

PERINATAL AND MATERNAL OUTCOME IN PRELABOUR RUPTURE OF MEMBRANESNesam Susana Minnalkodi¹¹Professor and HOD, Department of Obstetrics & Gynaecology, Government Chengalpattu Medical College.**ABSTRACT**

Prelabour Rupture of Membranes (PROM) is one of the most common complications of pregnancy that has major impact on fetal and maternal outcome. It occurs in 1 out of every 10 pregnancies; 80% of women who present with PROM are term. It is also one of the commonest event where a normal pregnancy can turn into a high risk situation for the mother as well as for the fetus. Despite the relative frequency of this event, clinical management is one issue unresolved by the clinical research till date. A prospective study was designed to know the incidence, etiology, risk factors, fetal and maternal outcomes of prelabour rupture of membrane in Government Chengalpattu Medical College Hospital. One hundred mothers with singleton pregnancy in the age group of 19 to 35 years with leaking per vaginam and without maternal complications interfering with active management of PROM like heart disease, Pregnancy Induced Hypertension (PIH) were chosen and assessed with a standardized protocol. The data was collected and analysed statistically.

KEYWORDS

Amniorrhexis, PROM, PPROM.

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INTRODUCTION

Prelabour Rupture of Membranes (PROM) is one of the most common complications of pregnancy that has major impact in fetal and maternal outcome. It occurs in 1 out of every 10 pregnancy.¹ 80% of women who present with prom are term. It is also one of the commonest event where a normal pregnancy can turn into a high risk situation for the mother as well as for the fetus. Despite the relative frequency of this event, clinical management is one issue unresolved by the clinical research to date.²

The maternal problem associated with PROM are risks of infection, cord prolapse and unfavorable cervix for induction.¹ The latter is associated with high incidence of dysfunctional labor, chorioamnionitis, an increased rate of cesarean section, post-partum haemorrhage and endomyometritis, while the problem of neonates includes problems of sepsis and postural deformities if the PROM to delivery interval is many weeks. Gestation of less than 34 weeks poses problems of bronchopulmonary dysplasia (If less than 26 weeks) hyaline membrane disease (Leading to respiratory distress syndrome).^{3,4,5} intraventricular hemorrhage, necrotizing enterocolitis and sepsis.^{5,6,7} Fetal wastage and neonatal mortality and morbidity are high when PROM occurs in pregnancies of less than 32 weeks. The decision for appropriate management depends on the assessment of the gestational age, the likelihood of infection and the availability of neonatal intensive care facilities.

The aim of the modern obstetrics is to have a healthy baby and a healthy mother. Much of the literature available is pertaining to the studies in the developing countries where neonatal salvage rates in preterm deliveries are very high and stringent asepsis is followed.

This study is undertaken to identify the etiological factors, maternal and perinatal outcome and also deals with the critical areas of controversies related to the management of PROM and to review the recent literature for clinical research. More recently the use of PGE2 for cervical ripening has been suggested.

AIMS AND OBJECTIVES

1. To know the incidence of prelabour rupture of membranes in Chengalpattu Medical College Hospital.
2. To evaluate the risk factors of PROM.
3. To find out the etiology of PROM.
4. To assess fetal and maternal outcome in PROM.

MATERIALS AND METHODS

This present prospective study was conducted in Chengalpattu Medical College Hospital. The cases were selected from Labour Ward.

Inclusion Criteria for Case Selection

1. Singleton pregnancy between 37-41 weeks of gestation.
2. Primi and multigravida.
3. Age group 19-35 years.
4. Confirmed cases of leaking with or without membrane.
 - a) Leaking from cervix confirmed by speculum examination.
 - b) History of leaking per vagina.
 - c) Cervix dilatation <3cm.
 - d) No uterine contractions.

Exclusion Criteria

1. Multiple gestation.
2. Maternal complications interfering with active management of PROM like pregnancy induced hypertension, heart disease, previous Cesarean section.

One hundred patients were taken for study with PROM. Similarly 100 patients with intact membranes were taken as control.

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ASSESSED WITH HISTORY TAKING

1. Age.
2. Socio-economic status.
3. Obstetric history.
4. Time of rupture.
5. Amount of liquor drained.
6. Any intervention outside.
7. History of coitus.
8. History of any infection.
9. Any prior surgical procedures of cervix.
10. History of recurrence of PROM.

