International Journal Dental and Medical Sciences Research
Volume 3, Issue 5, pp: 1500-1504www.ijdmsrjournal.com ISSN: 2582-6018

Maternal andPerinatal Outcome in Cases of Preterm Premature Rupture of Membrane

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Date of Submission: 18-11-2021 Date of Acceptance: 01-12-2021

ABSTRACT
Objective: The aim of present study is to assess the maternal and perinatal outcome.
Method: The present study is a retrospective observational study of perinatal and maternal outcome in 150 cases of preterm premature rupture of membranes in between 28 to 37 weeks gestation with singleton pregnancy, from June 2019 to November 2020. Patients with medical complications like anemia, pre-existing hypertension, diabetes, vascular or renal disease, multiple gestations, uterine or fetal anomalies etc. are excluded from the study. Detailed history, physical examinations were carried out and appropriate management instituted as per individual patients need.
Results: In this study maternal morbidity was 13.33%. Perinatal morbidity was 34% and most common causes were hyperbilirubinemia (36%), RDS (33%). Perinatal mortality was seen in 10% and mainly due to RDS (53%). Sixteen (16%) neonates were delivered by cesarean. The main indications for cesarean being malpresentation (33%) followed by fetal distress (20%).
Conclusion: PPROM is one of the important causeof preterm birth that can result in high perinatal morbidity and mortality along with maternal morbidity. Looking after a premature infant puts an immense burden on the family, economy and health care resources of the country. An understanding of gestational age dependent neonatal morbidity and mortality is important in determining the potential benefits of conservative management of preterm PROM at any gestation.
KEYWORDS:maternal outcome, perinatalmorbidity, PPROM

I. INTRODUCTION

Premature rupture of membranes (PROM) is defined as the spontaneous rupture of amniotic membrane with a release of amniotic fluid at least one hour before the onset of labor. If the membranes rupture after 37 weeks of gestation but before the labor it is called the term PROM. If the rupture of membranes (ROM) occurs after 28 weeks but before 37 weeks of gestation is termed as the preterm premature rupture of membrane PPROM.[1]
Prolonged Prom: It is the term used when more than 24 hours have elapsed before the labor ensues.[2]
PROM is usually followed by labor. The onset of labor after PROM is directly related to the gestational age at the time of rupture. Labor started within 24 hours of PROM in 81% of patients.
Only 48% of the patients develop labor within three days of PROM.[2]

INCIDENCE OF PPROM

PROM occurs in approximately 10 % of all pregnancies and in 70% of the cases at term. Although there is some morbidity when PROM occurs in term pregnancies, the fundamental clinical problem is preterm PROM, a condition that occurs in 3% of all pregnancies and is responsible for approximately 30 % of all preterm deliveries.[1]

PPROM is multifactorial in nature fetal membranes are made of an outer four to six layered chorion attached to a collagen rich connective tissue and an inner single cell layer amnion.[3] Weakness in the chorioamnion membrane is the overall mechanism of PROM, which may be due to deficiency of type III collagen, reduced size of the membrane at the affected site and reduced collagen content.[3-6] In addition, it may be caused by proteolytic enzymes from bacteria.[7] Choriodecidual infection or inflammation is considered as a major etiology for PPROM, especially at early gestational ages. [8] Amniotic fluids have certain bacteriostatic properties that prevent infections and thereby prevent PPROM.Oligohydroamnios is also considered responsible for PPROM.[9]Trauma, smoking, infections, low socioeconomic status, previous history of preterm delivery, sexually

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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.[10-12]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.[13]Maternal complications like chorioamnionitis, premature delivery, and increased risk of caesarean section are also noted.[10]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.

In PPROM, the management involves administration of antibiotics that reduces the risk of perinatal infection and increases the latency period while steroids reduce perinatal morbidity and mortality. [4,14]

II. METHODS

This is retrospective observational study over a period of one and half years from June 2019 to November 2020 attertiary care hospital.

Source of data: Total numbers of deliveries during this period 12,500 out of which 332 patients had PPROM.150 patients of preterm premature rupture of membrane in between 28-37 weeks of gestation admitted in the labor room were studied after considering inclusion and exclusion criteria.

Inclusion criteria

• All pregnant women with pregnancy between 28-37 weeks of gestational age with preterm premature rupture of membranes.

Exclusion criteria

• Intrauterine growth restriction
• Uterine anomalies
• Fetal anomalies
• Hypertensive disorders and pregnancy induced hypertension
• Gestational diabetes mellitus
• Antepartum hemorrhage
•Non reassuring fetal status

• Method of collection of data

This is a retrospective observational study conducted in the Department of Obstetrics and Gynecology, in a tertiary hospital in Ahmedabad, Gujarat (Western India). 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 June 2019 to November 2020. The hospital database, including medical records, and labor ward and NICU registries were used to obtain information.

