Original Research Article

Factors affecting the duration of latency period in preterm permature rupture of membranes

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Abstract

Background: To investigate the natural course of preterm premature rupture of membranes (PPROM) at 26-34 weeks and to identify factors that affect the duration of the latency period. **Material and Method**: This prospective observational study included women with singleton pregnancies presenting with rupture of membranes. A total of 113 Women with PPROM from 26 weeks to 34 weeks with rupture of membrane were included. Latency period was defined as the time between onset of PPROM to either spontaneous delivery, labor induction at 34 weeks, or indicated delivery prior to 34 weeks because of suspected chorioamnionitis or nonreassuring fetal heart rate. **Results:** The overall rate of PPROM was 2.9% (260/9000), of which 43.4% (113/260) occurred at ≤ 34 weeks. Overall, the latency period ≥72 h in about 69% of cases (78/113). Women with short latency periods (<72 h) were characterised by history of cervical examination, urinary tract infection, anemia and higher gestational age at admission and were more likely to be nulliparous. The duration of the latency period was inversely related to gestational age at admission. **Conclusion:** In this study, we have identified several predictive factors for the duration of the latency period in cases of PPROM. This information may assist clinicians in risk stratification and in providing consultation for women presenting with PPROM prior to 34 weeks of gestation.

Keywords: Latency, prediction, preterm premature rupture of membranes

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INTRODUCTION

Preterm premature rupture of membranes (PPROM) complicates 1–3% of all pregnancies and is the presenting symptom in approximately 30% of all preterm deliveries. PPROM is associated with potential maternal, fetal and neonatal morbidity and mortality[1]. Membrane rupture can occur for variety of reasons. At term, membrane rupture can result from a normal physiologic weakening of the membranes combined with shearing forces created by uterine contractions. During Preterm gestation, rupture of membranes can result from a wide array of pathological mechanisms that act individually or in oncert[2]. A previous history of PPROM is a major risk factor for preterm PROM or preterm labour in a subsequent pregnancy. Other risk factors include short cervical length, second and third trimester bleeding, low socioeconomic status, BMI, cigarette smoking, and illicit drug use.[2] Strong association between perinatal outcome and gestational age at birth, so most of the interventions studied were aimed at prolonging pregnancy after the rupture has occurred, despite the increased risk of neonatal and maternal infection[3]. Patient with PROM before 34 weeks of gestation should be managed expectantly if no maternal and foetal contraindications exist. Non reassuring foetal status, clinical chorioamnionitis and significant abruptio placentae are clear indications for delivery. Otherwise, gestational age is a primary factor when considering delivery versus expectant management[4]. Expectant management of PPROM includes use of antibiotic treatment and steroids. The administration of broad

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spectrum antibiotics prolongs pregnancy, reduces maternal and neonatal infection and reduces gestation age dependent morbidity. Antenatal corticosteroids are known to reduce neonatal mortality, respiratory distress syndrome, intraventricular hemorrhage and necrotizing enterocolitis[3] This study investigated the natural course of expectant management in cases of PPROM at 26-34 weeks of gestation and to identify factors that affect the duration of the latency period.

METHODS

we conducted this prospective observational study, in the department of Obstetrics and Gynaecology in Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College Shimla from 1st July 2018 to 30th June 2019. PPROM was defined as spontaneous rupture of membranes occurring before the onset of active labor and prior to complete 37 weeks of gestation. All women fulfilling the inclusion criteria were admitted and detailed obstetric, menstrual, past and family history was taken. Exclusion criteria for the study were included multiple pregnancies,Congenital defects ,Intrauterine death, Termination of pregnancy due to various complicating factors e.g., preeclampsia, eclampsia, diabetes mellitus, polyhydramnios and antepartum haemorrhage. Duration of pregnancy calculated from last menstrual period or 1st trimester ultrasound. Duration of rupture of membranes enquired into. Examination of patient included General physical examination, per abdomen and per speculum examination. Presence of uterine contractions, uterine tenderness, lie, presentation and FHS assessed on per abdomen examination. Rupture of membranes confirmed by per speculum examination or nitrazine test whenever required. Colour and smell of liquor was noted. Digital cervical examination avoided unless patient is in active labour. High vaginal swab was taken at the time of per speculum examination. After confirmation of PPROM, signs and symptoms of labour, placental abruption, chorioamnionitis and fetal distress ruled out.

Clinical chorioamnionitis is defined as maternal fever (higher than $38^{O}C$) plus atleast one of the following: maternal or fetal tachycardia, uterine tenderness, foul smelling amniotic fluid or maternal leukocytosis. Maternal CBC and CRP examination was done twice a week and ultrasonography fortnightly. Ultrasound for fetal biometry, placental localisation and AFI was done. According to our departmental protocol, all women with suspected PPROM at gestational age 26-34 weeks who are not in active labor and do not have signs of chorioamnionitis or placental abruption are admitted for expectant management, as follows: Women was put on expectant management, corticosteroids and antibiotics were administered. Dexamethasone 6mg, 4 doses, 12 hours apart was administered. Informed consent of the women taken explaining the risks and benefits of expectant management. A 7 days course of antibiotic therapy with a combination of intravenous ampicillin 2g every 6 hourly for 48 hours followed by oral amoxycillin 250 mg every 8 hourly or oral erythromycin 333mg initially every 6 hourly for 48 hours and then after every 8 hourly was administered during expectant management. Routine daily follow-up is conducted for evidence of active labor, infection or well being. Follow-up includes examination of body temperature, pulse, blood pressure, uterine tenderness, white blood cell count, non-stress test, biophysical profile and estimated fetal weight evaluation (every 10–14 days). Vaginal examinations are avoided as long as the patient is asymptomatic and free of contractions. When indicated, sterile visual inspection of the cervix with speculum is preferred over digital examination. Pregnancy terminated after 34 weeks of gestation in case of expectant management or earlier in case of chorioamnionitis, placental abruption and fetal distress. Maternal and fetal outcome was noted.

