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Original Research Article

A study of maternal outcome in term premature rupture of membranes in a tertiary care hospital

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ABSTRACT

Background: Premature rupture of membranes (PROM) remains a subject of great clinical relevance. The present study was conducted to study maternal morbidity and its relationship with PROM-delivery interval in patients with term PROM as compared to patients without PROM.
Methods: A prospective case control study was conducted in the department of obstetrics and gynecology, Kasturba Hospital, New Delhi. 100 pregnant patients presenting to the labor room with features of PROM at term (POG>37 weeks) were taken as cases and 100 term pregnant women (age and parity matched) with intact membranes were taken as controls and compared in terms of maternal outcome.
Results: This study reported maternal morbidity rate of 21% in term PROM cases which was significantly higher than in control group (5%). The major cause was febrile morbidity which occurred in 16% of cases indicating ascending infection. Other complications were abdominal and episiotomy wound infection (4%), chorioamnionitis (2%), postpartum hemorrhage (2%) and puerperal sepsis (1%). There was an increased rate of operative delivery in the case group (33%) as compared to 18% in patients without PROM. Duration of PROM-delivery interval had a significant direct proportional impact on the maternal morbidity. The duration of combined hospital stay of mother and neonate was also increased.
Conclusions: Patients with term PROM have significant maternal morbidity which was mainly due to infection. The duration of the hospital stay was also significantly increased.

Keywords: Chorioamnionitis, Lower segment caesarean section, Maternal morbidity, Postpartum hemorrhage, Term premature rupture of membranes

INTRODUCTION

Premature rupture of membranes (PROM) remains a subject of great clinical relevance for every obstetrician. Spontaneous rupture of membranes beyond 37 weeks of pregnancy but before onset of labor is called term premature rupture of membranes (PROM). The incidence of PROM is about 10% of all pregnancies and 70% of these occur at term.[1] At term infection remains the most serious complication associated with PROM due to ascending infection from the vagina and cervix which can cause increased maternal morbidity. Various maternal complications include chorioamnionitis, abruptio placenta, febrile morbidity, failed induction, increased incidence of operative delivery, postpartum hemorrhage, retained placenta, puerperal sepsis, and endometritis.[2-6]

METHODS

A prospective case control study was conducted in the department of obstetrics and gynecology, Kasturba Hospital, Daryaganj, New Delhi after the approval of Institutional Review Board (IRB). Informed consent was taken by all the patients. In this study, 100 women with singleton pregnancy and cephalic presentation at term (gestational age >37 weeks) with features of pre-labor

rupture of membranes presenting to the labor room of Kasturba Hospital were taken as cases. These were compared with 100 controls (normal term pregnancies without PROM matched to cases with respect to age and parity) in terms of maternal outcome. PROM was confirmed by fern test and pH paper test of clear leaking fluid on per speculum examination.

Inclusion criteria

- Cervical dilatation of less than 3 cm and lack of uterine contractions for at least 1 hour from the onset of PROM.

Exclusion criteria

- Gestational age less than 37 weeks, cervical dilatation more than 3 cm, previous caesarean section, labor within 1 hour of rupture of membrane, malpresentations, multiple gestation and cephalopelvic disproportion.

Patients with term PROM were given prophylactic antibiotics and depending upon the Bishop's score, labor was induced with prostaglandin E2 gel or oxytocin. Time of induction was noted. The progress of labor in each case was closely monitored and plotted on a partograph. Antepartum, signs and symptoms of chorioamnionitis were observed. Postpartum, they were observed for third stage complications like postpartum hemorrhage and retained placenta. They were followed till puerperal period. Episiotomy wound and caesarean section wound were observed, and regular follow-up was done. Maternal morbidity in terms of puerperal fever, puerperal sepsis and wound infection were noted. Total hospital stay was calculated and compared in both the groups.

Statistical analysis

Suitable tests of significance were applied and p-values less than 0.05 was considered significant.

RESULTS

The results showed that maternal morbidity was significantly higher in term PROM patients compared with patients without PROM. Out of 100 cases, 21 cases had complications in their antepartum, intrapartum and postpartum period as compared to only 5 patients in control group. These results were statistically significant (p=0.001) (Table 1).

Table 1: Distribution of study subjects according to maternal morbidity.

