Original Article

A Hospital Based Prospective Observational Study on the Maternal and Fetal Outcome in Premature Rupture of Membranes in low-risk Pregnancies at a Tertiary Care Hospital

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Abstract

Background: Amniotic fluid plays multiple important roles in pregnancy like homeostasis, protection from trauma, infection, and also facilitates cervical dilation in labour. Therefore, if the fetal membranes are ruptured before time, the consequences that follow can be detrimental to the fetus as well as the mother. The etiology of premature rupture of membranes (PROM) is still largely unclear and the complications are manifold. However prompt diagnosis and early management can help limit the adverse consequences and ensure a safe delivery.

Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, in a tertiary care hospital in Tezpur, Assam, over a period of 1 year (2021-2022). Out of all the patients who attended the OPD or emergency labour room, 94 cases were included in the study as per the inclusion and exclusion criteria. The data of these women was entered into a proforma and the study was done after due ethical clearance.

Results: Hospital incidence was 1.3%, with more women being primigravidae. Majority of cases had unknown etiology but women from lower socioeconomic class showed more chances of PROM. Caesarean section was the mode of delivery in 68% cases. Most common maternal morbidity factor was fever at 7.4%. Most babies had a good APGAR score. 20.2% of babies required admission to NICU. No maternal or perinatal mortality was seen.

Conclusion: PROM is an enigmatic condition associated with high risk of maternal and perinatal morbidity and mortality, even in the absence of other obstetric complications. Timely management and appropriate intervention can greatly improve both outcomes.

Keywords: Premature rupture of membranes, maternal outcome, fetal outcome

Introduction

Ideally, the rupture of membranes occurs during active phase of normal labour. However, if such rupture of membranes, occurs at or after 37 completed weeks of gestation, spontaneously before the onset of uterine contractions is the phenomenon called "Premature Rupture of Membranes" (PROM).[1] PROM is seen to occur in about 8%[2] of pregnancies and labour usually sets in 12-24 hours after the rupture

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of membranes[3]. The etiology is often unclear but there are a few risk factors that have been associated with women presenting with PROM such as local infection, incompetent cervix, fetal malpresentation, hydramnios, multiple gestation, fetal anomalies, smoking, inherent weakness of the membranes and accidental trauma, etc. However, the majority of these patients do not present with any clear cause of PROM. Diagnosis is usually made from the history by patient, usually of vaginal passage or leakage of fluid similar to water or urine. PROM significantly affects both the fetal and maternal outcome. It is also one of the most frequent instances in which a typical uncomplicated pregnancy can become a high-risk situation for both the mother and the fetus. The hazards to maternal health in these patients are concerns of infection[4] i.e., development of antepartum or postpartum infection in the form of fever, urinary tract infections, chorioamnionoitis, endometritis, septicaemia, and wound dehiscence. There is also an increased rate of dysfunctional labour and need for caesarean section especially in unfavourable cervix and more chance of postpartum haemorrhage. For the newborns, main concern is sepsis as PROM exposes the fetus to ascending infections[5] without the protective barrier that the membranes pose. There may be oligohydramnios and associated complications, respiratory distress[6], malpresentation and more babies requiring admission to the neonatal intensive care unit. Studies demonstrate that the longer the interval between ROM and delivery, the higher the risk of maternal and perinatal morbidity and mortality. This result served as the primary justification for the policy of rapid induction of labour[7] at least 12-18 hours following PROM if spontaneous labour does not set in. An accurate diagnosis of ROM and management of the delivery that results in a high rate of successful vaginal deliveries without an increase in newborn and maternal infections are the key goals for the obstetrician and the patient with suspected PROM. Therefore, the pregnancy should be carefully managed to prevent adverse outcomes. The goal of the obstetrician is obviously to deliver a healthy baby and mother.

Methods

This prospective study was conducted after obtaining due ethical clearance, in the Department of Obstetrics and Gynecology, in a tertiary care hospital in Tezpur, Assam, over a period of 1 year (1st August 2021- 31st July 2022). Out of all the patients who attended the OPD or emergency labour room, 94 cases were included in the study as per the following inclusion and exclusion criteria and statistically analysed for the maternal and fetal outcomes.

Inclusion Criteria

1. Pregnant women at 37 - 42 weeks of gestation with history of leaking from cervix for <24 hours, confirmed by clinical examination.
2. Pregnant women with ultrasonographic evidence of oligohydramnios with history of PROM.

