

Impact of duration of latency period on neonatal outcome after preterm prelabour rupture of membranes at 26 to 34 weeks

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Abstract

Background: Preterm prelabour rupture of fetal membranes is the commonest antecedent of preterm birth. Preterm prelabour rupture of membranes is defined as spontaneous rupture of the amniotic membranes before the onset of labour prior to 37 weeks of gestation. PPRM occurs in 3% of pregnancies and one third of preterm births. Prediction of latency period for women with PPRM is imprecise and therefore counselling women with PPRM about their predicted latency period is a difficult task. **Materials and methods:** This prospective observational study included women with singleton pregnancies presenting with rupture of membranes. A total of 113 Women with PPRM from 26 weeks to 34 weeks with rupture of membrane were included in this study. **Results:** An inverse association found between gestational age at the time of presentation and latency period was established. Gestational age and duration of latency period were found to be the important predictors of neonatal outcome. **Conclusion:** A latency >72h was associated with a decreased incidence of adverse neonatal outcome.

Keywords: preterm premature rupture of membranes, Latency period, neonatal outcome, premature.

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INTRODUCTION

The amniotic membrane acts as a shield to the fetus and hold the elixir called amniotic fluid that absorbs the sudden shocking waves, thus protecting the fetus from any mechanical harm. If somehow the membranes get ruptured, it predisposes the mother and fetus to infections that can be life threatening to the both. The normal development, structural integrity and function of fetal membranes are essential for the normal progress and

outcome of pregnancy. One of the most important function of the membranes is to remain intact until the onset of labour at term in order to maintain the protective intrauterine fluid environment; the amniotic fluid upon which foetus depends for its survival in utero.¹ Preterm prelabour rupture of fetal membranes is the commonest antecedent of preterm birth. Preterm prelabour rupture of membranes is defined as spontaneous rupture of the amniotic membranes before the onset of labour prior to 37 weeks of gestation. PPRM occurs in 3% of pregnancies and one third of preterm births. Rupture of membranes before viability occurs in less than 1% pregnancies.^{2,3} Latency duration is defined as interval between spontaneous rupture of the membranes till delivery. The latency time between rupture of membranes and birth tends to be longer when PPRM occurs at an earlier gestational age⁴. The most significant risks to the fetus after PPRM are complications of prematurity. Respiratory distress has been reported to be the most common complication of preterm birth. Sepsis, Intraventricular hemorrhage and

necrotizing enterocolitis is also associated with prematurity. PPROM with intrauterine inflammation has been associated with an increased risk of neuro-developmental impairment and white matter damage.

Aim

of this study is to determine the Impact of duration of latency period on neonatal outcome.

METHODS

We conducted a prospective observational study of women with singleton pregnancies who presented with rupture of membranes. A total of 113 women presenting with PPROM from 26-34 weeks with rupture of membrane were included in this study.

Exclusion criteria: Multiple pregnancies, Congenital defects, Intrauterine death, Termination of pregnancy due to various complicating factors e.g., preeclampsia, eclampsia, diabetes mellitus, polyhydramnios and antepartum haemorrhage.

All women fulfilling the inclusion criteria was admitted and detailed obstetric, menstrual, past and family history was taken. Duration of pregnancy calculated from last menstrual period or 1st trimester ultrasound. Duration of rupture of membranes enquired into. Examination of patient included General physical examination, per abdomen and per speculum examination. Presence of uterine contractions, uterine tenderness, lie, presentation and FHS assessed on per abdomen examination. Rupture of membranes confirmed by per speculum examination or nitrazine test whenever required. Colour and smell of liquor was noted. Digital cervical examination avoided unless patient is in active labour. High vaginal swab was taken at the time of per speculum examination. After confirmation of PPROM, signs and symptoms of labour, placental abruption, chorioamnionitis and fetal distress ruled out. Clinical chorioamnionitis is defined as maternal fever (higher than 38°C) plus atleast one of the following: maternal or fetal tachycardia, uterine tenderness, foul smelling amniotic fluid or maternal leukocytosis.⁵ Maternal CBC and CRP examination was done twice a week and ultrasonography fortnightly. Ultrasound for fetal biometry, placental localisation and AFI was done. Latency for the purpose of analysis was stratified into two groups <72 hours and ≥72hours. Women was put on expectant management, corticosteroids and antibiotics were administered. Dexamethasone 6mg, 4 doses, 12 hours apart was administered. Informed consent of the women taken explaining the risks and benefits of expectant management. A 7 days course of antibiotic therapy with a combination of intravenous ampicillin 2g every 6 hourly for 48 hours followed by oral amoxicillin 250 mg every 8

