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Original Research Article

A study on feto-maternal outcome in patients with preterm premature rupture of membranes

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ABSTRACT

Background: Preterm premature rupture of membranes (PPROM) is rupture of fetal membranes prior to labor in pregnancies between 28-37 weeks. PPROM is associated with significant maternal and neonatal morbidity or mortality. The present study was conducted to evaluate risk factor and etiology of PPROM and its fetomaternal effect in tertiary care hospital.
Methods: A cross-sectional study was conducted in the department of obstetrics and gynaecology, SMS Hospital, Ahemdabad. From August 2023 to February 2024.The study included 50 pregnant women between 28-37 weeks gestation with PPROM were subjected to detailed history and examination. Each patient was followed till her delivery and fetomaternal outcome was recorded.
Results: PPROM is a fair complication of pregnancy. 80% were belongs to 20-29 age, 70% were unbooked, 76% from low SE-class, 68% with gestational age of 34-36 weeks. Vaginal delivery was common 58%. The babies born to mothers with PPROM more in weight of 2-2.5 kg (48%). 34 had no risk factors to develop PPROM. Most common etiology for PPROM infection 16% and malpresentation 10%. Most of the mothers with PPROM had no complications. 17 (34%) babies required NICU admissions for complaints of premturity, respiratory distress, birth asphyxia, and sepsis. RDS was most common neonatal complication. 2 neonatal deaths in this study due to RDS and prematurity.
Conclusions: Effective PPROM Mx involves evaluating the risks and advantage of conservative Mx strategies. Whenever possible, Rx should be focused towards prophylactic use of antibiotics and steroids during pregnancy can reduce fetal and mother morbidity and mortality. Termination of pregnancy should be considered at the 1st sign of chorioamnionitis.

Keywords: Preterm premature rupture of membranes, Chorioamnionitis, Maternal outcome, Neonatal outcome

INTRODUCTION

Premature rupture of membranes (PROM) is the rupture of the chorioamnion prior to the commencement of true labour. [1] It is a major cause of spontaneous preterm delivery and can complicate pregnancy that is normal. Term premature rupture of membranes (TPROM) occurs between 37 and 42 weeks gestational age, while preterm premature rupture of membranes (PPROM) occurs between 24-37 weeks gestation. The latent period is defined as the time between membrane rupture and the commencement of uterine contractions. Prolonged PROM is when more than 24 hours have passed before labour ensues.

High rupture of membranes is defined as rupture of chorio-amnion membranes at a site distal to internal os. In some instances, spontaneous cessation of leaking occurs.[2] The condition known as PPROM is linked to a high likelihood of maternal and perinatal mortality and morbidity. It is found in 5 to 10 percent of all pregnancy.[3]

Ethiopathogensis of PROM and PPROM is multifactorial including: maternal enzymes like collagenase and trypsin, which is released from placenta and amniotic fluid, disrupt the collagen matrix resulting in PROM; decrease in collagen type 3 leads to loss of membrane elasticity and strength; and bacterial infections.

Risk factor for PROM and PPROM Over distension of uterus, prior history of preterm birth or PPROM, cervical incompetence, recent history of coitus, collagen disorders, nutritional deficiencies.

PPROM is associated with; smoking, lower socio-economic status, infection, polyhydramnios, multiple gestation and trauma. Women are at higher risk of developing complications, such as chorioamnionitis, cord compression, cord prolapse, placental abruption, increased caesarean sections and post-partum haemorrhage.[4] Neonates are at risk for morbidities associated with prematurity and septicaemia.[5]

The management of PPROM has seen substantial progress, resulting in better outcomes for both mothers and fetuses. Prophylactic antibiotics and steroids have played a crucial role in achieving this improvement. Nevertheless, the neonatal outcome differs across different centres due to variations in neonatal care facilities.

METHODS

An analysis of labour outcomes will be conducted on 50 patients with preterm premature rupture of membranes after receiving written informed consent, ensuring privacy protection. This prospective cross-sectional study will take place at the department of obstetrics and gynecology, SMS Hospital, Ahmedabad from 03 August 2023 to 01 February 2024.

Inclusion criteria

All pregnant females between 28 to <37 weeks of gestation. Cases of leaking with or without membranes included in our study.

Exclusion criteria

Maternal complications interfering with active management – PIH, APH, IUGR, heart diseases, fetal-malformations, and DM type 2 excluded from study.

On admission a detailed history is taken including age, booking, socio economic status, time of onset of rupture, amount of fluid loss, colour, odour, associated with pain or bleeding per vaginum and perception of fetal movements. Detailed obstetrics and menstrual history is taken. Relevant past obstetrics history is noted.

