

A Hospital Based Prospective Study to Evaluate the Maternal and Fetal Outcome of Preterm Premature Rupture of Membranes

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Abstract

Background: Preterm premature rupture of membranes (pPROM) is a fair complication of pregnancy. The etiology is obscure, leading to significant maternal and neonatal mortality and morbidity. It complicates 2-3% of pregnancies leading to 30-40% of preterm births. **Objectives:** To study the risk factors causing preterm premature rupture of membranes. The aim of this study to find out the maternal and perinatal morbidity and mortality trends in preterm premature rupture of membranes. **Materials and Methods:** A prospective study done on 50 pregnant women's between 34-37 weeks of gestational age with preterm premature rupture of membranes were selected from outpatient department at district hospital Dholpur, Rajasthan, India during one year period. The onset of complications like fetal distress, fetal heart rate variations, chorioamnionitis were looked for. In cases of fetal jeopardy or any other obstetric complications, labour was cut short by caesarean section. Mothers were watched for third stage complications like PPH and retained placenta and followed up in puerperal period. **Results:** In this study, the commonest risk factor was breech presentation. 66% patients delivered vaginally and 34% underwent lower segment caesarean section. The main indication for LSCS was fetal distress. There was no maternal mortality, and the common maternal morbidity was wound infection. The commonest neonatal complication was respiratory distress syndrome. **Conclusion:** pPROM is a common complication that leads to various maternal and neonatal complications. Adequate antenatal care and avoidance of risk factors can prevent preterm births. An understanding of gestational age dependent neonatal mortality and morbidity is important in determining the potential benefits of conservative management of preterm PROM at any gestation.

Keywords: Perinatal Complications, pPROM, Maternal Complications, Fetal Distress.

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Introduction

Preterm premature rupture of membranes (pPROM) was commonly associated with difficult labour and overcome by the use of powerful shaking sternuateries, encouragement, holding of breath and bearing down and strongsmellingthings[1]. Rupture of membranes long before the labor may be called dry labor where gentle cervical dilatation is lost causing injury to the cervix and increased pain due to the hard head pressing on cervix[2]. The uterine wall applies itself to the fetal contour which irritates the muscle to cause irregular contractions and thereby forming contraction rings which leads to prolonged labour.

Preterm premature rupture of membranes (pPROM) occurs in 2-3% of all pregnancies leading to 30-40% of preterm births. pPROM is a multifactorial process including certain risk components such as pPROM in previous pregnancy, smoking, socioeconomic status, poor nutrition (e.g. body mass index below 19.8 kg/m², copper and ascorbic acid deficiencies), prior cervical conization, cervical cerclage, second- and third trimester bleeding, acute pulmonary disease and prior episodes of preterm contractions, infection (bacterial vaginosis), amniocentesis, polyhydramnios and multiple gestation but in most of the cases, the cause remains unknown and is not apparent at the time of membrane rupture[3].

Fetal membrane rupture is a physiologic process at term, but when it occurs preterm, it results from abnormal structural weakening of the membranes in the region of the internal cervical os where it is initiated by membrane stretch and involves local inflammation and ascending bacterial colonization[4].

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The weakening of membranes is directly caused by bacterial collagenases and proteases, but a number of other pathways are also involved like increased maternal cytokines or an imbalance in MMPs and TIMPs in response to microbial colonization, trauma, and uterine over-distension[5]. Currently most authorities accept a plan of active management which includes prevention of infection, delay of delivery until fetal maturity is achieved and active intervention by induction if labor is no longer preventable or if early infection is suspected[6]. The present study undertaken is to identify the risk factors causing pPROM and to study fetal and maternal outcome associated with pPROM.

Materials & methods

A prospective study done on 50 pregnant women's between 34-37 weeks of gestational age with preterm premature rupture of membranes were selected from outpatient department at district hospital Dholpur, Rajasthan, India during one year period.

Inclusion Criteria

1. Primi gravida/Multi gravida
2. Singleton/Twin pregnancy
3. Mal presentations
4. Polyhydramnios
5. Mother with diabetes mellitus
6. Mother with PIH/Preeclampsia
7. Confirmation of pPROM by a speculum examination

Exclusion Criteria

1. PROM more than 37 weeks.
2. Congenital anomalies.
3. IUD.

Methodology: A detailed history was taken including age, booking, socio-economic status, parity, menstrual history, time of onset of draining, amount of fluid lost, its colour, odour, association with pain or bleeding per vagina and perception of fetal movements, history of previous similar episodes in other pregnancies and history suggestive

of incompetent os. General examination was done. Height and weight were noted. Pulse, BP, temperature was noted. Systemic examination included cardiovascular, respiratory systems and CNS systems.

