

Impact of Premature Rupture of Membranes on Perinatal Outcome

¹Dr Swasti Slathia, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

²Dr Sapna Puri, Professor and HOD, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

³Dr Saima Yousuf, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

⁴Dr Aayushi Jain, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

Corresponding Author: Dr Swasti Slathia, Post Graduate, Department of Obstetrics and Gynaecology, ASCOMS and Hospital, Sidra, Jammu, Jammu and Kashmir

How to citation this article: Dr Swasti Slathia, Dr Sapna Puri, Dr Saima Yousuf, Dr Aayushi Jain, “Impact of Premature Rupture of Membranes on Perinatal Outcome”, IJMACR- June - 2025, Volume – 8, Issue - 3, P. No. 257 – 262.

Open Access Article: © 2025 Dr Swasti Slathia, et al. This is an open access journal and article distributed under the terms of the creative common's attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Fetal membranes are essential during pregnancy, offering both mechanical and immunological protection to the developing fetus. PROM holds significant implications for the outcome of pregnancy. Hence; the present study was conducted for assessing the impact of premature rupture of membranes on perinatal outcome.

Materials & methods: Fifty patients were admitted to the Obstetrics and Gynaecology department via the outpatient and casualty departments, all diagnosed with term premature rupture of membranes (PPROM) confirmed through ultrasound and clinical examination, irrespective of their age. A data collection proforma was

completed for each case. Following admission, a comprehensive workup was conducted, which included taking a detailed history, performing a general physical examination, conducting abdominal and pelvic examinations, and noting relevant specific investigations. The perinatal outcomes were assessed, and the data were analyzed using SPSS software.

Results: A total of 50 subjects with PROM were assessed. Mean age of the patients was 31.5 years. 66 percent of the patients were of primigravida while the remaining 34 percent of the patients were of multigravida status. Mean gestational age was 37.9 weeks. Mode of delivery was C-section in 88 percent of the patients while in the remaining 12 percent of the

patients, mode of delivery was vaginal. Indications of C-section included Fetal distress, Oligohydramnios and Failure of induction found to be present in 34.09 percent, 38.64 percent and 27.27 percent of the patients respectively. PPH and puerperal pyrexia was seen in 10 percent and 8 percent of the patients respectively. NICU admission and RDS were seen in 24 percent and 12 percent of the patients respectively. Neonatal sepsis and perinatal mortality was seen in 8 percent and 2 percent of the patients respectively.

Discussion: The prevalence of premature rupture of membranes (PROM) is notably significant worldwide. To reduce the incidence of PROM and its negative perinatal consequences, it is essential to identify prenatal risks and detect complications early, particularly in mothers with a history of abortion and antepartum hemorrhage during the current pregnancy. Additionally, screening for and treating urinary tract infections (UTIs) is necessary.

Keywords: Perinatal, Premature rupture of membrane

Introduction

Premature rupture of membranes (PROM), now also referred to as "pre-labour rupture of membranes," is the rupture of gestational membranes after 37 weeks but before the process of labour begins. When membrane rupture takes place prior to 37 weeks of gestation, it is classified as preterm premature rupture of membranes (PPROM). Prematurity is a leading factor contributing to the high rates of morbidity and mortality among newborns. Approximately one-third of all preterm births are attributed to PROM, which complicates about 3% of pregnancies. PROM is linked to considerable rates of morbidity and mortality.¹

Fetal membranes are essential during pregnancy, offering both mechanical and immunological protection

to the developing fetus. These membranes consist of two layers: the inner amnion and the outer chorion, which is attached to the decidual layer of the endometrium. Consequently, the amnion reacts to alterations within the amniotic cavity, while the chorion is crucial for maintaining immune tolerance at the maternal-fetal interface. By the twelfth week of gestation, the amnion and chorion are interconnected by a robust yet flexible extracellular matrix composed of various collagen types, which serves as the structural foundation for the membranes. As gestation concludes, significant remodeling of the membranes occurs, driven by the programmed activation of matrix metalloproteinases and selective apoptosis, resulting in a notable weakening of the membranes. Notably, tumor necrosis factor α and interleukin 1β trigger similar biochemical markers associated with membrane weakening and apoptosis, akin to those observed at the end of gestation.²⁻⁴

Evidence indicates that the rupture of membranes is associated with infection, molecular dysfunction of the membranes, collagen degradation, and programmed cell death within fetal membranes. Accurate diagnosis and effective management are crucial to mitigate various complications for both the fetus and the mother, primarily those stemming from infections. PROM holds significant implications for the outcome of pregnancy. Delayed diagnosis can result in missed opportunities for timely intervention. While diagnostic procedures typically do not lead to major issues, there are instances where achieving an accurate diagnosis can be challenging.⁵⁻⁷ Hence; the present study was conducted for assessing the impact of premature rupture of membranes on perinatal outcome.

