Feto-maternal outcome in pregnancies with preterm premature rupture of membranes: a tertiary hospital experience

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ABSTRACT

Background: Preterm premature rupture of the membranes (PPROM) is a known dreaded complication of pregnancy as it is associated with significant perinatal complications. The objective of our study was to bring forward the incidence and feto-maternal outcome in pregnancies with PPROM in Indian scenario.

Methods: This retrospective cohort study was conducted in the Department of Obstetrics and Gynecology, in a tertiary hospital in Punjab between January 2014 and December 2014. Medical records of all pregnant patients who were admitted to our department with PPROM on the basis of clinical and/or laboratory data were reviewed. These 75 women were divided into two groups according to gestation age (GA), Group 1- early PPROM (24-33 6/7 weeks of GA) (n=38) and Group 2- late PPROM (34-36 6/7 weeks of GA) (n=37). A multivariate analysis was used to find the association between PPROM and perinatal outcome.

Results: During the study period, there were 1528 deliveries in the hospital and 75 pregnant women were diagnosed to have PPROM giving an overall incidence of 4.9%. In both the groups most common maternal complication was chorioamnionitis (15.7% vs. 2.7%) and most common neonatal complication was physiological jaundice (56.8% vs. 69.2%). Most of the babies required phototherapy (50% vs. 43.5%) and antibiotics. Our study demonstrated that patients in group 1 had significant increase in the frequency of chorioamnionitis, hyaline membrane disease, sepsis, periventricular leukomalacia, intrauterine pneumonia, need for ventilator support and inotropes. Patients in group 2 had significant increase in the frequency of APGAR score <7 at 1 min, APGAR <7 at 5 min and LSCS rate.

Conclusions: The study result implies that lesser the gestation age more are the chances of fetomaternal complications in patients with PPROM. Early PPROM is associated with higher rates of perinatal morbidity and mortality.

Keywords: PPROM, Chorioamnionitis, Feto-maternal outcome

INTRODUCTION

Preterm premature rupture of the membranes (PPROM) is a known dreaded complication of pregnancy as it is associated with significant perinatal complications. As per the definition, PPROM is the rupture of the amniotic membranes before 37 weeks of gestation and before the onset of labour, while pre-viable PPROM occurs before 24 weeks of gestation.¹ One third of the preterm births are due to PPROM and it complicates about 3% of pregnancies.²
PPROM is multifactorial in nature. Choriodecidual infection or inflammation is considered as a major etiology for PPROM, especially at early gestational ages. Amniotic fluids have certain bacteriostatic properties that prevent infections and thereby prevent PPROM. Inline with this, oligohydramnios is also considered responsible for PPROM. Deficiency of collagen content of the amniotic membranes is also among the other etiological factors of PPROM.

Trauma, smoking, infections, low socioeconomic status, previous history of preterm delivery, sexually transmitted diseases, genetic and/or enzymatic abnormalities, nutritional deficiencies, incompetent cervix, placental abruption, procedures like amniocentesis and cerclage are known predisposing factors which may result in PPROM.

PPROM may cause perinatal complications like neonatal sepsis, respiratory distress syndrome, placental abruption, umbilical cord compression due to oligohydramnios and even carries a 1 to 2% risk of fetal death. Maternal complications like chorioamnionitis, premature delivery, and increased risk of caesarean section are also noted. Management of PPROM varies according to the gestational age of the fetus. Expectant management and immediate delivery are the two potential options of management in patients with PPROM with its advantages and disadvantages.

The objective of our study was to bring forward the incidence and perinatal outcome in Pregnancies with Preterm Premature Rupture of Membranes (PPROM) in Indian scenario.

METHODS

This is a retrospective cohort study conducted in the Department of Obstetrics and Gynecology, in a tertiary hospital in Punjab. We reviewed the medical records of all pregnant patients who were admitted to our department with PPROM on the basis of clinical and/or laboratory data from January 2014 through December 2014. The hospital database, including medical records, and labour ward and NICU registries were used to obtain the following information: 1) maternal demographics; 2) gestational age at PPROM and at admission; 3) use of antibiotics and corticosteroids for fetal lung maturity; 4) gestational age at birth and mode of delivery (vaginal or Caesarean section delivery); 5) presence of chorioamnionitis; and 6) maternal and neonatal outcomes. Gestational age was determined by asking the mother the date of her last menstrual period, if reliable, or by doing an ultrasound before 20 weeks gestation. Diagnosis of PPROM was based on history and vaginal examination. A history of sudden passage of amniotic fluid from the vagina or feeling wet with a pooling of amniotic fluid in the posterior fornix on sterile speculum examination or fern test confirmed the diagnosis. Finally, ultrasonography was done to assess the amniotic fluid index level. The patients were managed conservatively in the obstetrical ward and monitored for signs and symptoms of chorioamnionitis or fetal compromise. All patients received oral antibiotics. The diagnosis of clinical chorioamnionitis was based on the presence of maternal pyrexia (37.8°C or 100.4°F) and two or more of the following: maternal tachycardia >100 bpm, fetal tachycardia > 160 bpm, uterine tenderness, purulent vaginal discharge, leucocytosis >15,000 or C-reactive protein > 2.7 mg/dl. Indications for delivery included clinical chorioamnionitis, fetal death, or advanced labour. Viability was defined as a gestational age of 24 weeks and above, or an estimated fetal weight of 500 gram or above.