CLINICAL EXAMINATION

1. Nutritional status/Anemia.
2. Vital Signs.
3. Abdomen Examination for Gestational Age.
 - Liquor volume.
 - Uterus acting or not.
 - Fetal presentation.
 - Fetal well-being.
4. Speculum Examination.
 - To confirm leaking.
 - Cervical dilatation.
 - Status of membranes.

LAB INVESTIGATIONS

Amniotic fluid for culture and sensitivity (By cervical swab) and other cultures for mother and fetus whenever necessary. All the patients are admitted in labour ward and started 1gm of systemic ampicilin and managed individually. Induction was done in 90% of the cases. Equal number of cases with no prom and no complication are taken as controls. Progress of labour was carefully watched. Depending upon the maternal and fetal condition, labour terminated by natural vaginal/operative methods. After delivery maternal and fetal outcome were studied. Neonates which needed admission were admitted in neonatal intensive care unit and subjected to investigation and followed till discharge. Mother also followed till discharge.

RESULTS AND OBSERVATION

Incidence in Chengalpattu Medical College Hospital – 9.06%. The incidence of PROM ranges from 5%-10% of all deliveries. PPRM occurs in approximately 1% of all pregnancies.

Age (Years)	Study (No. of Cases)	Control (No. of Cases)
<20	4	15
21-29	82	79
>30	14	6
Total	100	100

Table 1: Age Incidence in PROM

Incidence of PROM is more in the age group of 20-29 yrs. which is around 82%. In the control group 79% of the cases were between age group 20-29 years. There is no relationship between the two factors.

SOCIOECONOMIC STATUS IN PROM			
CLASS	STUDY (No. of Cases)	CONTROL (No. of Cases)	chi sq=5.7 p=0.06 not significant
III	4	1	
IV	5	1	
V	90	98	
TOTAL	100	100	

Table 2: Socioeconomic Status in PROM

Many studies (Stuart et al., Evans GS, Lin YS *boil Reprod.* 2005;72;2305) have shown that poor nutritional status causes

defect in the membrane, which is significantly influenced by the Socioeconomic status.⁸ Since the study was taken in a Government Hospital, almost all patients belonged to Class IV and V Socioeconomic status.

GRAVIDA STATUS			
GRAVIDA	STUDY (No. of Cases)	CONTROL (No. of Cases)	chi sq=2.44 p=0.48 not significant
1	47	50	
2	34	36	
3	17	14	
4	2	-	
TOTAL	100	100	

Table 3: Parity Incidence in PROM

The case distribution with regard to parity was not significant in this study and was comparable with the study of Margret B. Ballard.

BOOKED/UNBOOKED		
BOOKED/UNBOOKED	STUDY (No. of Cases)	CONTROL (No. of Cases)
BOOKED	61	73
UNBOOKED	39	27
TOTAL	100	100

Table 4: Antenatal Care and PROM

Thirty nine cases of PROM in this study did not have proper antenatal checkup, poor antenatal booking may be one of the risk factors implicated in PROM.

GESTATIONAL AGE (WEEKS)	STUDY (No. of Cases)	CONTROL (No. of Cases)
37	5	3
38	23	17
39	24	16
40	33	45
41	15	19
TOTAL	100	100

Table 5: Incidence of PROM in Relation to Gestational Weeks

Incidences of PROM are more in term pregnancies. The incidence in term PROM is 10% and PPRM complicates 3% of all pregnancies.

RUPTURED MEMBRANES		
STATUS	STUDY (No. of Cases)	CONTROL (No. of Cases)
ABSENT	91	100
PRESENT	9	0
TOTAL	100	100

Table 6: Membrane Status in PROM

In this study, high rupture of membranes was present in 9 cases. They continue to leak fluid in small amounts, but have adequate amniotic fluid. This has good prognosis. It is caused by tear in the membranes above the lower uterine segment. High leaks may seal spontaneously. They are not associated with fetal or maternal complications.

LIQUOR		
COLOUR	STUDY (No. of Cases)	CONTROL (No. of Cases)
CLEAR	93	100
MECONIUM STAINED	7	
TOTAL	100	

Table 7: Colour of the Liquor in PROM

Among 100 cases of PROM, in this study 93 cases had come with clear liquor and 6 cases had meconium stained

liquor with fetal distress which went for cesarean section. One case had thin meconium stained liquor and was induced and delivered.

