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MATERNAL AND NEONATAL OUTCOMES IN PRETERM PROM: EXPERIENCE FROM A TERTIARY CARE CENTER IN KASHMIR

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ABSTRACT

Background: Preterm premature rupture of membranes (PPROM) is associated with significant maternal and neonatal morbidity and mortality, particularly in resource-constrained settings.
Objective: To evaluate maternal and neonatal outcomes among women with PPROM admitted to a tertiary care hospital in Kashmir.
Methods: This prospective observational study included 100 pregnant women between 28–37 weeks gestation with PPROM. Maternal morbidity, delivery details, and neonatal outcomes were evaluated.
Results: Most patients presented within 6–11 hours of membrane rupture. Vaginal delivery occurred in 67% of cases; 33% underwent cesarean. Maternal morbidities included febrile illness (10%), urinary tract infection (4%), and postpartum hemorrhage (2.5%). Among neonates, 72% were healthy; 14% had jaundice, 7% had birth asphyxia, and 6% septicemia. NICU admission was required in 43% of cases.
Conclusion: PPROM poses a significant threat to both mother and neonate. Vigilant monitoring, timely intervention, and individualized management protocols are key to improving outcomes.

Keywords: PPROM, preterm labor, neonatal sepsis, maternal morbidity, NICU admission

INTRODUCTION

Prelabor rupture of membranes (PROM) is defined as rupture of the fetal membranes before the onset of labor; when it occurs before 37+0 weeks, it is termed preterm PROM (PPROM).[1] PPROM complicates ~2–4% of pregnancies and accounts for a substantial proportion of preterm births and related perinatal morbidity.[2,3] Risk factors overlap with those for spontaneous preterm birth and include prior PPROM/preterm birth, short cervix, bleeding in the 2nd/3rd trimesters, low BMI, low socioeconomic status, tobacco use, and genital tract infection; nevertheless, PPROM often occurs without identifiable risk factors.[1,2] Diagnosis is clinical history of fluid leakage with visualization of pooling on sterile speculum examination.[1,4] Digital vaginal exams should be avoided unless in

active labor.[1] Point-of-care tests that detect amniotic proteins (e.g., PAMG-1 or IGFBP-1) may aid diagnosis when speculum findings are equivocal,[4,5] and ultrasound can support evaluation (e.g., oligohydramnios).[4]

Management balances the risks of prematurity against ascending infection. Before 34 weeks, expectant management with antenatal corticosteroids, magnesium sulphate for neuroprotection (when appropriate), and latency antibiotics is recommended if there are no maternal or fetal contraindications.[1,3,4,6] Between 34 and 36.6 weeks, guidance diverges: ACOG recommends proceeding toward delivery,[1] whereas RCOG suggests expectant management to 37 weeks for women without Group B streptococcus (GBS) colonization and no other indications for birth, with planned birth if GBS positive or concerns arise.[3] All guidelines advise intrapartum GBS prophylaxis where indicated.[1,7]

Given regional variability in neonatal care capacity, local data are essential for contextualized counseling and protocol design. We therefore evaluated outcomes in women with PPROM managed at our tertiary center in Kashmir.

MATERIAL AND METHODS

This hospital-based prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital in Kashmir. The study involved 100 pregnant women diagnosed with preterm premature rupture of membranes (PPROM) between 28 and 36 weeks + 6 days of gestation. The duration of the study spanned 18 months. All patients were admitted and monitored from the time of diagnosis until delivery and immediate postnatal outcome assessment. Inclusion criteria consisted of women with singleton pregnancies between 28 and 37 weeks who had confirmed PPROM, identified clinically by a history of fluid leakage, pooling on sterile speculum examination, and supported by ultrasound showing reduced amniotic fluid index. Cases were excluded if they had multiple gestation, fetal anomalies, intrauterine fetal demise, uterine anomalies, antepartum hemorrhage, gestational diabetes, hypertensive disorders, or other medical complications that could independently affect maternal or neonatal outcomes.

Diagnosis was primarily clinical, supplemented by the nitrazine test and ultrasound. Digital vaginal examinations were avoided unless the patient was in active labor. Patients presenting before 34 weeks were managed conservatively unless complications such as chorioamnionitis, placental abruption, or fetal distress developed. Women with gestational age beyond 34 weeks were managed with planned induction if labor did not occur spontaneously within 24 hours. All patients received prophylactic antibiotics to prevent ascending infection. Women with gestation less than 37 weeks were given corticosteroids - either dexamethasone or betamethasone—to promote fetal lung maturity. Tocolytics were not routinely administered. Maternal condition was monitored with serial assessments of temperature, pulse, abdominal examination, and observation of liquor color and smell. Fetal well-being was assessed by cardiotocography and biophysical profiles as needed.

