Maternal and fetal outcome in preterm premature rupture of membrane: A cross-sectional study

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Abstract

Background and Aim: Premature rupture of membrane before 37 wks. Gestation is known as preterm premature rupture of membrane (PPROM). The key factor in the fetal and maternal outcome is that the diagnosis of pre labour rupture of membranes must be established. The aim of this study was to assess maternal and fetal outcome in women with premature rupture of membranes.

Material and Methods: Present study was prospective, analytical hospital based study. The study was conducted at Tertiary care Institute of India. The study population includes 200 obstetrics cases of singleton pregnancy with gestational age of 28 weeks to 36 weeks with spontaneous rupture of membranes over a period of 1.5 years. Detailed clinical examination of the patient was done to see any co-morbidity. Data was collected using a performa. Detailed workup including history, general physical examination, abdominal and pelvic examination and relevant specific investigation were noted.

Results: Maximum numbers of cases (50%) were primigravida and 25% were 2nd gravida. In 69% women duration of leaking was < 12 hours and in 8% women duration of leaking was> 24 Hours. Out of 200 cases 67% delivered vaginally and 33% were LSCS. Commonest neonatal mortality was respiratory distress syndrome. Those maximum numbers of NICU admission in cases as well as control group were in gestational age 34-36 weeks.

Conclusion: Most common cause of PPROM was unknown. Most common maternal morbidity was puerperal fever and neonatal morbidity was respiratory distress. Maternal and fetal morbidity increases with increase in duration between rupture of membranes and delivery of fetus, so augmentation of labour should be done. In our study most common cause of cesarean was previous cesarean.

Keywords: gestation, primigravida, premature rupture of membrane, respiratory distress

Introduction

Premature rupture of membrane (PROM) refers to the disruption of fetal membranes before the beginning of labor, resulting in spontaneous leakage of amniotic fluid [1]. PROM, which occurs prior to 37 weeks of gestation, defined as preterm PROM as PROM that occurs after 37 weeks gestation defined as term PROM. PROM occurs in approximately 5%–10% of all pregnancies, of which approximately 80% occur at term [2]. It is one of the leading identifiable causes of prematurity. PPROM is a condition that occurs in 3% of all pregnancies and is responsible for approximately 30% of all preterm deliveries [1]. Eighty five percent of neonatal morbidity and mortality is result of prematurity. PPROM remote from term is associated with significant perinatal morbidity and mortality that decreases with advancing gestational age at delivery. Alternatively, PPROM near term with expeditious delivery of non-infected and non-asphyxiated infants is associated with a high likelihood of survival and a low risk of severe morbidity. When PROM occurs remote from term, significant risks of morbidity and mortality are present for both the mother and fetus. Thus, the physician caring for the pregnant woman plays an important role in management and need to be familiar with potential complications and possible interventions to minimize risks and maximize the probability of the desired outcome.

Premature rupture of membrane is common occurrence with an incidence of 5-10%. It is a significant event as it causes maternal complications, increased operative procedures, neonatal morbidity and mortality [1]. PPROM occurs in 3% of pregnancies and causes around 25-30% of all preterm deliveries. Since PPROM is associated with lower latency from membrane rupture until delivery, it is an important cause of perinatal morbidity and mortality [4, 5]. During the latency period, the ascent of pathogenic microorganisms from the lower genital area could create complications such as intraterine infections.
Also, some studies introduced PROM as a pathologic process that often occurs following membrane inflammation and infection [6]. However, one of the most common complications in PPROM patients is intrauterine infection, which can lead to chorioamnionitis, metritis after delivery and perinatal outcome such as neonatal sepsis. Other complications are cord compression leading to fetal distress; cord prolapsed during rupture of membranes and placental abruption. Perinatal outcomes constitute prematurity, neonatal sepsis, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), and risk of fetal and neonatal death [7].