Data analysis

Data were entered in Microsoft® excel workbook 2019. Data analysis was done using Epi Info version 7. Continuous and categorical variables were reported as mean±SD and frequency (percentage) respectively. Chi–square test was used for analysis. P value <0.05 was considered significant.

RESULTS

Out of the total of 9000 deliveries during the study period, the rate of PPROM was 2.9% , of which 43.4% (113/260) occured at ≤ 34 weeks. Overall, the latency period exceeded 72h in about 69.2% of cases . Women with short latency periods (<72 h) were characterised by history of cervical examination, UTI, anemia and higher gestational age at admission and were more likely to be nulliparous (Table 1). There was a considerable variation in the duration of the latency period, ranging from 1-12 days (Table 2). The mean latency periods, as well as the variation in the duration of the latency period, were inversely related to gestational age at admission. We next sought to determine the reasons for preterm delivery in our study population, i.e., spontaneous preterm delivery, induction of labor at 34 weeks of gestation or indicated delivery prior to 34 weeks because of fetal or maternal complications (mainly chorioamnionitis). The rate of chorioamnionitis was directly related to the duration of the latency period and inversely related to gestational age at admission (Table 3). The relation to gestational age at admission was maintained even when controlling for duration of the latency period (Table 4).

Table 1: Risk factors of latency period

	Latency period (n=113)		P value
	<72 hours (n=35)	≥72 hours (n=78)	
Nulliparity (n=61)	36(59.01)	25(40.9)	<0.01
UTI (n=24)	17(70.8))	7(29.1)	<0.01
Anemia (n=12)	7(58.3)	5(41.6)	<0.05
Previous history of abortions /PTD (n=14)	7(50)	7(50)	>0.05
AFI<5 (n=32)	24(75)	8(25)	<0.01
Prior cervical examination (n=55)	33(60)	22(40)	<0.01

Data expressed as frequency (percentage); UTI, urinary tract infection; PTD, pre-term delivery; AFI, amniotic fluid index

Table 2: Comparison of mean latency period with period of gestation

Period of gestation	Mean latency period (days)	Std Deviation	Minimum (days)	Maximum (days)
≤28 weeks	6.5	0.58	6	7
28.1 weeks-32 weeks	4.70	2.3	2	12
>32-34 weeks	2.69	1.15	1	7

Table 3: Rate of chorioamnionitis by gestational age and duration of latency period

	Gestational age		P value
Latency period	26-32 weeks (n=13)	32-34 weeks (n=7)	
<72 hours	4 (57.1%)	3 (42.9%)	0.588
≥ 72 hours	9 (69.2%)	4 (30.8%)	

Data expressed as frequency (percentage)

DISCUSSION

In this study, we aimed to investigate the natural course of expectant management of PPROM at gestational age 26-34 weeks and to identify factors that predict the duration of the latency period. Our main findings were as follows: (1) The duration of the latency period and the rate of chorioamnionitis are inversely related to gestational age. (2) Advanced gestational age at admission, the presence of either oligohydramnios, cervical examination, UTI, anemia and nulliparity were significantly and independently associated with a shorter duration of the latency period. The overall rate of PPROM in our study is 2.9% is similar to previous reports[5]. In concordance with our findings, previous studies have also noted a strong correlation of gestational age with the latency period[5]. Our finding that oligohydramnios is associated with a shorter latency period and is also supported by several other studies.[5,6,7] Low amniotic fluid volume at admission has also been associated with adverse pregnancy outcome. The pathophysiology linking low amniotic fluid volume on admission to shorter latency remains unclear. Some researchers speculated that it could reflect increased uterine activity, large fetal membrane deficiency or an increased infection and fetal inflammatory response syndrome.[7] Another plausible mechanism comes from studies of isolated oligohydramnios at term in which oligohydramnios precedes the onset of labor, although, in the case of oligohydramnios at term, the suggested mechanism is a physiological one.[8] We have also found nulliparity to be associated with shorter latency periods. The reason for this finding is unclear; and it has not been described in previous studies. The rate of chorioamnionitis in our study was directly related to the duration of the latency period and inversely related to gestational age at admission. These findings are supported by previous studies [9,10]. Expectant management allows prolongation of pregnancy that is beneficial to neonatal outcome, while at the same time it increases the risk of chorioamnionitis and associated neonatal morbidity.

CONCLUSION

In this study we have identified several predictive factors for the duration of the latency period and described the reasons for preterm delivery in cases of PPROM. This information may assist clinicians in risk stratification and in providing consultation regarding the natural course of expectant management for women presenting with PPROM.

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