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Bacteriological Assessments of Premature Rupture of Membrane in Dhaka Medical College Hospital

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Abstract **Original Research Article**

Introduction: Premature rupture of membranes (PROM) is the single most frequent analysis associated with preterm delivery. The major complication of preterm PROM is early delivery. Every year around 28,000 women die due to complications of pregnancy and childbirth in Bangladesh. Nonscientific intervention in PROM made at several stages intensifies the pregnancy complications several times, thereby leading to many more deaths of the foetus and newborn. ***Methods:*** A prospective cross-sectional study was carried out in the Department of Obstetrics and Gynae, Dhaka Medical College and Hospital from March 2008 to July 2008.A total of 50 pregnant patients (N=50) with PROM in the maternity unit were enrolled in this study following the inclusive criteria. Data were collected in the pre-designed data collection sheet. Data were analyzed statistical package for social science (SPSS). ***Result:*** Commonest organism 72% were no growth, 10% were streptococcus, 6% were E. coli, 2% were delivered alpha-haemolytic streptococcus, 2% were candida, 2% were anaerobes, 2% was chlamydia and 2% pneumococcus. 52% were preterm and 42% were term delivery. 40% were chorioamnionitis, 10% were puerperal sepsis and 8% were DIC. Infection-related, 16% were urinary tract infections, 4% were lower genital traction infections and had no sexually transmitted disease. In fetal outcomes 58% were live birth, 42% were stillbirths, 46% were mature and 54% were premature. 66% were <2.5 kg and 34% were >2.5 kg. ***Conclusion:*** Premature rupture of membrane and chorioamnionitis may cause antagonistic maternal consequences linked to infection. Premature rupture of membrane indicated lower birth weight for infants. Proper antibiotics must be certain prophylactically for the anticipation of intra-partum infection in case of PROM.

Keywords: Premature rupture of membrane (PROM), Infection, Preterm Delivery, Gestation age.

INTRODUCTION

Premature rupture of membranes (PROM) is defined as rupture of the membranes before the onset of labour [1]. In approximately 10% of all pregnancies, it was estimated that PROM complicates 30 to 40% of the preterm deliveries and is one of the most common underlying causes of preterm delivery and perinatal death [2]. Premature rupture of membranes (PROM) is the single most common diagnosis associated with preterm delivery.' Premature rupture of membranes is defined as rupture of the bag of waters before the onset of labour. PROM is prolonged when it occurs more than 18 hours before labour. PROM is preterm (PPROM) when it occurs before 37 weeks of gestation [3]. One of the most common complications of preterm PROM is early delivery. The latent period, which is the time from membrane rupture until delivery, generally is inversely proportional to the gestational age at which PROM occurs. When PROM occurs too early, surviving neonates may develop sequelae such as malpresentation, cord compression, oligohydramnios, necrotizing enterocolitis, neurologic impairment, intraventricularhaemorrhage, and respiratory distress syndrome [4, 5]. In Bangladesh every year around 28,000 women die due to complications of pregnancy and childbirth. Nonscientific intervention in PROM made at various levels intensifies the pregnancy

complications several times, thereby leading to many more deaths of the foetus and newborn [6]. The aetiology of PROM is largely unknown. The possible causes are either reduction of membrane strength or an increase in intrauterine pressure or both [1]. It may be associated with an incompetent cervix, unstable lie polyhydramnios, multiple gestations or possibly bacteriuria, specially beta-streptococci infection [7]. Infection in the female reproductive tract Ureaplasmaurealyticum, Mycoplasma is associated with PROM and preterm labour. This process is in turn, responsible for many preventable infant deaths. Anti-bacterial therapy when used in the expectant management of preterm PROM is associated with prolongation of pregnancy and a reduction in maternal and fetal morbidity [8]. PROM is very often seen in a busy obstetric ward in our country. Proper diagnostic facilities, proper monitoring facilities and a standard protocol in the management can improve maternal and fetal outcomes. PROM has a wide spectrum of research material, and new lights are focused on the subject mostly in developed countries, but very few such studies have been carried out in our country. Several efforts at sticking the rupture of the membrane including the use of collagen plugs, a slurry of platelets, endoscopic closure of fetal membrane defects and also serial amnioinfusions have had limited attainment [9]. The study aimed to evaluate the bacteriological assessment of premature rupture of membranes.