PRESENTATIONS		
PRESENTATIONS	STUDY (No. of Cases)	CONTROL (No. of Cases)
VERTEX	97	100
BREECH	3	0
UNSTABLE	0	0
TOTAL	100	100

Table 8: Fetal Presentation and PROM

In this study group, 97% of the cases had cephalic presentation and about 3 cases of mal-presentation in the study group could be one of the contributing factors to cause PROM. In the control group, 100% of the cases had cephalic presentation

COITUS		
COITUS	STUDY (No. of Cases)	CONTROL (No. of Cases)
PRESENT	20	0
ABSENT	80	100
TOTAL	100	100

Table 9: Coitus as a risk factor

In this study, coitus within the preceding one month was found to be 20%. It frequently leads to PPRM.

ETIOLOGICAL FACTORS	PERCENTAGE
INFECTIONS	20
PRIOR SURGICAL PROCEDURES	15
H/O RECURRENCE	15
COITUS	9
MALPRESENTATIONS	3
NOT KNOWN	38
TOTAL	100

Table 10: Etiological Factors in PROM Study Group

Among the etiological analysis of PROM in the study group, most cases are caused by idiopathic causes. Infection caused 20% of all cases of PROM.

INFECTION	FREQUENCY
NIL	80
E.COLI	11
KLEBSIELLA	4
P.AERUGINOSA	1
PROTEUS	3
S.AUREUS	1
TOTAL	100

Table 11: Bacteriological Study of Amniotic Fluid in PROM

Amniotic fluid analysis showed 20 positive cases. Organisms grown were E. Coli, Klebsiella, Proteus, Pseudomonas, Staph Aureus and the remaining did not show any organisms. Infection causes 20% of all the cases of PROM.

PROM REC	STUDY (No. of Cases)	CONTROL (No. of Cases)
ABSENT	85	100
PRESENT	15	0
TOTAL	100	100

Table 12: PROM Recurrence

In the study group, about 15 cases had recurrence of PROM. PROM in prior pregnancy has a definite association and has significant recurrence risk. P value is significant.

PRIOR SURGICAL PROCEDURES		
ABORTION	STUDY	PERCENTAGE
1 D&C	17	17%
2 D&C	1	1%

Table 13: Prior Surgical Procedures in PROM

Prior surgical procedures of cervix has significant effect of PROM. In this study, about 17 cases had one D and C and one case had two D and C. P value is significant.

LATENCY PERIOD	
DURATION (HOURS)	NO.OF CASES
<6 HRS	53
6-12 HRS	47
>12 HRS	NIL
TOTAL	100

Table 14: Latency Period in PROM

In this study, all the cases were intervened and none were allowed to go beyond a latency period of >12 hrs. Pre-term gestations will have longer latency period.

About 53 cases had latency period of <6 hrs. It is inversely proportional to the gestational age.

PGE2 AND MISOPROSTOL	
STUDY	FREQUENCY (No. of Cases)
PGE2	46
MISO	44
SPONTANEOUS	10
TOTAL	100

Total 15: Induction in PROM

Forty four cases were given induction in this study using misoprostol while 46 were induced using PGE2. Immediate induction using ripening agents misoprostol/PGE2 appears to be beneficial in multiparae and nulliparae with poor Bishops Score.

DELIVERY			
PGE2/MISOPROSTOL		FREQUENC Y (No. of Cases)	PERCENTA GE
PGE2	NORMAL	42	91.30%
	CESAREA N SECTION	4	8.70%
	TOTAL	46	100%
MISOPROSTOL	NORMAL	41	93.20%
	CESAREA N SECTION	3	6.80%
	TOTAL	44	100%

Total 16: Induction in PROM and Nature of Delivery

In PGE2 induction group out of 46 cases 42 cases delivered normally, while 4 cases went for Cesarean Section. In misoprostol induction group, 41 patients delivered normally out of 44 while 3 cases delivered through Cesarean Section.