hourly or oral erythromycin 333mg initially every 6 hourly for 48 hours and then after every 8 hourly was administered during expectant management². Pregnancy terminated after 34 weeks of gestation in case of expectant management or earlier in case of chorioamnionitis, placental abruption and fetal distress. Fetal outcome was noted. A note was made of APGAR score at 5min, birth weight, neonatal mortality.

Data analysis was done by Epi Info version 7. The continuous and categorical variables were reported as mean±SD and percentage respectively. Chi-square test was used for analysis. P value <0.05 was considered significant.

RESULTS

The present prospective observational study was conducted in the department of Obstetrics and Gynecology in Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College Shimla from 1st July 2018 to 30th June 2019.

A total of 113 patients, between 26-34 weeks of gestation, with PPROM were registered during the study period. The objectives were to study the impact of duration of latency period on neonatal outcome. Mean age of the subjects was 26.4± 4.5yrs and maximum number of patients was between 20-30years. Majority of women were primigravida 61.9%. We establish an inverse association between gestational age and mean latency period. Induction was done in 26.5% cases and 73.4% went into spontaneous labour. With increasing period of gestation more number of subjects went into spontaneous labour. The rate of cesarean section was 24.8% and most common indication was breech presentation. PPROM was more prevalent in women carrying male fetus (63.7%). There are many factors which affect neonatal outcome in patients with PPROM. One such factors is gestational age at time of PPROM. It is possible that in cases of PPROM, it is not only gestational age that should be taken into consideration, but also the duration of latency period through which the fetus is exposed to a potentially unfavourable intrauterine environment. It has been demonstrated that, earlier the gestational age at the time of PPROM, worse is the neonatal outcomes. Most common neonatal complication was respiratory distress syndrome followed by Neonatal Jaundice. RDS, IVH and NNJ were more common in neonates with latency period <72hrs (P <0.05). NEC and sepsis were more common in neonates with latency period ≥72hrs (P>0.05). Neonatal mortality was observed in 18.5%. Neonatal mortality was more common in neonates with latency period <72hrs.

Table1: Mean latency period according to POG

| Period of gestation | Mean latency period (days) | Std Deviation | Minimum latency period (days) | Maximum latency period (days) |
|------------------------|----------------------------|---------------|-------------------------------|-------------------------------|
| ≤28 weeks(n=4) | 6.5 | .57735 | 6 | 7 |
| 28.1day-32 weeks(n=47) | 4.70 | 2.302 | 2 | 12 |
| >32-34 weeks(n=62) | 2.69 | 1.153 | 1 | 7 |

Table2: Neonatal complication according to latency period

| Neonatal complication | Latency period <72hrs (n=35) | Latency period ≥72hrs (n= 78) |
|-----------------------|------------------------------|-------------------------------|
| RDS (n=40) | 24(60%) | 16(40%) |
| NEC (n=9) | 3(33.3%) | 6(66.7%) |
| Sepsis (n=20) | 6(30%) | 14(70%) |
| IVH (n=3) | 2(66.7%) | 1(33.3%) |
| NNJ (n=30) | 20(66.7%) | 10(33.3%) |
| Mortality (n=21) | 13(61.9%) | 8(38.1%) |
| A/S <7 (n=23) | 16(69.6%) | 7(30.4%) |

