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Original Research Article

A study of feto-maternal outcome in case of premature rupture of membrane at a tertiary care center

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ABSTRACT

Background: Premature rupture of membranes is the rupture of the fetal membranes in the absence of uterine contraction or before the onset of labor. When this occurs before 37 weeks of gestation, it is termed as preterm premature rupture of membranes. Management depends upon gestational age and the presence of complicating factors. An accurate assessment of gestational age and knowledge of the maternal, fetal and neonatal risks are essential to appropriate evaluation, counselling, and care of patients with PROM. The purpose of the study is timely diagnosis and appropriate management of the cases of PROM and PPRM to improve maternal and neonatal outcomes.

Methods: A Prospective study was performed at the department of obstetrics and gynecology, at a tertiary care center from August 2020 to December 2021. A clinical data sheet was made for recording all information about the pregnant women after taking their consent. And their maternal and neonatal outcomes were recorded.

Results: a total of 150 cases of PROM and PPRM were taken during our study out of which 53.33% belong to the younger age group, 43.33% were primi gravida, 66.66% belonged to the lower socioeconomic class, 25.33% had a previous history of abortion followed by dilatation and evacuation, rate of cesarean delivery was 34.66% and rate of NICU admission of neonates was 15.78% and 57.87% babies had low birth weight and rate of stillbirth was 1.97%. whereas 34.66% of cases had various complications related to PROM.

Conclusions: Individualized management of PROM cases depending on the gestational age and risk of complications and antibiotic coverage is the best way to achieve a good fetomaternal outcome.

Keywords: Premature rupture of membrane, Preterm premature rupture of membrane, Chorioamnionitis, Pre-term

INTRODUCTION

Premature rupture of membranes (PROM) is the rupture of the fetal membranes in the absence of uterine contraction or before the onset of labor.¹ When this occurs before 37 weeks of gestation, it is termed a preterm premature rupture of membranes (PPROM). Preterm PROM complicates approximately 3% of all pregnancies and leads to one-third of preterm births.² It is associated with

an increased risk of prematurity and a number of other perinatal and neonatal complications, including a 1 to 2 percent risk of fetal death.¹ Among them preterm delivery is the most common complication, other complications include pulmonary hypoplasia due to severe oligohydramnios, skeletal and joint deformities of the fetus due to compression, increased risk of neurodevelopmental impairment, and neonatal white matter damage. About 30-40% of women with PROM deliver within 48 hours and 56-63% will deliver within one week of membrane

rupture. The time from membrane rupture until delivery, which is known as the latent period, is generally inversely proportional to the gestational age at which PROM occurs. The maternal complications associated with PROM include chorioamnionitis, placental abruption, umbilical cord accidents, postpartum hemorrhage, and endometritis. Risk factors associated with PROM are Black race, lower socioeconomic status, low maternal body mass index (BMI) <19.8 kg/m², smoking, past history of sexually transmitted infections or genital tract infections or urinary tract infections, history of a previous preterm delivery or past history of PROM, vaginal bleeding, or have uterine distention (e.g., polyhydramnios, multifetal pregnancy), intrauterine death, fetal abnormalities, short cervix or cervical incompetence. Procedures that may result in preterm PROM include cervical cerclage and amniocentesis, fetal blood sampling.³ Various theories explaining PROM include Oxidative stress-induced DNA damage, Choriodecidual infection, or inflammation which leads to a cascade of leukocyte activation and cytokine release.^{4,5} A decrease in the collagen content of the membranes which predispose patients to preterm PROM; premature cellular senescence.

METHODS

A Prospective study was performed at the department of obstetrics and gynecology, at a tertiary care center from August 2020 to December 2021. After deciding the aim of the study, a clinical data sheet was made for recording all information of the pregnant women after taking their consent.