In the obstetric examination, following were noted.

- Height of uterine fundus, lie, presentation and position of foetus, engagement of presenting part, condition of uterus, whether contracted or relaxed. Uterine tenderness was looked for as a sign of chorioamnionitis. Fetal heart sound was auscultated and its rate, rhythm and tone were noted.
- A sterile speculum examination was conducted and presence of liquor amni was noted. The amniotic fluid was collected in cases of frank leaking and sent for culture and sensitivity. When no amniotic fluid was seen in the vagina, the patient was asked to cough and the amniotic fluid was collected per speculum. In cases of doubt, fluid from vagina was collected in a glass slide and examined under microscope for ferning or subjected to litmus paper test. Cervical swab was taken and sent for Gram stain and culture sensitivity.
- A single pelvic examination was done to note the Bishop's score, adequacy of pelvis, assessment of CPD and to rule out cord prolapse. Injection Ampicillin 500mg was given as a prophylactic antibiotic 6th hourly. A 4th hourly monitoring for pulse, BP, temperature was carried out. Fetal heart sounds were recorded every half an hour initially. Depending upon the Bishop's score, the labour was allowed to progress spontaneously or induced with Cervi prime gel or misoprostol 25mcg according to RCOG guidelines.

The onset of complications like fetal distress, fetal heart rate variations, chorioamnionitis were looked for. In cases of fetal

jeopardy or any other obstetric complications, labour was cut short by caesarean section. Mothers were watched for third stage complications like PPH and retained placenta and followed up in puerperal period. Foul smelling lochia and febrile illness postnatally were specifically asked for. Episiotomy and caesarean section wounds were followed up regularly and wound infections are looked for. Maternal complications like puerperal sepsis, urinary tract infections and respiratory tract infections were noted. The babies were followed up in the postnatal period. Neonatal mortality and morbidity were noted. Neonates were monitored for the complications of birth injuries, signs of asphyxia, meconium aspiration and sepsis. Both mother and baby were followed up till their stay in the hospital.

Statistical Analysis: Variables like age, parity, socio economic status, duration of pregnancy, mode of delivery, maternal and fetal outcomes are recorded. Values are expressed as prevalence rates. Conventional Chi squared test was used to analyze differences. $P < 0.005$ were significant.

Results

In this study, pPROM was present in 54% of cases in the age group of 21-25 years, patients belonging to socio economic status V were observed to be the most common class to get admitted with pPROM with 66%. It was noted in the present study that 64% of the patients admitted with pPROM were primigravida. The percentage of booked cases was found to be 82% while that of unbooked cases was noted to be 18%. In this study, 32% in 32-34 weeks while the majority was observed in the gestational age of 35-36 weeks which was noted to be 68%. Most of the cases (66%) had vaginal delivery while only 34% delivered by caesarean section (table 1).

Table 1: Demographic distribution of patients

Variables	No. of patients (N=50)	Percentage
Age groups (yrs)		
<20 yrs	5	10%
21-25 yrs	27	54%
26-30 yrs	12	24%
>30 yrs	6	12%
Socioeconomic status		
III	3	6%
IV	14	28%
V	33	66%
Parity		
Multi gravida	18	36%
Primi gravida	32	64%
pPROM		
Unbooked	9	18%
Booked	41	82%
Gestational age		
32-34 weeks	16	32%
35-36 weeks	34	68%
Mode of delivery		
Vaginal	29	58%
Assisted Breech	3	6%
Twins by vaginal	1	2%
LSCS	17	34%

In this study, 82% of the patients with pPROM gave birth to children weighing >2kg, of which 50% of them were in the birth weight of 2-2.5kg. Only 6% had very low birth weight babies and 12% had low birth weight babies (table 2).

Table 2: Analysis of Childbirth Weight in pPROM Patients

Childbirth weight	No. of patients (N=50)	Percentage
<1.5 kg	3	6%
1.5-2.0 kg	6	12%
2.0-2.5 kg	25	50%
>2.5 kg	16	32%

Among 50 cases, maternal complications were present only in 16% of the population of which wound infection was predominating (6%) (table 3).