METHODS

A prospective cross-sectional study was carried out in the Department of Obstetrics and Gynae, Dhaka Medical College and Hospital from March 2008 to July 2008.A total of 50 pregnant patients (N=50) with PROM in the maternity unit were enrolled in this study following the inclusive criteria. A purposive sampling technique was used. 50 samples of the high vaginal swab for c/s were collected from the patient with PROM & send to the laboratory at the Department of Microbiology, Dhaka Medical College and Hospital. Data were collected by using a performed questionnaire (Appendix).After taking a proper history, gestational age was determined by last menstrual period, previous antenatal records, clinical examination and ultrasonography (where available).Documentation of membrane rupture was made by a sterile speculum examination or pooling of amniotic fluid in the posterior vaginal fornix following fundal pressure. Demonstration of oligohydramnios by ultrasonographic examination was used as a supporting diagnostic method (when available).During speculum examination, a high vaginal swab was taken from all the patients and sent for culture and sensitivity tests. On admission, a blood sample was sent for leucocyte count (both TC & DC) for each patient to exclude any preexisting infection.

Inclusion Criteria

- Gravid women both Primi & Multi.
- Pregnancy more than 28 week's duration.
- Spontaneous rupture of membrane before initiation of labour.

Exclusion Criteria

- High-risk patient with hypertensive disorder of pregnancy with Cardiac disease and pregnancy with diabetes mellitus.

PROM

The definition of PROM is the rupture of membranes before the onset of labour. Membrane rupture that occurs before 37 weeks of gestation is referred to as preterm PROM. Although term PROM results from the normal physiologic process of progressive membrane weakening, preterm PROM can result from a wide array of pathologic mechanisms acting individually or in concert [1].

Diagnosis of PROM

The diagnosis of PROM requires a thorough history, physical examination, and selected laboratory studies. Patients often report a sudden gush of fluid with continued leakage. Physicians should ask whether the patient is contracting, bleeding vaginally, has had intercourse recently, or has a fever. It is important to verify the patient's estimated due date because this information will direct subsequent treatment.

Data Analysis

The study coordinators performed random checks to verify data collection processes. Completed data forms were reviewed, edited and processed for computer data entry. Frequencies, percentages, and cross-tabulations were used for descriptive analysis data analysis were performed using Statistical Package for the Social Sciences (SPSS) Version 25.0. The significance level of 0.05 was considered for all tests.

RESULT

Among the study population (N=50), the majority of the patients (24, 48.0%) were within the age range of 26-30 years. Only six patients (6, 12.0%) age were below twenty years. Half of the patients (25, 50.0%) had para 1. Thirteen patients (13, 26%) were at 30 weeks, ten patients (10, 20%) were at 32 weeks, eleven patients (11, 22%) were at 33 weeks, fourteen patients (14, 28%) were at 34 weeks and two patients (2, 4%) were at 39 weeks. Thirty-two patients (32, 64%) took a regular antenatal check-up and eighteen patients (18, 36%) attained antenatal ncheck-up irregularly (Table 1). Among the study population (N=50), thirty-four patients (34, 68%) delivered spontaneously. Liquor amount was slight in thirty-one patients (31, 62.0%), and nineteen patients (19, 38%) had liqur which was profuse in amount. The majority of the patients (38, 76%) underwent caesarean section

