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Original Research Article

Outcome of neonates born to mothers with premature rupture of membranes

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ABSTRACT

Background: Premature rupture of membranes (PROM) is defined as rupture of membranes before the onset of labor which is caused by maternal intrauterine infection which increases with the duration of membrane rupture seen in one third cases of all preterm birth. The primary complication for the mother is risk of infection, complications for the newborn consists of prematurity, foetal distress, cord compression, deformation and altered pulmonary development. The present study was undertaken to evaluate the outcome of neonates born to mothers with PROM and know the incidence of adverse outcomes in neonates and the incidence of early onset sepsis following PROM more than 18hours in mothers who have not received intrapartum antibiotics.
Methods: Prospective cohort study conducted in between December 2015 to November 2017 in which 100 neonates born to mothers with history of Premature rupture of membranes admitted in Konaseema Institute and Medical Science and Research Foundation, Amalapuram were selected for this study. They were evaluated with various investigations by a written proforma and outcomes of these neonates were studied.
Results: Out of 100 cases of PROM 54 had 18-24 hours duration, 38 had 24-72hours and 8 had more than 72 hours duration of PROM. According to swab culture organism found were E Coli in 22, Staphylococcus in 20, Klebsiella in 12, Pseudomonas in 8 cases with rest 38 cases showed no growth. 49 out of 100 cases show morbidity with Respiratory distress being the most common with 37 cases followed by septicaemia with 8 cases. Morbidity are more in the neonate with longer duration (>24hrs) of PROM. Mortality increases progressively as the duration of PROM increases.
Conclusions: In neonates born after PROM of >24 hours, risk of maternal infection, neonatal morbidity and mortality is more compared to those with PROM of shorter duration. Active management is needed to enable delivery within 24 hrs of premature rupture of membranes as it is associated with better neonatal outcome compared to longer latency period.

Keywords: Neonatal morbidity, Neonatal mortality, PROM

INTRODUCTION

Premature rupture of membranes (PROM) is defined as rupture of membranes before the onset of labor. Preterm premature rupture of membranes (PPROM) is defined as rupture of membranes before 37 weeks GA; The most significant maternal risk of term PROM is intrauterine infection which increases with the duration of membrane rupture. Fetal risks include umbilical cord compression and ascending infection.[1] PPROM is a complication in approximately 1/3 of all preterm births (Mercer, 2010).

The fetal and neonatal morbidity and mortality, risks are significantly affected by duration of latency and gestation at PROM. The primary complication for the mother is risk of infection, complications for the newborn consists

of prematurity, fetal distress, cord compression, deformation and altered pulmonary development.[2] The most significant maternal risk of term PROM is intrauterine infection the risks of which increases with the duration of membrane rupture.[3] For patients with PPROM the most likely outcome is preterm delivery within one week with its associated morbidity and mortality risks.[4] Early onset neonatal septicemia is caused by organism prevalent in the genital tract or in the labor room. Early onset bacterial infections occur either due to ascending infection following rupture of membranes or during the passage of baby through infected birth canal.[5]

The knowledge of incidence of early onset neonatal sepsis in relation to PROM and its effect on neonatal outcome is essential in order to prevent the neonatal morbidity and mortality. Diagnosis of early onset sepsis by close observation for early signs of sepsis, aggressive evaluation and early treatment has decreased the incidence of early onset sepsis associated with PROM. The present study was undertaken to evaluate the outcome of neonates born to mothers with PROM.

The present study was undertaken to evaluate the outcome of neonates born to mothers with PROM and know the incidence of adverse outcomes in neonates and the incidence of early onset sepsis following PROM more than 18hours in mothers who have not received intrapartum antibiotics.

METHODS

This study was a prospective study of Outcome of neonates born to mothers with premature rupture of membranes conducted in the department of Paediatrics of Konaseema Institute of Medical Sciences and Research Foundation from January 2016 to June 2017. The present study was carried out at Department of Pediatrics, Konaseema Institute of Medical Sciences and RF, Amalapuram, Andhra Pradesh, India. The sample size is 100 neonates who are born to mothers with premature rupture of membranes.

Inclusion criteria

All neonates born to healthy mothers with premature rupture of membranes and preterm premature rupture of membranes of more than 18 hours duration during the study period.