III. RESULTS

Table 1: Aetiological factors of PPROM

Etiological factor	No.of cases	Percentage
Idiopathic	94	62.67
Bacterial infection	17	11.33
Anemia	15	10
Malpresentation	10	6.67
Previous history of PPROM/PROM	8	5.33
Twins	3	2
Polyhydramnios	3	2

In present study most common etiologicalfactor of PPROM was idiopathic and it is 62.67%.and next common was bacterial infection and anemia.[15]

Table 2 : Maternal morbidity causes

Morbidity	No.of Cases	Percentage
Febrile morbidity	14	9.33
Wound infection	2	1.33
PPH	2	1.33
MRP	1	0.66
Puerperal sepsis	1	0.66

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In this study maternal morbidity was13.33%. There are various causes of maternal morbidity including fever, wound infection, retained placenta which required manual removal of placenta (MRP) and postpartum hemorrhage (PPH). Out of this, in present study fever is the most common cause of febrile morbidity accounts for 9.33 % of cases. No maternal mortality was seen in this study.

Table 3:Mode of delivery and Comparison of mode of delivery with other studies

Mode of delivery	No of cases	Present study	Shehla[16]	Trinity[17]	Kadikar[18]
Vaginal delivery	126	84%	65.88%	71.4%	77%
Cesarean section	24	16%	14.11%	26.7%	10%

In present study vaginal delivery was in 84% cases and cesarean section done in 16% cases.

Table 4:Indication of LSCS in PPROM

Indication	No of cases	Percentage
Breech	7	29.16
Fetal distress	5	20.83
Failure of induction	4	16.66
Oligohydramnios	3	12.5
Prolonged Prom	1	4.1
Transverse lie	1	4.1
Other	3	12.5

In present study cesarean section was done in 16% of the cases, the main indications being malpresentation (breech and transverse lie) 33% followed by fetal distress 20.83%, failure of induction 16.66%., oligohydramnios and others accounts for12.5% each.

Table 5:Different modes of termination of pregnancy in PPROM at different gestational age

Gestational age in weeks	Vaginal (84%)			LSCS(16%)	
	Spontaneous (94) (62.67%)	Induced (32)(21.33%)		Failure of induction (4)	Cesarean section mandatory (20)
		Oxytocin(10)	Prostaglandins(22)		
28 to 30 (13)	10(76.90%)	2(15.3%)	1(7.69%)	0(0%)	0(0%)
31 to34 (66)	47(71.21%)	3(4.54%)	6(9.09%)	2(3.03%)	8(12.12%)
35 to 36 (71)	37(52.11%)	5(7.04%)	15(21.12%)	2(3.03%)	12(16.90%)
Total(150)	94(62.67%)	10(6.66%)	22(14.66%)	4(2.66%)	20(13.33%)

In present study 62.67% of patients went into spontaneous labor and delivered vaginally and 21.33% of patients required induction of labor.

Table 6: Causes of Perinatal morbidity and perinatal mortality

Causes	Perinatal morbidity	Percentage	Perinatal mortality	Percentage
Hyperbilirubinemia	24	36.36	-	-
Sepsis	10	15.15	5	33.33
RDS	22	33.33	8	53.33
HIE	3	4.54	-	-
NEC	2	3.03	-	-
IVH	2	3.03	-	-
Birth asphyxia	3	4.54	2	13.33
Total	66	34	15	10

In this study perinatal morbidity was 34%. There are various causes including hyperbilirubinemia (36.36%), respiratory distress syndrome RDS (33.33%), sepsis (15.15%). Other causes being necrotizing enterocolitis (NEC),

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Hypoxic Ischemic encephalopathy (HIE), intraventricular hemorrhage (IVH), birth asphyxia.

In this study, perinatal mortality was 10%. The most common cause is respiratory distress syndrome (53.3%) followed by sepsis (33.3%) and birth asphyxia (13.3%).

Table 7: Perinatal morbidity and mortality in relation to duration of PPROM

Duration of PPROM	No.of Cases	Perinatal morbidity	Percentage	Perinatal mortality	Percentage
<12 hrs	44	6	13.63	1	2.27
12-24 hrs	31	10	38.46	1	3.84
24-36 hrs	32	8	25	5	15.62
>36 hrs	43	28	65.11	8	18.60

In present study it is observed that as the duration of PPROM increases, perinatal morbidity and mortality also increases. Perinatal morbidity was 65.11% and perinatal mortality was 18.60% with PPROM to delivery intervals more than 36 hours.

Table 8: Perinatal morbidity and mortality according to birth weight

Birth weight	No. of cases	Perinatal morbidity	Percentage	Perinatal mortality	Percentage
Upto 1000 g	12	10	83.33	4	33.33
1001-1500 g	32	26	81.25	8	25
1501-2000 g	33	18	54.44	3	9.09
2001-2500 g	38	8	21.05	-	-
>2500 g	35	4	11.42	-	-

In this study perinatal mortality was highest (83.3%) when the birthweight was up to 1000 g and no mortality was seen when birthweight was more than 2000 g. In this study 8% of the cases were < 1000 gm in weight,17.33% were between 1001-1500 g, 22% of cases were between 1501-2000 g and 25% were between 2001-2500 g and 23% were above 2500 g.