(Table 2). Based on preterm and term delivery 54% were preterm delivery and 24% were term delivery (Table 3). Of fifty patients, twenty patients (20, 40.0%) had chorioamnionitis, five patients (5, 10%) had puerperal sepsis, and four patients (4, 8.0%) had disseminated intravascular coagulation (DIC). Twenty-three neonates (23, 46.0%) were born mature and twenty-one neonates (21, 42.0%) were stillbirth. Thirty-three neonates' (33, 66.0%) weight was under 2.5 kg. Apgar score at 1 minute found > 7 in sixteen neonates (16, 32.0%) & <7 in thirty-four neonates (34, 68.0%). Apgar score at 5 minute found > 7 in twelve neonates (12, 24.0%) and <7 in thirty-eight neonates (38, 74.0%) (Table 4). On bacteriological examination of study subjects, no growth was found in thirty-six cases (36, 72%), five cases (5,10.0%) were group B streptococcus, three cases (3, 6%) were E. coli, two cases (2, 4.0%) were alpha-haemolytic streptococcus, one case (1, 2.0%) was clamydia, one case (2.0%) was candida, one case (2.0%) was anaerobes and one case (2.0%) was pnemococcus (Table 5). Eight patients (8, 16.0%) had urinary tract infections, two patients (2, 4.0%) had lower genital traction infections and no one had sexually transmitted disease (Table 6).

Table 1: Distribution of the study population based on characteristics (N=50)

Characteristics	**(N, %)**
Age in years Mean age: 27.10±SD	
<20	6,12.0%
20-25	13,26.0%
26-30	24,48.0%
31-35	7,14.0%
36-40	0,0.0%
Parity	
0	13,26.0%
1	25,50.0%
2	12,24.0%
Gestational age weeks Mean gestational age:32.54±SD	
30 weeks	13,26.0%
32 weeks	10,20.0%
33 weeks	11,22.0%
34 weeks	14,28.0%
39 weeks	2,4.0%
Antenatal check-up	
Regular	32,64.0%
Irregular	18,36.0%

Table 2: Distribution of the study population based on events during labour (N=50)

Events	**(N, %)**
Induction of Labour	
Spontaneous	34,68.0%
Induce	16,32.0%
Drainage of liquor	
Slight	31,62.0%
Profuse	19,38.0%
Mode of delivery	
Vaginal	12,24.0%
Caesarean section	38,76.0%

Table 3: Distribution of the study population based on preterm and term delivery (N=50)

Types of PROM	**(N, %)**
Preterm	26,52.0%
Term	24,48.0%

Table 4: Distribution of the study population based on maternal and fetal outcome (N=50)

Maternal outcome	(N, %)
Chorioamnionitis	20,20.0%
Puerperal sepsis	5,10.0%
DIC	4,8.0%
Fetal outcome	(N,%)
Live birth	29,58.0%
Stillbirth	21,42.0%
Mature	23,46.0%
Premature	27,54.0%
Birth weight	
<2.5kg	33,66.0%
>2.5kg	17,34.0%
Apgar scored at 1 minute	
<7	34,68.0%
>7	16,32.0%
Apgar scored at 5 minute	
<7	38,74.0%
>7	12,24.0%

Table 5: Distribution of the study population based on bacteriological presentation (N=50)

Organism	**(N, %)**
No growth	36,72.0%
Streptococcus	5,10.0%
E.coli	3,6.0%
Alpha-haemolytic streptococcus	2,4.0%
Candida	1,2.0%
Anaerobes	1,2.0%
Chlamydia	1,2.0%
Pneumococcus	1,2.0%

Table 6: Distribution of the study population based on Infection characteristics (N=50)

Parameter	**(N, %)**
Urinary tract infection	8,16.0%
Lower genital tract infection	2,4.0%
STD	0,0.0%

DISCUSSION

This present study found that 12% were age group < 20 years, 26% were age group 20-25 years, 48% were age group 26-30 years and 14% were age group 31-35 years. The mean±SD was 27.10±4.49. Another analysis found a mean±SD of 26.2±5.8 years.

Another study showed the mean±SD was 27.0±1.0 years [10].

This presentstudy shows that 26% were 30 weeks, 20% were 32 weeks, 22% were 33 weeks, 28% were 34 weeks and 4% were 39 weeks. Mean ±SD was 32.54±2.03 Tanir *et al.*, showed gestational age mean±SD was 32.7±1.2 [11].