Materials & methods

The current research was carried out for evaluating the effect of premature rupture of membranes on perinatal outcome. Fifty patients were admitted to the Obstetrics and Gynaecology department via the outpatient and casualty departments, all diagnosed with term premature rupture of membranes (PPROM) confirmed through ultrasound and clinical examination, irrespective of their age. A data collection proforma was completed for each case. Following admission, a comprehensive workup was conducted, which included taking a detailed history, performing a general physical examination, conducting abdominal and pelvic examinations, and noting relevant specific investigations. The perinatal outcomes were assessed, and the data were analyzed using SPSS software.

Results

A total of 50 subjects with PROM were assessed. Mean age of the patients was 31.5 years. 66 percent of the

patients were of primigravida while the remaining 34 percent of the patients were of multigravida status. Mean gestational age was 37.9 weeks. Mode of delivery was C-section in 88 percent of the patients while in the remaining 12 percent of the patients, mode of delivery was vaginal. Indications of C-section included Fetal distress, Oligohydramnios and Failure of induction found to be present in 34.09 percent, 38.64 percent and 27.27 percent of the patients respectively. PPH and puerperal pyrexia was seen in 10 percent and 8 percent of the patients respectively. NICU admission and RDS were seen in 24 percent and 12 percent of the patients respectively. Neonatal sepsis and perinatal mortality was seen in 8 percent and 2 percent of the patients respectively.

Table 1: Indications of C-section

Indications of C-section	Number	Percentage
Fetal distress	15	34.09
Oligohydramnios	17	38.64
Failure of induction	12	27.27
Others	9	20.45
Total	44	100

Table 2: Maternal morbidity

Maternal morbidity	Number	Percentage
PPH	5	10
Puerperal pyrexia	4	8

Table 3: Perinatal Outcome

Perinatal outcome	Number	Percentage
NICU admission	12	24
RDS	6	12

Neonatal sepsis	4	8
Perinatal mortality	1	2

Discussion

Premature rupture of membranes (PROM) refers to the breaking of fetal membranes prior to the onset of labor, leading to the unintentional release of amniotic fluid. When this occurs before 37 weeks of gestation, it is classified as preterm PROM; if it happens after 37 weeks, it is termed term PROM. PROM affects approximately 5% to 10% of all pregnancies, with around 80% of these cases occurring at term. The occurrence of PROM is associated with considerable risks for both maternal and fetal health, contributing to 18% to 20% of prenatal deaths and 21.4% of morbidity cases. The primary causes of fetal mortality linked to PROM include sepsis, asphyxia, and pulmonary hyperplasia. Women experiencing intrauterine infections tend to deliver earlier than those who are not infected, and infants born with sepsis face a mortality risk that is four times greater than that of infants without sepsis.⁸⁻¹⁰

Maternal complications arising from PROM include intra-amniotic infection, which affects 13% to 60% of women with this condition, as well as placental abruption and postpartum endometritis. In low- and middle-income countries (LMICs), preterm birth, infections, hypertensive disorders, and asphyxia are frequently identified as major factors contributing to maternal and fetal mortality.^{11, 12} Hence; the present study was conducted for assessing the impact of premature rupture of membranes on perinatal outcome.

A total of 50 subjects with PROM were assessed. Mean age of the patients was 31.5 years. 66 percent of the patients were of primigravida while the remaining 34 percent of the patients were of multigravida status. Mean gestational age was 37.9 weeks. Mode of delivery was

C-section in 88 percent of the patients while in the remaining 12 percent of the patients, mode of delivery was vaginal. Indications of C-section included Fetal distress, Oligohydramnios and Failure of induction found to be present in 34.09 percent, 38.64 percent and 27.27 percent of the patients respectively. In a similar study conducted by Endale T et al, authors assessed maternal and fetal outcomes and associated factors in term PROM. Of the 4 525 women who gave birth in the hospital, 202 were complicated by term PROM. About 22.2% of the women showed unfavorable maternal outcomes. The most common cause of maternal morbidity and mortality was puerperal sepsis. About 33.5% of neonates experienced unfavorable outcomes. The duration of PROM >12 hours latency >24 hours, residing in rural areas and birth weight less than 2 500 g were associated with unfavorable outcomes.¹³ Wolde M et al, in another similar study, assessed perinatal outcomes of PROM among pregnant women. Among 69 women who experienced pre-labor rupture of membrane, 50 (72.5%) of them had adverse perinatal outcomes. Of all 69 neonates 17 (24.64%) were delivered with low birth weight and 20 (29%) of them were born preterm. The overall perinatal mortality rate was 10.1% or 101 per 1,000 live births. History of abortion, urinary tract infection, antepartum hemorrhage, and khat chewing in the current pregnancy were all significantly associated with pre-labor rupture of membrane.¹⁴

