

The Prospective study of the incidence, etiological factors and maternal outcome in pre-labour ruptured membranes (Term and Pre-term).

Astha Lalwani¹, Rehana Najam²

¹Assistant Professor, Dept. of Obstetrics & Gynaecology, Teerthankar Mahaveer Medical College, TMU, Moradabad, UP.

²Professor & HOD, Dept. of Obstetrics & Gynaecology, Teerthankar Mahaveer Medical College, TMU, Moradabad, UP.

ABSTRACT

Background: Pre-labour rupture of membranes is one of the most challenging and controversial obstetric dilemma which occurs even in low risk pregnancies. Premature rupture of membranes is defined as rupture of Amniotic Membranes with release of amniotic fluid more than 1 hour prior to onset of labour. It may be term i.e. after 37 weeks and preterm i.e. prior to 37 weeks. **Methods:** This is an observational study carried out in Teerthankar Mahaveer Medical College & Hospital (Maternity Ward) over a period of 24 months from June '14 to June '15. 182 cases of prelabour rupture of membranes were collected for study. The incidence and maternal outcome of pre-labour rupture of membranes in both term and preterm pregnancies was observed and statistically analyzed. **Results:** The incidence of disease is more in primigravida in the age group of 20-30 years. Infection and coitus are one of the important causes, which are preventable to an extent. The most common organism grown in vaginal swab culture was E. coli, followed by Klebsiella, Staph aureus, Enterococci and Group Beta Streptococcus. There was no maternal mortality in the study group. **Conclusion:** Prelabour rupture of membranes and preterm prelabour rupture of membranes require good maternal – fetal monitoring and timely interventions which can provide the best of maternal outcomes.

Keywords: Etiology, Incidence, Maternal outcome, Rupture of membranes.

INTRODUCTION

Pre-labour rupture of membranes (PROM) is defined as rupture of fetal membranes occurring prior to onset of labour.^[1]

Preterm pre-labour rupture of membranes (PPROM) refers to the occurrence of this event prior to 37 completed weeks of gestation and accounts for about one – fourth for all cases of ruptured membranes.^[1,2]

PPROM is the leading cause of preterm births and perinatal morbidities. Prematurity and its recognized sequelae like, respiratory distress syndrome, intraventricular hemorrhage, necrotizing enterocolitis are major complications. Other fetal complications owing to long standing oligohydramnios in PPRM before 26 weeks are skeletal and craniofacial abnormalities and pulmonary hypoplasia.^[2-4]

Name & Address of Corresponding Author

Dr. Astha Lalwani
Assistant Professor, Dept. of Obstetrics & Gynaecology,
Teerthankar Mahaveer Medical College, TMU,
Moradabad, UP.
E-mail: priyesumanrastogi@gmail.com

At or near term, the frequency of complications is lower but never the less, may sometimes be severe. Neonatal morbidities are mainly due to infection. Fetal maternal outcome is dependent on many factors, primarily on gestational age, interventions (antibiotics, steroids) done, duration of labour, development of intrapartum chorioamnionitis.^[5]

Maternal morbidities are found in terms of chorioamnionitis leading to endometritis, puerperal pyrexia, wound infection. Further consequences can be increased obstetric interventions in terms of instrumental deliveries and caesarean sections due to fetal distress or in-coordinate uterine actions.^[6-8]

Of all the reasons, bacterial infection of the membranes i.e. subclinical chorioamnionitis is most likely to result in PROM. Prolongation of pregnancy carries the risk of intraamniotic infection (clinical chorioamnionitis) leading to high incidences of neonatal sepsis, periventricular leukomalacia, cerebral palsy, broncho-pulmonary dysplasia and neonatal death.^[4]

In the absence of clinically obvious intraamniotic infection, fetal distress, placental abruption, prolongation of pregnancy to reduce the risk of prematurity has been the main goal of conservative management in PPRM above 28 weeks. However it possess a significant risk of potential development of foeto – maternal sepsis, leading to more adverse neonatal outcomes.^[9,10]

Thus the decision to abandon expectant management of womb with PPRM in favor of delivery requires a close assessment of potential risks in those pregnancies expectantly managed vs the gestational age related risks for neonatal morbidity & mortality related to intentional delivery.

Even though most cases are idiopathic and unpreventable, close monitoring with timely intervention and good neonatal set up, can contribute significantly to reduce foeto- maternal morbidities & mortalities.

Pre-labour rupture of membranes is one of the most challenging and controversial obstetric dilemma which occurs even in low risk pregnancies. So the aim of the present study is to know the incidence and maternal outcome of pre-labour rupture of membranes in both term and preterm pregnancies in Teerthankar Mahaveer Medical College & Hospital with clear liquor.

