SOCIODEMOGRAPHIC PROFILE AND OUTCOME IN WOMEN WITH PRETERM PREMATURE RUPTURE OF MEMBRANES IN A TERTIARY CARE CENTRE

Jisha Ismail¹, Chandrika C. V², Resmy C. R³

¹Assistant Professor, Department of Obstetrics & Gynaecology, Government Medical College, Thrissur.

²Professor & HOD, Department of Obstetrics & Gynaecology, Government Medical College, Palakkad.

³Associate Professor, Department of Obstetrics & Gynaecology, Government Medical College, Thrissur.

ABSTRACT

BACKGROUND

Preterm premature rupture of membranes (PPROM) occurs in less than 3% of deliveries and contributes to one third of preterm deliveries and is a major contributor for obstetric morbidity and adverse perinatal outcome. PPRM is multifactorial in aetiology with several risk factors postulated including maternal infections. The obstetric outcome is also dependent on these risk factors.

MATERIALS AND METHODS

Settings and Design- This was a prospective analytical study conducted in Department of OB/GYN, Government Medical College, Thrissur over a period of two years. 160 cases of singleton pregnancies presenting as PPRM between gestational age of 24 to 36 weeks were analysed for their sociodemographic factors and followed up for their obstetric outcome including latent period, mode of delivery, obstetric complications and perinatal outcome.

RESULTS

On analysing the complications, it was found that 11.25% of patients developed chorioamnionitis as a consequence of PPRM compared to an incidence of 3.1% (166 out of 5205) patients out of the total deliveries (chi square 30.4, p value 0.0000). 7.5% had antepartum haemorrhage in which two third (67%) were detected to have placenta praevia on ultrasound while one third (33%) were diagnosed with abruptio placenta compared to 3.86% of APH in the total population (201 out of 5205) (Chi square 5.38, p value 0.02). Cord prolapse occurred in 1 patient (0.6%) with PPRM, in which baby was stillborn (chi square 1.94, p value 0.16) when compared to 2 cases of cord prolapse in the total number of patients delivered (.04%). 13.1% of patients in this study developed postpartum haemorrhage with 4.1% requiring blood transfusion compared to 5.15% of PPH in the total population (268 out of 5205) (chi square 19.3, p value 0.00001).

CONCLUSION

PPROM is a significant contributor of poor obstetric outcome. Many of the contributing factors of PPRM if detected sufficiently early and appropriately treated may not only decrease the onset of PPRM, but also have the potential to reduce the complications.

KEYWORDS

Preterm Premature Rupture of Membranes (PPROM), Obstetric Outcome.

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BACKGROUND

Preterm premature rupture of membranes (PPROM) is defined as the rupture of foetal membranes before 37 weeks of gestation and before the onset of labour.¹ It occurs in 3% of pregnancies and is the cause of approximately one third of preterm deliveries.² This can result in high perinatal morbidity and mortality along with increased maternal morbidity.³ PPRM is multifactorial in aetiology.^{4,5} The relationship between PPRM and infection has been long established. The most commonly associated organisms found were those causing bacterial vaginosis, Trichomonas vaginalis, mycoplasma, Chlamydia trachomatis, Neisseria gonorrhoea, Group B Streptococci, lactobacilli &

Staphylococcus. The other major risk factors implicated are cigarette smoking, vaginal bleeding and previous preterm delivery. Black race, low socioeconomic status, cervical incompetence, connective tissue disorders, nutritional deficiencies, abnormal placentation, polyhydramnios, and multiple gestation have also been implicated. Genetic factors like polymorphisms of MMP 9 have also been linked.⁶

Intrapartum complications associated with PPRM are cord compression leading to foetal distress, cord prolapse, and placental abruption. Intrauterine infection can lead to chorioamnionitis and endometritis after delivery. Perinatal outcomes constitute prematurity, neonatal sepsis, respiratory distress syndrome (RDS), intraventricular haemorrhage (IVH), risk of foetal and neonatal death. Antibiotics have been used in reducing infectious infant morbidity.⁷ Corticosteroids can reduce many neonatal complications particularly respiratory distress syndrome and intraventricular haemorrhage.⁸

Expectant or conservative management with prolonged continuous foetal and maternal monitoring combined with modified bed rest to increase the opportunity for amniotic fluid re-accumulation is said to improve outcomes.⁹

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Corresponding Author:

Dr. Jisha Ismail,

Assistant Professor,

Department of Obstetrics & Gynaecology,

Government Medical College, Thrissur.

