

The Incidence and Management Outcome of Preterm Premature Rupture of Membranes (PPROM) in a Tertiary Hospital in Nigeria

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Abstract Preterm premature rupture of membranes (PPROM) complicates 3-8 percent of pregnancies and leads to one third of preterm deliveries. It results in increased risk of prematurity and leads to perinatal and neonatal complications with risk of fetal death. This article aims to determine the incidence and management outcome of PPRM in Enugu, Nigeria over a ten year period. This was a retrospective review of management outcome of PPRM at the UNTH Enugu from January 1st 1999 to December 31st, 2008. The frequency of 3.3% for PPRM and 7% perinatal death were recorded over the period. Preterm PROM is a major complication of pregnancies. Currently, there is no effective way of preventing spontaneous rupture of fetal membranes due to ignorance of its aetiology, with consequent inability to control its incidence. However, it is important that women be well informed regarding maternal, fetal and neonatal complications regardless of controversies of its management.

Keywords: *incidence, management outcome, preterm premature rupture of membrane (PPROM), Enugu, Nigeria*

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1. Introduction

Preterm premature rupture of membranes (PPROM) is the spontaneous rupture of the fetal membranes during pregnancy before 37 weeks gestation in the absence of regular painful uterine contractions [1]. Premature rupture of membrane (PROM) is the rupture of the fetal membranes before the onset of labour. This spontaneous rupture of membrane is a normal component of labour and delivery [2]. Preterm PROM complicates 3-8% of pregnancies and leads to one third of preterm deliveries [3]. It increases the risk of prematurity and leads to other perinatal and neonatal complications with 1-2% risk of fetal death [4]. It can lead to significant fetal perinatal morbidity such as respiratory distress syndrome, neonatal sepsis, umbilical cord prolapse, placental abruptio and fetal death [5]. It can also lead to maternal morbidity such as postpartum endometritis, disseminated intravascular coagulopathy, maternal sepsis, delayed menses and Asherman syndrome. PPRM is an important cause of perinatal morbidity and mortality because it is associated with brief latency from membrane rupture to delivery, perinatal infection and umbilical cord compression due to oligohydramnios [6].

Numerous risk factors are associated with PPRM such as Black race, lower socioeconomic status, smokers, past history of sexually transmitted infections, previous preterm delivery, polyhydramnios and multiple pregnancy [5,7]. Others are procedures such as cerclage and amniocentesis [5]. The aetiology is multifactorial [5,6].

PPROM evaluation and management are important for improving neonatal outcomes. Accurate diagnosis of PPRM requires a thorough history, physical examination and ancillary laboratory studies. These would allow for gestational age specific obstetric interventions to optimize perinatal outcome and reduce fetomaternal complications [5,8]. Speculum examination to determine cervical dilatation is preferred because digital vaginal examination is associated with a decreased latency period and has potential for adverse sequelae [9]. The management of pregnancies complicated by PPRM is challenging, controversial and should be individualized. However, it should focus on confirming the diagnosis, validating gestational age, documenting fetal wellbeing and deciding on the mode of delivery which depends on gestational age, fetal presentation and cervical examination [2,12-20]. Current evidence suggests aggressive antibiotic therapy which is effective for increasing latency period and reducing infectious infant morbidity. Corticosteroids can reduce many neonatal complications particularly respiratory distress syndrome and intraventricular haemorrhage [5,10,13,14,15].

Expectant management or conservative management is best accomplished by in patient observation. It generally consists of initial prolonged continuous fetal and maternal monitoring combined with modified bed rest to increase the opportunity for amniotic fluid re-accumulation and spontaneous membrane sealing. This approach is generally accepted and preferred because of the associated neonatal advantage and reduction in the risks of prematurity.

There is paucity of data on prevalence and management outcome of PPROMP in African Population including Nigeria, In order to address this problems, this study was designed to investigate the incidence and management outcome of PPRM in Enugu, Nigeria.

2. Methods

This was a 10-year retrospective study of PPRM at the University of Nigeria Teaching Hospital (UNTH) Enugu, Nigeria between January 1, 1999 and December 31, 2008. Data was retrieved from antenatal ward admission register, case files, theatre records and ward reports of 119 women who were treated for PROM over the study period. To be eligible for this study the following criteria were fulfilled: (1) the patient must have ruptured fetal membranes spontaneously and the gestational age must be below 37 completed weeks. (2) Labour must not start within 1 hour following spontaneous membrane rupture. (3) All cases of artificial rupture of fetal membranes are to be excluded from the study.

