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Original Article

Fetal Outcome in Preterm Prelabour Rupture of Membranes in Different Gestational Age

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Abstract:

Background: Preterm prelabour rupture of membranes (PPROM) is responsible for one third of all preterm births and specially increased risk of prematurity and is associated with significant fetal and neonatal complications with increased risk of fetal death. Appropriate evaluation and management are important for improving fetal outcome. **Objective:** To evaluate the fetal outcome in preterm prelabour rupture of membranes in different gestational age. **Methods:** This Prospective study was carried out in the department of Obstetrics and Gynae, Rangpur Medical college Hospital, Rangpur, from January 2016 to December 2017. A total 100 study subjects were selected after fulfilled the inclusion criteria. Study subjects were divided into two groups, Group-A (Gestational age 28 to <34 weeks) and Group-B (Gestational age 34 to <37 weeks). **Results:** Socio-demographic, clinical parameters and possible risk factors were matched in both groups.Neonatal outcome revealed, APGAR score >7 had 44% in group-A and 80% in group-B and 64% had birth weight between 1.6-2.0 kg in Group-A and 70% had birth weight between 2.1-2.5 kg in Group-B. The difference of APGAR score and birth weight was statistically highly significant ($p<0.001$) between two groups. RDS, Sepsis, and Jaundice had 20%, 16%, 36% in group-A and 4%, 4% and 28% in group-B respectively. The difference was statistically highly significant ($p<0.001$). Neonatal death was 12% in group-A and 4% in group-B and the difference was statistically not significant ($p>0.05$). Referred to NICU were 40% in group-A and 20% in group-B and the difference was statistically significant ($p<0.05$) between two groups. **Conclusion:** PPROM is one of the important causes of preterm birth that can results in high neonatal morbidity and mortality. Neonatal outcome was comparatively better with increase gestational age and birth weight. Therefore management of PPROM requires accurate diagnosis and evaluation of risks and benefits of continued pregnancy or expeditious delivery. Gestational age dependent neonatal morbidity and mortality is important in determining the potential benefits of conservative management of PPROM at any gestation.

Key words: Preterm prelabour rupture of membranes (PPROM), Fetal outcome, Respiratory distress syndrome (RDS), Neonatal intensive care unit (NICU), Membranes- outer chorion and inner amnion.

Introduction:

Preterm Premature rupture of membranes (PPROM) is defined as the spontaneous rupture of fetal membranes prior to the onset of labour and before 37 weeks' of gestation. When membrane rupture occur before 34 weeks, it is concern because no fetal lung maturity occur and after 34 weeks not concern because no adverse outcome of mother, fetus and neonate. Fetal outcome is directly proportional to gestational age and fetal weight[1].

The latent period, which is the time from membrane rupture until delivery, generally is inversely proportional to the gestational age at which PROM occurs[2]. Incidence of PPROM ranges from 3.0-10.0% of all deliveries and leads to one third of preterm births[3]. It increases the risk of prematurity and leads to other perinatal and neonatal complications with 1-2% risk of fetal death[4].

The interval between PPROM and the onset of labour is influenced by many factors including gestational age[5]. Numerous risk factors are associated with PPROM such as black race, lower socioeconomic status, smokers, gravida, occupation[6].

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The fetal membranes, consists of two layers- outer chorion and inner amnion, serve as a barrier to ascending infection[7]. The intact membranes maintain the protective intrauterine fluid environment; the amniotic fluid upon which foetus depends for its survival in utero[8]. Once the membranes rupture, both the mother and fetus are at riskof infection and of other complications[9].

Neonatal complications relate primarily to the gestational age at rupture of membranes[8]. Respiratory distress syndrome (RDS) is the most common complication after preterm PROM at any gestational age. Serious perinatal morbidities that may lead to long-term sequelae or death are common when PROM leads to preterm birth remote from term. Acute neonatal morbidities such as necrotizing enterocolitis, intraventricular hemorrhage (IVH), and sepsis commonly complicate early preterm birth but are relatively uncommon near term[10]. Thus earlier the gestational age at the time of PROM, longer is the latency and more the complications[9].

Corticosteroid for are given for fetal lung maturity and antibiotics to prevent fetal and maternal infection[11]. Tocolytic therapy may prolong the latent period for a short time but do not appear to improve neonatal outcome[2]. The main benefit of the conservative management is prolonging pregnancy which can decrease gestational age-related morbidity associated with prematurity[12]. PPROM is malnutrition and poverty related disease.Regular antenatal care is an important tool to prevent PPROM by identifying the risk factors and its management[15].

The purpose of this study was to find out the fetal outcome of PPROM in different gestational age between 28 to <37 weeks of pregnancy.