Maternal morbidity	Cases	Controls	Total
Absent	79 (79.00%)	95 (95.00%)	174 (87.00%)
Present	21 (21.00%)	5 (5.00%)	26 (13.00%)
Total	100 (100.00%)	100 (100.00%)	200 (100.00%)

(χ^2 = 11.317, df = 1) (p-value = 0.001).

Table 2: Distribution of study subjects according to mode of delivery.

Mode of delivery	Cases	Controls	Total
Lower segment caesarean section	33 (33.00%)	13 (13.00%)	46 (23.00%)
Normal vaginal delivery	67 (67.00%)	87 (87.00%)	154 (77.00%)
Total	100 (100.00%)	100 (100.00%)	200 (100.00%)

(χ^2 = 11.293, df = 1) (p-value = 0.001).

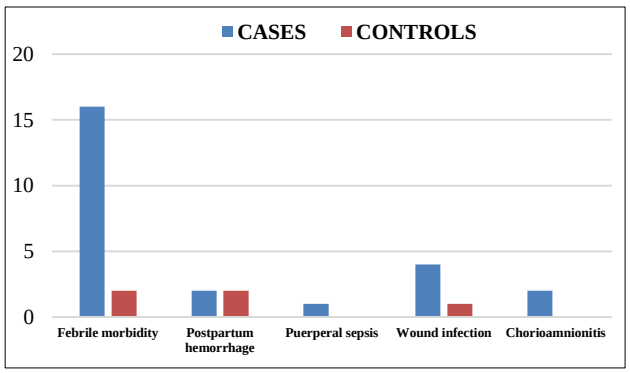

Figure 1: Distribution of study subjects according to the type of maternal complications.

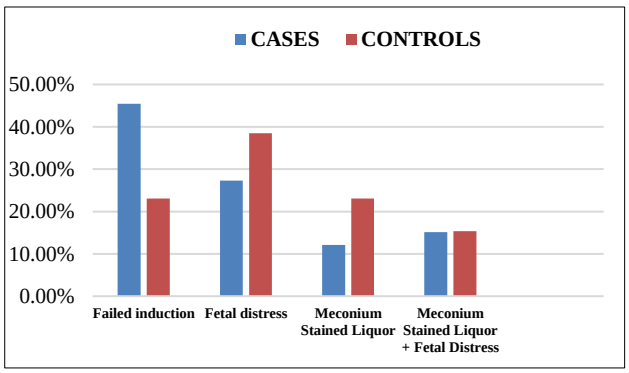

Figure 2: Indications of caesarean section.

Most common cause of maternal morbidity in case group was febrile morbidity which occurred in 16% of cases indicating infection. Other complications were abdominal and episiotomy wound infection (4%), chorioamnionitis (2%), postpartum hemorrhage (2%) and puerperal sepsis (1%) (Figure 1).

There was significantly higher number of term PROM patients who underwent operative delivery (p=0.001). About 33% of women with term PROM underwent Lower segment caesarean section (LSCS) as compared to only 13% of women in control group. Whereas, 67% of women delivered vaginally in PROM group as compared to 87% in control group (Table 2).

In the term PROM patients, out of 33 patients, 15 patients underwent LSCS due to failed induction, 9 due to fetal distress, 4 due to meconium stained liquor and 5 had both meconium stained liquor with fetal distress. In the control group, only 3 out of 18 patients underwent LSCS due to failed induction, 5 due to fetal distress, 3 due to meconium stained liquor and 2 for meconium stained liquor with fetal distress (Figure 2).

Table 3: Relationship between PROM-delivery interval and maternal morbidity.

PROM to delivery interval (hours)	Maternal morbidity
0-6	0 (0.00%)
6.1-12	0 (0.00%)
12.1-24	8 (15.09%)
>24	13 (50.00%)
Total	21 (21.00%)

The duration of PROM to delivery interval had statistically significant impact on maternal morbidity. Longer the PROM to delivery interval, higher chances of maternal complications. 50.00% of mothers had complications if the interval was more than 24 hours (Table 3).

Table 4: Distribution of study subjects according to hospital stay.

Mean hospital stay	Days
Cases	4.20±3.73
Controls	2.72±2.90

(p value=0.002).

