Safety of prolonged latency in preterm prelabor rupture of membranes

Abstract

Background: Preterm prelabor rupture of membranes (PPLROM) is known to cause 30-40% preterm births. Preterm births after PPLROM have been reported to be responsible for 85% of neonatal morbidity, mortality. Outcome seems to be affected by gestational age at PPLROM, latency, other factors. So research continues for knowing causes of PPLROM diagnosis, prevention, best management practices.

Objectives: Present study was done to know outcome in cases of PPLROM with prolonged conservative management.

Material methods: Study was done at rural referral institute. Women of 18 to 34 years of age who presented between 28 weeks to less than 37 weeks with watery discharge were study subjects. There were 8750 births during study period, 596 women presented with watery vaginal discharge. After evaluation, ROM was confirmed in 550 (92.3%), 145 (26.36) had PPLROM, 6.6% of preterm births.

Results: Of PPLROM cases 53(37%) were primigravida, 92(63%) multigravida, significant difference (p value<0.001) between each other, but not with over all primigravida (41%), multigravida (59%) during study period.

Of 145 women 38 had PPLROM between >28 to <32 weeks, 107 between ≤33-<37) weeks. Of 38 women, 7(18%) were primigravida and 31 (82%) multigravida, significantly more multigravida had early PPLROM (P<0.01). Twenty seven (18.6%) women’s cervical swabs were positive for microbes, 27.02% between >28-<32 weeks, 15.88% between ≤33-<37 weeks. More anemic women had microbial colonization than nonanemic, 100% of ≤33-<37 weeks, 80% of >28-<32 weeks who had PPLROM and microbes in cervical secretions were anemic, highly significant difference (p value<0.001) for both.

Among 38 with PPLROM between ≥28-<32 weeks, mean latency was 45.57 hours, minimum 12 hours, maximum 9 weeks. Almost 80% delivered after 24 hours giving time for corticosteroids. Of 107 of ≥33 to ≤37 weeks, 96 (90%) had spontaneous labor, 11(10.28%) induced labor. Mean latency was 57.42 hours, minimum 5 hours, maximum 27 days. Morbidity and mortality were more with PPLROM between >28-<32 weeks, early neonatal deaths 28.95%, 8.41% among ≥33-≤37, highly significant difference (p value<0.001).

Conclusion: PPLROM was common, responsible for many preterm births, a lot of neonatal mortality morbidity. Conservative management improved survival.

Background

Preterm prelabor rupture of the membranes (PPLROM) reported to be occurring in 1-5% pregnancies,1-6 is known to cause 30-40% preterm births.7-10 And preterm births after PPLROM have been reported to be responsible for around 85% of neonatal morbidity and mortality.11,12 Because of consequences like, respiratory distress syndrome (RDS), hypothermia, hypoglycemia, jaundice, necrotizing enterocolitis, intraventricular hemorrhage, neurologic impairment, retrolental fibroplasia, bronchopulmonary dysplasia, patent ductus arteriosus, fetal limb contracture, pulmonary hypoplasia and neonatal sepsis. The list is long. Final outcome is affected by gestational age, latency and many other factors. So research needs to continue for knowing causes of PPLROM, prevention and best management practices.

Objectives

Present study was carried out to know the outcome in cases of PPLROM with prolonged conservative management.
for induction of labour were kept. Many women had preterm births even after tocolytics. Only few women continued pregnancy till term and had spontaneous labour. Maternal and neonatal outcome were recorded. There were 8750 births during the study period of around 2 years and 596 women had presented with watery vaginal discharge. After evaluation, ROM was confirmed in 550 (92.3%) of 596. Nearly 8% had false alarms. Overall 145 (26.36) women had PPLROM, which constituted 6.6% of all preterm births, the study subjects.