Methods:

The study was a prospective observational study carried out betweenJanuary 2016 to December 2017 in Department of Obstetrics and Gynaecology, Rangpur Medical College Hospital, Rangpur. 100 pregnant women both primi and multigravida with a gestational age of 28to <37 weeks and diagnosed as PPROM admitted in different units of Obstetrics and Gynaecology ward, Rangpur Medical College Hospital, Rangpur during this study period were selected as a study population.

Inclusion criteria forPPROM weregestational age between 28 to <37 weeks, both primi & multi gravida with preterm prelabour rupture of membranes, spontaneous rupture of membranes with singleton pregnancies.

Results:

Table I shows that 64% of study subjects were belong to 20- 30 years age in Group- A and 56% in Group-B. The age difference was not statistically significant (p> 0.05) between two groups. Multigravida was 66% in Group-A and 60% in Group-B. 52% had primary level of education in Group-A and 48% in Group-B. 60% came from low socioeconomic status in Group-A and 68% in Group-B. 84% were unemployed in Group-A and 80% in Group-B. Most of the study subjects in both groups were matched in age, gravidity, level of education and socioeconomic status and the difference was not statistically significant (p>0.5) in both groups.

Table I: Socio-demographic profile of the study subjects (n=100)

Parameter		Group-A (Gestational age 28-<34 weeks)n=50		Group-B (Gestational age 34-<37 weeks)n=50		x^2 value	p value
		Number	Percentage	Number	Percentage		
Age(years)	<20	8	16	6	12		
	20-30	32	64	28	56	1.94^{ns}	
	>30	10	20	16	32		
Gravida	Primi gravida	17	34	20	40	0.39^{ns}	
	Multi gravida	33	66	30	60		
Level of Education	Illiterate	14	28	18	36		>0.05
	Primary	26	52	24	48	1.25^{ns}	
	Secondary & Highersecondary	6	12	6	12		
	Graduate	4	8	2	4		
Socio-economic status	Low	30	60	34	68		
	Middle	16	32	14	28	1.05^{ns}	
	High	4	8	2	4		
Occupation	Employed	8	16	10	20	0.27^{ns}	
	Unemployed	42	84	40	80		

ns= not significant

Statistical analysis was done by chi square test. p<0.05 is taken as significant.

Table II shows that APGAR score >7 had 44% in group-A and 80% in group-B and 64% had birth weight between 1.6-2.0 kg in Group-A and 70% had birth weight between 2.1-2.5 kg in Group-B. The difference of APGAR score and birth weight was statistically highly significant (p<0.001) between two groups. RDS, Sepsis, and Jaundice had 20%, 16%, 36% in group-A and 4%, 4% and 28% in group-B respectively. The difference was statistically highly significant (p<0.001). Neonatal death was 12% in group-A and 4% in group-B and the difference was statistically not significant (p>0.05). Referred to NICU were 40% in group-A and 20% in group-B and the difference was statistically significant (p<0.05) between two groups.

Table II: Neonatal outcome of study subjects (n=100)

Parameter	Group-A (Gestational age 28-<34 weeks) n=50		Group-B (Gestational age 34 -<37 weeks) n=50		x^2 value	p value
	Number	Percentage (%)	Number	Percentage (%)		
APGAR Score At 5 min						
<7	28	56	10	20	13.74[s]	
≥ 7	22	44	40	80		
Birth weight (kg)						
1.0 - 1.5kg	3	6	1	2	34.79[s]	<0.001
1.6 - 2.0kg	32	64	6	12		
2.1 - 2.5kg	15	30	35	70		
>2.5 kg	0	0	8	16		
Neonatal morbidity						
RDS	10	20	2	4	16.48[s]	
Septicaemia	8	16	2	4		
Jaundice	18	36	14	28		
No morbidity	14	28	32	64		
Neonatal outcome						
Neonatal death	6	12	2	4	2.17[ns]	>0.05
Alive baby	44	88	48	96		
Referred to NICU	20	40	10	20	4.76[s]	<0.05

ns= not significant
s= significant (p<0.001). p value reached from chi square test.

Discussion:

Preterm prelabour rupture of membranes (PPROM) is a common complication of pregnancy and can lead to increased maternal complications, operative procedures, neonatal morbidity and mortality. This prospective study was conducted in the Department of Gynae & Obstetrics, Rangpur Medical College Hospital, Rangpur to find out fetal outcome of preterm prelabour rupture of membranes in different gestational age. Total 100 patients who were admitted in the labour ward and fulfilled inclusion criteria were enrolled as a study subject. Samples were divided into two groups, Group-A (Gestational age 28 to <34 weeks) and Group-B (Gestational age 34 to <37 weeks).

