Section: Obstetrics and Gynaecology

Original Research Article

A PROSPECTIVE OBSERVATIONAL STUDY ON FETAL CLINICAL OUTCOMES IN CASES OF PRETERM PREMATURE RUPTURE OF MEMBRANES

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ABSTRACT

Background: Preterm Premature rupture of membranes (PPROM) is an important cause of perinatal morbidity and mortality mainly due to prematurity and its sequelae. The fetal outcome in PPROM is very important to decrease child mortality and for better management and prevention of complications. The objective is to determine the fetal outcome in preterm premature rupture of membranes.

Materials and Methods: This is a prospective observational study was conducted in Department of Obstetrics and Gynaecology, Adichunchanagiri Hospital and Research center, Balagangadharanatha Nagara. Study duration was 18months (September 2022 to March 2024).

Results: Mean birth weight of neonates was 2.48 ± 0.25kgs, the mean APGAR score in neonates at 1minute was 5.93 ± 0.26 and median of 6 and the mean APGAR score in neonates at 5minute was 8.86 ± 0.51 and median of 9. 88% of patients neonates required NICU admission. The neonatal mortality rate was 1% and the rest 99% of neonates were healthy and alive.

Conclusion: A longer PPROM to delivery delay was linked to higher rates of maternal and newborn morbidity. Infection treatment related to PPROM requires accurate prediction of these morbidities. Prenatal care should be coordinated and promptly, with education provided to pregnant cases.

Keywords: Fetal outcomes, Perinatal mortality, PPROM.

INTRODUCTION

PPROM is a significant contributor to premature births, resulting in elevated rates of perinatal morbidity and mortality. Studies conducted separately by Obi (2007) and Liu (2009) in developing nations have indicated that the incidence of PPROM ranges between 18% to 20%.[1,2] Overall, PPROM affects 1% to 5% of pregnancies and accounts for about 30% to 40% of all premature births. PPROM happens in around 3% of pregnancies and contributes to around approximately 33% of births that occur before full term and 10% of perinatal deaths. It complicates about 2-4% of singleton pregnancies and 7-20% of twin pregnancies.

The condition significantly increases the chance of perinatal mortality and morbidity primarily due to premature birth and its associated complications. Maternal health can be adversely affected by conditions such as chorioamnionitis, an unfavourable cervix, dysfunctional labour, higher rates of caesarean section, postpartum haemorrhage (PPH), and endometritis. Perinatal complications include infections, increased incidence of Hyaline membrane disease, bleeding within the brain's ventricles, infection, and umbilical cord prolapse, umbilical cord compression because of insufficient amniotic fluid (oligohydramnios), and fetal distress, all of which further jeopardize outcomes and increase the chance of fetal loss.3 Preterm delivery is accountable for 85% of morbidity and mortality of neonates. PPROM can result in various foetal complications depending on the period of gestation and the period between membrane rupture and delivery, including respiratory

distress syndrome, hypothermia, hypoglycaemia, jaundice, necrotizing enterocolitis, intraventricular haemorrhage, neurological impairments, apnoea, retinopathy of prematurity, bronchopulmonary dysplasia, patent ductus arteriosus, fetal limb contractures, pulmonary hypoplasia, and neonatal sepsis. PPROM contributes to 20% of all neonatal deaths.

In the background of these severe problems to the foetus, we are taking this prospective observational study at our institution which is mainly looking after patients from rural background.

Hence this study was conducted to determine the fetal outcome in preterm premature rupture of membranes.

MATERIALS AND METHODS

This is a prospective observational study was conducted in Department of Obstetrics and Gynaecology, Adichunchanagiri Hospital and Research center, Balagangadharanatha Nagara. Study duration was 18months (September 2022 to March 2024)

Sample size: All the patients of preterm labour with premature rupture of membranes who get admitted during the study period will be included. The sample size for my study will be 100.

Inclusion Criteria

- All cases of preterm premature rupture of membranes before 37completed weeks of gestation not in labour presenting to the department of Obstetrics and Gynaecology.

Exclusion Criteria

- Pregnancies who have crossed 37 weeks
- Pregnancies already in labour when admitted
- Pregnancies with intact membranes when admitted with labour pains
- Pregnancies complicated by abruption and placenta previa
- Pregnancies with comorbidities, twins, breech

Method of Data Collection: This is a prospective observational study which conducted in the department of Obstetrics and Gynaecology, Adichunchanagiri Hospital and Research center Balagangadharanatha Nagara. After obtaining approval and clearance from the institutional ethical committee, the patients fulfilling the inclusion criteria and exclusion criteria were enrolled for the study after obtaining written informed consent. A detailed assessment performed including detailed history of the patient with respect to following details as name, age, education, socio economic status, antenatal check-up, duration of onset of labour pain, presence of antenatal risk factors like previous preterm delivery, infections etc.