PROM is linked to significant maternal and fetal morbidity and mortality. It has been shown to be the cause of 18%–20% and 21.4% of prenatal mortalities and morbidity respectively. The three causes of fetal death associated with PROM are sepsis, asphyxia, and pulmonary hypoplasia. Women with intrauterine infection deliver earlier than non-infected women, and infants born with sepsis have a mortality rate four times higher than those without sepsis do [10]. Maternal complications include intra-amniotic infection, which occurs in 13%–60% of women with PROM, placental abruption, and postpartum endometritis [11, 12].

Pre-term birth, infection, hypertensive disease, and asphyxia are cited as the most common contributors to maternal and fetal mortality in developing countries (LMICs) [13, 14]. Evidence suggests that the rupture of membrane is related to infection [15], membrane dysfunction on a molecular level, collagen destruction, and programmed cell death in fetal membranes [17, 18]. The complication risk of PROM is increased if the mother has previous PROM, low body mass index, concomitant infection of the gestational tissues, and longer the time elapsed between the rupture and delivery [19, 20]. Diagnosis and proper management is very important to limit various fetal and maternal complications generally due to infection. However, in countries like Ethiopia where health facilities not well organized with necessary manpower, a large number of mothers come to the facilities late.

The key factor in the fetal and maternal outcome is that the diagnosis of pre labour rupture of membranes must be established. In most instances either it is obvious from the release of clear amniotic fluid from cervix or by simple laboratory test like detection of fern pattern. The key to the management is an accurate assessment of gestational age and the presence or absence of sepsis. However the management is especially difficult in preterm patient in whom the risk of foetal and maternal infection that can accompany expectant treatment has to be weighed against potential improvement in neonatal outcome that comes with greater maturity of foetal lungs. Currently most authorities accept a plan of active management which includes prevention of infection, delay of delivery until foetal maturity is achieved, and active intervention by induction if labor is no longer preventable or if early infection is suspected. The aim of this study was to assess maternal and fetal outcome in women with premature rupture of membranes.

### Material and Methods

Present study was prospective, analytical hospital based study. The study was conducted at Tertiary care Institute of India. The study population includes 200 obstetrics cases of singleton pregnancy with gestational age of 28 weeks to 36 weeks with spontaneous rupture of membranes over a period of 1.5 years. The cases that fulfils the inclusion criteria was selected. Women with multiple pregnancy, gestational age 36 weeks, pregnancy with any of medical disorder, cases with meconium stained liquor, faetal distress, intrauterine death, non-vertex presentation, artificial rupture of membranes and congenital malformations were excluded from the study.

200 pregnant women without PROM up to 36 completed weeks are taken as control. Pregnant women with complain of leaking >28 and up to 36 week coming from antenatal, outdoor, emergency were admitted and were enrolled in the study. Ethical approval was taken from the institutional ethical committee and written informed consent was taken from all the participants. A detailed history was taken age, parity, menstrual and obstetric parameters.

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Our study shows that 69% of PPROM cases were primigravida, 25% were 2nd gravida, and 5% were unknown factors. Most Studies found higher incidence of PPROM in primigravida, 17.8% in gravida II and 17.75% in multi gravida. While in study by Joelle M Lieman et al. [24] found 43% women with PPROM were primigravid, incidence of PPROM was 7.2% in which 48.8% cases were between 34-36, 26% between 31-33 weeks, 14.4% between 28-30 weeks, 3.4% at 27 weeks and 7.2% at less than 26 weeks. In our study it is evident that 62% are unknown factors of PPROM and history of coitus 5%, 4% UGI. Findings correlate with the study of Patil et al. with unknown factors by 59% and history of coitus 10%, UGI 6% as a cause of PPROM [25]. Our study shows 50% of PPROM case were primi and 25% 2nd gravida, 16% 3rd gravida. It shows that PROM occurs more frequently in primigravida compared to that of multigravida. This could be explained on the basis of less married life and more frequency of coitus, causing ascending infections and UGI, prostaglandin production causing direct toxic effect on membranes. Our study is comparable with the study of Jameela et al. [26].

