after 24 hours.

Table 5a : Distribution according to mode of delivery

Mode of delivery	No of subjects (n = 65)	Percentage
Caesarean Section	41	63.08%
Vaginal	24	36.92%

Among the total 65 patients, 63.08% underwent LSCS and approximately one-third of the patients (36.92%) were able to deliver vaginally.

Table 5b : Vaginal Delivery

Type of vaginal delivery	No of subjects (n = 24)	Percentage
Spontaneous	12	50%
Induced	12	50%

Among the 24 vaginal deliveries, there was an equal split between Spontaneous and Induced labor (12 cases each), each representing 18.46% of the total study population.

Table 6 : Distribution according to Indication of LSCS

Indication of LSCS	No of subjects (n = 41)	Percentage
Prolonged PPROM	11	26.8%
Previous LSCS	7	17.07%
Malpresentation	6	14.6%
Fetal Distress	4	9.75%
Not willing for vaginal delivery	5	12.1%
Non progress of Labour	3	7.31%
Oligohydramnios	2	4.87%
CPD	3	7.31%

- Prolonged PPROM was the leading cause of LSCS, in 26.8% of cases followed by History of Previous LSCS in 17.07% cases.
- A subset of patients (12.1%) opted for a Cesarean Section by choice (Not willing for vaginal delivery).

Table 7 : Antenatal High Risk Factors

Antenatal Factor	No of subjects (n = 65)	Percentage
None	33	50.77%
Hypothyroidism	8	12.31%
Oligohydramnios	7	10.77%
PIH	5	7.69%
FGR	5	7.69%
Rh negative	4	6.15%
Infertility	4	6.15%
GDM	3	4.62%
Anemia	2	3.08%
Others factors*	16	24.64%

**Other factors (1 occurrence each): ITP, SLE, Twins, Obesity, APH, Anhydramnios, Pyelonephritis, Asthma, HbsAg Reactive, Depression, Placenta previa, and Vasa Previa.*

About half of the patients i.e., 50.77% had no significant comorbid antenatal factors recorded. Among those with high risk antenatal factors, Hypothyroidism (12.31%) and Oligohydramnios (10.77%) were the most prevalent. Conditions like PIH and FGR were present in nearly 8% of the cases respectively, which are often associated with PPROM and preterm delivery.

Table 8a : Neonatal outcomes - Birth Weight

Birth Weight	No of subjects (n = 65)	Percentage
1 - 1.5kg	8	12.31%
1.6 - 2kg	14	21.54%
2.1 -2.5kg	31	47.69%
2.6 - 3kg	11	16.92%
> 3.1kg	1	1.54%

Among all babies, 81.54% weighed less than 2.5 kg , which is consistent with preterm births associated with PPROM of which 47.69% babies weighed 2.1 - 2.5 kg and 12.31% babies were in the very low birth weight category.

Table 8b : NICU Admission

NICU Admission	No of subjects (n = 65)	Percentage
YES	36	55.38%
NO	28	43.08%
IUFD	1	1.54%

Among all the neonates, 55.38% required NICU admission, which is common in PPROM cases due to prematurity.

Table 8c : Indication of NICU Admission

Indication of NICU Admission	No of subjects (n = 36)	Percentage
Tachypnea	18	50.00%
Tachypnea & LBW	12	33.33%
LBW	5	13.88%
CNS Anomalies	1	2.78%

Respiratory distress (Tachypnea) was the leading cause for admission in 83.33%, either alone or in combination with low birth weight and LBW was a contributing factor in over 47% of admissions.

DISCUSSION

Analysis of the age group in this study showed that most of the participants (70.95%) were in the age group of maximum fertility (20-29 years). 9.23% of total patients were teenage pregnancies.

- Raveena Shree.J et al, 2025, conducted a similar retrospective study on outcome in PPROM in which 60% women were between 25 - 30 years of age. [1]
- Niki Shah et al 2023, conducted a similar study on PPROM and its fetomaternal outcome in which 80% of the women were between 20 - 29 years of age. [2]

In terms of parity, 43.23% of patients were Primigravida and the rest were multigravida similar to a study conducted by Huzaifa Ashraf et al, 2023, were 56.9% primigravidas suggesting increased prevalence in primigravidas [3]. The high prevalence in primigravidas highlights the importance of early monitoring and risk assessment in first-time pregnancies. For multigravidas, previous obstetric history (such as prior preterm births or PPROM) often serves as a critical risk factor for recurrence in subsequent pregnancies.