Medical records were reviewed by trained staff using pre-established and pilot data extraction forms. The records of women who had PROM during the study period were retrieved and data extracted. Information sort were socio-demographic characteristics (maternal age, parity, occupation, tribe and gestational age), birth weight, Apgar scores at 1st and 5th minutes, need for neonatal resuscitation and admission to new born special care unit (NBSCU), fetal outcome, maternal complications which could be reasonably be assumed to have resulted from PROM such as postpartum endometritis, disseminated intravascular coagulopathy, maternal sepsis and Asherman syndrome.

The data were analyzed by descriptive statistics using the statistical package for social science version 12 (SPSS Inc. Chicago, IL, USA) and the results expressed in descriptive statistics by simple percentages.

Approval for the study was obtained from the University of Nigeria Teaching Hospital Ethical Committee. The University of Nigeria Teaching Hospital was established in 1970 and one of the oldest tertiary care centre in Eastern Nigeria. It receives high risk obstetric cases from this region. The antenatal clinics are run every working day (Monday to Friday). Patients are seen at every 4 weeks till 28weeks, fortnightly till 36 weeks, and then, weekly till delivery. At booking, obstetric, medical, and surgical history is obtained. Gestational age was estimated from the first day of the last menstrual period and was collaborated with ultrasonography. The first trimester ultrasound if available at booking was preferred. Height, weight and blood pressure were also measured. The following routine investigations were also done, packed cell volume, urinalysis, blood group and rhesus factor, genotype, hepatitis B surface antigen, VDRL (Venereal Disease Research Laboratory), HIV screening and ultrasound assessment. Pelvic examination using a sterile speculum was performed. Digital examination was avoided. Diagnosis of PPRM was based on history and confirmed by the presence of pooled amniotic fluid on a sterile speculum, positive results from a ferning test and trans-vaginal ultrasonographic evaluation that

demonstrated oligohydramnios. Each patient was observed in the labour and delivery room for at least 24 hours.

3. Results

During the study period, 2798 deliveries were recorded. There was 119 cases of premature rupture of fetal membranes, out of which 94 were cases of preterm premature rupture of membranes, while 25 were cases of term premature rupture of membranes. This showed an incidence of 4.2% for premature rupture of membranes in general and 3.3% for preterm premature rupture of membranes of all deliveries. The case notes of 10 patients could not be traced. While the case note of another 5 unbooked patients had scanty information documented in them and were removed from the analysis leaving a total of 79 patients out of the 94 that met the criteria for preterm premature rupture of membranes, for analysis and evaluation.

Table 1. Maternal age- group with PPRM

Maternal age (years)	Frequency	Percent
16-20	2	2.5
21-25	12	15.2
26-30	34	43.0
31-35	19	24.1
36-40	10	12.7
41-45	2	2.5

Table 2. Parity with PPRM

Parity	Frequency	Percent
0	23	29.1
1	15	19.0
2	21	26.6
3	9	11.4
4	8	10.1
5	2	2.5
5 ⁺	1	1.3
Total	79	100

Table 3. Maternal height with PPRM

Maternal height (cm)	Frequency	Percent
146-150	3	3.8
151-155	7	8.9
156-160	22	27.8
161-165	28	35.4
166-170	16	20.3
171-175	3	3.8

Table 1 compared the relationship of PPRM to maternal age. PPRM is highest among reproductive age group of 26-30 years but lowest among reproductive age group 16-20 and 41 year and above. Primigravidae had the highest occurrence of PPRM. Increasing parity does not significantly influence the incidence of PPRM as shown in **Table 2**. The incidence of PPRM is highest among maternal heights 161-165cm and 156-160cm but lowest among extremes of maternal heights as shown in **Table 3**. **Table 4** shows the relationship of PPRM to maternal

morbidity. A total of 16 cases (20%) had complications which led to prolonged hospital stay. 11 women out of the 16 patients were febrile and 7 women out of the 11 women that had febrile illness had secondary postpartum haemorrhage (PPH) and one out of this patients had total

abdominal hysterectomy (TAH) because of uncontrollable secondary PPH haemorrhage. One patient had offensive lochia, one patient had puerperal psychosis as a result of neonatal death while one patient had puerperal depression, one patient had umbilical cord prolapse.

Table 4. (Material morbidity with PPRM)

Age	Parity	GA	Latency period	complications
32	2	33	4 days	Secondary PPH
29	0	35	15 hours	Depression
30	2	35	16 hours	Pyrexia
26	0	32	14hours	Psychoses/neonatal death
41	0	34	18hours	Pyrexia
25	2	33	13hours	Secondary PPH/Hysterectomy death.
32	0	36	4 days	Pyrexia/offensive vaginal discharge
29	3	33	2days	Puerperal pyrexia
31	1	34	14hours	Intra-partum pyrexia
41	1	31	5days	Retained placenta/pyrexia
25	1	32	4days	Puerperal pyrexia
30	0	35	23hours	Secondary PPH/Pyrexia, died
28	2	36	2days	Pyrexia
38	1	36	36hours	Puerperal pyrexia
30	2	34	16hours	Puerperal/cord prolapsed
34	3	32	18hours	Secondary PPH