Inclusion and exclusion criteria

Patients with spontaneous rupture of membranes any time beyond the 28th week of pregnancy, but before the onset of labor were included. Patients with antepartum hemorrhage and associated maternal comorbidities were excluded. Patients presenting with the chief complaints of leaking per vaginum were thoroughly examined. An

elaborative clinical history regarding gestational age calculated from the first day of the last menstrual period or from the earliest first-trimester scan or previous antenatal records and other details regarding risk factors and past obstetrics and personal history was recorded according to Pro-forma. In this study, leaking was diagnosed by doing a per speculum examination in the lithotomy position after emptying the bladder and by asking the patient to cough & the presence or absence of leaking was noted. On admission, a blood sample for leukocyte count and C-reactive protein (CRP), along with urine for routine examination was sent. Management of patients with PROM was decided according to the condition of the patient, duration of gestational age, duration of membrane rupture, any associated complicating factors, maternal and fetal condition, and also the availability of neonatal intensive care facility. Prophylactic antibiotic Injection of Gentamicin 80 mg IV along with Injection of Cefotaxime 1gm IV was given to help reduce the risk of maternal and neonatal morbidity. Injection Betamethasone was given to the mother to improve fetal lung maturity after ruling out chorioamnionitis if the duration of pregnancy was less than 37 weeks. In uncomplicated PROM with more than 37 weeks, local dinoprostone gel (Prostaglandin E₂) or tab misoprostol 25 mcg orally was used to induce the labor. After an initial evaluation, P/V was restricted to a minimum and the progress of labor was monitored from the uterine contraction and descent of the fetal head. Cesarean section was performed when PROM was associated with other complicated factors or fetal distress or in case of leaking for more than 24 hours to reduce the chances of chorioamnionitis and infection. After delivery, all the babies were assessed by neonatologists by assessing the APGAR score at 1, 2 and 5 minutes and also looked for any complicating factors.

RESULTS

A total of 150 cases of premature rupture of membrane were recorded from August 2020 to December 2021 at a tertiary care center.

Table 1: Age, parity, registration, socio economic distribution of patients with PROM (n=150).

Parameters	Frequency (%)	Primigravida (N=65)	Multigravida (N=85)
Age distribution (years)			
18-20	80 (53.33)	48	32
21-30	52 (34.66)	13	39
>30	18 (12)	04	14
Socio economic status, N (%)	Upper	Middle	Lowers
	08 (5.33)	42 (28)	100 (66.66)
Registration details, N (%)	Un booked	Registered with <3 visits	Registered with >3 visits
	12 (8)	36 (24)	102 (68)

Most cases presented with PROM had a history of active or past infection of vaginal or urinary tract infection. Among 85 multigravida patients 38 (25.33%) women had history of previous abortions followed by dilatation and

evacuation. Out of 150 cases 52 (34.66%) cases were complicated (Table 4). The most common complication was oligohydramnios seen in 10.66% of cases. Umbilical cord accidents and placental abruption were the least common complications.

Table 2: Gestational age distribution in patients with PROM and it's outcome.

Parameters	≤34 weeks (N=10) (6.66%)	35-36 weeks (N=77) (51.33%)	≥37 weeks (N=63) (42%)
Gestational age			
Mode of delivery			
Vaginal delivery (N=98) (65.33%)	N=4 (2.66%)	N=51 (34%)	N=47 (31.33%)
Spontaneous delivery	02	12	10
Induced/augmented delivery	02	39	37
LSCS (N=52) (34.66%)	N=6 (4%)	N=26 (17.33%)	N=16 (10.66%)
Elective LSCS	02	05	04
Emergency LSCS	04	21	12

Table 3: Gestational age and fetal outcome (n=152).

Gestational age	≤34 weeks (N=11) (7.23%), Frequency (%)	35-36 weeks (N=78) (51.31%), Frequency (%)	≥37 weeks (N=63) (41.44%), Frequency (%)
Birth weight			
1.0-2 kg (N=16) (10.51%)	11 (7.23)	05 (3.28)	00 (0)
2.1-2.5 kg (N=72) (47.36%)	00 (0)	45 (29.60)	27 (17.76)
≥2.6 kg (N=64) (42.10%)	00 (0)	28 (18.42)	36 (23.68)
APGAR score			
≥8 (N=119) (78.28%)	06 (3.94)	62 (40.78)	51 (33.55)
4-7 (N=24) (15.78%)	02 (1.31)	12 (7.89)	10 (6.57)
1-3 (N=6) (3.94%)	01 (0.65)	03 (1.97)	02(1.31)
0 (still birth) (N=3) (1.97%)	02 (1.31)	01(0.65)	00 (0)
NICU admission			
No of babies (N=24) (15.78%)	04 (2.63)	12 (7.89)	08 (5.26)

