International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 5, May 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.5.2025.37

ORIGINAL RESEARCH

Microbial Profile and Fetomaternal Outcomes in Preterm Premature Rupture of Membranes: A Retrospective Study at Saraswati Medical College (2017–2019)

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Received date: 29 March, 2025 Acceptance date: 18 April, 2025 Published: 06 May, 2025

ABSTRACT

Purpose: To determine the microbial etiology and evaluate maternal and fetal outcomes associated with preterm premature rupture of membranes (PPROM) in patients presenting to the labor room at Saraswati Medical College between 2017 and 2019. **Methods:** A retrospective observational study was conducted on antenatal patients with PPROM between 28 and 37 weeks gestation. Maternal records, microbiological culture results, and perinatal outcomes were analyzed. Vaginal and cervical swabs were cultured to identify causative organisms. **Results:** Out of 1,260 deliveries, 126 cases (10%) were diagnosed with PPROM. The most common organisms isolated were Escherichia coli (26.1%), Streptococcus agalactiae (19.8%), Klebsiella pneumoniae (14.2%), and Gardnerella vaginalis (12.6%). Maternal complications included chorioamnionitis (9.5%), puerperal sepsis (7.9%), and placental abruption (4.7%). Neonatal complications included low birth weight (43.6%), respiratory distress syndrome (28.6%), neonatal sepsis (22.2%), and NICU admissions (38.9%). **Conclusion:** PPROM poses significant risk for both maternal and neonatal morbidity, with a distinct microbial profile. Early diagnosis and culture-guided antibiotic therapy can improve outcomes.

Keywords: PPROM, preterm labor, chorioamnionitis, neonatal sepsis, vaginal flora, microbial invasion, premature birth, infection control

INTRODUCTION

Preterm premature rupture of membranes (PPROM) is defined as spontaneous rupture of the amniotic sac before 37 weeks of gestation and prior to the onset of labor [1]. PPROM affects approximately 2–3% of pregnancies and accounts for a significant proportion of preterm births, leading to increased neonatal morbidity and mortality [2]. The pathophysiology involves weakening of fetal membranes often due to infection, inflammation, or mechanical stress [3]. Ascending infections are among the primary etiological factors in PPROM [4]. Identification of causative microorganisms is critical for guiding appropriate management and preventing adverse outcomes [5]. This study was conducted to evaluate the microbial patterns and associated maternal and neonatal outcomes among PPROM cases at Saraswati Medical College between 2017 and 2019.

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MATERIALS AND METHODS

Study Design: This retrospective observational study was carried out at Saraswati Medical College, Unnao. It included all antenatal patients with a diagnosis of PPROM between January 2017 and December 2019.

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Inclusion Criteria
Singleton pregnancies
Gestational age between 28 and 37 weeks
Confirmed rupture of membranes >12 hours before onset of labor

Exclusion Criteria
- Term PROM (≥37 weeks)
- Multiple gestation
- Incomplete patient records
- Known fetal anomalies

Diagnostic Criteria: PPROM was confirmed through sterile speculum examination, observation of amniotic fluid pooling, and positive nitrazine or fern test. Cervical and high vaginal swabs were obtained for microbial culture.

Data Collection: Data on maternal age, parity, gestational age, microbial culture results, complications, mode of delivery, neonatal birth weight, Apgar scores, sepsis, and NICU admissions were analyzed.

Statistical Analysis: Data were analyzed using SPSS v23.0. Descriptive statistics and chi-square tests were used where appropriate. A p-value <0.05 was considered statistically significant.

RESULTS

Out of 1,260 deliveries at Saraswati Medical College between 2017 and 2019, 126 cases (10%) were diagnosed with PPROM. The mean gestational age at membrane rupture was 32.4 ± 2.3 weeks.

Microbiological culture identified Escherichia coli (26.1%) as the most prevalent organism, followed by Streptococcus agalactiae (19.8%), Klebsiella pneumoniae (14.2%), and Gardnerella vaginalis (12.6%). Mixed flora were found in 10.3% of cases, and no growth was noted in 17.0%.

Maternal complications included chorioamnionitis (9.5%), puerperal sepsis (7.9%), and placental abruption (4.7%). Neonatal complications were significant: low birth weight (43.6%), respiratory distress syndrome (28.6%), neonatal sepsis (22.2%), NICU admissions (38.9%), and perinatal mortality (6.3%).

Table 1: Microbial Profile in PPROM Cases

Organism Isolated	Percentage (%)
Escherichia coli	26.1
Streptococcus agalactiae	19.8
Klebsiella pneumoniae	14.2
Gardnerella vaginalis	12.6
Mixed flora	10.3
No growth	17.0

Table 2: Maternal Complications in PPROM Cases

Complication	Incidence (%)
Chorioamnionitis	9.5
Puerperal sepsis	7.9
Placental abruption	4.7
Preterm labor	100.0

Table 3: Neonatal Outcomes in PPROM Cases

Outcome	Incidence (%)
Low birth weight (<2.5 kg)	43.6
Respiratory distress syndrome	28.6
Neonatal sepsis	22.2
NICU admission	38.9
Perinatal mortality	6.3