Table 3: Neonatal complication according to POG

| Neonatal complication | 26-32 weeks (n=51) | 32.1-34weeks (n=62) |
|-----------------------|--------------------|---------------------|
| RDS (n=40) | 28(70%) | 12(30%) |
| IVH (n=3) | 3(100%) | 0 |
| NEC (n=9) | 6(66.7%) | 3(33.3%) |
| Sepsis (n=22) | 16(72.7%) | 6(27.3%) |
| NNJ (n=30) | 19(63.3%) | 11(36.7%) |
| Death (n=21) | 16(76.2%) | 5(23.8%) |

DISCUSSION

Premature rupture of fetal membranes occurs in an approximately 10% of all pregnancies. When this occurs before 37 weeks of gestation, it is termed as preterm prelabor rupture of membranes that has been seen to affect 3-4% of all deliveries. Our study found that the duration of latency period was inversely proportional to gestational age. In concordance with our findings previous studies have also noted a strong correlation between gestational age and latency period⁵⁻⁹. Nulliparity was found to be associated with shortening of latency. Similar association has also been noted in past⁵⁻⁹. Advanced gestational age, digital cervical examination were found to be associated with significant shortening of latency. Gestational age at the time of rupture of membranes was inversely proportional to duration of latency. The duration of latency was significantly longer among women with PPROM before 32 weeks as compare to PPROM after 32 weeks. Mean latency period was found to be maximum in those women in whom rupture of membranes occurred before 28 weeks of gestation. Our finding was similar to other published studies⁵⁻⁹. The results of this study suggest that digital cervical examinations in patients with preterm PROM should be avoided until the patient is clearly in labor. Digital cervical examinations shortens the duration of latency period, because it increases the incidence of chorioamnionitis and endometritis.^{11,12} Oligohydramnios

has been associated with shortening of latency period¹³. The reasons are many but most accepted one is that there is redistribution of blood flow in these fetuses because of fetal inflammatory response syndrome. This leads to oliguria and thus reduced production of liquor by the fetus, this inflammation also stimulates labor AFI should be documented in patients with PPROM, as it is a very important predictor of duration of latency period. In the present study, Cases with ≤28 week's period of gestation had poor outcome inspite of having maximum latency period. At POG 28.1-32 weeks, with increase in latency period incidence of RDS, NNJ and Neonatal mortality were decreased. Incidence of NEC and sepsis were increased but that was statistically insignificant. Similarly >32-34 weeks incidence of RDS, IVH, NNJ decreased with increase in latency period. Incidence of NEC, Sepsis increased with increase in latency period but that was statistically insignificant. This was in accordance with D Nayot *et al.*⁴ study. Preterm prelabor rupture of membranes is a well known complication that has been threatening pregnancy outcome. Since ages, ongoing debate of carrying the pregnancy or to terminate, it has been a main concern for Gynaecologist and to throw some light on this topic the present study was undertaken. The overall effect of latency period on neonatal outcome, in women who presented with PPROM, can be considered as a fine balance between beneficial and negative effects which may

have resulted from prolonged exposure of fetus to an unfavourable intrauterine environment. Therefore, in order to determine a gestational age at which negative effects of expectant management outweigh its beneficial effects, we compared the outcome of PPRM cases in relation to gestational age and latency. At the same time we also tried to find out a gestational age at which pregnancy can be terminated safely with maximum neonatal benefits and no or minimal negative effects on prolonged latency period. It is widely acknowledged that up to a gestational age of 28-32 weeks neonatal outcome is largely dependent on gestational age at birth. Our result suggested that for women who presented with PPRM, the overall effect of expectant management is beneficial. Thus we suggest that immediate delivery after PPRM should not be practiced especially in developing countries like India, rather patients should be kept on expectant management for longer possible duration, possibly till 34 weeks. From this study we arrive at the conclusion that management should not be a generalized regime. Multi factorial study of individual cases and management has to be planned accordingly, varying from expectant to aggressive therapy. As already known increase in gestational age increases the overall survival of the baby. After studying the various parameter and neonatal outcomes the conclusion drawn in my study suggest that patient with PPRM need careful fetal and maternal monitoring.

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