

# Fetomaternal Outcome of Preterm Premature Rupture of Membranes

Dr. Payamkumar Shukla<sup>1</sup>, Dr. Preeti Goyal<sup>2</sup>, Dr. Shivraj Meena<sup>3</sup>, Dr. Bharti Saxena<sup>4</sup>, Dr. R. P Rawat<sup>5</sup>

<sup>1</sup>Department of Obstetrics & Gynaecology, J K Lon Mother & Child Hospital, Government Medical College, Kota, Rajasthan

<sup>2</sup>Department of Obstetrics & Gynaecology, J K Lon Mother & Child Hospital, Government Medical College, Kota, Rajasthan

<sup>3</sup>Department of Obstetrics & Gynaecology, J K Lon Mother & Child Hospital, Government Medical College, Kota, Rajasthan

<sup>4</sup>Senior Professor & HOD, Department of Obstetrics & Gynaecology, J K Lon Mother & Child Hospital, Government Medical College, Kota Rajasthan (Corresponding Author)

<sup>5</sup>Senior Professor, Department of Obstetrics & Gynaecology, J K Lon Mother & Child Hospital, Government Medical College, Kota Rajasthan

**Abstract:** **Background:** Preterm premature rupture of fetal membranes (pPROM) is major cause of neonatal mortality and morbidity, is defined as the amniotic fluid leakage before the onset of uterine contractions at < 37 weeks of gestation. Amniotic membranes are connective tissue structures whose tensile strength is determined by collagen synthesis, degradation, and quality. The tensile strength of the membranes grows till 20 weeks, plateaus by 39 weeks and then declines dramatically. **Material and methods:** The present study was conducted in the Department of OBG, GMC, Kota from 01 - 03 - 2021 to 28 - 02 - 22. 1) All patients of pPROM who presented during study period. 2) Prospective observational study. **Observations and results:** 200 gravidas admitted with pPROM were assessed in the current study. Majority of them 110 (55%) belonged to age group 21 - 25 years; 132 (66%) were from the low socioeconomic status and 126 (63%) were primigravida; 87 (43.5%) had early onset pPROM (20 - 34wk) and 113 (56.5%) had late pPROM (34 - 37wk). Outcome of labour: - 134 (67%) women delivered vaginally, 66 (33%) required caesarean section. Out of the 67%, 58.5% (117) had normal vaginal delivery, 6% (12) assisted breech, and 2.5% (5) had twin delivery. Indication of LSCS - fetal distress 29 (14.5%), severe oligohydramnios 20 (10%), prior LSCS 13 (6.5%), CPD 5 (2.5%), and breech presentation 3 (1.5%). Perinatal outcome: - Birth weight in the group was 57 (28.5%) was >2.5kg, 2 - 2.5kg in 97 (48.5%), 34 (17%) was 1.5 - 2.0kg, and Only 12 (6%) was <1.5kg. NICU admissions was needed in 72 (36%). The commonest reason being respiratory distress syndrome 25 (12.5%), followed by septicemia 10 (5%), jaundice 8 (4%), and IVH 6 (3%). 13 (6.5%) neonatal deaths were reported out of 200 instances. **Conclusion:** pPROM cases are associated with maternal and fetal complications. With conservative management with antibiotic and steroids there is significant reduction of fetomaternal complications.

**Keywords:** pPROM (preterm premature rupture of membranes), LSCS (lower segment caesarean section, fetal distress, NICU admissions, Respiratory distress syndrome.

## 1. Introduction

- Term pre - labor rupture of membranes: Rupture of the membranes at or beyond 37 weeks' gestation prior to the onset of labor. This definition is consistent with ACOG practice bulletins and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) guidelines.
- Preterm premature rupture of membranes (pPROM) is defined as the onset of amniotic fluid leakage into vagina before the onset of uterine contractions at less than 37 weeks of gestation. The definition is similarly defined by ACOG, NICE, RANZCOG and World Health Organization (WHO).<sup>1 - 4</sup>
- The classic term "premature rupture of membranes" has been recently modified to "prelabor rupture of membranes (PROM)" by the American College of Obstetricians and Gynecologists (ACOG) in 2018 and the National Institute of Clinical Excellence (NICE).<sup>1 - 2</sup>
- At term, PROM complicates approximately 8% of pregnancies. Preterm premature rupture of membranes (pPROM) occurs in 2-3% of all pregnancies leading to 30-40% of preterm births.
- It is twofold more common in African Americans.<sup>5</sup>

## Mechanism of pPROM:

- Physiologic weakening of the membranes combined with the forces caused by uterine contractions. Physiological weakening caused by an increase in local cytokines, an imbalance in the interaction between matrix metalloproteinases and tissue inhibitors of matrix metalloproteinases, increased collagenase and protease activity.
- Intramniotic infection is commonly associated with pPROM. Commonly associated organisms are Neisseria gonorrhoeae, Chlamydia trachomatis, Trichomonas vaginalis, and group B  $\beta$  - hemolytic streptococcus (GBS). (6)

## Risk Factor for pPROM:

- History of pPROM,
- Short cervical length,
- Second or third trimester vaginal bleeding,
- Uterine overdistension,
- Nutritional deficiencies of copper and ascorbic acid,
- Connective tissue disorders,
- Low socioeconomic status,
- Cigarette smoking, and illicit drug use.,
- Low body mass index

- Idiopathic: Despite a variety of etiologies, often no obvious cause found.

