



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 11, Issue, 09, pp.7084-7086, September, 2019

DOI: <https://doi.org/10.24941/ijcr.36358.09.2019>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

MATERNAL AND NEONATAL OUTCOME IN CASES OF PRETERM PREMATURE RUPTURE OF MEMBRANES AFTER 34 WEEKS OF GESTATION

*Divya, V., Sumathi, N. and Karthika, K.

Department of Obstetrics and Gynecology, Govt. Rajaji Hospital, Madurai, Tamil Nadu, India

ARTICLE INFO

Article History:

Received 15th June, 2019
Received in revised form
12th July, 2019
Accepted 16th August, 2019
Published online 30th September, 2019

Key Words:

Induced, Neonatal,
Premature, Rupture of membrane,
Sepsis.

ABSTRACT

Background: Preterm premature rupture of membrane (PPROM) is associated with various maternal and neonatal complications. The study was carried out to determine the various maternal and neonatal outcomes associated with rupture of membranes beyond 34 weeks of gestation. **Methods:** It was a prospective study carried out in Govt. Rajaji hospital for a period of 5 months from March 2019 to July 2019. All the pregnant women with rupture of membranes after 34 weeks are included in the study. After establishment of diagnosis of rupture of membranes, antibiotics were started and all of them were induced after 6 hours if they did not have spontaneous labour. Various maternal and neonatal outcomes were noted and statistical analysis carried out. **Results:** Incidence of rupture of membrane in our study was 1 %. 84 % of patients delivered within 24 hours of rupture of membrane and 20 % of them required caesarean section. 14 % neonates had respiratory distress syndrome and 12 % neonate had sepsis. **Conclusions:** Induction of labour and delivery within 24 hours of rupture of membranes associated with low incidence of maternal and neonatal adverse outcome.

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Citation: Divya, V., Sumathi, N. and Karthika, K. 2019. "Maternal and neonatal outcome in cases of preterm premature rupture of membranes after 34 weeks of gestation", *International Journal of Current Research*, 11, (09), 7084-7086.

INTRODUCTION

Premature rupture of membranes (PPROM) is defined as rupture of membranes before 37 completed weeks and before onset of labour (ACOG 2016 b) such rupture likely has various causes but intrauterine infection, oxidative stress induced DNA damage and premature cellular senescence are major predisposing events. Associated risk factors include lower socioeconomic status, BMI < 19.8, nutritional deficiencies and cigarette smoking. Women with PPRM carry an enhanced risk for recurrence during a subsequent pregnancy. Despite these known risk factors, none is identified in most cases of preterm rupture. Increased apoptosis of membrane cellular component and greater levels of specific proteases in membranes and amniotic fluid are related to PPRM. Thus collagen degradation has been a focus of research. Matrix Metallo Proteinase (MMP) family is involved with tissue remodeling and particularly with collagen degradation. Some members are found in higher concentration in amniotic fluid from pregnancies with PPRM. MMP activity is regulated by Tissue Inhibitor of metallo proteinases (TIMP). Several of these inhibitors are found in lower concentration in amniotic fluid from women with ruptured membrane. Bacterial endotoxins are TNF alpha cells which elicit release of fetal fibronectin by amnion epithelial cells.

*Corresponding author: Divya, V.,

Department of Obstetrics and Gynecology, Govt. Rajaji Hospital, Madurai, Tamil Nadu, India.

Fetal fibronectin binds to TOLL like receptors 4 in amnion mesenchymal cells to activate signaling cascades which results in augmented prostaglandin E synthesis and elevated activity of MMP resulting in premature rupture. The management of PPRM has long been in controversy in the obstetrics practice. The advocates of aggressive termination of pregnancy have played major role in severe maternal and foetal morbidity. Some suggested conservative management of PPRM in absence of labour or signs of infection to allow for a favourable gestational age. PPRM remains a major cause of preterm delivery, neonatal morbidity and mortality. The underlying multifactorial etiology and the lack of differentiation of preterm labour with intact membranes and that following PPRM in research studies has made preventive strategies difficult to develop. Treatment strategies including antibiotic therapy and the use of corticosteroids in women who have already undergone PPRM have improved neonatal outcomes significantly. However the prediction and prevention of PPRM remains a significant challenge in obstetrics. Some of the serious complications associated with PPRM include chorioamnionitis, cord prolapse, placental abruption, RDS, sepsis, intraventricular hemorrhage and fetal death. This study has been carried out to determine the various maternal and neonatal outcomes in cases of premature rupture of membranes after 34 weeks period of gestation and before 37 weeks of gestation.