The mode of delivery vaginal or cesarean was decided based on obstetric indications, fetal heart monitoring, and labor progression. Neonates were evaluated at birth with Apgar scoring, and were monitored for complications such as sepsis, birth asphyxia, jaundice, and respiratory distress. NICU admission and neonatal mortality were recorded. Data were entered and analyzed using SPSS version 21. Categorical variables were expressed as frequencies and percentages, and continuous variables were presented as mean ± standard deviation. Chi-square test and Student's t-test were used for statistical comparisons, and logistic regression analysis was applied to identify predictors of adverse maternal and neonatal outcomes. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Baseline Characteristics of Study Participants (N = 100)

Parameter	Categories	No. of Patients	Percentage
Age in Years	20 – 25	24	24.00
	26 – 30	46	46.00
	31 – 35	23	23.00

	> 35	7	7.00
Socioeconomic Status	Low	69	69.00
	Middle	27	27.00
	Upper middle	4	4.00
Gestational age PPROM	28 – 31.6 weeks	30	30.00
	32 – 33.6 weeks	23	23.00
	34 – 36.6 weeks	47	47.00
Gravida	Primigravida	56	56.00
	Multigravida	44	44.00
Time from PPROM to Admission	< 5 hours	34	34.00
	6 – 11 hours	44	44.00
	12 – 24 hours	15	15.00
	> 23 hours	7	7.00

Age in years: Of the 100 women, 46 (46.0%) were 26–30 years, 24 (24.0%) were 20–25 years, 23 (23.0%) were 31–35 years, and 7 (7.0%) were >35 years, indicating the highest burden in the late-twenties age group.

Socioeconomic status: A clear majority, 69 women (69.0%), belonged to the low socioeconomic group; 27 (27.0%) were middle, and 4 (4.0%) were upper-middle, reflecting predominantly low-resource backgrounds in this cohort.

Gestational age at PPROM: PPROM occurred most commonly at 34–36+6 weeks in 47 women (47.0%); 30 (30.0%) ruptured at 28–31+6 weeks, and 23 (23.0%) at 32–33+6 weeks, showing that nearly half presented in the late-preterm window.

Gravida: Primigravidae comprised 56 women (56.0%), while multigravidae accounted for 44 (44.0%), indicating a modest predominance of first pregnancies.

Time from PPROM to admission: 44 women (44.0%) reached the hospital within 6–11 hours of membrane rupture, 34 (34.0%) arrived in <5 hours, 15 (15.0%) presented between 12–24 hours, and 7 (7.0%) came >23 hours after rupture, demonstrating that the majority sought care within the first half-day.

Table 2: Organisms causing infection (N = 100)

Organisms	**No. of Patients**	**Percentage**
Streptococcus agalactiae (Group B Streptococcus)	20	20.0
Escherichia coli	16	16.0
Klebsiella spp.	9	9.0
Staphylococcus aureus	6	6.0
Enterococcus spp.	5	5.0
Gardnerella vaginalis / BV flora	5	5.0
Candida spp.	4	4.0
Polymicrobial (≥2 organisms)	4	4.0
No growth	31	31.0
Total	100	100

Cultures were positive in 69 women and negative ("no growth") in 31. The most common isolate was Streptococcus agalactiae (Group B Streptococcus), recovered from 20 women (20.0%), followed by Escherichia coli in 16 (16.0%) and Klebsiella spp. in 9 (9.0%). Staphylococcus aureus was isolated in 6 (6.0%), while Enterococcus spp. and Gardnerella vaginalis/BV flora were each identified in 5 (5.0%). Candida spp. accounted for 4 (4.0%) of cases, and polymicrobial growth (≥2 organisms) was seen in 4 (4.0%). Overall, the microbiologic profile was dominated by GBS and enteric Gram-negative bacilli, aligning with an ascending lower-genital-tract source in PPROM.

Table 3: Maternal Morbidity and Delivery Details

Parameter	Categories	No. of Patients	Percentage
Mode of Delivery	Vaginal Delivery	67	67.00
	Cesarean Section	33	33.00
Maternal Complications	Febrile Illness	10	10.00
	Urinary Tract Infection (UTI)	4	4.00
	Postpartum Hemorrhage (PPH)	3	3.00
	Chorioamnionitis	2	2.00
Latency Period (PPROM to Delivery)	<24 hours	75	75.00
	25–72 hours	22	22.00
	>72 hours	3	3.00

Mode of delivery: Vaginal delivery occurred in 67 women (67.0%), while lower-segment cesarean section was performed in 33 (33.0%).
Maternal complications: Febrile illness was recorded in 10 women (10.0%); urinary tract infection (UTI) in 4 (4.0%); postpartum hemorrhage (PPH) in 3 (3.0%); and chorioamnionitis in 2 (2.0%).
Latency period (PPROM to delivery): Delivery occurred within <24 hours in 75 women (75.0%), between 25–72 hours in 22 (22.0%), and after >72 hours in 3 (3.0%).