MATERIALS AND METHODS

This is a clinical observational study carried out in Teerthankar Mahaveer Medical College & Hospital (Maternity Ward) over a period of 24 months from June '14 to June '15. 182 cases of prelabour rupture of membranes were collected for study. All cases of PROM/PPROM above 28 weeks were admitted in the labour ward. The patient's name and age were noted. Detailed antenatal history was taken including parity, period of gestation, menstrual history, risk factors if any, antenatal care and socio economic status. History of recent coitus, genitourinary infection, history of PPRM/PROM in previous pregnancy was taken. History of presenting complaints of leaking per vaginum, duration of leaking, colour of liquor was also recorded.

Complete general examination to identify nutritional status (BMI), anemia, genital hygiene, temperature, pulse rate, blood pressure and respiratory rate were noted. Cardiovascular, respiratory and central nervous systems were assessed. Obstetric Examination was done at admission to determine Gestational Age, the Presentation, Liquor volume, Estimated Fetal Weight and Fetal Heart Rate. Per Speculum examination was done to confirm active leaking of amniotic fluid with pooling of amniotic fluid in the vagina, leaking with valsalva, nitrazine litmus test and Ferning test.

A Cervical swab or high vaginal swab was taken. Other investigations done like CBC, Blood Sugar, Urine R/E, CRP were done. Non Stress Test was done for fetal surveillance; Ultrasound to confirm the presentation, the Amniotic Fluid Index and the gestational age.

All patients admitted were started on IV antibiotics (IV Ampicillin 2 gm IV followed by 1 gm IV 8th hourly). Steroids (Betamethasone) 12 mg 24 hours apart in 2 doses were given IM if gestational age was less than or equal to 35 weeks.

Patients with gestational age less than 35 weeks were put on conservative management till 24 hours after the last dose of Betamethasone if no signs of chorioamnionitis were present. Pregnancy was terminated if maternal fetal surveillance was not good. Patient was monitored with NST twice a day and alternate day blood counts. Patients at or more than 35 weeks of gestation were induced at

admission with PGE2 gel if Bishop's score <5 and Oxytocin if Bishop's score >5. Term patients with previous LSCS who were not in labour with unfavorable cervix were taken up for repeat LSCS. Maternal outcome was noted with respect to fever, PPH, retained placenta, wound infection.

Inclusion Criteria:

1. Singleton pregnancy between 28-42 weeks.
2. Primigravida and multigravida with confirmed cases of leaking.
3. Cervical dilatation of <3 cm at admission and not in active labour.

Exclusion Criteria:

1. Multiple gestation.
2. Meconium stained liquor.
3. Maternal complications interfering with active management of PROM like preeclampsia, Heart Disease, Diabetes Mellites.

RESULTS

A total of 182 patients' i.e 14.2% of the patients who delivered in my study period presented with leaking PV. Of these, 10.2% had PROM and 4% had PPRM [Table 1].

Table 1: The incidence of premature rupture of membrane.

Variables	No. of cases	Percentage
PROM	131	10.2
PPROM	51	4.0
Total	182	14.2

In both the groups, percentage of primigravidae was more, i.e 63.3% in PROM group and 68.6% in PPRM group [Table 2 & 2a, Figure 1]. The significance of the difference between the 2 groups may be tested by using c2 Test.

H0: There is no significance between the two groups

H1: There is significance between the two groups

Level of Significance = 0.05
 Degrees of freedom = (2-1)(2-1) = 1

$$c^2 = \sum \frac{(O-E)^2}{E}$$

$$= \frac{(83-84.9)^2}{84.9} + \frac{(48-46.1)^2}{46.1} + \frac{(35-33.1)^2}{33.1} + \frac{(16-17.9)^2}{17.9}$$

$$= 0.43 < 3.84$$

i.e the calculated value is less than the tabulated value of c20.05 at 1 d.f. Hence H0 is accepted. So statistically there was no significant difference on this basis between the two groups at 5% significance.

Maximum incidence of both PROM and PPRM was found between 20 to 30 years of age, suggesting that age has no significant association

with Preterm Pre-labour Rupture of Membranes (PPROM) [Table 3, Figure 2].

Total number of PPRM cases was 51, out of which 9 cases i.e 17.6% of all PPRM were of less than 32 weeks gestation, and constituted 4.9% of total cases of ruptured membranes. All 9 babies were covered with steroids and all went into spontaneous labour in 7– 10 days. Maximum incidence of PPRM was between 35 completed weeks to 37 weeks i.e 62.7% of PPRM and 17.5% of total cases [Table 4].

The cause for PROM and PPRM was not detected in the majority of the patients. Associated factors like presence of positive vaginal swab culture, previous PPRM / PROM and coitus in last week were present in rest of the patients. Incidence of vaginal swab culture positive was comparable in both PROM and PPRM groups.