E-mail: jishajameel@gmail.com

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MATERIALS AND METHODS

This was a prospective analytical study conducted in the Department of OB/GYN, Govt. Medical College, Thrissur, Kerala. 160 cases of singleton pregnancies complicated by PPRM between gestational age of 24 to 36 weeks managed in the hospital were recruited in the study after getting consent. Congenital anomalies, multiple pregnancy, gestational diabetes, severe preeclampsia, polyhydramnios and foetal deaths were excluded from the study. Institutional approval for the study and its proforma were obtained following standard institutional research committee procedures. Detailed history and examination was performed and recorded. History of previous pregnancy complications and mode of delivery, details of current pregnancy including gestational age, any complications, frequency of antenatal visits, evidence of urogenital infections, periodontal infections, antepartum haemorrhage were noted. PPRM was confirmed by a sterile speculum examination by visualising amniotic fluid draining through the cervical os along with reduced AFI on USS. The patients were observed for clinical symptoms of chorioamnionitis such as fever, uterine tenderness, maternal tachycardia, foetal tachycardia, and laboratory investigations (Leucocytosis-CRP-ESR). A high vaginal swab was taken in all patients at the time of admission. All patients received antibiotic prophylaxis according to standard protocol. Antenatal corticosteroids (12 mg of betamethasone, 2 doses, 24 hours apart) were given to all patients. The patients were observed for at least 12 hours in the labour room for any symptoms of bleeding, contraction, or foetal distress. Patients who did not enter into active phase or those did not show any complications were transferred to the obstetrics unit for expectant management. Clinical chorioamnionitis, gestational age >34 weeks, haemorrhage and foetal distress were taken as indication for induction of labour. Latency of labour defined as the period between membrane rupture to the point of delivery was recorded.

Foetal and neonatal outcome like intrauterine death, early neonatal death (First week), signs of Respiratory Distress Syndrome (RDS), and signs of neonatal sepsis (Blood or CSF culture positive during the first 72 hours after birth) were noted.

Mothers were observed in postnatal period for pyrexia, foul smelling lochia and wound infection. Mothers and babies were followed up till the date of discharge.

Data were analysed using Epi Info Statistical software version 3.4 and expressed in its frequency and percentage.

RESULTS

Sociodemographic Profile

Majority of patients in this study were in the age group 20-24 years with the mean age of 26 years.

Majority of patients with PPRM belonged to the low socioeconomic category, with 143 patients (89.4%) coming in the Below Poverty Line. About 76% of patients resided in the rural area compared to 24% in the urban area. In this study, most of the women presenting with PPRM were housewives (81%) and working women constituting the remaining 19%.

Age in Years	<20 Yrs.	20 - 24 Yrs.	25 - 29 Yrs.	30 - 34 Yrs.	≥35 Yrs.
	10 (6.3%)	66 (41.3%)	51 (31.9%)	21 (13.1%)	12 (7.5%)
Socio-economic Status	Below Poverty Line			Above Poverty Line	
	143 (89.4%)			17 (10.6%)	
Place of Residence	Rural			Urban	
	122 (76.3%)			38 (23.8%)	
Occupation	Housewife		Labourer	Skilled Labour	
	129 (80.6%)		28 (17.5%)	3 (1.9%)	

Table 1. Socioeconomic Profile

Booking Status	Booked		Booked Outside		Un-booked	
	60 (37.5%)		91 (56.9%)		9 (5.6%)	
Parity	Primi		Para 1		Para 2	Para 3
	85 (53.1%)		59 (36.9%)		15 (9.4%)	1 (0.6)
Previous Pregnancy Complications	First trimester miscarriage		Cervical Encerclage		PPROM	Preterm delivery
	32 (20%)		2 (1.3%)		6 (3.8%)	13 (8.1%)
Present Pregnancy Events	Cervical Encerclage	Urinary Tract Infection	Abnormal Vaginal Discharge		Antepartum Haemorrhage	Periodontal Infection
	3 (1.9%)	21 (13.1%)	33 (20.6%)		12 (7.5%)	48 (30%)
Antenatal Visits in Present Pregnancy	Irregular Visits			Regular visits		
	33 (20.6%)			127 (79.4%)		
Gestational Age at Onset of PPRM	24-28 Weeks		29-33 Weeks		34-36 Weeks	
	11 (6.9%)		44 (27.5%)		105 (65.6%)	
Table 2. Obstetric Profile						

Table 2. Obstetric Profile

91 among the 160 patients (56.9%) were referred from the peripheral hospitals and were booked outside. Only 5.6% were unbooked patients. Of these 85 patients (53.1%) were primi and 75 (46.9%) were multigravidae. Majority of the patients i.e. 127/160 (79.4%) had regular antenatal checkups.