In terms of gestational age, 75.38% of the patients were between 34.1 - 37 weeks of gestation similar to Anita Thapa et al, 2023, and Surekha S. Mohan et al, 2017, 51.25% and 56.9% of the participants experienced late PPROM i.e., between 34 - 37 weeks of gestation respectively [4,5]. The concentration of cases in the late preterm category is clinically significant as these neonates generally have better outcomes compared to those born earlier, although they still require specialized care to manage potential complications like respiratory distress or jaundice. The distribution suggests that the risk of PPROM in this population increases as the pregnancy advances through the third trimester.

In my study, 56.92% of the participants presented in less than 6 hours of leaking per vaginuum, however a small but significant portion (9.23%) presented after 24 hours. In clinical practice, as the duration of leak increases, so does the risk of ascending infection (chorioamnionitis), which often influences the urgency and mode of delivery. According to a study conducted by Anita Thapa et al, 2023, 57.5% of the participants presented within 6 hours of vaginal discharge [4]. The duration of membrane rupture is a critical factor in obstetric decision-making. Patients presenting earlier (within 6 hours) provide a better window for the administration of corticosteroids (for fetal lung maturity) and antibiotics, and also suggest a high level of awareness or rapid access to healthcare for the majority of the patients in this study whereas those presenting after 24 hours (Prolonged PPROM) are often managed more aggressively to avoid maternal and neonatal sepsis.

In terms of mode of delivery, there was a high incidence of Cesarean Sections (63.08%) and approximately one-third (36.92%) of the patients were able to deliver vaginally of which there was an equal distribution between spontaneous and induced vaginal delivery. In a study conducted by Poovathi M et al, 2018, 64% of patients had delivered vaginally and 36% had delivered by LSCS [6] which is not comparable with my study.

In terms of indications of caesarean section, considering the whole study population, prolonged PPROM and its associated factors (non progress of labour, malpresentation, fetal distress) was the most common indication among 26.8% of the population. This is followed by history of previous LSCS in 17.07% of the population. Interestingly, 12.1% of the Cesarean Sections were performed because the patient was not willing to attempt a vaginal delivery, reflecting the role of maternal preference in the clinical pathway. In a similar study conducted by Raveena Shree.J et al, 2025 and Anita Thapa et al, 2023 [1,4] the primary indication for caesarean delivery was fetal distress in 50% and 8.8% respectively.

In terms of high risk antenatal factors, 50.77% of the patients had none specific factors, suggesting that PPROM can occur in otherwise "low-risk" pregnancies.

In my study, 81.54% of the neonates weighed 2.5kg or less with nearly 47.69% were in the range 2.1 - 2.5kg and 12.31% were between 1 - 1.5kg category having highest risk for neonatal complications such as respiratory distress syndrome (RDS) and require intensive NICU care, similarly in a study conducted by Huzaifa Ashraf et al, 2023, 47.7% of the neonates had birth weight between 1.5 - 2.4kg [3].

In terms of NICU admission, More than half of the neonates (55.38%)

required NICU admission and the most common reason for admission was Tachypnea (respiratory distress) in 83.33%, either alone or combined with low birth weight. This is often due to surfactant deficiency in preterm lungs or potential infection acquired during the period of ruptured membranes, suggesting the importance of administering antenatal corticosteroids to mothers with PPROM to accelerate fetal lung maturity and potentially reduce the severity of neonatal tachypnea. A total of 17 admitted babies (nearly 47% of all admissions) were admitted specifically because of low birth weight or a combination of LBW and respiratory issues. This correlates with the birth weight data showing that over 80% of the babies were born under 2.5 kg. In a study conducted by Reeti Rajan et al, 2016, 24% of neonates developed respiratory distress and 25% had sepsis [7].

CONCLUSION

The study highlights that PPROM is a significant complication among first-time mothers and women in the age group of maximum fertility (20-29 years). It also concludes that PPROM remains a significant obstetric challenge with a profound impact on both maternal and neonatal health. The findings emphasize that while PPROM often occurs in "low-risk" pregnancies, it necessitates high rates of clinical intervention.The primary driver for neonatal morbidity in this study was prematurity and low birth weight, with majority of neonates weighing less than 2.5 kg and more than half requiring NICU admission, predominantly for respiratory distress (Tachypnea). These outcomes underscore the critical importance of early presentation—ideally within the 6-hour window—to allow for the administration of corticosteroids and antibiotics to optimize fetal lung maturity and reduce infectious morbidity.

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