Infection is one of the important causes of PROM which is preventable to an extent. 40 cases out of 182 cases had cervical swab positive for bacterial growth, but it was not conclusive of intra-amniotic infection and neonatal sepsis, as of these, only 12.5 % babies had blood culture positive [Table 5].

The most common organism grown in vaginal swab culture was E. coli found in 15 cases, followed by Klebsiella in 11 cases, Staph aureus in 8 cases, Enterococci in 5 cases and Group Beta Streptococcus was found in 1 case. However, baby didn't have GBS septicemia [Figure 3].

Intrapartum chorioamnionitis developed in 1 patient in term PROM and in 2 patients in Preterm PROM inspite of antibiotics. It was diagnosed by presence of fever, fetomaternal tachycardia, and leucocytosis. Postnatally, 7 and 8 patients developed fever in PROM and PPRM group respectively. There was no maternal mortality in the study group [Table 6].

Table 2: The incidence of premature rupture of membrane in primi and multi-gravida.

Gravida	Total	PROM	PPROM
Primigravida	118	83	35
Multigravida	64	48	16
Total	182	131	51

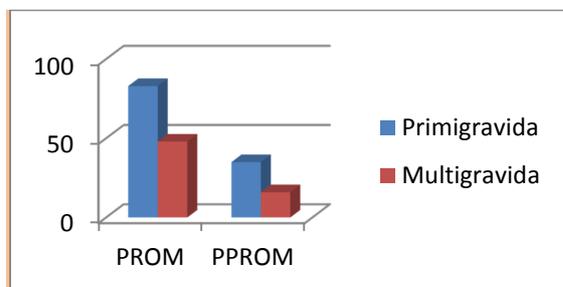


Figure 1: Comparison of the incidence of disease in primi and multi-gravida.

Table 2a: Expected Frequencies.

Gravida	PROM	PPROM	Total
Primigravida	84.9	33.1	118
Multigravida	46.1	17.9	64
Total	131.0	51.0	182

Table 3: The incidence of premature rupture of membrane in different age groups.

Age group (yrs)	PROM	PPROM	Total
15 – 20	4	3	7
20 – 30	106	37	143
30-45	21	11	32
TOTAL	131	51	182

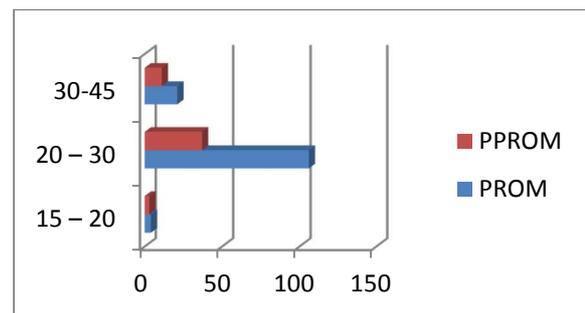


Figure 2: Comparison of incidence of disease in different age groups.

Table 4: The incidence of premature rupture of membrane as per gestational age.

Gestational age	PPROM	PROM
28 - 32 weeks	9	
32 - 35 weeks	10	
35 - 37 weeks	32	
> = 37 weeks	-	131
Total cases:	51 + 131 = 182	

Table 5: The common etiological factors for premature rupture of membrane.

Etiology	No. of cases
Idiopathic	111
Infection	40
Previous PROM	20
Coitus	10
Cervical surgeries, maternal diseases	Nil

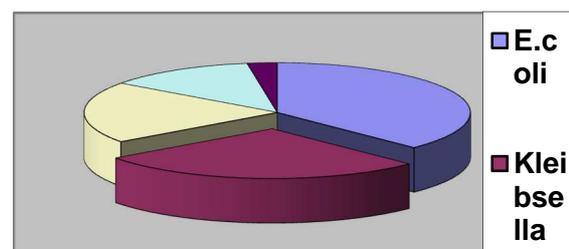


Figure 3: The frequency of bacteria causing pre mature rupture of membrane.

Table 6: The maternal outcome in pre-mature rupture of membrane.

Maternal Outcome	PROM	PPROM
Intrapartum chorioamnionitis	1	2
Abruption	Nil	Nil
Labour dystocia	5	1
PPH	3	2
Retained placenta	Nil	2
Delayed wound healing	3	Nil
Fever	7	8

DISCUSSION

Premature rupture of membranes (PROM) is defined as Rupture of Amniotic Membranes with release of amniotic fluid more than 1 hour prior to onset of labour. It may be term (PROM) i.e. after 37 weeks and preterm (PPROM) i.e. prior to 37 weeks.