DELIVERY		
DELIVERY	STUDY (No. of Cases)	CONTROL (No. of Cases)
NORMAL	87	90
CESAREAN SECTION	19	10
TOTAL	0	100

Total 17: Mode of Delivery

Eighty seven cases were delivered vaginally with or without induction (Miso or PGE2) and 13 cases were delivered by Cesarean Section. In no induction group about 4 cases delivered vaginally and 6 cases had Cesarean delivery mostly for fetal distress.

BIRTH WEIGHT(KG)	STUDY (No. of Cases)	CONTROL (No. of Cases)
2.0-2.5 KG	6	2
>2.5 KG	94	98
TOTAL	100	100

Total 18: Baby Birth weight in PROM

Since the study group only included term PROM the average birth weight of babies in both study and control group was not much different. Previous study by Allen 1991 also found that 60-80% PROM occurs in term pregnancies.

5 MINUTES APGAR SCORE		
APGAR (10)	STUDY (No. of Cases)	CONTROL (No. of Cases)
7	11	4
8	57	41
9	32	55
TOTAL	100	100

Total 19: 5 Minute Apgar score in PROM

Low APGAR in PROM in this study is mainly due to infection and meconium staining, which also contributes to increased morbidity.

FETAL OUTCOME					
PGE2	FREQUENCY (No. of Cases)	PERCENT (%)	MISOPROSTOL	FREQUENCY (No. of Cases)	PERCENT (%)
NORMAL	45	90	NORMAL	35	70
RD#	5	10	RD#	14	28
EXPIRED	0	0	EXPIRED	1	2
TOTAL	50	100	TOTAL	50	100

Table 20: Comparison of Fetal Outcome Using PGE2 and MISO

#RD-RESPIRATORY DISTRESS: Though Misoprostol group had a shorter induction time, the respiratory distress is comparatively higher than in the PGE2 group. This is attributed significantly due to more uterine tachysystoles.⁹

FETAL OUTCOME	
STUDY	FREQUENCY (No. of Cases)
NIL	80
RESPIRATORY DISTRESS	13
BIRTH ASPHYXIA	4
NEONATAL SEPSIS	2
DEATH DUE TO MENINGITIS	1
TOTAL	100

Table 21: Fetal Outcome

A 20% of the babies in the study group had various morbidities like birth asphyxia, respiratory distress and one mortality was due to meningitis. But only 4 cases had morbidities in the control group.

MATERNAL OUTCOME	
OUTCOME	STUDY (No. of Cases)
NIL	79
PUERPERAL FEVER	9
POST PARTUM HAEMORRHAGE	11
WOUND INFECTION	1
TOTAL	100

Table 22: Maternal Morbidity in PROM

Clinical features of chorioamnionitis are nil, but bacteriological study showed positive cultures for 20 cases. This is attributed to intrapartum use of antibiotics. The study had 9 cases of puerperal fever, 11 cases of post partum haemorrhage and 1 case of wound infection.

DISCUSSION

PROM contributes to significant maternal and neonatal morbidity. The obstetrician is faced to challenge the situation. The option for management includes expectant management vs. immediate intervention.¹⁰ The exact etiology is poorly understood. Infective, biochemical, mechanical pathways are included in this process. At term, the programmed cell death and activation of catabolic enzymes such as collagens and mechanical forces result in ruptured membranes.

This study was done in Govt. CHMC Hospital taking into account of 100 patients with PROM and 100 patients as control without PROM. Overall, incidence at CHMC Hospital was found to be 9.06% General Incidence varies from 2-18% (GLIIH et al. 1970) 2.7 to 17% (Arias).¹¹

The incidence of PROM is high in low socio-economic group. This is attributed to poor nutritional status due to deficiency of vitamins and minerals. In this study group, 96% of the patients were in the low Socio-economic group.

Sixty one cases of PROM patients were getting proper antenatal care among 100 cases of PROM when compared to 73 cases getting proper antenatal care in control group. Poor antenatal care may be one of the risk factors for PROM.

In this study, 47% were primi and 34% were multi. Distribution of cases with regard to parity was not significant in this study and was comparable with the study of Margret B. Ballard who did not find any difference in parity distribution.

But Calvin from his extensive studies showed increased incidence in multigravida.