Mean hospital stay of cases was significantly higher (4.20±3.73 days) in patients with term PROM which included combined stay of mother and neonate. In control group mean hospital stay was 2.72±2.90 days. The difference was statistically significant (Table 4).

DISCUSSION

Maternal morbidity

The incidence of maternal morbidity in this study was 21% in the case study group compared to only 5% in the control group.

The incidence of maternal morbidity was 14% in the study by Bangal V et al.[8] Results similar to this study were seen in the study by Kodkany et al where 21% mothers had complications.[7] This study results were comparable to studies by Singhal P et al, Devi A et al, Kodkany et al (Table 5).[3,5,7]

Table 5: Comparison of incidence of maternal morbidity in patients with term PROM across various studies.

Study	Devi A et al[3]	Singhal P et al[5]	Kodkany et al[7]	Present study
Incidence of maternal morbidity	22.11%	19%	21%	21%

Maternal morbidity is due to intrapartum infection which results from spread of ascending genital infection to amniotic cavity due to absence of the protective barrier of amniotic membranes in cases of PROM.

Type of maternal complications

Maternal outcome was measured in terms of chorioamnionitis, abruption, labor dystocia, postpartum hemorrhage, retained placenta, puerperal fever, delayed wound healing and wound infection.

Most common cause of maternal morbidity was febrile morbidity seen in 16% of cases in PROM group as compared to only 2% in control group, difference being statistically significant.

Similar results were reported by Devi A et al and Singhal P et al wherein study subjects had 20.19% and 17.5% febrile morbidity respectively.[3,5] Revathi V et al noted 22% mothers with term PROM had puerperal fever.[6] Lalwani A et al at reported 5.3% incidence of febrile morbidity in term PROM.[2] Kadikar et al, reported 2% cases having puerperal fever.[4] Wound infection was seen in 4% cases as compared to only 1% in the control group. Wound infection in terms of episiotomy and abdominal wound infection gaping was reported. 2.3% of patients had wound infection in the study by Lalwani A et al.[2] Revathi V et al noted 14% incidence of wound infection.[6] Wound infection rates in this study corroborated with the study by Kadikar et al study (~3%).[4] Chorioamnionitis is an important and peculiar sequalae of PROM. It is a grave complication of PROM where the mother has to be

treated aggressively with broad spectrum antibiotics and pregnancy has to be terminated immediately.

It was seen in 2 cases in term PROM group in this study whereas none of the patients had chorioamnionitis in the control group. This study results showed much lower rate of chorioamnionitis than compared to the study of Devi A et al, Kodkany et al and Pandey S et al probably because all patients with features of PROM at this hospital were given prophylactic intravenous antibiotics (Table 6).[3,7,9,10]

Table 6: Comparison of incidence of chorioamnionitis in patients with term PROM across various studies.

Study	Pandey S et al[9]	Kodkany et al[7]	Devi A et al[3]	Present study
Incidence of chorioamnionitis	6%	5%	5.6%	2%

Postpartum hemorrhage occurred in 2% cases in this study. One patient out of them was a grand multipara and had atonic PPH. Results were similar to study by Lalwani A et al who noted 2.3% patients with term PROM had PPH.[2] One patient on 5th postoperative day of LSCS developed high grade fever with chills and foul-smelling lochia. She had history of leaking for more than 24 hours and her high vaginal swab antenatally was positive for Group B *Streptococcus*. She was treated aggressively with broad spectrum antibiotics and her wound gaped on 10th day. She underwent abdominal wound resuturing and was discharged on 15th postoperative day. Hence, if early intervention and steps for termination of pregnancy are taken it will lead to decreased morbidity of mothers. Maternal health is the primary indicator for the need to deliver. Any evidence of infection or maternal instability due to complications of PROM requires careful evaluation and determination of the appropriate management.

Mode of delivery

In this study, 33% of women with term PROM underwent lower segment caesarean section (LSCS) as compared to only 13% of women in control group. Whereas, 67% of women delivered vaginally in PROM group as compared to 87% in control group. The results were statistically significant indicating higher rate of caesarean section in PROM group in this study.