Exclusion Criteria

1. Patients with high-risk pregnancies like

- Multiple gestations
- Elderly primigravida
- Precious pregnancy
- History of previous caesarean section
- Congenital anomalies
- Malpresentation
- Severe anemia (Hemoglobin <7 gram%)
- Antepartum haemorrhage

2. Maternal complications like heart disease, hypertensive disorders, diabetes.
3. Cases with fetal distress, fetal growth restriction.

Results

A total of 7229 patients delivered at the study hospital during the study period, out of which 94 patients were fit to be included in the study as low risk PROM cases. This brought the hospital incidence to be 1.3%.

The number of primigravidae (61.8%) was higher in this study than multigravidae (38.2%).

Most of the women did not show any direct causative factor for PROM, i.e. most cases were idiopathic in nature, however, the majority of patients were from lower socioeconomic background.

A history of PROM in previous pregnancies was seen in 10.6% cases, poor general health contributed

to 7.4% cases while history of UTI complicated 0.9% cases.

The most common mode of delivery was lower segment caesarean section (in 68%) while in 30 patients, vaginal delivery was possible, with 27 (28.7%) normal vaginal deliveries and 3 (3.19%) being instrumental deliveries.

The interval between rupture of membranes to delivery being an important aspect, was studied and found to be 12-24 hours for most cases (52 out of 94, i.e. 55%). 32% cases delivered within 12 hours (30 out of 94), while about 13 %(12 of 94) took longer than 24 hours to deliver.

The maternal morbidities studied showed that puerperal fever was the most common event (7.4% cases), followed by diagnosed UTI (in 6.3% cases) and clinical chorioamnionitis (in 4.2% cases). Wound infection and postpartum haemorrhage was noted in 3.1% cases each. Puerperal sepsis developed in about 2% cases.

No maternal death was recorded during this study.

Neonatal parameters showed that 80% of the delivered babies did not require admission to NICU, with 82 (87%) of them having good APGAR scores at the first minute after birth which improved to 89 (94.6%) good APGAR scores at the fifth minute after birth.

No perinatal death was recorded in this study.

Table 1: Predisposing Factors

Factor	Frequency	Percentage
Idiopathic	67	71.2
History of coitus	13	13.8
Lower socioeconomic status	58	61.7
Poor general health	7	7.4
History of PROM in previous pregnancy	10	10.6
History of UTI	1	0.9

Table 2: Modes Of Delivery

MODE OF DELIVERY	FREQUENCY	PERCENTAGE
Normal Vaginal Delivery	27	28.72
Instrumental (Forceps/ Ventouse) Delivery	3	3.19
Caesarean section	64	68.08

Table 3: Rom-Delivery Interval

ROM -DELIVERY INTERVAL	NUMBER	PERCENTAGE
Within 12 hours	30	31.91
12-24 hours	52	55.31
>24 hours	12	12.76

TABLE 4: MATERNAL OUTCOME

OUTCOME	NUMBER	PERCENTAGE
Fever	7	7.4
Urinary Tract Infection	6	6.3
Clinical Chorioamnionitis (CAM)	4	4.2
Postpartum Hemorrhage (PPH)	3	3.1
Wound infection	3	3.1
Puerperal sepsis	2	2.1
Death	0	0

TABLE 5: APGAR SCORE

APGAR SCORE	%	%
	AT 1 MINUTE	AT 5 MINUTES
<7	12.76	5.31
≥7	87.23	94.69

TABLE 6: ADMISSION TO NICU

ADMITTED TO NICU	NUMBER	PERCENTAGE
Yes	19	20.21%
No	75	79.79%

Discussion

There are many studies that focussed on different aspects of PROM in all pregnancies. In this study, the sole focus was on the problems posed by PROM isolated from other complications of pregnancy. As such, the results obtained can compare with the existing similar studies as well as shed light on the outcomes exclusive to PROM.

This study supports early detection, management and action to improve the feto-maternal outcomes.

Incidence in low risk pregnancies is 1.3% which is quite lower than other studies like Shahela N. et al[8] (3.6%) and Jigyasa S. et al[9] (6.7%), which did not have such strict exclusion criteria. Idrisa A. et al[10], however, recorded similar incidence(1.3%).

Maternal parameters and outcome

In this study we saw that the majority (61.8%) of women were primigravidae, which is similar to studies by Jigyasa S. et al (57% vs 43% multigravidae) and Lovereen S. et al[11] (62.7% vs 37.3% multigravidae).

The lower socioeconomic background played a factorial role in PROM with 61.7% cases belonging to this strata, in concurrence with studies by Tigist E. et al[12] (70.3% cases) and Idrisa A. et al (79.5% cases).

