Original Research Article

A prospective study of clinical profile of premature rupture of membranes and its effect on maternal and perinatal outcome at term gestation in primigravida

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ABSTRACT

Introduction : Premature rupture of membranes (PROM) is defined as the spontaneous rupture of amniotic membranes with a release of amniotic fluid, before the onset of labor. If it occurs after 37 weeks of gestation, it is called as term PROM. The incidence of PROM worldwide varies between 5-10%.Out of which 80% occurs at term. In India, the incidence of PROM was reported as 7-12% in all labours.

Materials and Methods: This study was a prospective, observational hospital based study which include the cases admitted to labour ward, Department of Obstetrics, District hospital, Tumakuru, Karnataka with Premature rupture of membranes or prelabor rupture of membranes (PROM) after fulfilling the inclusion and exclusion criteria.

Results: Out of 220 participants, about 60% (132) of subjects delivered vaginally and40%(88)of subjects underwent caesarean section. Among the 88 subjects who underwent caesarean section, the indications were fetal distress(34.09%), CPD(23%), failed induction (15.9%), non-progress of labour (23.86%). Among the study population, 10(4.54%) babies were with APGAR score <7 and 210(95.45%) babies were with APGAR score ≥7.

Conclusion: The Premature rupture of membranes at term still remains as one of the challenging situation to the practicing obstetrician. It is still an important cause of maternal and perinatal morbidity.

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1. Introduction

Premature rupture of membranes (PROM) is defined as the spontaneous rupture of amniotic membranes with a release of amniotic fluid, before the onset of labor. If it occurs after 37 weeks of gestation, it is called as term PROM. When the membranes rupture before 37 weeks, but after 28 weeks of gestation, it is termed as the preterm premature rupture of membrane (PPROM). [1]

The incidence of PROM worldwide varies between 5-10%. Out of which 80% occurs at term. In India, the incidence of PROM was reported as 7-12% in all labours. [1,2]

Risk factors associated with PROM include tobacco abuse, low socioeconomic status, low body mass index, PROM in previous pregnancy, vaginal bleeding at any trimester in pregnancy, polyhydramnios, multiple gestations. [1,3]

The maternal complications associated with PROM are chorioamnionitis, dysfunctional labour, abruption of placenta, increased caesarean section rate, PPH, post operative wound infection, endomyometritis, pelvic abscess, septicaemia. [4,5]

Perinatal morbidity is due to respiratory distress syndrome, hypothermia, Transient Tachypnea of Newborn, meconium aspiration syndrome, neonatal sepsis. Three common causes for neonatal death associated with PROM are sepsis, asphyxia and pulmonary hyperplasia. Early

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Onset Neonatal Infection (EONI) is often acquired prenatally in pregnancies with PROM and is associated with increased neonatal morbidity and mortality.

Many studies on Term PROM has shown increase in cesarean rate[6,7] and increase in the perinatal complications.[8] However, in contrast, some studies have shown Term PROM does not increase the LSCS rate[9] and perninatal complications.[1] The identification of risk factors and meticulous management of term PROM is very crucial to decrease maternal and fetal morbidity and mortality.[1] This prompted me to do the study on term PROM.

2. Aim and Objectives

1. To assess the clinical profile of PROM-like age, socio economic status, risk factors like anemia, h/o coitus, h/o UTI.
2. To determine the maternal outcome of PROM at term gestation in primigravida-mode of delivery, morbidities like febrile morbidity, PPH, wound infection, puerperal sepsis.
3. To determine the perinatal outcome of PROM at term gestation in primigravida.

3. Materials and Methods

This study was a prospective, observational hospital based study which included the Primigravidas admitted to labour ward, Department of Obstetrics, District hospital, Tumukuru, Karnataka with Premature rupture of membranes or prelabor rupture of membranes (PROM) after fulfilling the inclusion and exclusion criteria. In the present study, 220 subjects who attended the labour ward, Department of Obstetrics. Study Duration was One and half year. (i.e. Oct 2019 to Apr 2021).