General examination done at the time of admission. Systemic examination including respiratory system, cardiovascular system in obstetric examination, fundal height, lie, presentation, position of fetus, engagement of presenting part, condition of uterus. Uterine tenderness to be looked for as a sign of chorioamnionitis fetal heart auscultation, look for rate and rhythm A sterile per speculum examination is to be done to note the condition of cervix and vagina. Liquor draining from the os to be observed. Colour and smell of fluid to be noted. If no fluid is seen, lady is asked to cough and drainage of the fluid is to be looked for. Pelvic examination – to know Bishop score, adequacy of pelvis, assessment of CPD and to rule out cord prolapsed.

Investigations

Complete blood count (CBC) with peripheral smear, C-reactive protein (CRP), and urine routine micro were the investigations. Prophylactic antibiotics to be given – injection ceftriaxone 1 g IV 12 hourly. In patient with gestational age <34 weeks: injection betamethasone 12 mg, 2 doses 24 hours apart. Depending upon Bishop's score, whether to do induction or not is decided (with prostaglandins – tab. misoprostol (25 micrograms), and dinoprostone gel (0.5 mg).

Statistical analysis

Statistical analyses were performed through Microsoft excel. All categorical data were reported as number and percent.

RESULTS

Majority of women 35(70%) are unbooked in study. Poor antenatal visits could be one of the risk factors implicated in PPROM.

Incidence of PPROM is more in the age group of 20-29 years (80%) (Table 1).

Table 1: Distribution of age incidence in PPROM.

Age (years)	No. of patients	Percentage
<20	05	10
20-29	40	80
>30	05	10
Total	50	100

Many studies have demonstrated that membrane abnormalities result from low nutritional status, which is heavily influenced by socioeconomic position. The majority of (76%) the patients in this study are from the lower socioeconomic level.

Many studies have demonstrated that membrane abnormalities result from low nutritional status, which is heavily influenced by socioeconomic position. The majority of (76%) the patients in this study are from the lower socioeconomic level (Table 2).

Table 2: Distribution of socio economic status in PPROM.

Socioeconomic class	No. of patients	Percentage
Low	38	76
Middle	12	24
Total	50	100

Majority of patients (68%) had pregnancy of 34-36 weeks (Table 3).

Table 3: Incidence of PPROM according to gestational age.

Gestational age (weeks)	No. of patients	Percentage
<34	16	32
34–36	34	68
Total	50	100

In this study, 12 cases were having high leak with intact membrane, had good prognosis (Table 4).

Table 4: Membrane status among case of PPROM.

Membrane	No. of patients	Percentage
Present	12	24
Absent	38	76

Among the etiological analysis of PROM in this study, most cases (34 patients) had unknown etiology. Most common cause was infection.

Among 50 cases, majority of women 30 (60%) managed conservatively (Table 5).

Table 5: Etiological factors in cases of PPROM.

Cause	No. of patients
Infection	08
Malpresentation	05
Polyhydramnios	02
Multiple gestation	00
H/O, cervical surgery	01
Not known	34
Total	50

Among 50 cases, majority of women 35 (70%) delivered between 1 to 7 days (Table 6).

Table 6: PPROM to delivery interval.

PPROM to delivery interval	No. of cases	Percentage
<24 hours	03	06
1-7 days	35	70
>1 week	12	24

Among 50 cases, majority of women 35 (70%) had normal vaginal delivery – 21 (42%) spontaneous labour cases and 14 (28%) induced labour cases. Out of which 1 were delivered by vacuum and 1 by forceps (Table 7).

Among 50 cases in this study, 22 (44%) patients delivered babies whose birth weight was >2.5 kg. 24 babies were between 2 to 2.5 kg (48%) and only 8% babies were <2 kg (Table 8).

Table 7: Mode of delivery.

Gestational age	Spontaneous labour, N (%)			Induced labour, N (%)		
	Vaginal	**LSCS**	**Total**	**Vaginal**	**LSCS**	**Total**
<34	4 (8)	1 (2)	5 (10)	3 (6)	2 (4)	5 (10)
34-36	17 (34)	7 (14)	24 (48)	11 (22)	5 (10)	16 (32)
Total	21 (42)	8 (16)	29 (58)	14 (28)	7 (14)	21 (42)

Table 8: Birth weight in PPROM.

Birthweight (kg)	No. of cases	Percentage
<2	04	08
2–2.5	24	48
>2.5	22	44
Total	50	100

Maximum morbidity was attributed to febrile illness. Cases of clinical chorioamnionitis may be missed due to use of prophylactic antibiotics. In this study, babies born to 17 mother (34%) had NICU admission (Table 9).

Among all cases 10 patients had various morbidities like prematurity, SGA, sepsis, birth asphyxia, respiratory distress, meningitis, etc. Other morbidities like pulmonary hypoplasia, developmental delay or cerebral palsy can also occur, which are related to prematurity.

