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Research Article

Determinants and Complications of Pre-Labour Rupture of Membranes (PROM) At the University of Calabar Teaching Hospital (UCTH), Calabar, Nigeria

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Abstract: The management of pre-labour rupture of membranes (PROM) has been a challenging problem for decades in Obstetrics. The pregnancy complications are increased before term because of the increased risk of infection, preterm labour and prematurity. The objectives were to determine the prevalence, socio-demographic characteristics, risk factors and complications of women with PROM at UCTH, Calabar. This was a retrospective study of cases of PROM managed at UCTH over a 4 year period (January 2010 to December 2013). During the study period, there were 11,241 deliveries and 218 cases of PROM giving a prevalence of 1.94%. The mean age of the study population was 26.2± 6.7 years while the mean parity was 2.4± 1.9. Majority (49%) of the study population had PROM between 37 to 39 weeks. The commonest risk factor for PROM was previous history of PROM 79(41.2%), while 45(23.4%) of the population studied had no identifiable risk factor. A total of 31(16.2%) of the babies with PROM had birth asphyxia, while 16(8.3%) had neonatal death. Fetal complications of PROM were more among preterm PROM with neonatal jaundice, birth asphyxia and neonatal sepsis the commonest. PROM is a major complication of pregnancies and an important cause of perinatal morbidity and mortality. Currently, there is no effective way of preventing spontaneous rupture of fetal membranes. However, it is important that women be well informed regarding maternal, fetal and neonatal complications. Early presentation to the hospital and interventions will improve neonatal outcomes of patients with PROM.
Keywords: Premature rupture of membranes (PROM), preterm labour, birth asphyxia, neonatal sepsis, pregnancy, Calabar.

INTRODUCTION

Pre-labour rupture of membranes still features in the majority of causes of neonatal morbidity and mortality and accounts for a great number of admissions to neonatal intensive care unit [1, 2]. It is defined as the rupture of fetal membranes prior to the onset of labour irrespective of the gestational age and the reported incidence varies between 3 and 18.5% of all deliveries [3]. Overall, PROM is a significant contributor to perinatal morbidities and mortalities, and in the tropics where there is dearth of facilities for proper neonatal care, this poses a significant therapeutic dilemma in current obstetric practice [4].

Although the exact aetiology of pre-labour rupture of membranes is poorly understood, several maternal risk factors have been implicated in its aetiology. These include the previous history of PROM, bacterial vaginosis, cervical incompetence, uterine over-distension, prior cervical surgery (eg: conization), poor nutrition and poor socio-economic status, connective tissue disorders e.g. Ehler's-Danlos Syndrome among others [5, 6].

Management of PROM has long been controversial. For cases of PROM remote from term, expectant management has been of great value in the improvement of perinatal survival, and in developed world, efforts have been made to either replace the lost amniotic fluid (amnio infusion), or to seal off the site of rupture (amnioseal); sometimes with commendable results [5-7]. In our environment where it is very difficult for extra uterine survival of fetuses less than 28 weeks, PROM occurring before 34 weeks gestation are usually managed conservatively, usually with antibiotics, steroid therapy, in addition to bed rest and fetal monitoring. The above measures have occasionally improved neonatal outcomes [8-23]. However, the management of PROM at term is controversial. Evidences support the stimulation of labour, as opposed to expectant management, to decreases the risk of chorioamnionitis without increasing the caesarean delivery rate [9,10]. Hannah et al revealed that

stimulation of labour and expectant management resulted in similar rates of caesarean delivery and neonatal infection in women with PROM at term [11]. They also showed that the stimulation of labour with oxytocin resulted in a lower risk of maternal infection such as endometritis when compared with expectant management.

At term, infection remains the most serious complication associated with PROM for the mother and the baby. The risk of chorioamnionitis with term PROM has been reported to be less than 10% and to increase to 40% after 24hours of PROM [12]. Hence, it is importance for appropriate management strategies for PROM.

This study is aimed at reviewing the patterns of risk factors, gestational age at presentations, and fetal complications of PROM in University of Calabar Teaching Hospital. This will help to determine the pattern of complications and to find ways to improve on its management outcome.

MATERIALS AND METHODS

This was a retrospective study of women managed for PROM from 28 weeks gestation in University of Calabar Teaching Hospital between January 1, 2010 and December 31, 2013. Information was obtained from antenatal records, labour ward records and patients' case files. Out of 218 cases of PROM, 192 case files were available and was used for analysis. All patients who went into spontaneous labour within one hour of admission were excluded from the study. The ages of the patients, parity, gestational age at presentation, and the various management modalities were obtained and analyzed. The fetal and obstetric outcomes were all analyzed using the Epi Info statistical software version 3.3.2.

RESULTS

During the period, there were a total of 218 cases of PROM and 11,241 deliveries in the hospital, giving a prevalence of 1.94% of total deliveries. There were 3,416 admissions into the antenatal ward during the same period. Thus, pre-labour rupture of membranes constitutes 6.38% of all antenatal admissions in UCTH over the study period.