Results

Of the 145 women with PPLROM, there were 53 (37%) primigravida and 92 (63%) multigravida, significant difference (p value<0.001) between each other, but no significant difference with overall primigravida (41%) and multigravida (59%) during the study period. Of 145 women 38 had PPLROM between ≥28 to ≤32 weeks, and 107 between ≤33≤37 weeks of pregnancy, of 38 women, 7 (18%) were primigravida and 31 (82%) multigravida, significantly more multigravida had early PPLROM (P<0.01). Eighteen (12.41%) women of gestation ≥28≤32 weeks had presented with leaking of 6 to 12 hrs, 14 (78%) multigravida and 4 (22%) primigravida. Of 14 multigravida 2 (14%) women’s cervical swabs had microbes and of 4 primigravida, 2 (50%) had microbes, not easy to explain. Overall twenty seven (18.6%) women’s swabs were positive, 27.02% in those with PPLROM between ≥28≤32 weeks and 15.88% in those between ≥33≤37 weeks, significant difference (P<0.05).

Of the 55 women with gestation between of 33 to less than 37 weeks and leaking of 12 to 18 hours duration, 11 (20%) had microbes in vaginal secretions. Of 47 women with leaking of 6 to 12 hours duration, three (19%) of 16 primigravida and 4 (13%) of 31 multigravida had microbes in cervical and vaginal swabs. More anemic women had microbial colonization than nonanemic. Actually all of those of ≥33≤37 weeks pregnancy and microbes and 80% of those with PPLROM between 28≤32 weeks gestation and microbes, were anaemic, highly significant difference (p value<0.001) for both. In 15 women, 4 (27%) primigravida and 11 (73%) multigravida, cervical scores were less than zero.

Of the 38 women with PPLROM at ≥28≤32 weeks, 30 had spontaneous labour with variable latency, (interval between PPLROM and birth), only 8 delivered within 24 hrs (one ≤6<12 hrs, four 12 to 18 hrs 3 ≤18<24 hrs), 8 (21.05%) had latency of ≥24 to 36 hours, 3 (8%) 48 hours, 8 (21%) 1 week, 3 of 3 weeks, 1 four weeks and 1 had 9 weeks latency. Of these 30 women (78.90%) with spontaneous labour, 27 (87%) had vaginal births and 3 (9.6%) C births (2 for fetal distress and one for other reason). In 8 of 38 women (21.10%) labor had to be induced. Mean latent period was 45.57 hours, minimum 12 hours and maximum 9 weeks. Most women, around 80% (30 out of 38) delivered after 24 hrs, giving time for corticosteroids. Of the ten (26.31%) women of 38 of ≥28≤32 weeks (3 primigravida and 7 multigravida) who had microbes in swabs, one (2.63%) had latency of 12 hours, three (8%) 24 hours, one (2.63%) of 36 hours, 3 (8%) upto one week and 2.5(26%) more than 1 week, one (2.63%) of 3 weeks and one (2.63%) of 3.5 weeks. Minimum latency was 16 hours, maximum 3.5 weeks and mean 41. Hours. Of the rest 28 women who did not have microbes, the mean latency was 54.31 hours, minimum 16 hours and maximum 9 weeks and difference in latency of those with microbes 41.5hr and without microbes 54.31hr was significant (P<0.05). Of ≥28≤32 weeks gestation with cervical score between zero to 2 (23) overall, 19 (82.6%) of 23 had spontaneous labor, one delivered with latency of 18 hours, one of 24 hours, 4 of 36 hours, two of 48 hours, 7 of one week and 4 more than 1 week. The mean latency was 48.35 hours, minimum 14 hours and maximum 9 weeks and only 3 (2.8%) reached term. Of those with cervical score less than 0 (15women) the mean latency was 57.42 hours, minimum 5 hours and maximum 27 days (Tables 1–3).

**Table 1** Gestation, parity and latency

<table>
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<th>Gestation (weeks)</th>
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<th>Latency period</th>
<th>Total</th>
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<tr>
<td>≥28≤32</td>
<td>Primi</td>
<td>00 01 00 01   02 01 01 00 00 06</td>
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<td>Multi</td>
<td>00 00 04 02   06 01 11 8 32</td>
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<td>Primi</td>
<td>00 00 06 04   24 07 06 00 47</td>
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<tr>
<td></td>
<td>Multi</td>
<td>01 03 08 10   15 05 11 07 60</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>01 04 18 17   47 14 29 15 145</td>
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</table>