Exclusion criteria

- Antepartum hemorrhage
- Toxemia of pregnancy
- Co-morbidities in the mother other than infection
- Neonates with major congenital anomalies
- Mothers with PROM of more than 18 hours duration who have received antibiotics prior to delivery.

100 neonates born to mothers with history of Premature rupture of membranes admitted in Konaseema Institute and Medical Science and Research Foundation, Amalapuram were selected for this study. Informed written consent was obtained from parents. All the details of the newborn and mother were noted in a proforma at the time of enrolment. A detailed history was taken including age, parity, antenatal history of the mother with special emphasis on the exact time of rupture of membranes, duration and history of administration of antibiotics prior to delivery were evaluated. Detailed birth history including resuscitation details, APGAR score and gestational assessment were evaluated. In the examination of the neonate hemodynamic parameters such as temperature, pulse, respirations, capillary refill time were assessed first, followed by systemic examination. Necessary investigations were done and the neonates were followed during their hospital stay.

Statistical analysis

The data was collected and analyzed. Mean, range, standard deviation, frequency and percentages were calculated.

RESULTS

Total number of neonates included in this study was 100. Out of which 52 (52%) were males and 48 (48%) were females. Out of 100 neonates, 65 (65%) were delivered by normal vaginal delivery and 35 (35%) were delivered by caesarean section.

Table 1: Distribution of cases according to birth weight.

Weight in grams	<1500	1500-2500	>2500
Number of Cases (n-100)	7	25	68

Out of 100 neonates, 7 (7%) cases weigh <1500gm, 25 (25%) cases weigh between 1500-2500gm and 68 (68%) cases weigh >2500gm (Table 1).

Table 2: Distribution of cases according to gestational age.

Gestational age	<37 weeks	>37 weeks	Total
Number of cases (n-100)	38	62	100

This table shows that out of 100 cases, 38 (38%) were <37 weeks and 62 (62%) cases were >37 weeks of gestation (Table 2).

The analysis shows that out of 100 mothers, 54 (54%) had PROM of 18-24 hours duration, 38 (38%) had

PROM of 24-71 hours duration and 8 (8%) had PROM of >72 hours duration (Table 3).

Table 3: Distribution of cases according to the duration of PROM.

Duration	Number of cases	Percentage
18-24 hours	54	54
24-72 hours	27	27
>72 hours	19	19
Total	100	100

Cervical swab culture and sensitivity was done in all cases with PROM. Out of 100 cases, 62 (62%) had growth on cervical swab culture. Of these 62 cases, growth was of E. coli in 22 (22%) cases, Staphylococcus in 20 (20%) cases, Klebsiella in 12 (12%) cases and Pseudomonas in 8 (8%) (Figure 1).

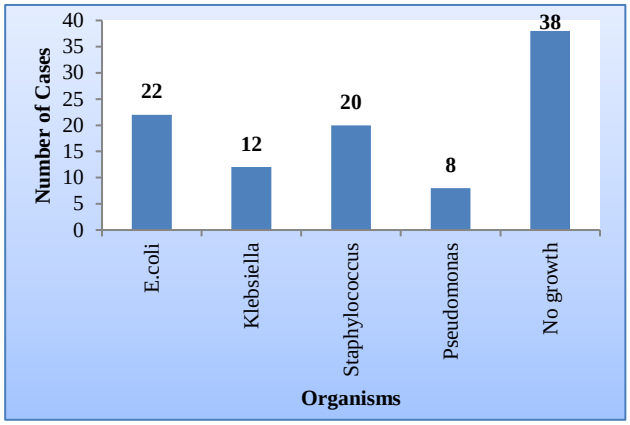

Figure 1: Distribution of cases according to cervical swab culture.

Out of 100 cases, morbidity was seen in 49 (49%) cases in this study. Of which RDS was the commonest with 37 (37%) cases. Next commonest was septicemia (EOS) with 8 (8%) cases (Figure 2).