Looking into the previous pregnancy complications, it was found that 53 patients among the 160 had complications like first trimester abortion in 32 patients (20%), preterm delivery in 13 patients (8.1%), PPRM in 6 patients (3.8%). Two patients (1.3%) had cervical encerclage done in their previous pregnancy.

On analysing the present pregnancy events, among the 160 patients, 21 patients (13.1%) had UTI, 33 patients (20.6%) had abnormal/increased discharge per vaginum, 12 patients (7.5%) had antepartum haemorrhage and 48 patients had periodontal infection (30%). Three patients (1.9%) had undergone cervical encrclage in this pregnancy, of which one was history indicated and 2 of them were ultrasound indicated.

Majority of the patients, 105 among the 160 (65.6%) developed PPROM between 34-36 weeks. Of the remaining, 44 patients (27.55) developed PPROM between 29-33 weeks while only 11 patients (6.9%) presented with very early PPROM between 24 - 28 weeks.

Presentation and Lie of Foetus	Cephalic		Breech		
	143 (89.4%)		17 (10.6%)		
Mode of Onset of Contraction	Spontaneous		Oxytocin	Prostaglandins	
	93 (58.1%)		53 (33.1%)	14 (8.8%)	
Mode of Delivery	Vaginal Delivery	Instrumental (Outlet Forceps)	Caesarean Section	VBAC	Assisted Breech Delivery
	98 (61.3%)	2 (1.3%)	50 (31.3%)	2 (1.3%)	8 (5%)

Table 3. Obstetric Outcome

Majority of the babies i.e. 143 out of 160 (89.4%) were in cephalic presentation and the rest 17 (10.6%) were in breech presentation. Spontaneous onset of contraction occurred in 93 patients (58.1%) of which latency period was less than 1 day in 61 cases (38.1%), 2 - 7 days in 87 cases (54.4%), 8 - 14 days in 6 cases (3.8%), 15 - 21 days in 3 cases (1.9%), 22 - 28 days in 2 cases (1.25%), and more than 28 days in 1 case (0.6%).

67 patients underwent induction of labour either by prostaglandins in 14 (8.8%) and oxytocin in 53 (33.1%).

The mode of delivery was vaginal in 110 patients (68.75%), of them 2 underwent operative vaginal delivery by forceps (1.3%), 2 underwent VBAC (1.3%), 8 had assisted breech delivery (5%). Caesarean section was done in 50 patients (31.3%).

Gestational Age in Weeks	≤ 1 Day	2 - 7 Days	8-14 Days	15-21 Days	22-28 Days	>28 Days
24 - 28	4	4	-	2	1	-
29 - 33	10	28	3	1	1	1
33 - 36	47	55	3	-	-	-
	61 (38.1%)	87 (54.4%)	6 (3.8%)	3 (1.9%)	2 (1.3%)	1 (0.6%)

Table 4. Latency Period in Days

In high vaginal swab, in 85% of cases no pathogen was isolated. E. coli was isolated in 11 cases (6.9%), Group B Streptococci in 5 cases (3.1%), Klebsiella in 5 cases (3.1%), Staphylococcus aureus in 2 cases (1.3%) and candida in 1 case (0.6%).

On analysing the complications following PPROM, Chorioamnionitis developed in 18 cases (11.3%), abruptio placenta in 4 (2.5%), cord prolapse in 1 (0.6%) and intrauterine death in 2 cases (1.3%). Postpartum haemorrhage occurred in 21 cases (13.1%), postpartum fever in 15 cases (9.4%), retained placenta in 6 cases (3.8%) and wound infection in 10 cases (6.3%).

Complications	Incidence in Total Population (5205)	Incidence in PPROM	Chi Square	p Value
Antepartum Haemorrhage	201 (3.86%)	12 (7.5%)	5.38	0.02
Chorio-amnionitis	166 (3.1%)	18 (11.25%)	30.4	0.0000
Cord Prolapse	2 (.04%)	1 (0.6%)	1.94	0.16
PPH	268 (5.15%)	21 (13.1%)	19.3	0.00001

Table 5. Complications following PPROM

Duration of hospital stay was less than 7 days in 81 cases (50.6%), 7 - 14 days in 52 cases (32.5%), 15 - 21 days in 14 cases (8.8%), 22 - 28 days in 11 cases (6.9%) and more than 28 days in 2 cases (1.3%).