A thorough clinical examination including general physical examination, systemic examination and obstetric examination is done. Abdominal examination was done for height of uterus in weeks, the lie of the foetus, presentation, position of foetus, fetal heart rate. A detailed per speculum examination is done to check if any leak is present and to check if membranes are intact. A detailed per vaginal examination done to determine the consistency, effacement, dilatation of cervix, position of cervix, cervical length is done. Maternal and fetal outcomes are assessed in case of preterm premature rupture of membranes

Statistical analysis: Data entered into MS Excel and analysed using SPSS. Data expressed in Mean/Median and Proportion. To test the significance, Independent 't' test/Mann Whitney 'U' test for continuous variables and Chi-Square/Fisher exact test for categorical variables were used. P VALUE < 0.05 considered statistically significant.

RESULTS

In current study, majority of patients belong to age group of 21 to 25 years (40%) followed by 36% of patients belong to age group of 26 to 30 years, 14% of patients belong to age group of 16 to 20 years, 8% of patients belong to age group of 31 to 35 years and 2% of patients belong to age group of more than 36 years with mean age of 25.26 ± 4.14 years.

In current study, 82% of patients belong to socio-economic class IV, 14% of patients belong to SES class III and 4% of patients belong to SES class V.

In current study, 91% of pregnant women were booked patients whereas 9% of pregnant women were un-booked patients.

In current study, 80% of pregnant women were primigravida's, 8% of patients were G2P1L1, 7% of patients were G2A1, 3% of patients were G3P2L2 and 2% of patients were grand multigravida.

In current study, majority of pregnant women had gestational age of 35 to 36 weeks (52%) followed by 34% of pregnant women had gestational age of 32 to 34 weeks and 14% of pregnant women had gestational age of 29 to 31 weeks with mean gestational age of 34.08 ± 2.12 weeks.

In the present study, most of patients had urinary tract infections (22%) followed by 13% of patients had lower genital tract infection, 12% of patients had anemia, 8% of patients had previous history of PPROM and 7% of patients had history of recent coitus. 38% of patients had no risk factors.

In the present study, 53% of women who are pregnant experienced a duration of Preterm premature rupture of membranes (PPROM) ranging from 1 to 5 hours. Additionally, 38% of patients had a PPROM duration of 5.1 to 10 hours, while 7% and 2% of patients had durations of 10.1 to 15 hours and 15.1 to 20 hours, respectively. On average, the duration from PPROM to admission was 5.79 hours with a standard deviation of 3.12 hours.

In the present study, 63% of patients experienced duration of 1 to 10 hours, 34% of patients experienced duration of 10.1 to 20 hours and 3% of patients experienced duration of 20.1 to 30 hours with mean duration of PPROM to delivery of 6.91 ± 2.08 hours.

In the present study, 58% of patients had normal vaginal delivery, 32% of patients had cesarean section, 8% of patients had vacuum assisted delivery and 2% of patients had forceps delivery.

In the present study, women who are pregnant requiring cesarean section, 28.6% were because of fetal distress, 26.2% due to cephalopelvic disproportion (CPD), 23.8% were because of failed maternal efforts, 9.5% due to severe oligohydramnios, 7.1% were because of failure to progress, and 4.8% due to second stage arrest.

Table 1: Distribution of patients according to PPROM to delivery time (hours)

PPROM to delivery hrs	N	%
1 – 10	63	63.0
10.1 – 20	34	34.0
20.1 – 30	3	3.0
Total	100	100.0
Mean ± SD	6.91 ± 2.08 hours	

Table 2: Distribution of patients according to birth weight (kg)

Birth weight (kg)	Number	Percentage (%)
≤ 2.5	58	58.0
>2.5	42	42.0
Total	100	100.0
Mean ± SD	2.48 ± 0.25kg	

In the present study, 58% of women had neonates weighing less than 2.5kgs and 42% of patients had neonates with birth weight of more than 2.5kgs with mean birth weight of 2.48 ± 0.25kgs.

Table 3: Distribution of patients according to APGAR score

Parameters	APGAR score		
	Mean	SD	Median
At 1min	5.93	0.26	6
At 5min	8.86	0.51	9

In current study, the mean APGAR score in neonates at 1minute was 5.93±0.26 and median of 6. The mean APGAR score in neonates at 5 minute was 8.86±0.51 and median of 9.

Table 4: Distribution of patients according to NICU admission

NICU admission	Number	Percentage (%)
Yes	88	88.0
No	12	12.0
Total	100	100.0

In current study, 88% of patient's neonates required NICU admission whereas 12% of neonates did not require NICU admission.

Table 5: Distribution of patients according to indications for NICU admission

Indications	Number	Percentage (%)
Hyperbilirubinemia	56	63.6
Sepsis	16	18.2
Respiratory distress	12	13.6
Asphyxia	4	4.5
Total	88	100.0

In current study, among the neonate's indications for NICU admission were hyperbilirubinemia in 63.6%, sepsis in 18.2%, respiratory distress in 13.6% and asphyxia in 4.5%.