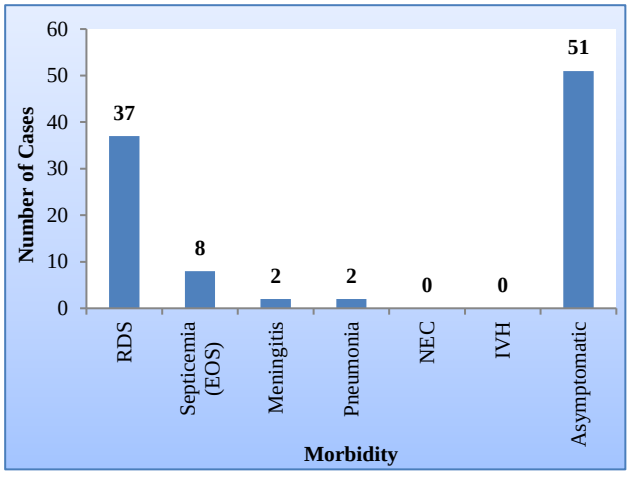

Figure 2: Distribution of cases according to neonatal morbidity.

Out of the total 100 neonates, 54 neonates were born to mothers with PROM of 18-<24 hours duration. Out of these 54 neonates, 20 (37%) were symptomatic and 34 (63%) were asymptomatic. Out of total 100 neonates, 27 neonates were born to mothers with PROM of 24-72 hours duration. Out of these 27 neonates, 10 (37%) were symptomatic and 17 (63%) were asymptomatic. Out of total 100 neonates, 19 neonates were born to mothers with PROM of >72 hours duration. Out of these 19 neonates, all neonates (100%) were symptomatic. Morbidity was more in the neonates with longer duration (>24 hours) of PROM. It is statistically significant (Table 4).

Table 4: Neonatal morbidity in relation to duration of PROM.

Complication	PROM of 18-24 hrs	24-72 hours	>72 hours
RDS	20	5	12
Septicemia	0	5	3
Meningitis	0	0	2
Pneumonia	0	0	2
Asymptomatic	34	17	0
Total (n=100)	54	27	19

Distribution of neonatal deaths according to duration of PROM

Analysis shows that out of 100 neonates born to mothers with PROM, 54 were of PROM 18-24 hours duration. Out of these 54 neonates, mortality was seen in 1 case (1.85%). Out of 27 neonates born to mothers with PROM of 24-72 hour duration, mortality was seen in 1 case (3.7%). Out of 19 neonates with PROM >72 hours, mortality was seen in 3 cases (15.8%). Thus, mortality increases progressively as the duration of PROM increases.

DISCUSSION

This study is a prospective study of Outcome of neonates born to mothers with premature rupture of membranes (PROM). The present study shows that the incidence of PROM was more in babies with birth weight >2500 grams (68%).

In a study by Shubeck F et al shows that the incidence of PROM was more in babies with birth weight <2500 grams.[6] This is because the sample size of babies with birth weight >2500 grams were more in this study. Similar results were observed in the study conducted by Woranart et al.[7]

The present study shows that there was an increase in incidence of PROM in term neonates. The results were consistent with the Woranart et al study.[7] This study shows more is the gestational age more is the chance of having PROM.

A study conducted by Boskabadi H et al found that two-thirds of babies born were preterm.[8] Al-Qa Qa K and Al-Awayshah F study found that incidence of PROM was more in preterm gestation with 62% and between 28-36 weeks of gestation.[3] Danforth's textbook of obstetrics states that 70% of cases of PROM occurred at term and 30% of PROM occurred at preterm.[9] The in Al-Q Qa K and Al-Awayshah F study 74% cases had PROM of <72 hours and 26% had PROM of >72 hours.[3] In the present study, 81% cases had PROM of <72 hour duration, which is consistent with the Al-Q Qa K and Al-Awayshah F study.

In the present study, the commonest organism isolated was *E. coli* in 22% cases, followed by Staphylococcus in 20% cases, Klebsiella in 12% cases and Pseudomonas in 8% cases. Kodkany et al study isolated *E. coli* in 20% cases, Klebsiella in 11% cases and Staphylococcus in 6% cases.[10] Gibbs et al study isolated *E. coli* in 8% cases.[11] In the present study, RDS was seen in 37% cases, Septicemia in 8% cases, meningitis in 2% cases and Pneumonia in 2% cases. Devi A et al found neonatal infection in 53.8% cases and RDS in 18.3%.[12]