Sample Size:Sample size (n) = Z2 * P * (1-P)

E2Z value for 95% level of significance (Z) = 1.96 Incidence Rate (P) = 10% = 0.1

Error margin (E) = 4% = 0.04

Sample size (n) = (1.96)2 *0.1 * 0.9 (0.04)2

= 216.09 ~ 220

3.1. Inclusion criteria

Primigravida, Age between 19 to 35 years,37-42 weeks of gestation, Vertexpresentation, Direct visualization of amniotic fluid, Cervical dilatation <3cm.

3.2. Exclusion criteria

Multigravida, Gestational age < 37weeks or > 42 weeks, Multiple pregnancies, Malpresentations, Polyhydramnios, Intra uterine demise, Obstetric complications like GDM, Pre eclampsia, Rh negative pregnancy.

3.3. Method of collection of data

Patients considered as per inclusion and exclusion criteria admitted into labour ward, Department of Obstetrics, District hospital, Tumukuru, Karnataka were selected. A detailed history including age, booking, socioeconomic status, menstrual history, h/o leaking per vagina, time duration since leaking per vagina, its color, odour, association with pain or bleeding per vagina, perception of fetal movements, h/o fever, h/o any cervical surgeries, h/o coitus, h/o urinary tract infection was taken.

Confirmation of the diagnosis was done by sterile speculum examination. Ultrasound was done if necessary-to look for amniotic fluid, fetal well-being.

Admission test was done. Pelvic examination was done to note the Bishop score and adequacy of pelvis. Bed rest was advised and prophylactic IV antibiotic was given. Monitored the patient in labour room -temperature, Blood pressure, respiratory rate, abdominal tenderness, foul smelling vaginal discharge 4th hourly. Waited for spontaneous onset of labour till 6-12 hours, if there was no major degree CPD or fetal distress. After 6-12 hours, depending upon BISHOP score and Cardiotocography, patients were considered for expectant management /induction of labour.

Monitored with partogram. In case of failed induction, non-progress or any obstetric indications, cesarean section was done. Immediately after delivery, APGAR score of the newborn was noted at 1 min and 5 min interval. Followed up the patients to assess whether they had any PPH, febrile morbidity, chorioamnionitis, puerperal sepsis, wound infection, anemia. Neonatal follow up included any NICU admission, RDS, sepsis, hyper bilirubinemia, Birth Asphyxia, neonatal mortality.

3.4. Statistical analysis

Maternal and neonatal complications were considered as primary outcome variable. Bishop score was considered as Primary explanatory variable. Descriptive statistical analysis was done by mean and standard deviation for quantitative variables and frequency and percentages for categorical variables. And the count variables were analyzed by the Chi- square, expressing as number. Data was also represented using appropriate diagrams like bar diagram, pie diagram and cluster bar diagram. CoGuide was used for statistical analysis.

4. Results

A total of 220 patients participated in this study conducted at district hospital, Tumakuru, Karnataka, a tertiary care hospital between October 2019 to April 2021 with clinical features and investigations suggestive of Premature rupture of membranes or pre labor rupture of membranes (PROM).

Mean age of the subjects with term gestation in primigravida is 22.59years. Most of the cases were in the age group of19 24years (70%). The unbooked and booked cases for the antenatal care were 119(54.09%) and 101(45.91%) respectively. The low socio-economic status (84.55%) constituted the predominant section in the study population.(Table 1)

4.1. Outcome

Out of 220 participants with Non stress test, 188 (85.45%) cases were reactive. 32(14.55%) were non-reactive. Spontaneous labour was observed in 149(67.73%) subjects and labour was induced in 71 (32.27%) subjects. Meconium stained liquor was present in only 12.73% of patients. Out of 149 participants with favorable bishop score, 92 (61.74%) women delivered vaginally and 57 (38.26%) women underwent caesarean section. Out of 71 participants with unfavorable bishop score, 40 (56.34%) women delivered vaginally and 31 (43.66%) women underwent caesarean section. The p value being 0.044 and was considered statistically not significant. So 60% (132) of subjects delivered vaginally and 40% (88) of subjects underwent caesarean section. Among the 88 subjects who underwent caesarean section, the indications were fetal distress (34.09%), CPD (23%), failed induction (15.9%), non-progress of labour (23.86%).