Table 6: Distribution of patients according to neonatal outcomes

Neonatal outcomes	Number	Percentage (%)
Alive	99	99.0
Death	1	1.0
Total	100	100.0

In current study, the neonatal mortality rate was 1% whereas 99% of neonates were healthy and alive.

DISCUSSION

The aetiology of preterm premature rupture of membrane (PPROM), which occurs in 5–15% of pregnancies, is complex and multifaceted, with idiopathic factors accounting for the majority of cases.[4]

Premature gestation, lower birth weight at birth, cord compression that increases the risk of foetal compromise, newborn sepsis, respiratory distress

syndrome (RDS), intraventricular haemorrhage, necrotizing enterocolitis, cord accidents during membrane rupture, placental abruption, and the possibility of foetal and neonatal mortality are among the morbidities associated with PPROM.[5] A baby's degree of impairment is contingent upon the amount of liquor aspirated, the length of latency, and the baby's gestational age at the time PPROM manifests.[6] Skeletal and craniofacial deformities are another consequence of oligohydramnios. PPROM causes 18–20% of perinatal mortality and premature births even with advancements in neonatal care.

In current study, majority of patients belong to age group of 21 to 25 years (40%) and mean age of 25.26 ± 4.14 years. In a study done by Herzlich J et al,[7] showed that the mean maternal age of the patients was 28.4 ± 5.4 years.

In current study, 82% of patients belong to socio-economic class IV, 14% of patients belong to SES class III and 4% of patients belong to SES class V. In a study done by Bai JM et al,[8] showed that 63.3% of patients belong to upper lower class, 28.3% belong to lower class and 8.3% belong to lower middle class.

In current study, 80% of pregnant women were primigravida's, 8% of patients were G2P1L1, 7% of patients were G2A1, 3% of patients were G3P2L2 and 2% of patients were grand multigravida. In a study done by Bai JM et al,[8] showed that 60% of patients were primigravida and 40% of patients were multigravida.

Birth weight: In the current study, 58% of participants delivered neonates with a birth weight below 2.5 kg, while 42% had neonates weighing more than 2.5 kg. The average birth weight recorded was 2.48 ± 0.25 kg.

In a study conducted by Jaiswal AA et al., it was observed that 65.24% of participants had neonates with birth weights exceeding 2.5 kg, 27.62% had neonates weighing between 2 kg and 2.5 kg, 6.19% had neonates weighing between 1.5 kg and 2 kg, and 0.95% had neonates weighing less than 1.5 kg.

APGAR score: In this current study, neonates had an average APGAR score of 5.93 ± 0.26 at 1 minute, with a median score of 6. By 5 minutes, the average APGAR score improved to 8.86 ± 0.51, with a median score of 9.

In research conducted by Jaiswal AA et al,[9] demonstrated that 6.19% of neonates scored less than 7 on the APGAR scale and 93.81% of neonates had APGAR scores higher than.[7]

Herzlich J et al,[7] conducted research showing that the mean APGAR score for neonates at 1 minute was 6.8 ± 2.5. At 5 minutes, the mean APGAR score improved to 9.6 ± 1.8.

NICU admission: In the present study, 88% of patients neonates needed to be admitted to the NICU whereas 12% of neonates did not require NICU admission. Among the neonates indications for NICU admission were hyperbilirubinemia in 63.6%, sepsis in 18.2%, respiratory distress in 13.6% and asphyxia in 4.5%.

In a study done by Bai JM et al8 showed that 48.3% of patients neonates required NICU admission.

Neonatal outcomes: In current study, the neonatal mortality rate was 1% whereas 99% of neonates were healthy and alive.

In a study done by Jaiswal AA et al,[9] showed that 69.52% of neonates were healthy, 6.19% had birth asphyxia, 24.29% had EONI, 0.95% had sepsis, 0.48% had malformation, 2.86% had hyperbilirubinemia and 0.48% had congenital pneumonia. Perinatal mortality rate was 1.43%.

In a study done by Kasliwal A et al,[10] showed that 15% of neonates had sepsis, 5% had neonatal jaundice, 4% had neonatal infection, 3% had hypoglycemia, 2% had respiratory distress and 1% had late onset of sepsis and congenital anomalies. There was neonatal mortality.

In a research conducted by Herzlich J et al,[7] demonstrated that the neonatal mortality rate was 8.5%.

In a research conducted by Bai JM et al,[8] demonstrated that 98.3% of newborns were healthy and alive whereas perinatal mortality rate was 1.7%.

In a study done by Sajitha AK et al,[11] showed that neonatal mortality rate was 3.25%.

CONCLUSION

A longer PPROM to delivery delay was linked to higher rates of maternal and newborn morbidity. Infection treatment related to PPROM requires accurate prediction of these morbidities. Prenatal care should be coordinated and promptly, with education provided to pregnant cases

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