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Original Research Article

A Study of Perinatal Outcome in Premature Rupture of Membrane

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Abstract: The objective is to assess the perinatal outcome in patients with PROM. Material and method: 40 pregnant women, between 20 to 41 weeks of gestation, with complaint of leaking p/v with positive pooling, nitrazine test and fern test were included in the study group. The control group comprised of 40 pregnant women between 20 to 41 weeks of gestation without any complains. All patients underwent USG examination for AFI calculation followed by comparison of perinatal outcomes between the two groups. Results: 92.5% women with PROM were between 32 to 36 weeks of gestation. Latency period increases as the gestational age of the women with PROM decreases. 6 neonates, from the study group were admitted to NICU, out of which one died due to prematurity, birth asphyxia and infections. Patients with PROM had significantly lower AFI and poorer perinatal outcome. Conclusion: PROM is associated with poorer neonatal outcome. Prompt diagnosis and management of PROM may improve neonatal outcome in women with PROM.
Keywords: PROM, neonatal outcome, prematurity, AFI, ultrasound examination

INTRODUCTION

Premature rupture of membranes is defined as the rupture of fetal membranes before the onset of labor [1]. Preterm Premature Rupture of Membranes is premature rupture of membranes occurring before 37 weeks of gestation [2]. PROM most commonly present as a gush of fluid from the vagina, which is followed by persistent, uncontrolled leakage, however some patients may complain of only small or intermittent leakage or perineal wetness. It has been documented to occur in 2-25% of all pregnancies [3] and has been shown to be the cause of 18-20% of perinatal mortality [4] and 21.4% of perinatal morbidity [5].

Preterm PROM, a complication of 2% to 20% of all deliveries [6], is a known important contributor to maternal and perinatal morbidity and perinatal mortality. Latency in PROM, defined as the interval between PROM and birth [7], is known to be inversely related to gestational age at rupture, and is also related to a multitude of other factors. The major cause of perinatal morbidity and mortality associated with PPROM is prematurity [7]. Failure to identify patients with membrane rupture can result in failure to implement obstetric measures. Conversely, the false diagnosis of membrane rupture can lead to inappropriate interventions such as hospitalization or induction of labor. Therefore, it is highly desirable to establish a definite diagnosis of ruptured membranes in uncertain cases without delay.

Its close association to infection has been the major concern. Chorio decidual infection or inflammation is thought to play a substantial role in the etiology of preterm PROM, more importantly at early gestational ages [8]. It has also been proposed that amniotic fluid possesses certain bacteriostatic properties that protects against potential infections processes and that a decrease in the amniotic fluid volume can impair the pregnant women ability to combat such infections. This latter hypothesis was tested by Vintziuleos *et al.;* [9].

Investigations have demonstrated that patients with oligohydramnios (AFI<5), were at greater risk of having chorioamnionitis and subsequent sepsis in the neonate' [9, 10]. The purpose of our study was to determine whether patients with PROM are at an increased risk of having perinatal morbidity.

MATERIAL AND METHOD

In this prospective study, conducted at Dept. of Obs and Gyneac, SMS medical college, Jaipur after

getting consent from ethical committee, 40 pregnant women between 20 to 41 weeks of gestation, with complains of leaking P/V, positive pooling, positive nitrazine test and positive fern test were included in the study group after getting a proper informed consent. Pregnant women with suspicious PROM, h/o vaginal bleeding (either spontaneous or traumatic), use of vaginal drugs, multiple pregnancy, regular uterine contractions, intercourse in previous night, meconium in amniotic fluid, presence of foetal anomalies and intrauterine foetal death were not included in the study. The control group comprised of 40 pregnant women without any complains, no pooling, negative nitrazine test and negative fern test. All the pregnant women, participating in the study, then underwent ultrasound examination for Amniotic Fluid Index calculation. These pregnant women then went into labour, either induced or spontaneous, or underwent caesarean section depending on the indication and the perinatal outcome was observed and recorded.