PPH and puerperal pyrexia was seen in 10 percent and 8 percent of the patients respectively. NICU admission and RDS were seen in 24 percent and 12 percent of the patients respectively. Neonatal sepsis and perinatal mortality was seen in 8 percent and 2 percent of the

patients respectively. Similar to our study, Andrabi SU et al reported the incidence of PROM in their research to be 8.76% of which 54.7% were primigravida and 45.3% were multigravida. Most of the patients (70.4%) were term, only 29.6% were preterm with gestational age of <37 weeks. Incidence of PPH was 2.8%, puerperal pyrexia occurred in 9.8%. The incidence of RDS in neonates was 8.9% while the incidence of neonatal sepsis was 6.7%. There was 1.1% perinatal mortality.¹⁵ Risk factors and predictors of neonatal outcomes among babies born to mothers with PROM were identified in another previous study conducted by Shanbhag S et al. Prematurity (39.3%) emerged as the most prevalent complication, followed by hyperbilirubinemia (15.7%) and respiratory distress (12.2%), with a neonatal mortality rate of 2.3%. The leading maternal risk factors linked to premature rupture of membranes (PROM) included antenatal complications (24.8%) and medical conditions in the mother (13.7%). The median latency period was recorded at 590 minutes, with the longest median latency of 1,380 minutes observed in pregnancies between 28 and 32 weeks of gestation. Factors such as primiparity and preterm gestation were associated with an extended latency period. A latency exceeding 24 hours was identified as a significant contributor to lower Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) scores, as well as increased admissions to the Neonatal Intensive Care Unit (NICU). The study concluded that PROM poses a considerable risk for neonatal morbidity and mortality, with prematurity and low birth weight being the most frequent complications.¹⁶

Conclusion

The prevalence of premature rupture of membranes (PROM) is notably significant worldwide. To reduce the

incidence of PROM and its negative perinatal consequences, it is essential to identify prenatal risks and detect complications early, particularly in mothers with a history of abortion and antepartum hemorrhage during the current pregnancy. Additionally, screening for and treating urinary tract infections (UTIs) is necessary.

References

1. Garg A, Jaiswal A. Evaluation and Management of Premature Rupture of Membranes: A Review Article. *Cureus*. 2023 Mar 24;15(3):e36615.
2. Mossman HW. Classics revisited: Comparative morphogenesis of the fetal membranes and accessory uterine structures. *Placenta*. 1991 Jan-Feb;12(1):1-5.
3. Moore RM, Mansour JM, Redline RW, Mercer BM, Moore JJ. The physiology of fetal membrane rupture: insight gained from the determination of physical properties. *Placenta*. 2006 Nov-Dec;27(11-12):1037-51.
4. Menon R, Richardson LS. Preterm prelabor rupture of the membranes: A disease of the fetal membranes. *Semin Perinatol*. 2017 Nov;41(7):409-419.
5. Thomson AJ., Royal College of Obstetricians and Gynaecologists. Care of Women Presenting with Suspected Preterm Prelabour Rupture of Membranes from 24+0 Weeks of Gestation: Green-top Guideline No. 73. *BJOG*. 2019 Aug;126(9):e152-e166.
6. Ash AK. Managing patients with meconium-stained amniotic fluid. *Hosp Med*. 2000;61:844-848.
7. Dickute J, Padaiga Z, Grabauskas V, Gaizauskiene A, Basys V, Obelenis V. Maternal socio-economic factors and the risk of low birth weight in Lithuania. *Med Kaunas Lith*. 2003;40:475-482.
8. Duff P. Premature rupture of membranes in term patients: induction of labor versus expectant

- management. Clin Obstet Gynecol. 1998;41:883–891.
9. Liu J, Feng Z-C, Wu J. The incidence rate of premature rupture of membranes and its influence on fetal-neonatal health: a report from mainland China. J Trop Pediatr. 2010;56:36–42.
10. Wu J, Liu J, Feng Z, Huang J, Wu G. Influence of premature rupture of membranes on neonatal health. Zhonghua Er Ke Za Zhi Chin J Pediatr. 2009;47:452–456.
11. Velemínský M, Sák P. Management of pregnancy with premature rupture of membranes (PROM) Available from: medportal.ge/eml/publichealth/2006/n2/11 .
12. ACOG Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin No. 80: premature rupture of membranes. Clinical management guidelines for obstetrician-gynecologists. Obstet Gynecol. 2007;109:1007–1019.
13. Endale T, Fentahun N, Gemada D, Hussen MA. Maternal and fetal outcomes in term premature rupture of membrane. World J Emerg Med. 2016;7(2):147-52
14. Wolde M, Mulatu T, Alemayehu G, Alemayehu A, Assefa N. Predictors and perinatal outcomes of pre-labor rupture of membrane among pregnant women admitted to Hiwot Fana Comprehensive Specialized University Hospital, Eastern Ethiopia: a retrospective study. Front Med (Lausanne). 2024 Jan 23;10:1269024.
15. Andrabi SU, Khan IA, Bashir N, Nisa ZU.A prospective study of maternal outcome of labor and perinatal outcome in premature rupture of membranes. Int J Reprod Contracept Obstet Gynecol 2023;12:989-93.
16. Shanbhag S, Alva R. Early Neonatal Outcomes in Premature Rupture of Membranes Beyond Twenty-eight Weeks of Gestation in a Tertiary Care Hospital of Coastal Karnataka. J Pediatr Res. 2020 Dec;7(4):273-278.