**Table 2** Gestation, parity, microbes latency

<table>
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<th>Culture</th>
<th>Latency period</th>
<th>Total</th>
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<tr>
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<td>00 01 00 01   01 01 00 00 00 03 02 07</td>
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<td>00 00 00 00   02 00 00 03 03 02 07</td>
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<td>Primi</td>
<td>-</td>
<td>00 00 00 00   00 01 01 01 01 00 00 03</td>
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<td>Primi</td>
<td>+</td>
<td>00 00 01 01   01 02 01 02 01 02 08</td>
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<td></td>
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<td>+</td>
<td>00 01 01 01   01 03 00 03 01 10</td>
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<td>Primi</td>
<td>-</td>
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<td></td>
<td>Multi</td>
<td>-</td>
<td>01 02 07 09   12 05 08 05 49</td>
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<tr>
<td>Total</td>
<td></td>
<td>01 04 18 17  47 14 29 15 145</td>
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</table>

Safety of prolonged latency in preterm prelabor rupture of membranes

Percentage of women with PPLROM, 27(18%) had AFI less than 5 cm and were admitted to NICU. Amongst this group, 18(67%) had spontaneous labour, 4(15%) were induced at 35 weeks in view of severe oligohydramnios. Of the 38 women admitted to NICU, 12(32%) had vaginal births and 26(68%) had CS (20 for fetal distress, 6 for other reasons).

When the latency was less than 24 hours, 40(37%) of mothers in this group had normal delivery, 12(11%) had vaginal births and 4(5%) had CS. Amongst women with longer latency, 29(25%) had spontaneous labour, 10(8%) were induced after they reached term, and 6(5%) had CS between 34-36 weeks. The mean latency was 56.6 hours, minimum 10 hours and maximum 2.5 weeks.

Overall of the 107 women between 33 to 37 weeks gestation, (47(44%) primigravida and 60(56%) multigravida, 32(30%) had latency of less than 24 hours, 40(37%) had between 24-48 hours, 30(28%) of women had latency of 48 hours and more than one week. In this group, 4(15%) of women had spontaneous labour, 12(45%) were induced after they reached term, and 14(51%) had CS (11 for fetal distress, 3 for other reasons). The mean latency was of 29 hours, minimum 13 hours and maximum 3 weeks.

Of the 55 women with PPLROM of 33 to less than 37 weeks gestation, cervical score of less than zero, (27(49%) primigravida and 28(51%) multigravida). Amongst primigravida, 4(15%) delivered within 18 hours, 3(11%) within 24 hours, 15(56%) within 36 hours, 4(15%) within 48 hours and one (3%) 3 days. The mean latency was of 29 hours, minimum 13 hours and maximum 3 days. Amongst primigravida three (11%) delivered within 12 hours, 5(18%) within 18 hours, 2(7%) within 24 hours, 9(32%) within 36 hours, 3(11%) within 48 hours, 5(18%) within 1 week and one (3%) 2 weeks. The mean latency was 56.6 hours, minimum 10 hours and maximum 2.5 weeks.

Of the 145 women with PPLROM, only 19(13%) had labour induced, 11(7.6%) when they reached term, 6 between 34-36 weeks for FGR with oligohydramnios and 2 for other reasons. Women who had PPLROM at >28-≤32 weeks only 2.7% reached beyond 37 weeks, 97.3% had preterm births, 87% with preterm spontaneous labour. Overall in all cases of PPLROM 92.4% had preterm births. Of the 145 women with PPLROM, nine (6.2%) women had severe oligohydramnios, of which 8 (89%) had spontaneous labor and one (11%) had labor induced at 35 weeks in view of severe oligohydramnios. Of the 145 women with PPLROM 9 women with AFI less than 5 cm, the mean latent period was 30 hours. Severe oligohydramnios was associated with shorter latency.