Table 1: Age and parity distribution of patients studied.

Age (Yrs)	**Frequency**	**Percentage (%)**	**Cumulative Percentage (%)**
15-19	28	14.6	14.6
20-24	34	17.7	32.3
25-29	63	32.8	65.1
30-34	36	18.8	83.9
35-39	22	11.5	95.4
40-44	9	4.6	100.0
Parity			
0	53	27.60	27.60
1	35	18.23	45.83
2	26	13.54	59.37
3	22	11.46	70.83
4	24	12.50	83.33
5 and above	32	16.67	100.0

Most patients 63(32.8%) were in 25-29 years age group and nulliparous 53 (27.60%) (Table 1). The mean age was 26.2± 6.7years while the mean parity was 2.4±1.9.

Table 2: Gestational Age of Patients at Presentation with Prom

Gestational Age (Wks)	**Frequency**	**Percentage (%)**	**Cumulative Percentage (%)**
28-30	15	7.8	7.8
31-33	31	16.1	23.9
34-36	46	24.0	47.9
37-39	81	42.2	90.1
40-42	19	9.9	100.0

Table 2 shows the distribution of the patients based on the gestational age at presentation. Majority 81 (42.2%) of the patients were between 37 weeks and 39 weeks gestation. A total of 31 (16. 1%) were 31-33weeks while 46(24.0%) were 34-36 weeks.

Table 3: Risk Factors For Pre-Labour Rupture Of Membranes

Risk Factors	Frequency	Percentage(%)	Cumulative Percentage(%)
Cervical incompetence	5	2.6	2.6
Chronic cough	3	1.6	4.2
Coitus	21	10.9	15.1
Fever	12	6.3	21.4
Trauma	2	1.04	22.4
Urinary tract infection	6	3.1	25.5
Vaginal discharge	19	9.9	35.4
Previous history of prom	79	41.2	76.6
None	45	23.4	100.0

Table 3 shows the risk factors for PROM among patients with PROM. The majority of the patients 79(41.2%) had a previous history of PROM. However, 45(23.4%) of the patients had no recognized risk factor.

Table 4: Duration of Drainage Before Presentation

Duration Of Drainage	Frequency	Percentage (%)	Cumulative Percentage(%)
Less than 4 hrs	30	15.6	15.6
4-8 hrs	29	15.1	30.7
8-16 hrs	33	17.2	47.9
16-24 hrs	29	15.1	63.0
24-48 hrs	28	14.6	77.6
48-72 hrs	20	10.4	88.0
72 hrs- 1 wk	23	12.0	100.0

The duration of drainage of liquor before presentation is shown in table 4. Only 30 (15.6%) of the patients drained liquor for less than 4 hours before presentation while 71 (37%) drained liquor for 24 hours or more before presentation (Table 4).

Table 5: Mode of delivery

Mode Of Delivery	No	%	Cumulative. %
Caesarean section	68	35.4	38.0
Vaginal delivery	124	64.6	100.0

Table 5 shows the mode of delivery. Majority, 124(64.6%) had vaginal deliveries while 68(35.4%) of them had emergency caesarean deliveries.

Table 6 shows the complications of the patients with PROM and the gestational ages when PROM occurred. It showed that 31(16.2%) of the babies with PROM had birth asphyxia, while 16(8.3%) had neonatal death. Patients with PROM at earlier gestations had greater morbidity and mortality.

Table 6: The Complications Of The Patients With Prom In Relation To Their Gestational Ages After 28 Weeks.

Complications	Total N(%)	28-30 Weeks N(%)	31-33 Weeks N(%)	34-36 Weeks N(%)	37-39 Weeks N(%)	40-42 Weeks N(%)
Chorioamnionitis	**16(8.3)**	5(31.3%)	6(37.5%)	2(12.5%)	1(6.2%)	2(12.5%)
Birth asphyxia	**31(16.2)**	10(32.3)	9(29)	7(22.6)	3(9.7%)	2(6.4%)
Still birth	**8(4.2)**	4(50%)	3(37.5%)	1(12.5%)	0(0.0%)	0(0.0%)
Neonatal sepsis	**25(13.0)**	11(44%)	7(28%)	4(16%)	2(8.0%)	1(4.0)
Neonatal jaundice	**45(23.4)**	13(28.9%)	17(37.8%)	8(17.8%)	3(6.7%)	4(8.8%)
Neonatal death	**16(8.3)**	9(56.3%)	4(25%)	2(12.5%)	0(0.0%)	1(6.2%)

DISCUSSION

Pre labour rupture of membranes from this study accounted for 1.94% of total deliveries and 6.38% of antenatal admissions. This was similar to the quoted incidence in some other centres [4, 5, 7]. The similarity with other studies may be because the study was carried out in a tertially centre as in above studies with similar delivery rate and risk factors. However, this prevalence is slightly lower than the 3 percent reported in Enugu, Nigeria [24]. The difference in incidence may be due to missed diagnosis and differences in delivery rate. Sometimes, the patients are in established labour before presenting to the hospital following rupture of membranes, this could lead to non documentation of such cases as PROM resulting in the difference in incidence observed.