### Complications associated with pPROM:

#### Maternal

- 1) Chorioamnionitis
- 2) Dysfunctional labor
- 3) Increased cesarean delivery rates
- 4) Postpartum hemorrhage
- 5) Postpartum infection, endometritis in the mother.
- 6) Placental abruption

#### Perinatal

- 1) Hyaline membrane disease
- 2) Intraventricular hemorrhage
- 3) Sepsis
- 4) Cord prolapse
- 5) Fetal distress
- 6) Increased fetal wastage.<sup>7</sup>

- Clinical assessment aims to confirm the diagnosis and minimize introduction of infection. History taking should include; time of onset of fluid leakage, description of the amount and color of leaking fluid, onset of uterine contractions (if present) in relation to fluid leakage, and the presence of abdominal pain or vaginal bleeding. History alone does not confirm or rule out the diagnosis and thus a thorough physical examination is essential in all cases. Diagnosis is made following history and physical examination in most cases. Visualization of fluid pooling in the posterior vaginal fornix is the basis of diagnosis. However, several tests are available to confirm that it is amniotic fluid. These tests include “ferning” of dried vaginal fluid under microscopic examination, basic vaginal fluid pH (Nitrazine test), and the use of amniotic fluid detection strips, if pooling is not visualized.
- The latent period from membrane rupture to delivery is typically brief after pPROM. If pPROM occurs before 34 weeks of gestation, more than 90% of women will deliver within 1 week. About two - thirds of women will deliver within 1 week of membrane rupture, but with expectant management, a latency of four weeks or more can be achieved in one in five cases.

Currently most authorities accept a plan of active management which includes prevention of infection, delay of delivery until fetal maturity is achieved and active intervention by induction if labor is no longer preventable or if early infection is suspected.<sup>8</sup>

### Aims and Objectives

To study:

- The outcome of labour.
- The maternal morbidity and mortality.
- The perinatal morbidity and mortality in cases of preterm premature rupture of membranes.

## 2. Materials and Methods

The present study on " Maternal and Perinatal outcome in cases of preterm premature rupture of membranes (pPROM) " was conducted in the Department of Obstetrics and Gynaecology, Govt. Medical College kota over period of 1 year.

**Design of Study:** Prospective observational study.

**Study Population:**

#### Inclusion Criteria:

- All the pregnant woman with preterm premature rupture of membranes admitted in OBG dept during 1yr study period.
- Confirmation of pPROM by a speculum examination.

#### Exclusion Criteria:

- PROM in period of gestation more than 37 weeks.
- Congenital anomaly
- Intra uterine fetal demise

#### Method of Collection of Data

All the women fulfilling the inclusion criteria were subjected to:

- Thorough history taking
- Meticulous clinical examination (general, systemic&local)
- Treatment was individualized according to gestational age, duration of leakage, quantity of liquor and maternal and fetal monitoring results.
- All women were given prophylactic antibiotics and steroids for pulmonary maturity.
- Timing and mode of delivery was individualized.
- All neonates were examined by neonatologist and were followed for 7days.

#### Maternal Outcome

- 1) Gestational age at delivery.
- 2) Need for Induction of labour.
- 3) Mode of delivery
- 4) Complications

#### Perinatal Outcome:

- 1) Birth weight
- 2) Nicu admission
- 3) Perinatal deaths

## 3. Observation and Results

**Table 1:** Distribution of study participants according to age group:

Age	Number	Percentage
<20years	20	10
21 - 25years	110	55
26 - 30years	47	23.5
>30years	23	11.5
<b>Total</b>	<b>200</b>	<b>100</b>

In this study, 55% of pPROM patients were between 21 - 25years of age.

**Table 2:** Distribution of study participants according to socioeconomic status:

Socioeconomic status	Number	Percentage
Above poverty line	58	34
Below poverty line	132	66

66% of pPROM patients were from below poverty line.

**Table 3:** Distribution of study participants according to Parity

Gravida	Number	Percentage
Primigravida	126	63
Multigravida	74	37
<b>Total</b>	<b>200</b>	<b>100</b>

63% of pPROM patients are primigravidas

**Table 4:** Distribution of study participants according to mode of delivery

MOD	Number	Percentage
Vaginal	117	58.5
Assisted Breech	12	6
Twins by vaginal	5	2.5
LSCS	66	33
<b>Total</b>	<b>200</b>	<b>100</b>

33 % of the patients required a caesarean section, with 67% of deliveries occurring vaginally.

Out of the 67 % of patients who delivered vaginally, 58.5% had a normal vaginal delivery, 6% assisted breech delivery, and 2.5% had twins delivered vaginally.