IV. DISCUSSION

It is retrospective observational study done in a tertiary care hospital including 150 patients of preterm premature rupture of membranes in between 28-37 weeks gestation admitted in labor room for a period of one and half year. The overall incidence of PPROM in the present study is 2.65% which is well compatible with other studies like TC Okeke et al(3.3%),Arnido(3.1%),Hernandez et al(3.5%).[19]

Maternal age: In this study PPROM was present in 82% of cases in the age group of 20-29 years.

Socio-economic status: In this study the patients of low socioeconomic status were 68% and middle socioeconomic status were 31% which is comparable with the study by Noor et al which is 68.23% and 31.77% respectively.[16] Studies have shown that defects in the amniotic membranes occur due to low socio-economic status associated with factors like malnutrition, over exertion, poor hygiene, stress, high parity, recurrent genitourinary infection and anemia. The risk of PPROM increases with decreased antibacterial activity in the amniotic fluid of patients with low socioeconomic status.

Booked and unbooked cases: In this study the booked cases were 58% and unbooked cases 42% .In unbooked cases there is lack of antenatal care leading to lack of identification of recurrent risk factors like PPROM, preterm delivery, induced abortions and their managements.

Duration of PPROM and Maternal morbidity: It is observed that as the duration of PPROM increases the maternal morbidity also increases. In this study 75 %had maternal morbidity when duration of PROM exceeded 24 hours.

Mode of delivery: In our study normal delivery was 84% and cesarean section was done in 16%cases. Cesarean sections were more when cervix was unripe, and induction was done in cases with Bishop score>6. Also, malpresentations, failure of induction and fetal distress due to oligohydramnios resulted in LSCS.

Indications for LSCS: In this study LSCS was done in 16% of the cases, the main indications being Breech 29% followed by fetal distress 20%, failure of induction 16% and transverse lie 4% which is comparable to the study by Kamala Jayaram, the indications being failed induction, fetal distress and malpresentation. [20]

Different modes of termination of pregnancy in PPROM at different gestational age: In this study 62.67% of patients went into spontaneous labor and delivered vaginally. In 21.33% cases induction of labor was done with oxytocin and prostaglandins.In which induction with oxytocin was done in 6.66% cases and with prostaglandins in 14.66% cases. Out of these 36 cases 32(88.88%) cases were delivered vaginally while in 4(11.11%) cases LSCS was done. Present study also indicates that Percentage of cases going into spontaneous labor increases as the gestational age reaches towards the term. Similarly observed by Janice and Andrew.

Investigations for evidence of infection :The investigations like total count, C-reactive protein and high vaginal swab for culture and sensitivity were done to evaluate for the evidence of infection. Leukocytosis can be affected by pregnancy and labor. CRP estimates seem to be reliable monitoring tool.[21]But in more detailed studies WBC and CRP were poor predictors of the presence of a positive amniotic fluid or fetal blood culture.

Perinatal morbidity and mortality in relation to duration of PPROM In this study, as the duration of PPROM increases, perinatal morbidity and mortality also increases. When PPROM to delivery interval more than 36 hours Perinatal morbidity was 65.11% and perinatal mortality was 18.60%which comparable with shehla et al study [16] . The study by the Russel showed that here was danger to mother and fetus both as duration of pprom increased, But prolongation of latent period decreases the incidence of RDS because when there was prom fetus was exposed to stress which leads to release of glucocorticoids and decrease the incidence of RDS[22]. Perinatal morbidity and mortality according to birth weight. Perinatal morbidity and mortality decrease as the birthweight increases. When the weight was < 1000 g, perinatal morbidity was 83.3% and mortality was 33.3%. It reduced to 8.33% morbidity and no mortality when birth weight increased to >2500 g.

V. CONCLUSION

PPROM is significant obstetric problem and it poses a huge challenge to the obstetrician who is caught in dilemma due to the jeopardising effect of preterm premature rupture of membrane on both maternal and fetal health.Hence ,all cases of PPROM should be treated early and energetically to minimise the adverse maternal and fetal effects of PPROM.Once PPROM is diagnosed ,it should be followed by prompt admission and antenatal corticosteroids should be administered in women with PPROM. Routine antibiotic administration reduces maternal and neonatal morbidity.Demographic variables can be applied to develop risk scoring as to identify high risk cases and treating them in time to prevent PPROM.Careful antenatal monitoring, detection and promt treatment of infection necessary. Strict aseptic precautions, appropriate therapy, regular antenatal follow up are important features in the prevention and management of PPROM.

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