Maternal morbidity was seen in 23 patients (10.45%). Wound infection was the major morbidity which was seen in 13 patients. Febrile morbidity was seen in 9 patients and puerperal sepsis in 1 patient.(Table 2)

Maternal morbidity were more in PROM >24 hours group, There was no maternal mortality in the present study.

4.2. Neonatal outcome

Among the study population, 9 (4.09%) babies were in birth weight 2000 to 2499 grams, 192(87.27%) babies were in 2500 to 2999 grams, and 19 (8.64%%) babies were in ≥ 3000 grams. Among the study population, 10(4.54%) babies were with APGAR score <7 and 210(95.45%) babies were with APGAR score ≥7.(Table 3)

4.3. Descriptive analysis of NICU admissions in the study population (N=220)

About 31% (68) of neonates were admitted into NICU. The causes of admission were Hyper bilirubinemia 20(9.09%), Respiratory Distress Syndrome 30(13.63%), Neonatal sepsis 15(6.82%) ,Birth Asphyxia 3 (1.36%)

There were 5 neonatal deaths. The causes for neonatal mortality was Birth Asphyxia in 2 neonates, Neonatal Sepsis in 1 neonate and Respiratory distress in 2 neonates.(Figure 1)

Table 1: Descriptive analysis of risk factors in the study population (N=220

Risk factors	Frequency	Percentages
History of urinary tract infection	22	10.00%
History of coitus	24	10.91%
Anemia	46	20.91%
Absent	128	58.18%

Table 2: Descriptive analysis of maternal morbidity v/s time of rupture to delivery interval

Time of PROM to delivery	No. of cases with Maternal morbidity	Percentage
<12hrs	1	4.34%
12-24hrs	4	17.39%
>24hrs	18	78.26%
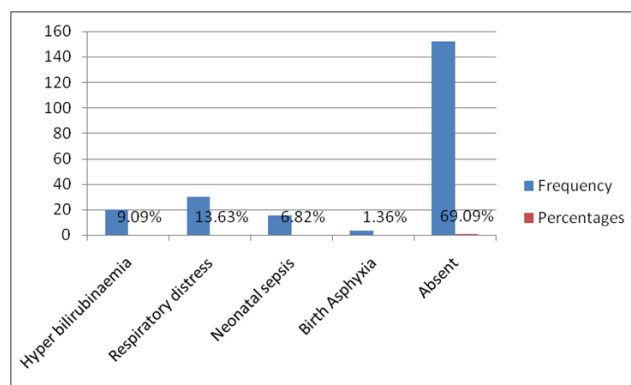
Figure 1: Bar chart of neonatal complications in the study population (N=220)

5. Discussion

5.1. Demographic data analysis

The mean age in the subjects recruited in the study was found to be 22.59 years and most of the cases were in the age group of 19-24 years (70%). This is similar to study done by Zirsangliana Chhangte et al[15] who quoted 50 % in the 18-24 years age group. Similar results were obtained in study performed by Abirami et al[1] where majority of the patients were in the age group of 22-25 years (42%).

Majority of the cases were un-booked cases in this study (54%). This correlates with the study done Revathi et al[9] in which the maximum number of cases were un booked (78%). The study of Jalli Padmaja et al[11] showed similar results (73.3% cases were un-booked).

The major set of cases belonged to low socio economic status (84.55%). This is on par with the study conducted by Amulya. M. N et al. [12] (80%) and Revathi et al[9](62%).

Table 3: Descriptive analysis of perinatal outcome vs time of rupture to delivery interval

No. of cases	Perinatal morbidity	Percentage	Perinatal mortality	Percentage
46	11	23.91%	-	-
140	42	30%	2	1.42%
34	18	52.94%	3	8.82%

Table 4: Risk factors in various studies

Risk factors	Revathi et al[9]	Lovereen et al[10]	Jalli Padmaja et al[11]	Amulya et al[12]	Present study
H/o UTI	13%	29%	10%	15.83%	10%
H/ocoitus	-	9.09%	-	18.33%	10.91%
Anemia	22%	-	20%	-	20.91%
Absent	42%	52%	27%	59.16%	58.18%