AIM: To study the maternal and fetal outcome of preterm premature rupture of membranes at Govt Rajaji hospital, Dept of Obstetrics and gynecology, a tertiary care center – which caters unbooked cases and as a referral center of the region.

MATERIALS AND METHODS

This was a prospective study carried out at Govt. Rajaji hospital, Madurai from 15th MARCH 2019 to 15th JULY 2019. Institutional Ethical Committee clearance was obtained. An informed consent was obtained from all the participants enrolled in the study. All pregnant ladies presenting to hospital labour room with history of rupture of membrane after 34 weeks period of gestation were included in the study. Rupture of membrane was established by clinical examination. Period of gestation was established from the last menstrual period and in cases of unsure dates, first trimester ultrasonographic date was taken into consideration. After doing general examination of patient, speculum examination was done and high vaginal swab was taken. Blood counts were sent. Per vaginal examination was done using sterile precautions. Fetal wellbeing was established by cardiotocogram. Antibiotics were started to the patient as per hospital policy i.e. T. Erythromycin 400 mg 1 QID. Antibiotics were given for a maximum period of 5 days. Fetal wellbeing and liquor state was established by doing CTG and AFI. Patients who were in labour with cephalic presentation were allowed to progress spontaneously and those not in labour were observed for 6 hrs for onset of spontaneous labour. If patient had not gone into labour for 6 hrs were induced depending on their Bishops score with PGE2 or oxytocin infusion. Those with malpresentations were taken up for scheduled LSCS. Those who were given trial of vaginal delivery were taken up for operative or instrumental deliveries for Obstetric indication. Neonates with birth weight more than 2 kg and normal APGAR score were observed in NICU for 4 hrs, breast feeding was established in NICU. If postnatal course was uneventful both the neonate and mother were shifted to the ward. Neonates were observed in the ward for 48 hrs and if neonatal course was uneventful and maternal condition was stable they were discharged with post natal advice.

Data analysis: Details of all cases of PPROM were noted in Proforma and data was entered in the excel sheet.

Quantitative analysis was done using Excel.

RESULTS

Total no of deliveries during the period of one year was 4804. 50 pregnant women reported to labour room with history of leaking >34 weeks < 37 weeks. On examination, leaking was demonstrable in all patients and 26 patients. Table 1 shows the socio-demographic factors associated in this study and it shows that most of the pregnant women who had PPROM were < 22 years of age. Incidence of PPROM was more in primipara. Among the PPROM cases, 40 % cases occurred at 36 weeks as shown in table 2. Almost 84 % of PPROM patients delivered within 24 hours and 78 % of them had normal vaginal delivery and 20 % of them required caesarean section. Klebsiella was the predominant organism grown in vaginal swab and growth of other organisms are as shown in Table 3. Neonatal outcomes were shown in table 4. Total 72 % neonates were observed in NICU and 6 % of them required

Table 1. Socio-demographic factors of PPROM.

| (n=50) Maternal age | No(n) | Percentage |
|----------------------|-------|------------|
| (yrs) | | |
| < 22 | 22 | 44 |
| 23-27 | 18 | 36 |
| >28 | 10 | 20 |
| Parity | | |
| Primipara | 30 | 60 |
| Multipara | 20 | 40 |
| Socioeconomic status | | |
| Low | 29 | 58 |
| Middle | 21 | 42 |
| High | 0 | 0 |
| H/o abortion | | |
| No | 44 | 88 |
| Yes | 6 | 12 |

Table 2. Obstetrics factors for PPROM.