This study showed that 64% study subjects were in Group-A and 56% study subjects were in Group- B in the age group between 20-30 years. The age difference was statistically not significant (p >0.05) between two study groups (Table I), which was comparable with the study by Mohokar et al in India, where 79% of cases belong to age group between 20 - 29 years[8].This is probably due to the sociodemographic profile is almost similar in south East Asian countries. Multigravida were more common in both groups which was 66% in group-A and 60% in group-B (Table I) and the difference was statistically not significant (p>0.05) which was comparable with Akter et al study in Bangladesh where 62% were multigravida and 38% were primigravida[11]. This study was also similar to other study by Dars et

al in India where 83% were multigravida and 17% were primigravida[13]. Multiparity may be a risk factor for PPROM due to infection like chronic cervicitis, previous trauma to cervix and patulous os. The majority(52%) of the study subjects in group-A and 48% in group-Bwere primarily educated, 28% were illiterate in group-A and 36% in group-B, secondary and higher secondary were 12% in both groups and graduate were 8%in group-A and 4% in group-B (Table I) and the difference was statistically not significant (p>0.05). These findings were correlated with the study by Malik et al in Bangladesh where 45% of the study subjects were primarily educated[14]. This scenario reflects that the literacy rate is increasing in our country probably due to primary education is free of cost. Most of the study subjects were unemployed in both groups. So unemployment and its consequences are responsible for PPROM. Poverty and illiteracy is interrelated and it affects nutritional status, living standard, personal hygiene, immunity and awareness of the population.

The present study showed that 60% study subjects came from low socioeconomic condition in group-A and 68% in group-B and then from middle class family (Table I) and the difference was not significant (p>0.05) which was comparable with study by Dars et al in India, where most of the study subjects belong to poor class in 72% followed by middle class in 21% and upper class 7%[13]. It was seen that PPROM is higher in lower socioeconomic status, the reason for this difference is not clear, but it may be due to poor hygienic condition and also poor sanitation that favours infection and causes PPROM.

In the present study 56% neonates in group-A and 20% in group-B had APGAR score at 5 minutes <7 and 44% in group-A and 80% in group-B had APGAR score at 5 minutes ≥7 (Table II) andthe difference was statistically highly significant (p<0.001). 64% neonates had birth weight between 1.6 - 2.0 kg in group-A and 12% in group-B and 30% had birth weight between 2.1 - 2.5 kg in group-A and 70% in group-B and 16% had birth weight >2.5 kg in group-B (Table II) and the difference was statistically highly significant (p<0.001). This result correlated with the study by Malik et al in Bangladesh where 25% had APGAR score <7 and 75% had ≥7.44% neonates had birth weight between 1.6 - 2.0 kg and 16% had between 2.1 - 2.5 kg[14]. In the present study birth weight gradually increase with increasing gestational age. In this study most of the cases morbidity occurred due to RDS 20%, Sepsis 16% and Jaundice 36% cases in group-A and 4%, 4% and 28% cases in group-B respectively (Table II) and the result was statistically highly significant (p<0.001). From the present study it was observed that more the gestational age at the time of PPROM, less the perinatal complications because lung maturation has to be occurred, increased birth weight and shorter latency period.Though neonatal death was 12% in group-A and 4% in group-B (Table V), the difference was not significant (p>0.05). Neonatal death was more in group-A due to RDS, sepsis and jaundice. This findings consistent with Mohokar et al study in India where RDS 21%, sepsis 10% and hyperbilirubinaemia had 23% study subjects and perinatal mortality occurred in 15% cases due to sepsis, RDS and birth asphyxia[8]. 40% neonate in group-A and 20% in group-B were referred to NICU (Table II) and the difference was significant (p<0.05). In early gestational age (group-A), neonatal admission to NICU were more due to more complications.

The result of present study showed that neonatal outcome was better in majority of cases in group-B (gestational age 34 to <37 weeks) than group-A (gestational age 28 to <34 weeks). Better outcome observed in group-B due to increase gestational age causes lung maturity, increase birth weight and shorter latency period. In early gestational age neonatal morbidity and mortality was more due to more complications. So precaution should be taken to prevent PPROMspecially in early gestational age (28 to <34 weeks) by regular antenatal care, identifying high risk cases and avoiding possible risk factors. High risk cases should be delivered in a tertiary care centre where NICU facilities are available which can reduce significant neonatal morbidity and mortality.

Conclusion:

From this study, it was observed that neonatal outcome was better in PPROM with gestational age 34 to <37 weeks of pregnancy. Where neonatal morbidity like Respiratory distress

syndrome, neonatal sepsis and neonatal mortality was low due to increase gestational age and birth weight and the result was statistically highly significant.In PPROM with gestational age 28 to <34 weeks,neonatal morbidity and mortality was high. Therefore management of PPROM requires accurate diagnosis and evaluation of the risks and benefits of continued pregnancy or expeditious delivery. An understanding of gestational age dependent neonatal morbidity and mortality is important in determining the potential benefits of conservative management of PPROM at any gestation.

Improvement of socioeconomic condition and poverty elimination with the help of government approach and improvement of nutritional status may play a role to prevent PPROM.

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