Of the 107 women with PPLROM of 33 to less than 37 weeks gestation, 19 babies (17.75%) were admitted to NICU [18 after spontaneous onset of labor (14 vaginal births and 4 CS for fetal distress) and 1after induced labor with CB for fetal distress]. Eight babies were admitted for prematurity and small for gestational age, 5 for respiratory distress, one severe birth asphyxia, 4 septicemia and one for exaggerated physiological jaundice. Of the 38 women of >28≤32 weeks gestation, 1(29%) of babies at >28≤32 weeks) babies died, (5(13%) of all primigravida of 28-32 weeks and 6 (15%) of multigravida), 55% due to prematurity, 27% due to sepsis and 18% due to problems of severe birth asphyxia. Prolonged latency did not cause neonatal deaths. On the contrary survival improved in cases with prolonged latency. Deaths were in cases of lower gestation at ROM, preterm births and dysmaturity.

Discussion

PPLROM continues to be common problem affecting many pregnancies and their outcome. Heyd et al. reported PPLROM complicated 3% of pregnancies, approximately, 150,000 pregnancies yearly in the United States. In separate studies Mercer, Simhan and ACOG reported that PPLROM complicated 2 to 4% of all singleton pregnancies. Other researchers reported the incidence of PPLROM to be 1-4% of all preterm deliveries, contributing to 30 to 40% identifiable causes of preterm births. A recent study, revealed that PPLROM complicated 2 to 20% of all births and was associated with 18 to 20% of perinatal deaths. Nilli et al. studied 2357 pregnant women, reported 5.85% incidence of PPLROM in Tehran. Some studies revealed higher incidence of PPLROM compared to the present study. In the present study of the 145 women with PPLROM, there were 53(37%) primigravida and 92(63%) multigravida, more multigravida had PPLROM, difference was significant but not from overall primigravida (41%) and multigravida (59%) during the study period. The mean age of the women presenting with ROM was 24 years, Shanti reported higher age than reported by Akter and Kurdoğlu. Lim, 24 28.4 years. Melamed reported mean age 30 years and Piazze 33 years. Women in these countries marry at later ages compared to developing countries, affecting age at pregnancy and so PPLROM too. In a recent study, Tavassoli from Iran also reported the mean age 25.8 years, close to that of present study. In the present study PPLROM was diagnosed in 6.6% of all preterm births. However in all those with PPLROM most delivered preterm specially if PPLROM occurred between >28≤32 weeks, almost all (97.5%). The problem could be intra uterine bacteria leading to prostaglandin synthesis by activating macrophages which increase uterine contractions there by weakening the fetal membranes causing preterm pains. Bacteria weaken the fetal membranes, perhaps by proteolysis secondary to activation of the peroxidase-hydrogen peroxyde halide system in the fetal membranes and placental macrophages responsible for preterm pains and preterm

Table 3 Gestation, cervical score and mode of delivery

<table>
<thead>
<tr>
<th>Gestation (weeks)</th>
<th>Cervical score</th>
<th>Mode of delivery</th>
<th>Total</th>
<th>Percentage</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Spontaneous</td>
<td>Induced</td>
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<tr>
<td></td>
<td></td>
<td>VD</td>
<td>CS</td>
<td>VD</td>
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<tr>
<td>28-32</td>
<td>&lt;0</td>
<td>012</td>
<td>000</td>
<td>001</td>
</tr>
<tr>
<td>(38)</td>
<td>&gt;0-2</td>
<td>015</td>
<td>004</td>
<td>004</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>027</td>
<td>004</td>
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<tr>
<td>33-&lt;37</td>
<td>&lt;0</td>
<td>033</td>
<td>016</td>
<td>004</td>
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<td>(107)</td>
<td>&gt;0-2</td>
<td>034</td>
<td>010</td>
<td>005</td>
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<tr>
<td>&gt;2</td>
<td></td>
<td>002</td>
<td>000</td>
<td>000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>069</td>
<td>026</td>
<td>009</td>
</tr>
</tbody>
</table>

VD, vaginal delivery; CS, caesarean section; Score <0=cervical length ≥2cm, Cervical dilation ≥2.5cm, 0-2=cervical length ≥2cm, cervical dilation 0.5-2cm, Score >2=cervical length ≥2cm, cervix undilated
Safety of prolonged latency in preterm prelabor rupture of membranes

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Akteer reported time interval of ROM and delivery, 27.60±21.127 hours and 54% delivered within 24 hours of ruptured membrane, 84% vaginally. Forty two percent newborns suffered from neonatal asphyxia, RDS, neonatal jaundice and neonatal sepsis. Thirty two percent women suffered from chorioamnionitis, abruptio placenta and endometritis. In the present study conservative management in women with PPLROM helped in better neonatal outcome without increasing the CSR and maternal morbidity. Kurogu has reported CSR 28.3% Lim reported that those with ROM at 34-36 weeks gestation with labor induced (19%) were more likely to undergo CS than the women with spontaneous labor (7%).