Table 5: Indications for LSCS in various studies

Indications for C-Section	Abirami et al[1]	Sailaja et al[2]	Priyanair et al[6]	Presentstudy
Fetal distress	25.61%	32.73%	42.42%	34.09%
CPD	14.87%	-	-	26.13%
Failed induction	13.22%	-	21.21%	15.90%
Non progress of labour	9.91%	45.45%	-	23.86%

Table 6: Maternal morbidity in various studies

Maternal morbidity	Revathi et al[9]	Sailaja et al[2]	Nivedhana arthi et al[13]	Present study
Fever	22%	8%	10.7%	4.09%
Wound infection	14%	2.5%	2.7%	5.91%
PPH	-	1%	-	0.45%
Chorioamnionitis	4%	-	1.3%	-
Absent	60%	82.5%	85.3%	89.55%

Table 7: Perinatal morbidity in various studies

Perinatal morbidity	Abirami et al[1]	Priya Nair et al[14]	Sailaja et al[2]	Present study
Hyper bilirubinemia	0.4%	17.56%	-	9.09%
Respiratory distress syndrome	6.9%	2.7%	-	15.00%
Neonatal sepsis	1.2%	8.1%	4%	6.82%
Birth Asphyxia	-	-	14%	1.36%

5.2. Clinical profile analysis

The risk factors we observed in our study included were history of urinary tract infection (10%), history of coitus (10.91%) and anemia (20.91%).(Table 4)

5.3. Mode of delivery

Vaginal delivery was the commonest mode of delivery. The LSCS rate was 40% in this study. This is comparable to the studies by Priya Nair et al[6] (44%), Anjana Devi et al[7] (45.2%), Singhal et al[14] (49%). However, in disparity, studies done by Revathi et al[9] showed Lower LSCS rates 29%.

In the study, only 28 cases (12.73%) had meconium-stained liquor. Similarly, 17% cases of meconium stained liquor was found in study done by Abirami et al[1] and Amala et al[16].

5.4. Indications for LSCS

In the study, LSCS was done in 88 cases, indications were - 30(34.09%) fetal distress, 23(26.13%) CPD, 14(15.90%) failed induction and 21(23.86%) non progress of labour.

5.5. Maternal and Perinatal outcome analysis

5.5.1. Maternal outcome

As per our observation, maternal morbidity was seen in 10.4% of patients. This is in concordance with the studies of Nivedhana Aarthi et al[13] (14%). But it is in discordance with the study of Sailaja et al[2] where the maternal morbidity was significantly high.

5.5.2. Maternal mortality

There was no maternal mortality in our study. This is on par with the study conducted by Sailaja et al,[2] Zirsangliana et al[15] Abirami et al.[1]

5.6. Perinatal outcome

In our study, there were 68 (30.91%) NICU admissions-Hyperbilirubinemia 20(9.09%), Respiratory Distress Syndrome 30(13.63%), Neonatal Sepsis 15(6.82%), Birth Asphyxia 3(1.36%).

5.7. Perinatal mortality

There were 5 perinatal deaths in the study 2.27%. This coincides with the study of Sailaja et al[2] (3%). But, it is in contrast with the study carried out by Kiranmai et al[8] where perinatal mortality was 14.6%. The causes of neonatal mortality were Respiratory distress in 2 babies, birth asphyxia in 2 babies and Neonatal sepsis in 1 baby. This is in concordance with study done by Sailaja et al[2].

6. Conclusion

The Premature rupture of membranes at term still remains as one of the challenging situation to the practicing obstetrician. It is still an important cause of maternal and perinatal morbidity.

Proper antenatal care should be available to all pregnant women. It is also essential to educate the antenatal mother regarding regular ANC checkups for the better maternal and perinatal outcome. Emphasizing the possibility of prelabour rupture of membranes to all women during antenatal checkup and the need to report at the earliest is necessary. Evaluation of risks of PROM and treatment of factors like anemia, UTI, genital infections may reduce the incidence of PROM. Proper parto graphic monitoring should be done to prevent maternal and perinatal morbidity and mortality. Timely diagnosis and necessary intervention (Expectant/Induction of labour, prophylactic antibiotics) is essential to reduce maternal and perinatal morbidity and mortality.

7. Source of Funding

None.

8. Conflict of Interest

None.

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