Research Article

Maternal and Perinatal Outcome of Preterm Premature Rupture of Membranes in Minia University Maternity Hospital. (A prospective observational study)

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Abstract
Introduction: Premature membrane rupture (PROM) is generally characterized as membrane rupture at any point prior to the initiation of uterine contractions. PROM, which occurs before 37 weeks of gestation, is referred to as preterm premature membrane rupture (PPROM), while PROM, which occurs after 37 weeks of gestation, is referred to as the term premature membrane rupture. The latent phase is known as the duration of the rupture of the membranes until the onset of true labor. [(1)] **Aim of the Work:** This study was conducted to evaluate the maternal and perinatal outcome of PPROM (between 24 and 37 weeks) among pregnant women attending Minia University Maternity Hospital [MUMH]. **Patients and Methods:** This prospective observational study was conducted in the department of obstetrics and gynecology, Minia University Maternity Hospital (MUMH) during the period from march 2021 to august 2021 and after being approved by the local department ethical committee of MUMH. All patients diagnosed by PPROM during this study period were recruited into this study. **Results:** This prospective observational study was conducted in MUMH during the period from march to December 2021. 110 pregnant females presented with PPROM between 24 and 37weeks' gestation were recruited in this study
Keywords: Premature membrane rupture, gestation, pregnant females

Introduction
Premature membrane rupture (PROM) is generally characterized as membrane rupture at any point prior to the initiation of uterine contractions. PROM, which occurs before 37 weeks of gestation, is referred to as preterm premature membrane rupture (PPROM), while PROM, which occurs after 37 weeks of gestation, is referred to as the term premature membrane rupture. The latent phase is known as the duration of the rupture of the membranes until the onset of true labor [(1)]

PPROM complicates 1-4% of all pregnancies, and it is associated with 30-40% of all preterm births [(2)]

Certain risk components identified are PPROM in a previous pregnancy, smoking, socioeconomic status, poor nutrition, prior cervical conization, cervical cerclage, second and third trimester bleeding, acute pulmonary disease, prior episodes of preterm contractions, infection (bacterial vaginosis), amniocentesis, polyhydramnios, and multiple gestations, but in most cases, the cause remains unknown and is not apparent at the time of membrane rupture [(3)]

PPROM is associated with increased maternal morbidities like chorioamnionitis, sepsis, abruption, dysfunctional labor, increased incidence of operative delivery, postpartum endometritis and third stage complications like PPH and retained placenta [(3)]

There is an increased incidence of perinatal mortality in PPROM, which may be due to RDS, infection, asphyxia and congenital anomalies. Other causes of death are cord accidents, intracranial hemorrhage, trauma and necrotizing enterocolitis. The inefficient blood-brain barrier makes them more prone to brain damage.[(3)]

The management of pregnancies complicated by PPROM 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. 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 hemorrhage. (4)

Aim of the Work

This study will be conducted to evaluate the maternal and perinatal outcome of PPROM (between 24 and 37 weeks) among pregnant women attending Minia University Maternity Hospital [MUMH].

Patients and Methods

This prospective observational study was conducted in the department of obstetrics and gynecology, Minia University Maternity Hospital (MUMH) during the period from march 2021 to august 2021 and after being approved by the local department ethical committee of MUMH.

All patients diagnosed by PPROM during this study period were recruited into this study.
A written informed consent was Obtained from all patients prior to participation in the study.

Patients recruited into this study are subjected to:

1. **history taking**

- **personal history**: name, Age, Parity, Residence, Occupation, Special habits of medical importance specially smoking
- **complaint**: sudden gush of watery fluid from the vagina, trying to reach a diagnosis of PPROM and exclude other possible causes
- **menstrual history**: menarche, regularity, amount, duration, cycle length and most importantly last menstrual period trying to reach a reliable clinical dating to confirm the gestational age and calculate the expected date of delivery
- **obstetric history**: analysis of all previous pregnancies and deliveries wither ended in term delivery or miscarriage and document any abnormality especially past history of PROM and preterm labor
- **present history**: -analysis of patient complaint (onset, causes, duration of fluid gushing per vagina, nature of this fluid, color, odour)
  -We tried also to exclude other possible causes for this gushing fluid like urinary incontinence or vaginal infection by asking about if being associated with itching, bad smell or burning sensation
  -History of recent intercourse or trauma was asked for
  -history of any intervention like amniocentesis or cerclage which may cause PPROM
  -history suggestive of urinary tract infection
  -analysis of the currant pregnancy itself regarding: type of this pregnancy: spontaneous, post induction of ovulation, IVF pregnancy, single or multiple pregnancy
  -history of vaginal bleeding
  -history of fetal kicking
  -history of gradual abdominal enlargement
  -history suggestive of DM or hypertension
- **Past history**: of significant medical or surgical conditions
- **family history**: of an obstetric significance like DM, hypertension, multiple pregnancy

2. **Clinical examination**

- **General examination**

-Significant general findings
-vital signs: blood pressure, heart rate, temperature (signs of chorioamnionitis)

Results

This prospective observational study was conducted in MUMH during the period from march to December 2021. 110 pregnant females presented with PPROM between 24 and 37weeks' gestation were recruited in this study

Table (1): Demographic data of the cases included in the study (baseline characteristics) (N=110)

		Number	Percentage %
Maternal Age (N%)	< 20	15	13.6%
	20-30	70	63.6%
	> 30	25	22.7%
Mean ± SD	25.85 ± 6.23		
Residence (N%)	Rural	66	60.0%
	Urban	44	40.0%
Occupation (N%)	Working	27	24.5%
	Housewife	83	75.5%
Socioeconomic status (N%)	Low	63	57.3%
	Moderate	36	32.7%
	High	11	10.0%
Special habits (N%)	No	69	62.7%
	Passive smoking	41	37.3%
Parity (N%)	Primigravida	30	27.3%
	Multigravida	80	72.7%

N: Number SD: Standard deviation

According to table (1) which shows various demographic variables in patients with PPROM. The mean age of the patients was 25.85 ± 6.23 SD years with range between (18-42) years. Highest number of PPROM cases (63.6%) occurred in the age group between 20-30 years. The majority of patients were housewife's (75,5%) and most of them (60 %) live in rural areas. (57,3%) of patients were with low socioeconomic level and the majority of them had no special habits of medical importance, The above table shows that PPROM occurred more frequently in multi-gravida (72.7%) than primigravida (27.3%)

Table (2): Gestational age at time of PPROM and at time of delivery (N:110)

Gestational Age at time of PPROM (Weeks.)	**Range**	(24 - 36+6d) weeks
	Mean ±SD	33.13 ± 2.70
24+0 to 33+6 w	**Number (%)**	51 (46.4%)
34+0 to 36+6 w		59 (53.6%)
Gestational age at time of delivery (Weeks.)	**Range**	(26- 37+2d) weeks
	Mean ±SD	34.58 ± 2.57
24+0 to 33+6 w	**Number (%)**	32 (29%)
34+0 to 37 w		68 (61.8%)
>37 w		10 (9.1%)
Latent Period (days)	**Range**	0-35 days
	Mean ±SD	3.20 ± 8.63

SD: Standard deviation

According to Table (2) which shows gestational age at time of PPROM and at time of delivery, the mean gestational age at time of PPROM of studied cases was 33.13 (±2.7SD) with range (24-36+6) weeks, 46.4% of the patients had PPROM from 24+0 to 33+6 weeks and 53.6 % of the patients had PPROM from 34 to 36+6 weeks.