Vaishnav J et al, found no correlation in mode of delivery and PROM.[11] They noted 21.21% LSCS rate in cases and 18.18% LSCS rate in controls. Revathi V et al, in a study noted a fourfold higher caesarean section rate in term PROM cases, the rate being 29%.[6]

Comparable results were noted by Shrestha SR et al i.e., 27% and 30% in Kodkany et al.[7,10] Kadikar et al observed that in term PROM, 33 cases had vaginal delivery (48%), 28 cases had cesarean section (41%) and 8 (11%) cases had instrumental delivery.[4] This study results were comparable to study of Revathi V et al, Shrestha SR et al, Kodkany et al and Kadikar et al (Table 7).[4,6,7,10]

Higher rates of caesarean section were mainly observed in patients with PROM due to immediate induction given to these patients which resulted in increased operative delivery.

Table 7: Comparison of mode of delivery (normal vaginal delivery versus lower segment caesarean section) in patients with term PROM across various studies.

Study	Revathi V et al[6]	Shrestha SR et al[10]	Kodkany et al[7]	Kadikar et al[4]	Present study
Normal vaginal delivery	61%	70%	68%	48%	67%
Lower section caesarean section	29%	27%	30%	41%	33%

Relationship between maternal morbidity and PROM-delivery interval

The duration of PROM to delivery interval had statistically significant impact on maternal morbidity. Longer the PROM to delivery interval, higher chances of maternal morbidity. 50.00% of mothers had complications if the interval was more than 24 hours compared to none if they delivered within 12 hours. While it was 15.09% if this interval was in between 12-24 hours.

Revathi V et al, reported maternal morbidity of 20.68% in 12-24-hour interval which increased to 75.86% in more than 24 hours PROM to delivery interval.[6]

Rakholia S et al also reported 0%, 12.5% and 75% maternal morbidity in PROM to delivery interval 0-12

hour, 12-24 hour and more than 24 hour respectively.[12] Bangal V et al observed 0%, 16% and 64% in PROM to delivery interval 0-12 hour, 12-24 hour and more than 24 hour respectively.[8] This study was comparable to studies by Rakholia S et al and Bangal V et al (Table 8).[8,12]

Table 8: Comparison of PROM to delivery interval with maternal morbidity in patients with term PROM across various studies.

Study		Rakholia S et al[12]	Bangal V et al[8]	Present study
PROM to delivery interval with maternal morbidity	0-6 hour	0%	0%	0%
	6-12 hour	0%	0%	0%
	12-24 hour	12.5%	16%	15.09%
	>24 hour	75%	64%	50.00%

This lends credence to the observation that risk of infection and associated chorioamnionitis and thus morbidity increases with the passage of time after PROM. Thus, it seems prudent to induce labor immediately in PROM patients in order to shorten the PROM to delivery interval and the associated maternal morbidity.

Mean hospital stay

It was observed that mean hospital stay of patients with term PROM was significantly higher (4.20±3.73 days) which included combined stay of mother and neonate. It was also majorly due to neonatal morbidity. It was mainly due to antibiotics given to baby. In the control group mean hospital stay was 2.72±2.90 days. This is lower than the study by Shah M et al in which hospital stay in patients of term PROM was longer (5.98 days) as compared to control (3.96 days).[1] Vaishnav J et al in a study also found higher hospital stay to the order of 6.87 days in case group which they attributed to antibiotics given to baby due to neonatal morbidity for which mother was kept in ward (Table 9).[11]

Table 9: Comparison of mean hospital stay in patients with term PROM across various studies.

Study		Shah M et al[1]	Vaishnav J et al[11]	Present study
Mean hospital stay (days)	Cases	5.98	6.87	4.20±3.73
	Controls	3.96	4.36	2.72±2.90

CONCLUSION

Term PROM is an important complication of pregnancy which leads to significant maternal morbidity. Pregnancy complicated with PROM can led to complications such as chorioamnionitis, postpartum hemorrhage, puerperal fever, puerperal sepsis and delayed wound healing, wound infection. Also, it leads to increased operative interventions leading to higher rates of operative delivery. These complications can be reduced by use of appropriate antibiotics and immediate induction of labor. Health care strategies should strive to decrease and eliminate genital tract infections with the help of a low-cost tool such as syndromic approach. By making antenatal care and basic health services available to women of all sections of society the incidence of PROM and associated maternal morbidity can be reduced.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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