Stuart et al [25] reported that the incidence of PROM rose with advancing maternal age. However, this study was not in agreement with that observation. This study showed a peak incidence at the reproductive age group of 25-29 years (32.8%). The reason for this may be that this is the age group most women are at peak of their reproductive carrier resulting in higher rate of pregnancy and PROM. PROM was commoner among multiparous women than nulliparous women. This may be due to trauma to the cervix from previous deliveries resulting in cervical incompetence.

It was also found that majority of the patients with pre labour rupture of membranes had a previous history of PROM as a risk factor. The reason for this finding is not very clear, but may be due to recurrent risk factors for PROM in the study group such as cervical incompetence, prior cervical conization, poor nutrition, poor socio-economic status and connective tissue disorders[5,6]. This does not buttress the fact observed from other studies of no identifiable risk factor as the commonest finding in PROM [7,9,16]. This may be due to the differences in socio-demographic characteristic of the study population. Another notable risk factor in this study was the history of coitus preceeding PROM, which was also noted in the study done in India [7]. The role of coitus during pregnancy in causing PROM is not clear. However, an India study revealed that coital position has been shown to influence the rate of PROM [7]. Superior position during coitus in pregnancy may lead to abdominal trauma and increase in abdominal pressure resulting in PROM.

The study found that 52.1% of the study population presented with term PROM compared with 24.0% of the patients presenting with late preterm PROM (34-36 weeks). This distribution is similar to other studies [24, 25].The reason for this finding may be because as pregnancy progresses, the physical stress tolerated by the membranes decreases due to decrease in the relative concentration of collagen resulting in membrane weakness and so more PROM occurring at term [3].

The maternal complication of PROM is chorioamnionitis, which is a risk that increases with increase in the duration of membrane rupture [2]. Infection rate of 8.3% was noted in mothers in this study. The reason for this peculiar finding could be that a significant number of the patients presented with prolonged PROM and might have had multiple digital vaginal examinations before presentation to the hospital. The incidence of infection increases with prolonged latency period more than 24 hours as seen in some studies [12-15]. This is due to adequate time for infection to migrate to the amniotic fluid through the vagina as observed in this study. Previous studies reported that use of prophylactic antibiotic in PROM reduces maternal morbidity [1-3, 24]. Despite the fact that prophylactic antibiotics were liberally used in the patients' management, maternal chorioamnionities rate of 8.3% and neonatal sepsis of 13.0 % were recorded. This may be due to late presentation and prolonged latent phase observed in this study. The use of corticosteroid in preterm PROM before 34 weeks gestation reduces perinatal morbidity and mortality by reducing the risk of respiratory distress syndrome [24, 25]. In this study, steroid was used in all cases of Preterm PROM below 34 weeks and this may be responsible for low prevalence of birth asphyxia (16.2%) observed in this study.

In the management of PROM, the initial step is informed consent. Risks and benefits information must be given to the patient since she will participate in the management and decision making. The issues frequently observed in the management of PROM such as prematurity, infectious morbidity and its complications must be explained to the patients. The principal risk to fetus is prematurity while the primary maternal risks are infectious morbidity and its complications. In this study, the incidence of neonatal complications is high. This high neonatal complication may be related more closely to the effects of premature birth and neonatal infection. This finding is comparable to the finding in Enugu [24] with similar premature delivery rate and neonatal infection rate. A total of 64.6% had vaginal delivery whereas 35.4% had caesarean delivery. The caesarean section rate of 35.4% in this study was higher than the previously reported rate of 19.8% in this centre among the general population [26]. The reason is that most of the caesarean sections were done due to fetal distress from maternal infection and extreme prematurity. This is also similar to the reports from some centres with similar rate of fetal distress [18, 20].

There is a consensus as regards the benefit of antibiotic therapy in the management of pre-labour rupture of membranes. Patients who have antibiotics tend to deliver babies with better neonatal outcomes

[10-20]. In some instances the membranes have spontaneously sealed following the use of antibiotics. Conservative management is usually abandoned once there is evidence of fetal distress or when the fetus reaches 34 weeks. Currently, there is no effective way of preventing spontaneous rupture of fetal membranes. Several areas of controversies exist regarding the best medical approach or management of PROM remote from term (<34 weeks). Expectant management is generally accepted in preterm PROM less than 34 weeks since it is associated with neonatal advantage by reducing risks of prematurity.

In conclusion, pre-labour rupture of membranes is a condition in obstetrics that is associated with adverse neonatal outcomes. It is important that a detailed history be taken in women with PROM. Education of pregnant women on the features and complications of PROM will help in early presentation immediately after PROM. Early presentation to the hospital and early intervention with steroids, antibiotics and delivery when necessary will improve neonatal and maternal outcomes of patients with PROM.

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