The incidence of disease is high as stated by various studies. Incidence of PROM in my study is 10.3% and of PPRM is 4.0%.

M K Sanyal ¹¹	Shehla Noor ¹²	Mercer ¹³	Sita Ram shrestha ¹⁴	Present study
2.6% PROM	16% PPRM	3% PROM	6.06% PROM	10.3% PROM / 4%PPROM

In this study, 66 % of patients with PROM were primigravida as compared to 68.6% of primigravida in PPRM group. 79.5 % patients were from 20 – 30 years in PROM as compared to 74.5 % patients in PPRM group.

As this study was carried out in a private hospital, majority of the patients belonged to upper medium class (90%). Hence, though PPRM (especially before 32 weeks) as compared to PROM (at term) is considered to be more common in low socioeconomic class with poor nutrition and hygiene, thus this study was not able to depict particular relevance.

Parity, age group, socioeconomic status was not statistically significant in both groups i.e PROM and PPRM (p value > 0.05%).

Shehla Noor found in her study that PPRM was common among patients who were young (15 – 25 years) with 58.8% incidence and with low socioeconomic status with 68.2%. Further she concluded that risk of PPRM was higher among primi (42.2%) with GA between 30 – 35 weeks (43.5%) and 35 – 37 weeks (35.2%).^[12]

Devi Anjana^[15] did a comparative study between PROM and PPRM and concluded that majority of patients in both groups were in 20 – 29 years. Further findings were similar to the present study that women on both groups were similar in age, gravida education with p > 0.05.

Although it is widely agreed that PROM is multifactorial, findings from my study show that mostly the cause is idiopathic but can be associated with E. coli, bacterial vaginosis, Staph aureus. Even if we reinforce early detection and treatment of lower genital tract infections there is still a great research to explicate the biological forces of fetal membranes, especially with regard to exogenous risk factors such as nutritional deficiency and infection.

In this study, main cause for PROM was idiopathic (61%) followed by genital tract infection (30%), previous PROM (11%), coitus (5.5%). No case of cervical surgeries, connective tissue disorder was seen

In Shehla Noor^[12] study, previous history of PROM was in 30.6% cases and Devi Anjana^[15] showed that 40% in PROM group had history of coitus 2 weeks before delivery.

Genital tract culture was found in 22% of cases, out of which most common organism isolated was E coli (37.5%) > kleibsella (25%) > staph aureus (20%) > enterococci (12.5%) and bacterial vaginosis (5%). Beagrie found Gram positive Staphylococcus as most common organism in western country^[16], whereas in India, Rao K^[17] found that organism most commonly found was E coli > streptococcus > kleibsella. Mhasker^[18] found a prevalence of 1.62% of Gram positive Staphylococcus in asymptomatic cases in India.

P. Madhivanan^[19] in his study found that 6% of cases had UTI at admission, 1/3rd had h/o coitus in past week. Vaginal swab culture was positive in 60 % of cases, with staph aureus as most common organism (28%). Habeebullah and Baswaraj^[20] also in their study found E.coli as most common organism isolated from genital tract and surface cultures of babies, but Kleibsiella species was most common organism isolated from blood.

Maternal outcome was measured in terms of labour dystocia, abruption, PPH, retained placenta, postnatal fever, delayed wound healing. Labour dystocia was more in PROM as compared to PPRM. Both groups had almost equal incidence of fever postnatally.

Out of total 182 cases with leaking, only 2 patients (1%) had fever at admission, 3 pateints developed fever intrapartum (1.6%), 2 in PPRM and 1 in PROM.

Inspite on I.V antibiotics, postnatally, 8 mothers (16%) had fever in PPRM group and 7 (5.3%) mothers had fever in PROM group. Delayed wound healing was in 2.3% cases of PROM, 4.6% of patients in PROM group had labour dystocia (subjected to CS) as compared to 2% in PPRM group. 2.3% had PPH (atonic) in PROM group and 4% in PPRM group. No case of abruption was seen in either group. Most of postnatal fever was associated with prolonged labour. In Shehla Noor study^[12], postntally 16.47% mothers developed

infection. Ananth CV^[21] proved that prophylactic antibiotic use was associated with reduced perinatal morbidity, neonatal sepsis, endometritis and chorioamnionitis. But it does not totally prevent infection.

CONCLUSION

Total number of deliveries in the present study period was 1270 out of which 131 patients had PROM and 51 patients had PPRM. In the majority of patients, the cause for PROM was not detected, but associated causes like urogenital tract infections, previous history of PPRM / PROM and coitus were found responsible in the rest. To conclude, prelabour rupture of membranes and preterm prelabour rupture of membranes require good maternal – fetal monitoring and timely interventions which can provide the best of maternal outcomes.

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