The mean gestational age at time of delivery was 34.58 (±2.57 SD) with range (26-37+2d) weeks. (23.6%) of the patients delivered between (24-33+6d) weeks, (66,4 %) of the patients delivered between (34-37) weeks and (9,1%) of the patients delivered at gestational age (>37) weeks.
The mean latent period was 3.20(± 8.63SD) with range (0-35) days

Discussion

Preterm premature rupture of membranes PPROM, refers to rupture of membranes before the onset of labor in women with a pregnancy <37 weeks gestation. It complicates 1-3% of all pregnancies and is responsible for approximately 30% of preterm deliveries. [(5)]

Premature rupture of membranes is a fairly common complication of pregnancy and can lead to increased maternal complications, operative procedures, neonatal morbidity and mortality. [(6)]

The present study is being planned to describe the course of pregnancies and evaluate perinatal and maternal outcomes with PPROM between 24- and 37-weeks' gestation in Minia University Maternity Hospital (MUMH).
The study included 110 pregnant females presented with PPROM between 24 and 37weeks' gestation.

This study obtained the maternal characteristics from all cases suffering from PPROM and they were found to be as follow: The cases were selected from all age groups; maternal age range between 18-42 years.

In this study most of the patients belonged to the age group 20-30 years (63.6%), Next (22.7%) were more than 30 years of age and mean age was 25.85 ± 6.23 years, this is comparable with study conducted by Mohan et al., 2017[(7)] who obtained the same sample (<20 and >30 years age) in which mean age group was 26.3±6.9 years and most of cases belong to age group 20 – 30 years (50.1%)

Large numbers of respondents came from rural area (60%), and socioeconomically poor class (57.3%) comprising the major percentage of the patients. Maximum patients were house wife (75.5%) followed by daily worker (24.5%).

It was observed that most patients belonged to low socio-economic class 57,3%, which is comparable with the study conducted by Sajitha et al., 2020[(3)] in which the same class accounted 53.7% of all, while high and moderate class stood at 17.1% and 29.3% respectively. The high incidence found can be due to the relatively high prevalence of malnutrition, anemia, poor hygiene, stress, overexertion, high parity, recurrent genitourinary infections, etc. which in turn can lead to a decrease in immunity that can cause a reduction in antibacterial activity in the amniotic fluid and then PPROM

This study found PPROM was common in multigravidas 70% due to possible long-standing infection, previous trauma to the cervix and patulous os; and 30% among Primigravida. Agreeing with Mohan et al., 2017 and Chakravartty et al., 2018[(162)], they found of 38.9% and 38% of their total number among primigravida respectively and 61.1%, 62% were multigravida respectively.

Disagreeing with Sajitha et al., 2020[(3)] in which Primigravida were at higher risk to develop PPROM by by 60.2% comparable to other mentioned studies.

Highest number of cases (53.6%) of PPROM occurred near to term (34 to 36+6weeks). The mean gestational age at the onset of membrane rupture was 33.13 ± 2.70 weeks, this was comparable with the study by Mohan et al., 2017[(161)] which showed 56.9 % of cases of PPROM between (34 to 36+6) weeks of gestation and mean gestational age of 34.1±2.4 weeks.

Late PPROM is more common than early PPROM as stretching of the membranes is more during advanced gestational age.
This study recorded no risk factors among 51.8% of the participants, while 48.2% of cases had one or other risk factors, this was

comparable with the study by Sajitha et al., 2020[3] which showed most of cases had no risk factors (67.5%), while 32.5% of cases had one or other risk factors.

Cases of vaginal infection showed to be 11.8 %, while multiple pregnancy and antepartum hge were 10% and 9.1%, previous history of PPROM was listed in 6.3% of patients, indications of a history of recent coitus comprised 5.5%, UTI was noted in 3.6% respectively. Urinary tract infection was the least occurred risk factor; the reason could be proper diagnosis and judicious use of antibiotics while anemia and UTI were the highest risk factors recorded in other studies [162,163]

Recommendations

- Women diagnosed as having PPROM should be hospitalized early and followed up until delivery with adequate neonatal intensive care unit.
- Developing and disseminating educational material to raise and upgrade awareness of pregnant women about symptoms of PPROM and the need for professional care.
- Further studies on large geographical scale and on larger sample size to emphasize our conclusion.
- More available NICU places should be available to the obstetric department to give no chance to delay termination of pregnancy once the decision had taken.

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