Devi A et al found septicemia in 11.5% cases, Pneumonia in 58% cases and Meningitis in 2.9% cases.[12] Nili et al observed that in their study, the most common cause of neonatal morbidity was clinical sepsis with 33.7% cases, RDS with 33.7% cases, followed by Pneumonia with 3.7% cases.[2] Medina et al. illustrated that, sepsis was occurred in 5.2%, pneumonia in 0.9% of newborns following PROM.[13]

A study conducted by Boskabadi H et al observed in their study that RDS was the most common morbidity with 22.6% among all newborns and 34% among preterm infants. Clinical sepsis was seen in 22% cases, Pneumonia in 1.3% cases.[8]

The present study shows that the complications of PROM increases as the duration of PROM prolongs. Nili F et al in their study observed that risk of pneumonia, NICU admission and mortality were high in PROM of >24 hours duration[2]. Taylor study showed that as the latency period increases from 12 hours to >24 hours, neonatal infection rate also increased from 1.3% to 13.3%.[14]

CONCLUSION

Premature rupture of membrane the exposes the sterile intrauterine environment to vaginal tract and environmental pathogen. Most common among them are E Coli, Staphylococcus, Klebsiella and Pseudomonas.

As the duration of PROM increases the morbidity and mortality increases with it due to multiple complication like Respiratory distress syndrome, septicaemia, meningitis, pneumonia etc.

Authors conclude that as premature rupture of membrane is a high risk obstetric condition needing active management to enable delivery within 24 hours of premature rupture of membranes as it is associated with better neonatal outcome compared to longer latency period. Advances in care of preterm babies may reduce the perinatal mortality following premature rupture of membranes, but the ultimate solution lies in prevention of premature rupture of membranes before term gestation.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. APEC Guidelines Premature Rupture of Membranes-9-6-2016. Available at http://apecguidelines.org/wp-content/uploads/2016/07/Premature-Rupture-of-Membranes-9-6-2016.pdf
2. Nilli F, Shams AA. Neonatal Complications of premature rupture of membrane Acta Medica Iranica. 2003;41(3):176.
3. Al-Qaqa K, Al-Awaysheh F. Neonatal outcome and prenatal antibiotic treatment in premature rupture of membranes. Pak J Med Sci. 2005;21(4):441-4.
4. Beydoun SN, Yasin SY. Premature rupture of the membranes before 28 weeks: conservative management. Am J Obstet Gynecol. 1986 Sep 1;155(3):471-9..
5. Davies PA. Bacterial infection in the fetus and newborn. Arch Dis Child. 1971;46:1.
6. Shubeck F, Benson RC, CLARK JR WW, Berendes H, Weiss W, Deutschberger J. Fetal hazard after rupture of the membranes: a report from the collaborative project. Obstet Gynecol. 1966 Jul 1;28(1):22-31.
7. Ratanakorn W, Srijariya W, Chamnanvanakij S, Saengaroon P. Incidence of neonatal infection in newborn infants with a maternal history of premature rupture of membranes (PROM) for 18 hours or longer by using Phramongkutklao Hospital Clinical Practice Guideline (CPG). J Med Assoc Thai. 2005;88(7):973-8.
8. Boskabadi H, Maamouri G, Mafinejad S. Neonatal complications related with prolonged rupture of membranes. Maced J Med Sci. 2011 Mar;4(1):93-8.
9. Scott JR, Gibbs RS, Karlan BY, Haney AF, Haney A. Donforth's obstetrics and Gynaecology 9th edition Ch-II. Lippincott Williams & Wilkins;2003:191.
10. Kodkany BS, Telang MA. Premature rupture of membranes. A study of 100 cases. J Obstet Gynecol India. 1991;41(4):492-6.
11. Duff P, Huff RW, Gibbs RS. Management of PROM and unfavourable cervix in term pregnancy. Obstet Gynecol. 1984;63:697.

12. Devi A, Devi R. Premature rupture of membrane: a clinical study. J Obstet Gynecol India. 1996;46:63-8.
13. Medina TM, Hill DA. Preterm premature rupture of membranes: diagnosis and management. Am Fam Physician. 2006;73(4):659-64.
14. Taylor ES Morgan RL, Bron PD and Broose VE, Am J Obstet Gynecol. 1961;82:1341.

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