The collected data was analyzed using unpaired t-test and Mann Whitney test for analysis of continuous variables while chi square test was used for nominal/categorical variables.

RESULTS

The two groups, study and control group, of 40 pregnant women each were comparable w.r.t. age, socioeconomic status, religion, occupation and literacy. The mean maternal ages of women at the time of delivery in study and control group were 23.20 ± 2.96 years and 24.20 ± 2.95 years, respectively.

Table-1: Disribution of cases according to period of gestation

	Study group		**Control group**		**Total**	
Period of gestation (in week)	No	%	No	%	No	%
<29	1	2.5	0	0	1	1.25
29to 31	2	5	0	0	2	2.5
32 to 36	37	92.5	19	47.5	56	70
>36	0	0	21	52.5	21	26.25
Total	40	100	40	100	80	100

Chi-square = 29.786 with 3 degrees of freedom; P<0.001

Table-2: Time between admission and delivery (latent period in hrs)

Time since admission to delivery (in hrs)	**No. of cases**	**%**
1to 20	9	22.5
21 to 40	19	47.5
41 to 60	12	30
61 to80	2	5
81 to 90	1	2.5
Total	40	100
Mean ± Std	37.13 ± 17.431	

Table-3: Relationship of gestational age with time between admission and delivery

Gestational age	**<29**		**29to 31**		**32 to 36**		**>36**		**Total**
Time since admission to delivery	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**NO**
1to 20	0	0	0	0.00	4	44.44	5	55.56	9
21 to 40	0	0	1	5.26	12	63.16	6	31.58	19
41 to 60	0	0	1	11.11	8	88.89	0	0.00	9
61 to80	0	0	0	0.00	2	100.00	0	0.00	2
81 to 100	1	100	0	0.00	0	0.00	0	0.00	1
Total	1	100	2	5.00	26	65.00	11	27.50	40

Chi-square = 61.580 with 12 degrees of freedom; P<0.001S

Table-4: Distribution of cases according to AFI

	Cases	**Control**	**Total**

AFI	No	%	No	%	No	%
<5	28	70	4	10	32	40
5 to 6	5	12.5	6	15	11	13.75
7 to 8	6	15	25	62.5	31	38.75
>8	1	2.5	5	12.5	6	7.5
Total	40	100	40	100	80	100

Chi–square = 32.403 with 3degrees of freedom; P<0.001S

Table-5: Distribution of cases according to birth weight

Birth weight(Kg)	**Study group**		**Control group**		**Total**	
	No	%	No	%	No	%
<2	5	12.5	0	0	5	6.25
2to 2.5	27	67.5	22	55	49	61.25
>2.5	8	20	18	45	26	32.5
Total	40	100	40	100	80	100

Chi-sqaure = 17.979 with degrees of freedom; P<0.001S

Table-6: Disribution of cases according to neonatal complication

Neonatal complications	**Cases**		**Control**		**Total**	
	No	%	No	%	No	%
NICU Admission	6	15	3	7.5	9	11.25
neonatal infection	3	7.5	0	0	3	3.75
birth asphyxia	4	10	1	2.5	5	6.25
perinatal death	1	2.5	0	0	1	1.25

Table 1 shows comparison between study and control group according to period of gestation. Most of the patients in the study group, i.e. 37 women (92.5%), were between 32 to 36 weeks of gestation. However, 21 women (52.5%) in the control group were in >36 weeks of gestation at the time of delivery. Table 2 shows latency period in hours among women in the study group. 19 women (47.5%) delivered within 21 to 40 hours of admission and 12 women (30%) delivered between 41 to 60 hours of admission into the hospital. Mean time of delivery after admission to the hospital was 37.13 ± 17.431 hours in patients with PROM. Table 3 compares gestational age with latency. It shows that as the gestational age increases latent period decreases. As the table shows, patient with gestational age <29 weeks delivered after 80 hours of admission while most of the patients between 32 to 36 weeks of gestation and above delivered within 40 hours of admission. Table 4 shows comparison of amniotic fluid index between study group and control group. The table shows that women with PROM had significantly lower AFI as compared to the women without PROM. Table 5 compares the birth weight of neonates of women in the study and the control groups. Significant difference was observed between the two groups. Table 6 shows neonatal complications observed in the two groups. There was one perinatal death due to prematurity with a birth weight of 1.1kg which lead to birth asphyxia and neonatal infections in women with gestational age <29 weeks in the study group and the latent period in this patients was 88 hours. In the study group, a total of 6 neonates were admitted to NICU, out of which 1 had both birth asphyxia and neonatal infection, 3 had birth asphyxia and 2 had neonatal infection.