Table 5. (Comparison of GA, PPRM, Latency Period, birth weight and perinatal death)

GA at PPRM	Birth weight(kg)		Perinatal death	No of cases	%	Latency period	
	<25.kg	>2.5kg				<24hrs	>24hrs
36-30	6	0	4	6	7.6	2	4
31-34	26	0	3	26	32.9	17	9
35-36 ⁺	17	20	0	47	59.5	38	9

Table 5 shows the relationship of the GA at which PROM occurred, the latency period with birth weight and perinatal death. All the babies delivered before gestational age (GA) of 34 weeks weighed < 2.5kg while 20 babies delivered after 35-36 weeks weighed > 2.5kg while 17 babies delivered after 35-36weeks still weighed < 2.5kg. Four perinatal deaths occurred in those with gestational age between 26-30weeks and 3 perinatal deaths occurred in those with gestational age between 31-34 weeks. No perinatal death was recorded in those with gestational age between 35 weeks and above. 59.5% had preterm PROM in those with gestational age between 35-36weeks +6days while 32.9% had preterm PROM in those with gestational age between 31-34 weeks and less number of cases occurred in those remote from term.

4. Discussion

The incidence of preterm premature rupture of membranes of 3.3 percent in this study fell within the range of 3-8 percent reported in a review by Egarter et al [16]. However, this incidence is slightly higher than the 3 percent reported by Meis et al [17]. This difference could be explained by the fact that many patients in this review had latency period less than one hour and were therefore not included by definition in the current study.

Stuart et al [18] reported that the incidence of preterm PROM rose with advancing maternal age. However, this study was not in agreement with this observation. This current study showed a peak incidence at the mid-reproductive age group of 26-30years (43%). Also in this study, 67.1% was recorded in multigravida while 29.1% was recorded in primigravida.

Incidence of PPRM was high in women with short stature as was documented by Babson and Benson in their previous work [19]. However, this study did not show such association, since there was a high incidence of 87.3% in those more than 155 cm tall.

The risk of infection is significant following PPRM. In this study, infection was the most important complication of PPRM and similar observation was noted by Stuart and his colleagues [18]. Infection rate of 13.9 percent was noted in this study in the mothers both intrapartum and postpartum. In this study, there was increase in incidence of infection with increase latency period more than 24hours.

The rate of maternal morbidity of 20% reported in this study is high compared to previous study by Vermillion et al [20] but is an agreement with that reported by Yoon et al²¹. Previous studies by Egarter et al [16] and Davidson [22] reported that use of prophylactic antibiotic in PPRM reduces maternal morbidity. However, despite the fact that prophylactic antibiotic was used liberally in

this study: maternal morbidity rate of 20% and perinatal mortality rate of 8.9% were reported. The lack of effectiveness of prophylactic antibiotic as noted in this study might be due to adulterated drugs in our environment and low socio-economic status of patients involved.

Harding et al demonstrated that use of corticosteroid in preterm PROM before 34 weeks gestation reduces perinatal morbidity and mortality by reducing the risk of respiratory distress syndrome, intraventricular hemorrhage and necrotizing enterocolitis [23]. In this study, steroid was used in all cases of PPROM below 34 weeks and this may be responsible for low incidence of respiratory distress syndrome, intraventricular haemorrhage and necrotizing enterocolitis observed in this study.

In the management of PPROM, the initial step is informed consent. Risks and benefits information must be given to the patient since she will participate in the management decision making. There are issues frequently observed in management of PPROM such as prematurity, infection morbidity and its complications. The principal risk to fetus is prematurity while the primary maternal risks are infection morbidity and its complications. In this study, the incidence of neonatal complications is high but comparable to that documented by Elimian et al [24] and Dexter et al [25]. This high neonatal complication may be related more closely to the effects of premature birth and sophistication of New born special care unit (NBSCU) rather than PROM.

Several areas of controversies exist regarding the best medical approach or management of PROM remote from term. Expectant management and immediate delivery are potential options in these patients, and each has its own merit and demerits. Expectant management are generally accepted and preferred since it is associated with neonatal advantage by reducing risks of prematurity.

Limitation of this study was the restriction of the study population to the UNTH, Enugu, Nigeria. The women who received care in other health institution outside UNTH and those who received no care at all were not included in this study. Furthermore, this small scale retrospective study should be interpreted with caution. However, this is a stepping stone towards further research on PPROM among Nigerian women.

PPROM 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 due to ignorance of its aetiology, with consequent inability to control its incidence. However, it is important that women be well informed regarding maternal, fetal and neonatal complications regardless of controversies of its management.

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