There were 157 live births (98.1%), one still birth (0.6%) and two intrauterine deaths (1.3%). The birth weight was less than 2.5 Kg in 146 babies (11.25%) and more than 2.5 Kg in the remaining 14 babies (88.75%). APGAR score at 5 minutes was less than 8 in 28 babies (17.5%), and 8-10 in the majority, that is 132 babies (82.5%). Babies who were admitted in neonatal ICU were 97 (60.6%). There were 17 neonatal deaths (10.6%).

DISCUSSION

The total number of obstetric admissions in our hospital during the study period were 5365 out of which 160 were PPROM cases. The prevalence of PPROM was 2.98%, which accounts for 12.5% of all preterm deliveries which is similar to the study by Noor S et al which showed a prevalence of 16%.

The mean age of women in this study was 26 years with 41.3% of the patients in the age group 20 - 24 years. In the study group, 53.1% of patients were primiparous. Obi SN and Ozumba¹⁰ et al in their study reported that PPROM was highest in primiparous patients. 56.9% of patients in this study were booked outside or referred from peripheral hospitals while 37% were booked in the institution and 6% constituted unbooked patients. In this study, 76.3% of patients belonged to rural population. Majority (89.4%) were of low socioeconomic status. Ferguson¹¹ et al in his study reported that PPROM is associated with low maternal haemoglobin and low socioeconomic status. 20.6% had irregular antenatal checkups during the current pregnancy.

3.8% of patients had PPROM in their previous pregnancies and 8.1% had a history of preterm labour similar to the observations made in various other studies^{12,13} which reported a 5.5 times increased risk of recurrence. In our study, 1.3% of patients had underwent cervical encrclage in their previous pregnancy and 20% had a history of first trimester abortion.

Abnormal discharge per vaginum indicating the presence of cervicovaginal infection and Urinary tract infection was reported in 20.6% and 13.1% patients respectively. Pathogens were isolated in 15% of patients which may have contributed to the onset of PPROM as reported in many studies implicating vaginal infection and UTI.^{14,15,16} Presence of infections may affect the tensile strength of membrane resulting in PPROM.^{14,15} 30% of patients with PPROM were found to have periodontal infections which is also reported to be a significant high risk factor by Goldenberg et al.¹⁶ PPROM

occurred following cervical encirclage in 1.9% of patients in the study group. The mean gestational age at rupture of membranes in this study was 33.28 weeks with the majority (65.6%) occurring between 34-36 weeks. The latency period between onset of membrane rupture to delivery was less than 24 hours in 38% of patients. The mean gestational age at delivery in this study was 34 weeks and the mean latency period between PPRM and delivery was 3.8 days.

On analysing the complications, it was found that 11.25% of patients developed chorioamnionitis as a consequence of PPRM compared to an incidence of 3.1% (166 out of 5205) patients out of the total deliveries (chi square 30.4, p value 0.0000). The rates of chorioamnionitis were found significantly higher in the PPRM group compared with women without PPRM (16.5 vs. 2.7%) in a study by Furman et al.¹⁷ 7.5% had antepartum haemorrhage in which two third (67%) were detected to have placenta praevia on ultrasound while one third (33%) were diagnosed with abruptio placenta compared to 3.86% of APH in the total population (201 out of 5205) (chi square 5.38, p value 0.02). Cord prolapse occurred in 1 patient (0.6%) with PPRM, in which baby was stillborn (chi square 1.94 p value 0.16) when compared to 2 cases of cord prolapse in the total number of patients delivered (0.04%).

13.1% of patients in this study developed postpartum haemorrhage with 4.1% requiring blood transfusion compared to 5.15% of PPH in the total population (268 out of 5205) (Chi square 19.3, p value 0.00001). 3.8% required manual removal for retained placenta. In a study of PPRM between 18 - 23 weeks by Verma U and Goharkhay¹⁸ in 2006, the incidence of retained placenta was 7% and postpartum haemorrhage 9%. The incidence of postpartum fever in this study was 15%. 10% of patients developed wound infection.

The overall neonatal survival was 87.5% in this study with perinatal mortality of 12.5%.

CONCLUSION

PPROM is a significant contributor of poor obstetric outcome. Currently, there is no effective way of preventing spontaneous rupture of foetal membranes due to its multifactorial aetiology. Many of the contributing factors of PPRM if detected sufficiently early and appropriately treated may not only decrease the onset of PPRM, but also have the potential to reduce the complications.

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