Table 3: Maternal complications distribution

Maternal complications	No. of patients (N=50)	Percentage
No complications	42	84%

Chorioamnionitis	2	4%
Abruption	2	4%
Puerperal pyrexia	1	2%
Wound infection	3	6%

24% of the babies born to pPROM mothers were admitted in NICU for various complications in this study (table 4).

Table 4: Analysis of Neonatal Complications in pPROM

Neonatal complications	No. of patients (N=50)	Percentage
No complications	38	76%
RDS	6	12%
Septicemia	3	6%
Jaundice	2	4%
IVH	1	2%

Discussion

In this study, pPROM was present in 54% of cases in the age group of 21-25 years. Similar results were obtained in a study conducted by Akter et al.[7], (40.33%). Patients belonging to socio economic status V were observed to be the most common class to get admitted with pPROM with 66% which is comparable with the study conducted by Swathi Pandey[8] which is 61%. The factors that lead to pPROM in low socio-economic status include poor hygiene, malnutrition, anemia, stress, over exertion, high parity, recurrent genitourinary infections etc. These factors lead to a decreased antibacterial activity in the amniotic fluid of patients that in turn leads to pPROM. The major factor that leads to an increase in cases of pPROM among mothers belonging to low socio-economic status is malnutrition. Malnutrition in turn leads to increased risk of infections that eventually leads to pPROM. Hence the cause of pPROM involves a vicious cycle of malnutrition and infections. It was noted in the present study that 64% of the patients admitted with pPROM were primigravida. In a study conducted by Swathi Pandey[8] (multigravida 48% and primigravida 52%), and Fatemeh Tavassoli[9] (multigravida 44.1% and primigravida 55.9%), similar results were obtained. The percentage of booked cases in the present study was found to be 82% while that of unbooked cases was noted to be 18%. These results are comparable to a study conducted by Shwetha Patil et al.[10], where the percentage of unbooked cases was accounting to 31% and booked cases to 69%. There was no significant correlation between the antenatal care and incidence of pPROM which was in contrast to a study done by Shweta Anant Mohokar et al.[11], where there was a strong correlation between the unbooked cases (84%) and the incidence of pPROM. The unbooked cases receive poor antenatal care that ultimately leads to increased risk of infection to the mother which is a major risk factor for pPROM. In this study, 32% in 32-34 weeks while the majority was observed in the gestational age of 35-36 weeks which was noted to be 68%. In a study conducted by Shweta Patil et al.[10], the percentage of pPROM in 28-31 weeks was 7%, that between 32-34 weeks was 18% and 75% between 35-36 weeks of gestational age, whose results correlate with the present study. In the present study, 60% of the population had delivery within 24 hours, which was similar to the results obtained in a study conducted by Shweta Patil et al.[10], (64%) and also in a study conducted by Russels[11] (80%). Most of the cases (66%) had vaginal delivery while only 34% delivered by caesarean section. In a study conducted by Tahir S et al.[12], the rate of caesarean section was 20%. Out of the 67% of the patients who delivered by vaginal route, 58.5% had a normal vaginal delivery while 6% delivered by assisted breech method and 2.5% of them delivered twins vaginally. In this study, 82% of the patients with pPROM gave birth to children weighing >2kg, of which 50% of them were in the birth weight of 2-2.5kg. Only 6% had very low birth weight babies and 12% had low birth weight babies. These results obtained were nearly similar to the results in the study by Swetha Anant Mohokar et al.[11], where 26% gave birth to babies weighing 2- 2.5kg. Among 50 cases, maternal complications were present only in 16% of the population of which wound infection was predominating (6%). A study by Artal K showed

the incidence of puerperal pyrexia to be 13% and chorioamnionitis to be 3%.

24% of the babies born to pPROM mothers were admitted in NICU for various complications in this study. These results correlated with Shweta Patil et al.[10], where the percentage of NICU admissions was 36%. NICU admissions of 24% included babies born by normal vaginal delivery and LSCS. Out of the 24% babies admitted, the most common cause for neonatal morbidity was respiratory distress syndrome (12%), followed by septicemia (6%), jaundice (4%), IVH (2%).

Conclusion

Preterm premature rupture of membranes (pPROM) is a common complication that leads to various maternal and neonatal complications. Adequate antenatal care and avoidance of risk factors can prevent preterm births.

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