| Obstetric | No (n) | Percentage |
|------------------------------|--------|------------|
| factors(n=50) | | e |
| Leaking to delivery interval | | |
| <12 H | 22 | 44 |
| 13-24 H | 20 | 40 |
| 25-96 H | 8 | 16 |
| POG at delivery | | |
| 34 weeks | 17 | 34 |
| 35 weeks | 13 | 26 |
| 36 weeks | 20 | 40 |
| Mode of delivery | | |
| Vaginal | 39 | 78 |
| Instrumental | 1 | 2 |
| Caesarean section | 10 | 20 |

Table 3. Organisms grown in vaginal swab.

| Name of the organism | No (n) | Percentage |
|----------------------|--------|------------|
| Klebsiella | 5 | 10 |
| Coagulase negative | 4 | 8 |
| Staph. aureas | | |
| Enterococcus | 1 | 2 |
| E.Coli | 4 | 8 |
| No growth | 36 | 72 |

Table 4. Neonatal outcome of PPROM

| Neonatal factors(n=50) | No (n) | Percentage |
|----------------------------|--------|------------|
| Support in NICU | | |
| Observation | 36 | 72 |
| O2 by hood | 8 | 16 |
| CPAP | 3 | 6 |
| Ventilator | 3 | 6 |
| Birth weight (Kg) | | |
| < 1.5 | 1 | 2 |
| 1.5-1.99 | 11 | 22 |
| 2 – 2.5 | 30 | 60 |
| >2.5 | 8 | 16 |
| Length of stay at hospital | | |
| Upto 2 days | 1 | 2 |
| 2-4 days | 15 | 30 |
| >4 days | 34 | 68 |
| Morbidities | | |
| Jaundice | 22 | 44 |
| RDS | 1 | 2 |
| Sepsis | 6 | 12 |
| Sepsis / RDS | 7 | 14 |
| Nil | 13 | 26 |

ventilatory support. 68 % of the neonates were discharged within 4 days. 84 % of the babies had birth weight below 2.5 Kg. 2 % babies were diagnosed as a case of respiratory distress syndrome (RDS) and 12 % neonate had sepsis, 14 % babies had both sepsis and RDS.

DISCUSSION

The incidence of preterm premature rupture of membranes (PPROM) is about 3-8% and premature rupture of membranes at term i.e. beyond 37 weeks period of gestation also complicates approximately 8% of pregnancies.³ In our study, the incidence of premature rupture of membrane after 34 weeks period of gestation was 1 %. With advancing maternal age the incidence of PPRM also increases but in our study 44 % women who had PPRM were below 22 years of age.³ This may be due to most of the deliveries occurring to women below 30 years of age in this socio cultural background. 60 % primigravidas had PPRM as compared to 40 % multigravida in this present study. 88 % of pregnant women who had PPRM had no prior history of abortion. In our study, all the pregnant women with PPRM beyond 34 weeks period of gestation were induced either by oxytocin or PGE2 gel depending on Bishop's score. Almost 84 % of the pregnant women were delivered within 24 hours of rupture of membranes. 20 % of pregnant women with PPRM underwent caesarean section in this study. Use of prophylactic antibiotics are recommended in PPRM but benefit of prophylactic antibiotics in women with ruptured membranes at term before labour is unclear according to Passos et al.⁶ We have used antibiotics in all cases of PPRM in this study. The low incidence of infection may be because of antibiotic use and most of the deliveries completed within 24 hours of rupture of membrane as most of the studies shows that if the latency period increased beyond 24 hours after rupture of membranes, there is increased incidence of infection related morbidity. Out of 14 cases where vaginal swab culture grown organism, 5 of them were Klebsiella. As the gestation increases, incidence of fetal morbidity and mortality decreases. In our study, there was no case of perinatal mortality. Among the neonates who required NICU admission, 12 % of them required continuous positive airway pressure (CPAP) or ventilator support. Lower incidences of chorioamnionitis, endometritis, and NICU

admissions were noted in our study. Prospective design and inclusion of all pregnant women with rupture of membrane after 34 weeks of gestation for a period of five months is the strength of our study.

Conclusion

Induction of labour and delivery within 24 hours of rupture of membranes is associated with low incidence of maternal and neonatal adverse outcome.

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