Of the 145women with PPLROM, 27(19%) had microbes in their cervical and vaginal swabs. Of them 24(86%) had spontaneous labor, 3(14%) had labor induced. A total 118(81%) had no microbes, 104(88%) had spontaneous labor and in 14(12%) labor was induced, 6 on reaching term and 6 earlier for other reasons, so no difference than over all spontaneous labour of 87%. There were 9 women with PPLROM with microbes in cervical swab and positive blood culture of neonates also, 5(56%) with latency period of more than 24 hours. 4 had CS and 5 had vaginal delivery. Five cases who had latency period of more than 24hours, had no microbes in their cervical swabs but neonatal cultures were positive, two had CS and 3 delivered vaginally. The rate of neonatal sepsis in PPLROM was 13%, slightly higher than reported by Merenstein where the incidence of neonatal sepsis in PPLROM was 7-11%. In the study by Nilli, the incidence of neonatal sepsis was 5.5 %. Makhoul reported increased risk of neonatal sepsis, with increased duration of membranes rupture. Parry (1998) reported range of 2 to 20%. In the present analysis most of the neonatal deaths (11) were of babies in cases of PPLROM ≥28-≤32 weeks, 50% due to prematurity/dysmaturity. 27% due to sepsis and 18% due to birth asphyxia. Nili also reported that neonatal morbidity was affected by prematurity itself, rather than occurrence of PPLROM. In the present study, neonatal morbidity of 42% was mainly due to preterm birth. Parry7 reported neonatal deaths due to infection in 5%. In the present study sepsis was responsible for 20% of neonatal deaths, 30% neonatal deaths were due to severe birth asphyxia, 30% due to prematurity, 10% due to meconium aspiration syndrome and 10% due to very very low birth weight.

In the present study there were 20(13.7%) neonatal deaths, (5 of primigravida, 15 of multigravida). All had vaginal births and had AFI less than 5 cm only. One out of them had cervical and vaginal swabs positive for E.coli. No maternal death or severe maternal morbidity occurred and no woman had obvious chorioamnionitis. Ramsey reported that the expectant management in PPLROM allowed prolongation of pregnancy benefited neonatal outcome, though increased the risk of chorioamnionitis and associated maternal and neonatal morbidity. Drassinower has also reported that delivery at later gestational age was associated with improved prognosis for the baby. When the per week effect of latency was combined with the protective effect of each additional week of gestational age, the adjusted results pointed towards a slight (but not significant) net benefit from each additional week in utero. In the present study the risk of neonatal complications such as asphyxia or infection did not increase by conservative management. Pregnancy could be prolonged in women with PPLROM for many days, some even to term without harming the maternal and neonatal outcome. Due to availability of broad spectrum antibiotics and advanced neonatal intensive care, the prognosis for neonates is not so unfavorable as was previously reported. The present study revealed that gestational age at the time
of PPLROM was inversely associated with duration of latency. Present study was to know the effects of prolonged conservative treatment. PPLROM with no active labour contributed to 6.6% of preterm births and 10% of all perinatal deaths during the study period. Of all cases with PPLROM, most (97.5%) delivered preterm when gestation at PPLROM was >28<32 weeks and even those who had PPLROM between ≥33<37 weeks most (92.4%) delivered preterm spontaneously. Women with PPLROM were managed conservatively with tocolytics and antibiotics and in some cases it was possible to delay labor for days, some weeks improving neonatal survival.

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Are due to all patients who consented to be study subjects.

Conflict of interest

The author declares there no conflict of interest.

Reference


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