This current study found 26% had no para 50% had para 1 and 24% had para 2. The author showed a dissimilar result, that 61.8% had no parity [10].

This presentstudy found that 16% were urinary tract infections, 4% were lower genital traction infections and had no sexually transmitted disease. Another article found that 7.8% were urinary tract infections [10].

This present study showed that 68% were delivered spontaneously. A study was carried out in Australia and New Zealand. Estimated that 57% were spontaneous delivery [12].

This current study shows that 24% were vaginal delivery and 76% were caesarean sections. Another research found that 40% were caesarean sections [13]. In another study, the author described that 12.7% of caesarean sections in their gestation age was 26 weeks [14]. A contradictory study showed that 53.8% were vaginal delivery and 46.2% were caesarean sections [11].

This current study found that 52% were preterm and 48% were term delivery. Another author identified no differentiation was preterm and term delivery in premature rupture of the membrane [15]. Another study.determined that bacterial vaginosis is common vaginitis in term pregnancy, but could not find any relationship between bacterial vaginosis and premature rupture of membranes at term [16].

In this study, in the case of fetal outcomes, 58% were live birth and 42% were stillbirths. 66% in < 2.5 kg and 34% in >2.5 kg in foetal birth. Another study found that the mean±SD was 2008±260 (g) in their study [11].

This present study showed that 40% were chorioamnionitis, 10% were puerperal sepsis and 8% were DIC. Another author found that 39.4% were chorioamnionitis [12]. Another study showed that 43.0% were chorioamnionitis [17]. Another study showed Tanir *et al.*, showed 53.8% were chorioamnionitis [11].

This presentstudy found 36(72%) were no growth, 5(10%) were group B streptococcus, 3(6%) were E. coli, 1(2%) were alpha-haemolytic streptococcus, 1(2%) were candida, 1(2%) were anaerobes, 1(2%) was Chlamydia and 1(2%) pneumococcus. A similar study found 8% group B streptococcus, 7% mixed anaerobes and 3% E. coli [14]. Another article showed that 24 were no growth, 4 were group B streptococcus, 4 were candida, 4 were alpha-haemolytic streptococcus, 2 were chlamydia, 2 were anaerobes and 2 were pneumococcus [12].

Bacterial infection is one of the main causes of PPROM leading to preterm delivery, pulmonary hypoplasia, sepsis and joint deformities [18]. A substantialthreat of PPROM is that the infant is very likely to be born within a few days of the membrane rupture. Another substantial threat of PROM is an enlargement of a serious infection of the placental tissues called chorioamnionitis, which can be very hazardous for mothers and infants [19]. Broad spectrum antibiotics, expected management, and antenatal corticosteroids are routinely used in this state with very limited success to prevent bacterial growth, funisitis and intra-amniotic infection syndrome [18].

CONCLUSION

This study was undertaken to determine the bacteriological assessment of premature rupture of membranes. Premature rupture of the membrane and chorioamnionitis is often associated with adverse maternal outcomes related to infection. This study found group B streptococcus, E. coli, alpha-haemolytic streptococcus, candida, anaerobes, Chlamydia and pneumococcus in study subjects. Premature rupture of membrane (PROM) results low birth weight in the infant.

RECOMMENDATIONS

Biochemical, biophysical and microbiological parameters must be available for proper diagnosis of the PROM. Suitable antibiotics must be given prophylactically for the prevention of intrapartum infection (Chorioamnititis) in case of PROM. Patients with PROM before 32 weeks of gestation must be cared for expectantly until 33 completed weeks of gestation if no maternal or fetal contraindications exist. A single course of antenatal corticosteroids must be provided to women with PROM before 32 weeks of gestation to lessen the threats of respiratory distress syndrome (RDS), perinatal mortality, and other morbidities. Delivery is recommended when PROM occurs at or beyond 34 weeks of gestation. With PROM at 32 to 33 completed weeks of gestation, labour induction may be considered if fetal pulmonary maturity has been predictable. For a woman with preterm PROM and a viable fetus, the safety of expectant management at home has not been conventional.

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CONFLICT OF INTEREST

None declared.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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