Our study shows that 69% of women of PPROM leaking time was less than 12 hours, 23% from 12-24 hours and 8% >24 hours. This could be explained on the basis that most of the patients were unbooked and they reported to the concerned CHC or PHC early and were referred to higher center immediately due to lack of NICU facility. Our findings are comparable with the study of Shailaja et al. [27]. In our study 69.8% were delivered vaginally spontaneously, while 13.69% were induced with cerviprime gel, 8.21% induced with syntocinon. Patil et al. showed 19% spontaneous vaginal delivery and 17.8% induced by cerviprime gel while Minakeshi et al. show 66% spontaneous vaginal delivery and 34% induced with cerviprime gel [25, 26]. Our study is comparable with the study of Patil et al. and Minakeshi et al. [25, 26] Our study shows that out of 200 cases, 24% accounted for respiratory distress syndrome, 12% septicemia. Our study is comparable with study of Patil et al. and Padma et al. [25, 26] Present study shows out of 200 cases each in the study and control group, 34% were admitted in NICU which is comparable with the study of Patil et al. where NICU admission was 36% [25]. Our study shows less NICU admission compared with the study of Hassan et al. (65.3%) [29].

Our study has some limitations. Due to incomplete documentation and inappropriate chart keeping, some important outcome indicators were not included in the study. The sample size of this study was small.

**Conclusion**

Most common cause of PPROM was unknown. Most common maternal morbidity was puerperal fever and neonatal morbidity was respiratory distress. Maternal and fetal morbidity increases with increase in duration between rupture of membranes and delivery of fetus, so augmentation of labour should be done. In our study most common cause of cesarean was previous cesarean.

**Table 1:** Parity-wise distribution

<table>
<thead>
<tr>
<th>Parity</th>
<th>Case</th>
<th>Control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primigravida</td>
<td>100</td>
<td>104</td>
<td>0.5</td>
</tr>
<tr>
<td>Gravida-2</td>
<td>50</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Gravida-3</td>
<td>32</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>≥G-4</td>
<td>18</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Test applied chi-square test

**Table 2:** Duration of leaking wise distribution of case

<table>
<thead>
<tr>
<th>Duration of leaking (hours)</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;12</td>
<td>138</td>
<td>69</td>
</tr>
<tr>
<td>12-24</td>
<td>46</td>
<td>23</td>
</tr>
<tr>
<td>&gt;24</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 3:** Type of delivery wise distribution

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Case</th>
<th>Control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>134</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>LSCS delivery</td>
<td>66</td>
<td>44</td>
<td>0.01*</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

*indicates statistically significance at p<0.05

Test applied chi-square test

**Discussion**

Premature rupture of membranes is fairly a common complication of pregnancy and can lead to increased maternal complications, operative procedures, neonatal morbidity and mortality the present study was undertaken to identify risk factors causing PROM and to study labor outcome maternal morbidity and perinatal morbidity and mortality associated with PPROM. Most Studies found higher incidence of PPROM in women belonging to low socioeconomic status. In study by Arij Faksh Doa et al. [23] incidence of PPROM was 64.5% in primigravida, 17.8% in gravida II and 17.75% in multi gravida. While in study by Joelle M Lieman et al. [24] found 43% women with PPROM were primigravid, incidence of PPROM was 7.2% in which 48.8% cases were between 34-36, 26% between 31-33 weeks, 14.4% between 28-30 weeks, 3.4% at 27 weeks and 7.2% at less than 26 weeks. In our study it is evident that 62% are unknown factors of PPROM and history of coitus 5%, 4% UGI. Findings correlate with the study of Patil et al. with unknown factors by 59% and history of coitus 10%, UGI 6% as a cause of PPROM [25]. Our study shows 50% of PPROM case were primi and 25% 2nd gravida, 16% 3rd gravida. It shows that PROM occurs more frequently in primigravida compared to that of multigravida. This could be explained on the basis of less married life and more frequency of coitus, causing ascending infections and UGI, prostaglandin production causing direct toxic effect on membranes. Our study is comparable with the study of Jameela et al. [26].

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**References**

12. El-Messidi A, Cameron A. Diagnosis of premature rupture of membranes: inspiration from the past and insights for the