Table 4: Neonatal Outcome

Parameter	Categories	No. of Patients	Percentage
Birth Weight	<1.5 kg	22	22.00
	1.5–2.0 kg	13	13.00
	2.0–2.5 kg	43	43.00
	≥2.5 kg	22	22.00
Apgar Score at 5 min	<7	13	13.00
	>7	87	87.00
Neonatal Morbidity	Birth Asphyxia	7	7.00
	Jaundice	14	14.00
	Septicemia	6	6.00
NICU Admission	Yes	43	43.00
	No	57	57.00
Neonatal Mortality	Yes	3	3.00
	No	97	97.00

For birth weight, 22 newborns (22.0%) weighed <1.5 kg, 13 (13.0%) weighed 1.5–2.0 kg, 43 (43.0%) were 2.0–2.5 kg, the largest subgroup and 22 (22.0%) weighed ≥2.5 kg. Regarding Apgar score at 5 minutes, 87 neonates (87.0%) had scores ≥7, while 13 (13.0%) had scores <7. In terms of neonatal morbidity, jaundice was the most frequent diagnosis, affecting 14 infants (14.0%), followed by birth asphyxia in 7 (7.0%) and septicemia in 6 (6.0%). NICU admission was required for 43 newborns (43.0%), whereas 57 (57.0%) did not require intensive care. Neonatal mortality occurred in 3 cases (3.0%), and 97 infants (97.0%) survived the neonatal period.

DISCUSSION

Our cohort was predominantly late-preterm at presentation (47% at 34–36.6 weeks) with rapid presentation (78% within 11 h) and short latency (75% delivered <24 h). This is consistent with contemporary series showing latency is often short at higher gestational ages, while earlier GA PPROM exhibits longer but variable latency.[8–10] Maternal infectious morbidity was low (clinical chorioamnionitis 2%), which likely reflects early admission, avoidance of digital exams, and timely antibiotics—core elements of modern PPROM care pathways.[1,3,4]

The microbiologic profile was dominated by GBS and enteric Gram-negative bacilli (E. coli, Klebsiella), aligning with ascending lower-genital-tract sources reported in recent guidelines and cohorts.[1,4,11] Given our 20% GBS isolation rate and the known risks of early-onset disease, adherence to intrapartum GBS prophylaxis remains critical.[1,7]

Therapeutically, current guidance supports latency antibiotics for PPROM <34 weeks (7-day regimen) and antenatal corticosteroids (24–33.6; consider at 23; single course in late-preterm if delivery is planned in 24 h to 7 days).[1,6] Meta-analytic data suggest azithromycin may be a reasonable substitute for erythromycin with similar latency and potentially lower clinical chorioamnionitis rates; unit protocols should follow national guidance and local susceptibilities.[12]
For late-preterm PPROM (34–36.6 weeks), evidence synthesis and guidelines differ: the PPROM randomized trial and an individual participant data meta-analysis showed mixed tradeoffs between immediate delivery and expectant management,[9,10] and recommendations vary by society (ACOG favors delivery; RCOG supports expectant care to 37 in GBS-negative women without other indications).[1,3] Shared decision-making that incorporates local neonatal capacity is advisable.
Neonatal outcomes in our series (NICU 43%; mortality 3%) compare favorably to cohorts enriched for earlier gestations, where longer latency and immaturity raise risks of sepsis and respiratory morbidity.[8,11] Our data reinforce the central role of gestational age at rupture in prognostication and echo recent findings that inflammatory indices may help anticipate near-term delivery in PPROM.[13]
Strengths and Limitations: Strengths include prospective capture and organism data. Limitations include single-center design, small sample, and lack of multivariable adjustment for all neonatal outcomes.

CONCLUSION

PPROM remains an important cause of perinatal morbidity and mortality, particularly in resource-limited settings. In this cohort characterized largely by late-preterm presentation, a short latency interval, and high culture positivity (predominantly Group B Streptococcus and Enterobacterales) maternal infectious morbidity was low, whereas adverse neonatal outcomes clustered at lower gestational ages and birth weights. Optimal outcomes depend on early presentation and protocolized care: strict asepsis with minimal digital examinations, timely antenatal corticosteroid administration, appropriate antibiotic prophylaxis followed by culture-directed therapy, close maternal fetal surveillance, and individualized timing of delivery, particularly before 34 weeks. These findings provide region-specific evidence supporting strengthened referral pathways, enhanced NICU capacity, and local antibiogram-informed protocols to improve perinatal outcomes in comparable settings.

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