In 80% of the cases, PROM occurs in term. This study included only term gestation. Among 100 patients in the study group, 91 patients were with absent membranes and leaking liquor and 9 patients had intact membranes with leaking

liquor (HROM). In control group all patients had intact membranes and with no leaking. In study group who had leaking 93% had clear liquor and 7 had meconium stained liquor and none of them had blood stained liquor.

Taking malpresentation as one of the risk factor for PROM in the study group, three cases were presented with breech presentation while in control group all presented with vertex presentation Coitus being one of the major risk factor for PROM.¹² coitus within the preceding one month was found to be 20% in the study group (Rayburn and Wilson 1980) Naeye (1987) reported that preterm delivery due to PROM were 11 times more frequent with coitus. Digital vagina examination should be avoided until labour is initiated as it may have an impact on neonatal infections and endometritis in PPRM.

In 38% of PROM the cause and risk factors could not be elicited.¹³ The remaining 20 cases had bacteriological evidence of infection.¹² They showed positive cultures for *E. coli*, *Klebsiella*, *pseudomonas aeruginosa*, *staph. aureus* and *proteus*. Specific culture for chlamydial infection could not be done due to lack of facility and cost effects.

Regarding the latency period no cases in study group had >12 hrs. latency. When the gestational age is smaller, the latency period is longer. The mean total duration of labour in multipara in study group was almost more than >6hrs, while in control group it was <6 hrs. No significant differences on the total duration of labour in nullipara in both groups.

At present the management of PROM lies with immediate stimulation of labour rather than waiting for spontaneous onset of labour. Immediate stimulation with PGE₂, Misoprostol is a good approach in all term PROM with unripe cervix. Prostaglandin induction shortens the time to delivery and decreases the risk of infection and Cesarean section rate is not increased.^{14,15}

After taking into consideration fetal presentation, parity, gestational age, cervical favorability, presence of signs/risk factors for chorioamnionitis and by exclusion of fetal distress, Cephalopelvic Disproportion, labour is induced at the time of presentation.¹⁶ Thirteen cases of Cesarean section in study group were done for fetal distress and failed induction and 10 cases of Cesarean section was done in control group.

The major maternal complication of PROM is chorioamnionitis. Clinical evidence of infection has not been noticed in any of the patients in study group, but bacteriological evidence of infection showed 20%, 9 patients in study group had fever in the immediate postpartum period and 1 case had wound infection and 11 cases went in for postpartum haemorrhage. Complications due to infection are reducing now a days. This may be attributed to regular use of intrapartum antibiotics.^{17,18}

High perinatal morbidity in PROM is attributed to respiratory distress in this present study, one case of perinatal mortality due to meningitis and its complications.^{3,4,6}

Among 21 cases of perinatal morbidity, 13 cases of respiratory distress, 4 cases of birth asphyxia has been documented.⁶

With good neonatal intensive care, strict asepsis, prophylactic antibiotics, immediate induction policy, the maternal and neonatal morbidity due to infection is grossly reduced.

SUMMARY AND CONCLUSION

PROM term is now managed by inducing labour at the time of presentation. This study shows that careful antenatal monitoring for risk factors and etiology detection and prompt treatment of infection and pelvic examination under aseptic precautions and appropriate therapy are important factors in the prevention of PROM.

- Abnormal labour and operative procedures have increased in PROM. Failed induction and fetal distress are the common indications for caesarean section in induction group. Use of vaginal prostaglandins offered better results in this study. PGE₂ is safe shortens labour and has no effect on Cesarean section rate.
- Expectant line of management is beneficial for preterm PROM patients without signs of infection.
- Early interventions with proper care with strict asepsis and with prompt delivery and with good neonatal setup mortality due to sepsis, respiratory distress and birth asphyxia have been decreased.
- Neonates treated with prophylactic antepartum and intrapartum antibiotics definitely has fewer complications and an improved long term outcome.
- Use of corticosteroid helps to improve the outcome in PPRM between 28-32 weeks.
- Even though PROM occurs more at term the perinatal morbidity and mortality is mainly due to PPRM research is needed to identify the etiologies and prevention of PROM, especially in the preterm gestation.
- This study coincides with other studies and shows that the most important risk factors associated with PROM are low socioeconomic status, nutritional deficiency and improper antenatal care.
- To conclude with improvement in SE status, nutritional supplement and proper antenatal care will definitely reduce the incidence of PROM.

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