The study population consisted of 75 pregnant women who were admitted to our department with PPROM. These 75 women were divided into two groups according to gestation age, Group 1 (n=38) - early PPROM (24–33 6/7 weeks of GA) and Group 2 (n=37) – late PPROM (34–36 6/7 weeks of GA).

A multivariate analysis was used to find the association between PPROM and feto-maternal outcome. Microsoft Excel (Microsoft, Redmond, Washington, USA) and the Statistical Package for the Social Sciences (SPSS), Version 19 (IBM, Inc, Chicago, Illinois, USA) were used for data analysis. A P value of <0.05 was determined to be statistically significant.

RESULTS

Table 1: Demographic and obstetrical variables with PPROM.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group 1 (n=38) (%)</th>
<th>Group 2 (n=37) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td>26±3.68</td>
<td>27.8±4.83</td>
</tr>
<tr>
<td>Parity</td>
<td>1.58±0.68</td>
<td>2±1.03</td>
</tr>
<tr>
<td>Antenatal visits</td>
<td>Booked 17 (44.7%)</td>
<td>27 (73%)</td>
</tr>
<tr>
<td></td>
<td>Unbooked 21 (55.3%)</td>
<td>10 (27%)</td>
</tr>
<tr>
<td>Type of pregnancy</td>
<td>Singleton 32 (84.2%)</td>
<td>35 (94.5)</td>
</tr>
<tr>
<td></td>
<td>Twin 06 (15.7%)</td>
<td>02 (5.4%)</td>
</tr>
<tr>
<td>Fetal presentation</td>
<td>Cephalic 30 (78.9%)</td>
<td>31 (83.7%)</td>
</tr>
<tr>
<td></td>
<td>Breech 08 (21.0%)</td>
<td>06 (16.3%)</td>
</tr>
<tr>
<td></td>
<td>Shoulder 00</td>
<td>03 (8.1%)</td>
</tr>
</tbody>
</table>

During the study period, there were 1528 deliveries in the hospital and 75 pregnant women were diagnosed to have PPROM giving an overall incidence of 4.9%. 38 patients were included in group 1 and 37 patients were included in group 2. The two groups were similar with respect to maternal age and parity. The pregnancies included 67 (89.33%) singletons and 8 (1.07%) twins. PPROM was more commonly seen in younger age group 21-25 yrs (44%). The maximum number of women in the entire study group were primigravida (45.33%) followed by second gravida (30.67%). Most of these patients were of
Prophylactic antibiotics were administered to all the mothers. In addition, betamethasone was administered in 81.6 % (31/38) of the mothers with early PPROM and 45.9% (17/37) of mothers with late PPROM. In our study 36.8% gave birth within 2-7 days of PPROM in group 1 and 44.7% delivered within < 18 hrs. In group 2 (Table 2), therefore there was lesser incidence of chorioamnionitis in group 2 as shown in Table 3.

Table 2: Latency from rupture of membrane.

<table>
<thead>
<tr>
<th>Group</th>
<th>&lt;18 hrs.</th>
<th>&gt;18 hrs–48 hrs.</th>
<th>2-7 days</th>
<th>&gt;7 days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong> (n=38 (%))</td>
<td>07 (18.4%)</td>
<td>06 (15.8%)</td>
<td>14 (36.8%)</td>
<td>11 (28.9%)</td>
</tr>
<tr>
<td><strong>Group 2</strong> (n=37 (%))</td>
<td>17 (44.7%)</td>
<td>07 (18.9%)</td>
<td>09 (24.3%)</td>
<td>04 (10.8%)</td>
</tr>
</tbody>
</table>

A total of 83 neonates, 46 (55.4%) males and 37 (44.6%) females, were born (8 being twin pregnancies). The mean birth weight of the neonates was 1659.94±462.34 gm and 2361.86±402.29 gm respectively. There were a total of 7 perinatal deaths out of the 83 births; 2 being stillbirths and 4 early neonatal deaths in group 1. There was only 1 neonatal death in group 2. Prematurity was the most common reason for perinatal mortality. Our study demonstrated that babies born to mothers with early PPROM had statistically significant increase in the frequency of hyaline membrane disease, sepsicaemia, periventricular leukomalacia, intratrine pneumonia, need for ventilatory support and inotropes. Babies born to mothers with late PPROM had significant increase in the frequency of APGAR score <7 at 1 min, APGAR <7 at 5 min and LSCS rate. In both the groups most common
complication was physiological jaundice and maximum babies required phototherapy and antibiotics (Table 4 & 5).