**Table 5:** Distribution of study participants according to indication of LSCS

Indication	Number	Percentage
Previous LSCS	13	6.5
Breech	3	1.5
Fetal Distress	29	14.5
CPD	5	2.5
Severe oligohydramnios	20	10
<b>Total</b>	<b>66</b>	<b>33</b>

Among the pPROM patients fetal distress was most common indication of LSCS

**Table 6:** Distribution of study participants according to birth weight (in kg):

Indication (Birth weight in kg)	Number	Percentage
<1.5	12	6
1.5 - 2.0	<b>34</b>	17
2 - 2.5	97	48.5
>2.5	57	28.5
<b>Total</b>	<b>200</b>	<b>100</b>

65.5% of the patients with pPROM delivered babies weighing between 1.5 and 2.5 kilograms (low birth weight). Six percent of births had babies with very low birth weight.

**Table 7:** Case Distribution according to maternal complications

Maternal complications	Number	Percentage
No complications	167	83.5

Chorioamnionitis	8	4
Abruption	7	3.5
Puerperal pyrexia	7	3.5
Wound infection	11	5.5
<b>Total</b>	<b>200</b>	<b>100</b>

**Table 8:** Distribution of NICU admission

NICU admission	Number	Percentage
No	128	64
Yes	72	36
<b>Total</b>	<b>200</b>	<b>100</b>

**Table 9:** Distribution of neonatal complications

Neonatal complications	Number	Percentage
No complications	151	75.5
RDS	25	12.5
Septicemia	10	5
Jaundice	8	4
IVH	6	3
<b>Total</b>	<b>200</b>	<b>100</b>

The most frequent reason for newborn morbidity among the 24.5 % of babies admitted was respiratory distress syndrome (12.5%), followed by septicemia (5%), jaundice (4%), and IVH (3%).

**Table 10:** Distribution of neonatal death:

Neonatal death	Number	Percentage
No	187	93.5
Yes	13	6.5
<b>Total</b>	<b>200</b>	<b>100</b>

13 neonatal deaths were reported out of 200 babies born to mothers with pPROM.

#### 4. Discussion

- 200 gravidas who had been admitted with pPROM were assessed in the current study. In this study, Maximum patients belonged to 21 - 25 years age group. In a study by Akter et al report similar results.<sup>9</sup>
- Majority of study subjects (66%) belonged to low socioeconomic status, which is comparable to the 61% reported in the study by Swathi Pandey.<sup>10</sup>
- Low socioeconomic status has been linked in studies to abnormalities in the amniotic membrane. Poor hygiene, malnutrition, anemia, stress, overexertion, high parity, recurring genitourinary infections, and other conditions might cause pPROM in people with low socioeconomic status. These variables cause the antimicrobial activity in individuals' amniotic fluid to diminish, which results in pPROM.
- Malnutrition is the main cause of an increase in pPROM incidence among mothers with poor socioeconomic status. Malnutrition raises the risk of infections, which ultimately results in pPROM. Therefore, starvation and infections are a vicious cycle that contribute to pPROM.
- In the current study, 63% of the patients with pPROM were primigravida. Similar findings were reported in studies by Swathi Pandey<sup>10</sup> (multigravida 48% and primigravida 52 %) and Fatemeh Tavassoli<sup>11</sup> (multigravida 44.1 % and primigravida 55.9 %). Only 33 % of the patients required a caesarean section, with 67% of deliveries occurring vaginally. In a study by Tahir S et al<sup>14</sup>, caesarean sections were performed in 20 % of the

women. In the current study, the most frequent reason for LSCS was fetal distress, which accounted for 14.5% of cases. Other reasons included severe oligohydramnios (10%), previous LSCS (6.5%), CPD (2.5%), and breech presentation (1.5 %). Fetal distress was the most frequent indication of LSCS in studies by Swathi Pandey<sup>10</sup> and Singhal.<sup>15</sup>

- In this study, 48.5% of the patients with pPROM delivered babies weighing between 2 and 2.5 kilograms. These findings were comparable to those of Swetha Anant Mohokar et al study.<sup>13</sup> in which 26% of pregnancies resulted in infants weighing between 2 and 2.5 kilogram.
- 36 % of the infants born to pPROM mothers in our study were admitted to the NICU for various complications. These findings agreed with those of Shweta Patil et al<sup>12</sup>, who found 24 % of newborn via normal vaginal birth and LSCS were admitted to the NICU.
- 13 neonatal deaths (6.5%) were reported out of 200 study cases. A research by Swetha Anant Mohokar et al<sup>13</sup> revealed that neonatal mortality was 15%.

## 5. Summary and Conclusion

Present study reveals that amongst 200 cases of pPROM greater number of patients belonged to 21 - 25 years of age group, lower socio economic status. pPROM is more common in primigravidas. 67% patients had vaginal delivery and 33% delivered by cesarean section, most common indication for cesarean section was fetal distress. maternal morbidity was 16.5% in pPROM patients.

- Only 36% of newly born infants required admission to the NICU due to complaints of respiratory distress, jaundice, septicemia, and intraventricular hemorrhage.
- The majority of infants born to mothers with gestational age between 28 and 31 weeks gestation required admission to the NICU.
- Of the 13 newborn deaths in this study, RDS was the primary cause of death for the majority of them.

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