Out of 50, total 2 mortality occurs due to prematurity and birth asphyxia (Table 10).

Table 9: Maternal morbidity in PPROM.

Morbidity	No. of patients
PPH	2
Post-partum fever	3
Wound infection	1
Chorioamnionitis	2
Endometritis	1

Table 10: Perinatal morbidity in PPROM.

Morbidity	No. of cases
Pre maturity	02
SGA	01
Birth asphyxia	01
Respiratory distress	03
Neonatal sepsis	02
Meningitis	01
Total	10

DISCUSSION

PPROM is associated with significant maternal and neonatal morbidity or mortality. It presents the obstetrician with a management dilemma. Despite the amount of research done in this area, there is still no universally accepted policy for management.

This study was done tertiary care hospital taking into account of 50 patients with PPROM. Overall incidence at our hospital was found to be 10.6% which is comparable to Rana et al study 8.9%.[7] General incidence varies from 2-18% (Gunn et al) and 2.7 to 17% (Arias).[6] In present study, 80% cases were between 20-29 years of age because most women marriages happened in this decade, which is similar to Shela et al, 58.8% women belonged to age group of 15-25 years.[8]

High incidence 76% PPROM occurs in low SE group. Shela et al also observed 68.2% PPROM in low SE group.[8] Defects in the membrane may arise because of poor nutritional status, which significantly influenced by low SE status. In our study 70% cases of PPROM were unbooked. Taking improper antenatal care is the important risk factor for PPROM, which is comparable to study conducted by Thapa et al in which 88% patient were unbooked in PPROM patients.[9]

In 34 (68%) of PPROM the cause and risk factors could not be elicited while most common risk factor was infection which is in 8 (16%) patients. According to Thapa et al, genital tract infections, UTI, past history of PROM most often reported with PPROM.[9] Taking malpresentation as one of the risk factor for PPROM in the study, 4 (8%) cases were presented with breech presentation while and 1 (2%) case was of compound presentation. Hill et al study showed that prevalence of breech presentation at 28 weeks was 24.4% and decreased to 3.7% by 37 weeks. We hypothesized that higher the probability of breech presentation with the lower the gestational age.[11]

Most common mode of delivery in PPROM was (70%) vaginal delivery in which 21 (42%) delivered by spontaneous labour and 14 (28%) were induced labour which is similar to Singh et al, majority (67.33%) of the study subjects of PPROM were delivered vaginally. Among them, 55.66% delivered by spontaneously while 45.66% were induced incidence of operative deliveries was noted. 2 patients in study had instrumental delivery.[12] Out of which 1 were delivered by vacuum and 1 by forceps. Maternal exhaustion was the major indication. Caesarean delivery was noted in 30% cases which is comparable to Jain et al study 33% cesarean section noted.[10]

In this study, 44% of the babies delivered were >2.5 kg, 48% were between 2 to 2.5 kg. Simliar findings were also observed in this study.[12]

The maternal complication of PPROM is chorioamnionitis seen in 4% cases. Clinical evidence of infection has not been noticed in any of the patients in this study. Complications due to infection are reducing nowadays. This may be attributed to regular use of intrapartum antibiotics.in this study we also found 3 (6%) patients had fever in the immediate postpartum period, 1 (2%) cases had wound infection and 1 (2%) patients had endometritis.

17 (34%) of the babies born to PROM mothers were admitted in NICU for various complications in present study. Among 10 cases of perinatal morbidity, 2 (4%) cases of sepsis, 3 (6%) cases of respiratory distress, 1 (2%) cases of birth asphyxia, 1 (2%) cases of SGA have been documented. Perinatal loss in PPROM is attributed to prematurity and birth asphyxia in this present study. In Rana et al study incidence of respiratory distress 5% and neonatal sepsis 5%.[7] According to Thapa et al, 11.25% had respiratory distress syndrome, 7.50% had septicemia.[9]

The main limitation of our study is its retrospective nature, its single institutional experience, and small number of cases available. This study did not look into variables such as a history of PROM, previous abortion, or length of hospital stay, all of which are important for maternal-fetal outcomes.

CONCLUSION

PPROM plays a significant role in contributing to fetomaternal morbidity and mortality. Vicious treatment of patients with PPROM is critical. Prolonged leaking increases the possibility of developing chorioamnionitis. Prophylactic antibiotics, corticosteroids, and tocolytics should be administered promptly in cases of premature labour. Prostaglandins and oxytocin are recommended to shorten labour length Monitoring feto-maternal health throughout the intrapartum phase is critical. A multidisciplinary strategy in a hospital setting with resources, competent personnel, operating theatre, and neonatal care facilities is advised for managing PROM. Aggressive therapy of PPROM is crucial for reducing maternal and perinatal morbidity and mortality.

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