Table 5: Neonatal interventions.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICU Adm &gt; 24 Hrs.</td>
<td>34 (77.2)</td>
<td>33 (84.6)</td>
<td>0.7163</td>
<td>0.208</td>
</tr>
<tr>
<td>Ventilatory support</td>
<td>14 (31.8)</td>
<td>03 (7.6)</td>
<td>7.389</td>
<td>0.006</td>
</tr>
<tr>
<td>Surfactant</td>
<td>17 (38.6)</td>
<td>04 (10.2)</td>
<td>8.811</td>
<td>0.003</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>26 (59.0)</td>
<td>20 (51.2)</td>
<td>0.5103</td>
<td>0.243</td>
</tr>
<tr>
<td>Photo therapy</td>
<td>22 (50)</td>
<td>17 (43.5)</td>
<td>0.3411</td>
<td>0.289</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>03 (6.8)</td>
<td>01 (2.5)</td>
<td>0.8157</td>
<td>0.214</td>
</tr>
<tr>
<td>Inotropes</td>
<td>10 (22.7)</td>
<td>03 (7.6)</td>
<td>3.358</td>
<td>0.033</td>
</tr>
</tbody>
</table>

DISCUSSION

PPROM complicates only 3% of pregnancies but is associated with 40% of preterm deliveries and can result in significant neonatal morbidity and mortality. The overall incidence of PPROM (4.9%) was high in our study; it’s mainly because the institution was a tertiary referral centre, but is comparable to range of 3-8% as reported by Egrater et al.9

PPROM was more commonly seen in younger age group 21-25 yrs. (44%). The maximum number of women in the entire study group were primigravida (45.33%) followed by second gravida (30.67%). Most of these patients were of low income group (62.7%). These observations are consistent with studies by Doa FA et al and Joelle M et al Stuart et al reported that the incidence of preterm PROM rose with advancing maternal age.10-12 However, this study was not in agreement with this observation.

The rate of maternal morbidity of 22.6% reported in this study is high compared to previous study by Verrmillon et al but is an agreement with that reported by Yoon et al. Infection rate of 13.3 percent was noted in this study in the mothers both intrapartum and postpartum.13,14 In this study, there was increase in incidence of infection with increased latency period more than 1 week. It has been found that 50% of patients with PPROM will deliver within 24-48 h and 70-90% within a week as reported by Dagklis et al.15 In our study 80% of the neonates delivered within first week of rupture of membrane. This latency period is similar to a previously reported review by Garite et al where 75% of patients delivered within a week.16

Caesarean section rate was 36% for this study. This is comparable to a rate of 32.0% reported in study by Tauassoli et al but higher than 14% reported by Tahir et al.17,18 Kayem et al. in his study showed that neonatal death was not associated with any particular mode of delivery.19 Hence in early preterm after counselling, the patients were kept for vaginal delivery which explains higher LSCS rates in group 2 of our study. Prospective study by Tauassoli F et al had 5% incidence of choorioamnionitis which is close to present study. The risk of infection is significant following PPROM.17 In this study, infection was the most important complication of PPROM and similar observation was noted by Stuart and his colleagues.12

In our study the neonates delivered following early PPROM were at a significantly higher risk for a multitude of adverse outcomes during the neonatal period. Even the neonatal death rate was higher among those delivered following early PPROM compared with later PPROM (13.6% vs. 2.5%). In this study, the incidence of neonatal complications is high but comparable to that documented by Elimian et al and Dexter et al.20,21 This high neonatal complication may be related more closely to the effects of premature birth and sophistication of New born special care unit.

The major limitation of this study was the restriction of the study population to a central referral hospital and a small sample size. Hence the findings of this study may not reflect the true situation in the general population and should be interpreted with caution. Despite the limitations, this study has provided baseline information on PPROM in our setup and is a stepping stone towards further research on PPROM among Indian women.

CONCLUSIONS

PPROM is a major complication of pregnancies and an important cause of perinatal morbidity and mortality. Several areas of controversies exist regarding the best medical approach or management of PROM remote from term. Currently, there is no effective way of preventing spontaneous rupture of fetal membranes. The management of pregnancies complicated with PPROM, is individualized, highly controversial and challenging. Management of PPROM varies according to the gestational age of the fetus. Expectant management and immediate delivery are the two potential options in these patients, and each has its own merit and demerits.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES


