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Research Article

A Study on the Relationship between High Vaginal Swab Culture and Neonatal Sepsis in Prelabour Rupture of Membranes at Term

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ABSTRACT

Premature rupture of membranes (PROM) is defined as rupture of the foetal membranes occurring before the onset of labour. Women presenting with PROM are at increased risk for intrauterine infection, when the interval between the membrane rupture and the delivery is prolonged. It has been estimated that 10% of perinatal deaths are directly or indirectly attributable to PROM.

Objectives of the Study

1. *To report the incidence of PROM in our institution.*
2. *To report the incidence of positive high vaginal swab culture in PROM at term,*
3. *To study the relationship between the microbiological study of high vaginal swab in PROM and the incidence of neonatal sepsis.*

Materials and Methods

Study design: Prospective study
Study setting : Labour Room, Department of Obstertrics and Gynacology
Govt. Medical College, Kottayam
Study period : March 2007 –Feb 2008

High vaginal swabs were taken from women with PROM who have completed 37 weeks of gestation with singleton foetus in cephalic presentation, before doing a vaginal examination and before starting antibiotics. Ninety three patients were included in the study. The neonates there followed up in the special care neonatal unit for the development of any features of sepsis on the basis of C - reactive protein.

Results: *As the latency period (Interval between the onset of PROM and delivery) increases many of the babies developed sepsis. When it was <6hrs none of the babies were affected.*

Keywords (MeSH): *Neonatal sepsis; pregnancy; pregnancy outcome; term birth.*

INTRODUCTION

In most pregnancies labour begins at term in the presence of intact fetal membranes[1]. Without intervention they usually remain intact until they spontaneously rupture near the end of the first stage of labour. However, 8-10% of term pregnancies[2]and upto 60% of preterm deliveries are preceded by prelabour rupture of the membranes[3]. Premature rupture of fetal membranes is defined as rupture of the fetal membranes occurring before the onset of labour[4]. At term 8-10% of pregnant women present with premature rupture of membranes. These women are at increased risk for intrauterine infection when the interval between the membrane rupture and deliveries is prolonged[4]. It has been estimated that 10% of perinatal deaths are directly or indirectly attributable to PROM[5].

There is growing evidence associating upper genital tract infection with PROM[6,7]. One possible mechanism by which infection might act is through adhesion from the cervical/ vaginal area and replication in the placenta, the decidua and the membranes. Another hypothesis is that several organisms that are commonly present in the vaginal flora, including group B streptococcus, Staphylococcus aureus and microorganisms that cause Bacterial vaginosis secrete proteases that degrade collagen and weakens the fetal membranes leading to PROM[8,9], Researchers have postulated that PROM maybe the result of direct bacterial insults thatnecrotize tissues leading to host mediated auto destruction[10]. Infection with E.coli, S.aureus, C.albicans, and Bacterial vaginosis are strongly associated with PROM. Bacterial vaginosis and E.coli infection are independent risk factors[11].

PROM may result in immediate risk factors such as cord prolapse, cord compression and placental abruption and later problems such as maternal and neonatal infections as well as the use of interventions such as caesareans and instrumental vaginal deliveries.

The incidence of neonatal infections for infants born to mothers with PROM range from 1-2.6%[12]. Neonatal sepsis was defined by positive CRP readings [CRP >6]. In many studies it was found that the risk of neonatal infection was increased among mothers colonized with group B streptococcus, other risk factor for neonatal infection included premature rupture of membranes >18hrs, maternal fever during labour and prematurity[13].

Antibiotics have become an important part of the recent advances in the treatment of PROM. Many studies have demonstrated that antibiotic therapy decreases maternal and neonatal morbidity[14, 15].

In our study also as the time interval between PROMand delivery increase then is increased +vity of vaginal swab culture which in turn leads to high incidence of neonatal sepsis.

AIMS AND OBJECTIVES

1. To report the incidence of PROM in our institution.
2. To find out the relationship between the microbiological study of high vaginal swab in PROM and the incidence of neonatal sepsis.

MATERIALS AND METHODS

This is a prospective study performed in the labour room of Medical College Kottayam during the period March 2007 to February 2008, after approval from the local ethical Committee. Proper informed consent was obtained from all the patients after explaining the benefits of the study.

STUDY POPULATION

Antenatal parturients admitted in the labour room with term premature rupture of membranes and their neonates.

INCLUSION CRITERIA

1. Patients should complete 37 weeks of gestation with a diagnosis of PROM.
2. Single live fetus in cephalic presentation.
3. No uterine contractions felt or observed for 30 minutes after admission.

EXCLUSION CRITERIA

1. Ruptured membranes >6hrs at the time of admission.
2. Patients with feature of chorioamnionitis like fever, tachycardia, uterine tenderness or foul smelling liquor.
3. Fetal distress and meconium stained amniotic fluid on admission.
4. Active labour on admission.
5. Medical and surgical diseases complicating pregnancy.
6. Twin gestation, IUGR, IUD, congenital anomalies for the fetus
7. Cervical encirclage operation.
8. Patients with history of APH

METHODS OF STUDY

High vaginal swabs were taken from parturient women who have completed 37weeks of gestation, with singleton fetus in cephalic presentation, before doing a vaginal examination and before starting antibiotics. These women were followed up during labour for any signs of chorioamnionitis and the interval between the rupture of membrane and delivery where identified. The neonates were followed up in the special care Neonatal unit for the development of any features of sepsis on the basis of C-reactive protein. 93 patients were included in the study. On admission, detailed history was recorded regarding medical surgical or obstetric complications. Gestational age was confirmed by date of LMP and 1st trimester USG.

Rupture of membranes was suspected if the patient's history suggested either a sudden gush of fluid or slow persistent watery vaginal discharge per vagina.

PROM was confirmed by visualisation of fluid from cervix.

- Pooling of amniotic fluid in the posterior fornix seen with a single speculam examination under aseptic precaution.
- High vaginal swabs were taken before doing pervaginal examination.
- Swabs were sent for culture and sensitivity in the Dept. of Microbiology, Medical College, Kottayam.
- Antibiotics are started after taking vaginal swab. (Inj. Ampicillin, Gentamycin and Metronidazole) till delivery.

Patients were kept in the labour room till delivery and monitored by charting half hourly fetal heart sounds, maternal pulse rate and 4th hourly blood pressure and temperature. If the cervix was unfavorable labour was induced with Prostaglndin El or E2 and later with oxytocin if needed. Inpatients who developed some complications or non-progression of labour underwent emergency Caesarean section.The neonates were observed for the development of probable sepsis on the basis of C-reactive protein or any features of sepsis.

STATISTICAL ANALYSIS

Data was initially entered into an Excel file and this was entered into the SPSS software data variable. The categorical variables were analyzed by the chi square test. Univariable analysis was done and a p value less than 0.05 was taken as statistically significant

RESULTS

Total number of deliveries of in our institution during the study period was 6408 out of the 558 (8.67%) patients presented with PROM.

Patient characteristics

Mean age=26.8± 4.1

Gestational Age	Induced	Spontaneous Labour	Total
37-38 Wks	20	4	24
38-39wks	32	9	41
39-40wks	16	12	28
	68	25	93

Among the total 93 patients, 68 (73.1%) were Induced either with prostaglandins or oxytocin, depending on the Bishops Score. 25 patients (26.9%) entered in to spontaneous labour.

Table 1:- PROM-Delivery interval and CRP positivity

PROM-Delivery interval(Hours)	CRP				Total	
	Positive		Negative			
	Count	%	Count	%	Count	%
<6	0	.0	4	100.0	4	100.0
6-12	5	13.9	31	86.1	36	100.0
12-18	5	12.2	36	87.8	41	100.0
>18	5	41.7	7	58.3	12	100.0
Total	15	16.1	78	83.9	93	100.0

Chi square=7.2,p=.057

Table 2:- Association of Vaginal Swab Culture and CRP positivity

Vaginal Swab Culture	CRP				Total	
	Positive		Negative			
	Count	%	Count	%	Count	%
Positive	13	25.5	38	74.5	51	100.0
Negative	2	4.8	40	95.2	42	100.0
Total	15	16.1	78	83.9	93	100.0

Chi square=7.3,p=.007

DISCUSSION

Premature rupture of fetal membranes occur in approximately 10% of pregnancies[16]. In our study the incidence was 8.67%. Of the 93 patients included in the study maximum numbers of patients (64.5%) were referred from peripheral hospitals.

Among the 93 women who were included in the study, 58 (62.3%) were primigravida. Of the 93 patients 41(44%) were in the gestational age group 38-39 weeks.

After premature rupture of membranes at term, 75% of women begin to labour within 24 hours, and 95% within 72 hours (Johnson JW 1981). In our study 81 (87%) patients delivered within 18 hours after premature rupture of membranes.

Early onset bacterial infections in the newborn may occur when the mother has abnormal bacterial colonization of the urogenital tract, an ascending but silent amniotic fluid infection, or symptomatic chorioamnionitis. Thus, the physician cannot assume that maternal symptoms may be used to identify all infected infants. Currently, two new challenges face the physician who must diagnose and treat mothers and their infants with infections. GBS infections are no longer the predominant cause of early onset neonatal sepsis; that honor now goes to gram-negativeorganisms (Stoll, 2005)[17]. In addition, methicillin resistant Staphylococcus aureus, already a common cause of nosocomial infection in maternity and neonatal units (Bratu, 2005[18], looms as a major cause of early onset neonatal sepsis.

In our study the main organism isolated from high vaginal swab cultures were E.coli (33.3%) followed by Staphylococcus aureus (25.4%). This was in agreement with a hospital based case-control study of patients with PROM by C.Karat, (2006), [12]which concluded that E.coli and Staphylococcus infection were significantly associated with PROM, although it was multifactorial. It remains to be seen whether these are a direct cause of PROM or are simply surrogate markers for another not yet identified pathogenic process.

In many studies it was found that increase in latency period increases the incidence of neonatal sepsis. In our study also features of neonatal sepsis were positive when the latency period was >18 hours (p-0.057) which was statistically significant.

Though in many studies it is seen that male babies have a twofold increased risk for neonatal sepsis no such observation was made in our study.

On analyzing the relationship between the high vaginal swab culture positivity and neonatal sepsis, there was a statistically significant relation for positive culture reports and neonatal sepsis (p-0.007).

There are many conflicting views regarding the management of PROM at term. The incidence of maternal sepsis and perinatal mortality prompted many authors to recommend immediate induction of labour in PROM at term. At term infection remains the most serious complication associated with PROM for the mother and the neonate. The risk of chorioamnionitis with term PROM has been reported to be less than 10% and to increase to 40% after 24 hrs of PROM. This points to the importance of induction of labour in cases of term PROM unless reasons exist to consider waiting for spontaneous labour. In our study 73.1% of patients were induced with either prostaglandins or oxytocin.

SUMMARY AND CONCLUSION

- Incidence of PROM in our institution during the study period was 8.67%. There was a statistically significant increase in neonatal sepsis with increase in latency period.
- Most common organism isolated for the high vaginal swab culture was E.coli followed by Staphylococcus aureus. Babies whose mothers had a positive report of vaginal swab culture had an increased incidence of sepsis which was statistically highly significant.

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DECLARATIONS

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