DISCUSSION

PROM is associated with significant maternal, foetal and neonatal risks. A number of studies have demonstrated that PROM may be strongly associated with the subsequent development of adverse neonatal outcomes such as neonatal death, PVL, PIVH, cerebral palsy and bronchopulmonary dysplasia, especially among children of women who develop chorioamnionitis after PROM [11].

In this study the average age of women presenting with PROM was 23.20 ± 2.96 years. Various other studies have report PROM in women of similar age group. Tripti Nagaria, Chandrakant Diwan and Jyoti Jaiswal studied feto-maternal outcome in PROM patients and reported that PROM occurs mostly in women between 20 to 25 years of age [12]. Tigist Endale, Netsanet Fentahzun, Desta Gemada and Mamusha Aman Hussen reported mean maternal age in

PROM patients to be 24.6 years while studying Maternal and fetal outcomes in term premature rupture of membrane [13].

Various studies have been conducted before to evaluate neonatal outcome in women with PROM. In this study the women with PROM with lower gestational age had longer latency period and lower AFI which increased the risk of neonatal complications. Tigist Endale *et al.;* studied Maternal and fetal outcomes in term premature rupture of membrane and showed that Compared to neonates with rupture of membranes in less than 12 hours, those with a duration of PROM greater than 12 hours were 12 times more likely exposed to unfavourable outcomes and the risk of unfavourable maternal outcome was 5.6 times higher in women with a duration of PROM greater than 12 hours. 3.8% neonates were stillbirth, and 11.9% died. The deaths (54.8%) were caused by foetal infection followed by birth asphyxia (27.4%) and low birth weight (9.7%) and the rest are unknown causes [13].

Maria Goya *et al.;* studied maternal and perinatal outcomes in singletons pregnancies with premature rupture of membranes before 34 weeks managed expectantly and reported that worst perinatal outcomes were in pregnancies with the lowest GA at rupture, with 2 foetal deaths and 11 perinatal deaths due to prematurity. No antenatal or neonatal deaths occurred after 30 weeks of gestation. Later GA at rupture and delivery, longer latency period, heavier birth weight and more frequent use of corticosteroids were variables associated with perinatal survival. Higher AFI on US at admission was also significantly associated with greater probability of perinatal survival [14].

Jing Liu, Zhi-Chun Feng, and Jing Wu studied the incidence rate of premature rupture of membranes and its influence on foetal–neonatal health in mainland china. Their results suggested that the incidence of PROM was 19.53% and it could influence various aspects of the health of foetuses and neonates, including platelet parameters, erythrocyte parameters, neonatal jaundice and myocardial injury. The average birth weight of infants born to women with PROM was 1997.2 ± 532.3 g (range, 700–3900 g), and the average gestational age was 32.4 ± 2.01 weeks (range, 26–36 weeks). The incidence of premature birth was 11.2% in the PROM group and 5.96% in the non-PROM group. The incidence rate of foetal distress was 15.1% in PROM infants, which was significantly higher than that in non-PROM patients (6.7%). Birth asphyxia occurred in 15.0% infants in the PROM group and in 6.8% infants in the non-PROM group (P<0.001). RDS was seen in 9.8% infants in women with PROM. The incidence of RDS was 5.2% in full term infants and 11.6% in premature infants [15].

The results of the above mentioned studies correlate with our study. Thus, it can be concluded from our study that PROM can lead to increased perinatal morbidity and mortality, if not managed properly. Small sample size was a major limitation of our study.

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