DISCUSSION

Preterm premature rupture of membranes is one of the causes of premature birth and perinatal deaths, particularly in developing countries due to poor access to and availability of medical resources to manage and sustain the pregnancy to term. Adolescent pregnancy has a significant relationship with the incidence of complications such as premature rupture of the membrane. As seen in a study done in Indonesia between 2017-2018 at Cempaka room, dr. Doris Sylvanus regional public hospital shows adolescent pregnancy as the risk factor for PROM.⁶ which can be co-related to our study as Most of the affected women belong to the age group of 18-20 years (53.33%). At the age of fewer than 20 years, female reproductive organs have not functioned perfectly which resulted in less formation of connective tissue and imperfect vascularization that formed a thin and weak amniotic membrane, that condition could lead to PROM.⁷ One of the causes of PROM and PPRM is a vaginal infection, a common vaginal syndrome in women of reproductive age that has been associated with increased risks for prematurity and premature rupture of membranes.⁸ as also seen in our study most of them had clinically active or had a past history of urogenital tract infection. The use of antibiotics following PROM is associated with a statistically significant reduction in chorioamnionitis, the number of babies born within 48 hours and seven days, reduced neonatal infection, use of surfactant, oxygen

therapy, and abnormal cerebral ultrasound scan prior to discharge from the hospital.⁹

Table 4: Complications of PROM (n=52).

Complications	N	%
Postpartum infection	30	20
Oligohydramnios	16	10.66
Chorioamnionitis	04	2.66
Umbilical cord accidents	01	0.66
Placental abruption	01	0.66

In this study 43.3% were primigravidae and 57.6% were multigravida indicating multiparity as the risk factor for PROM, which can be compared to the study done at Sadewa hospital (2014).¹⁰ This can occur because the multiparous mothers will affect the embryogenesis process so that the formed membranes will be thinner and fragile which will cause rupture of membranes.¹¹ There was no correlation noted between the number of antenatal visits and the incidence of PROM. Although it is more commonly seen in patients with lower socioeconomic class. The normal vaginal birth rate was high compared to the cesarian section and the most common indication was fetal distress other indications include previous CS, leaking for more than 24 hours, multifetal pregnancy, cord accident, etc. It is seen that the cesarean section rate was higher in primi para patients presented with PROM. Begum shows that only 32% of patients were delivered by

the Cesarean section.^{12,13} Whereas in our study rate of the cesarian section was around 34.6% which is similar to the study. The most common complication was post-partum infection seen in 30 (20%) patients. Although there is less 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 as reported by Arias and Tomich.¹⁴ During this study period, 58 (38.66%) patients were admitted at term (>37 weeks) and 92 (61.33%) patients came before 37 completed weeks of gestation. It is observed that with increasing maturity chances of NICU admission decrease. In developing countries like India, the incidence of perinatal morbidities is still higher especially in a resource-poor setting. Also, 38 (25.33%) patients had a history of previous abortions and D&E shows co-relation with PROM supported by research done in the USA, Lithuania, India, China, and Uganda.¹⁵⁻¹⁸ 100 (66.66%) patients belong to the lower socio-economic status which is one of the risk factors for PROM as seen in many studies.

CONCLUSION

Premature rupture of membranes requires immediate attention. Accurate diagnosis and knowledge of gestational age are crucial to determine the management of the patient. Gestational age dictates management. It is important to monitor patients for signs and symptoms of infection. The patient must be evaluated in a clinical setting in order to determine if a rupture of membranes has occurred. A physician must always tell the patient to present to labor and delivery or an OB/GYN clinic for evaluation. The conclusion drawn at the end of the study was that individualized management of PROM cases depending on the gestational age and risk of complications and antibiotic coverage is the best way to achieve a good fetomaternal outcome.

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