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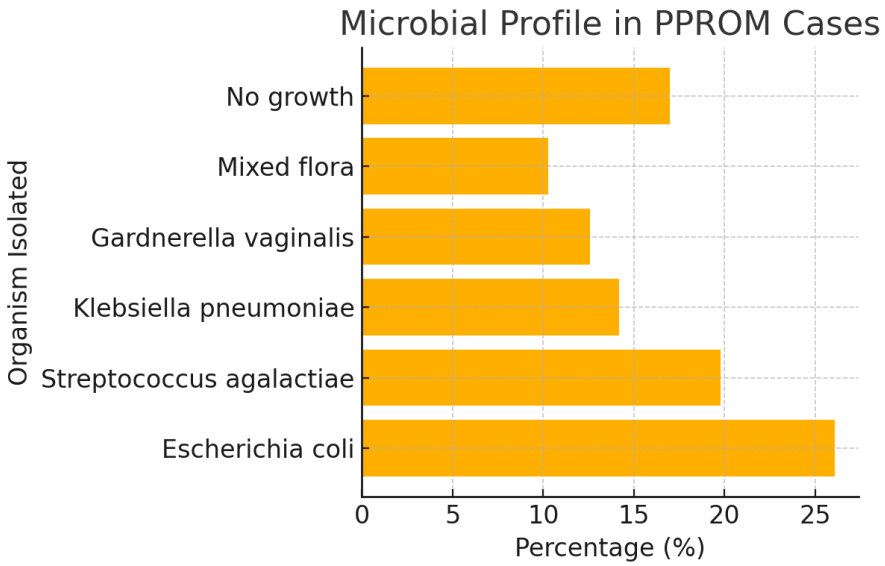

Figure 1: Microbial Profile in PPROM Cases

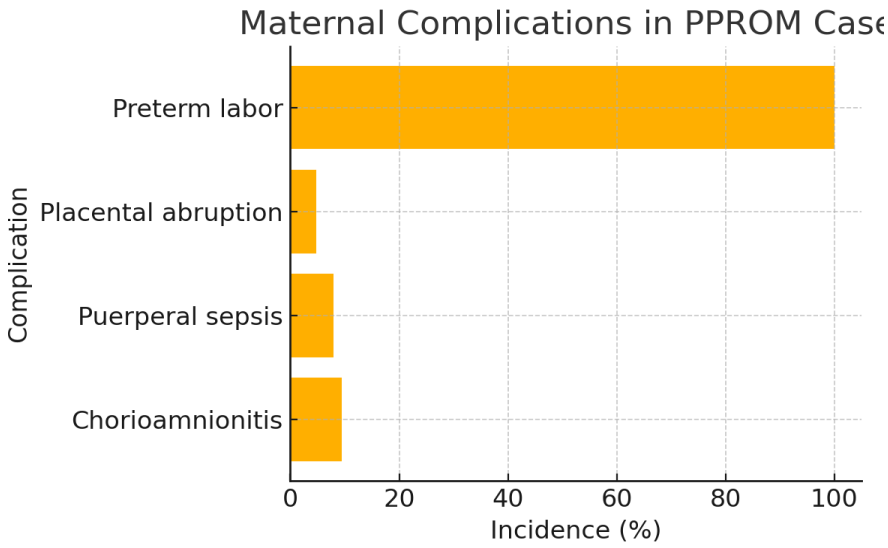

Figure 2: Maternal Complications in PPROM Cases

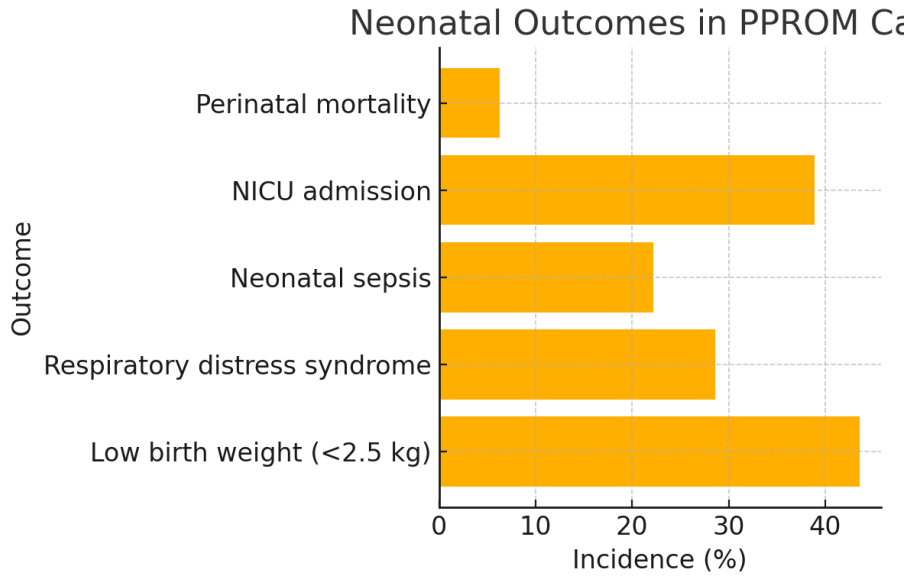

Figure 3: Neonatal Outcomes in PPROM Cases

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DISCUSSION

This study found a PPROM incidence of 10%, which aligns with reported global prevalence rates. The microbiological profile revealed that Gram-negative bacilli such as E. coli were most commonly isolated. These findings support existing evidence that ascending bacterial infections contribute substantially to PPROM pathogenesis [1,2].

The maternal risks associated with PPROM—particularly chorioamnionitis and sepsis—are well-documented and observed in our population. Additionally, neonatal outcomes such as low birth weight and NICU admissions are directly linked to the degree of prematurity and intrauterine exposure to infection [3,4,5].

Our findings reinforce the importance of early recognition, appropriate use of antibiotics, and close monitoring of maternal and fetal parameters in PPROM management. Limitations of this study include its retrospective design and potential bias from incomplete microbial data.

CONCLUSION

PPROM is a critical condition with significant implications for both mother and fetus. Early identification and timely intervention, including microbiological assessment and antibiotic treatment, are essential in reducing morbidity and improving outcomes.

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