The predisposing factors found possible were studied and it was found that in this study most cases were idiopathic (71.2%), 13.8% had history of recent coitus, 10.6% cases had a history of PROM in previous pregnancies and 0.9% presented with history of UTI. Comparably, Lovereen S. et al in their study had 47.3% cases with no definite cause, 9.09% with recent history of coitus, 16.3% had history of PROM in previous pregnancies, while 26.4% came with history of UTI.

Maternal morbidity increased with the delay in seeking medical care.

The most common maternal morbidity parameter was puerperal pyrexia seen in 7.4% patients in this study. Rauf Abdul et al[13] found puerperal pyrexia in 7% cases, similar to this study. While Arpita A. et al[14] in 10.5% cases and Lovereen S. et al recorded 11.8% cases in their studies, which are higher than in this study.

Next commonest maternal morbidity was urinary tract infections, in 6.3% cases while Arpita A. et al recorded only 0.5% cases. Much higher incidence in studies by Shahela N. et al in 53% patients, by Jigyasa S. et al in 51% as they included subclinical infection as well.

Clinical chorioamnionitis was seen by Lars Ladfors et al[15] in 25.7% patients, by Shahela N. et al in 13.5%, by Arpita A. et al in 11.9% and by Lovereen S. et al in 3.6% cases. This study has similar rates to Lovereen S. i.e, 4.2%, which is much lower than the other studies.

Wound infection rates are seen to be 6.5% in the study by Rauf Abdul et al, 6% in the study by Tigist E. et al and 4.5% by Lovereen S. et al. This study had lower rates than the others with 3.1% cases.

The rate of puerperal sepsis in this study was 2.1% which is similar to Arpita A. et al having 1.4% cases. Tigist E. et al had a higher rate of 11.4%.

PPH was noted by Rauf Abdul et al in 8% cases, which is higher than this study (3.1%), while Tigist E. et al had similar rates with 3.7%, and Arpita A. et al and Lovereen S. et al had slightly lower rates of 1% and 1.8% respectively. It was seen that PPH was higher with increasing parity and longer interval between rupture of membranes to delivery.

No maternal death was recorded in this study.

Delivery and PROM

The mode of delivery in this study was found to be predominantly via caesarean section (68%). Higher incidence of caesarean section was also seen in studies by Shahela N. et al (77%), Jigyasa S. et al (54.3%), Arpita A. Jaiswal (77%) and Lovereen S. et al (71%).

Most cases (or 55%) in this study delivered within the window of 12-24 hours from rupture of membranes. Jigyasa S et al had most cases deliver after 24 hours of rupture of membranes (75%), and Rauf Abdul et al had very little difference in the proportion of patients delivering within 12 hours, 12-24 hours or after 24 hours, however, slightly higher number of cases managed to deliver in the 12-24 hour period (36%). This included the delay in the patients attending the hospital even after PROM.

Neonatal outcome

Since this study includes low risk term pregnancies, the risks were less but still led to a

NICU admission rate of 20%, demonstrating that PROM poses significant risk to the fetus. Compared to this Tigist E. et al recorded a NICU admission rate of 25.4%.

The APGAR scores at first minute after birth for this study were good for 87% of babies (score of 7 or more). Similarly, Shahela N. et al recorded a good score in 78% babies, Jigyasa S. et al saw a favorable score in 75% and 94% babies had a good score in the study by Arpita A. et al.

The APGAR score at fifth minute after birth in this study was good in 94.6% babies and comparably, majority of the babies (76.2%) had a good score in the study by Tigist E. et al.

Conclusion

PROM without other obstetric complications is not without its risks and may endanger a pregnancy.

The prognosis of the mother and baby can be drastically different pertaining to the interval between rupture of membranes to delivery, therefore prompt intervention and action is the mainstay of treatment and can significantly improve the maternal and fetal outcomes.

This study showed that the premature escape of liquor due to PROM leads to higher caesarean delivery rates which in itself increases the maternal morbidity, possibly even for future pregnancies. It is important to expedite the process of labour or delivery in these patients such that the infective exposure may be reduced as well as effectively treat any corresponding signs or symptoms in the mother and the baby, that may arise as a consequence of PROM. This study recorded a low rate of admission to neonatal intensive care unit, which is attributable to the timely management and prompt treatment. This in turn, also led to a low sepsis rate and decreased morbidity. This also reflects in the nil mortality recorded by this study.

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