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Fetal outcome of pre-labor rupture of membranes

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Abstract:

Objective: To study the determinants and outcome of prelabour rupture of membrane at term pregnancy in Patan Hospital.

Method: A prospective, hospital based case control study done in maternity ward of Patan Hospital over the period of three months (Poush 2059-Phalgun 2059). A total no of 100 pregnant women with prelabor rupture of membrane and 100 pregnant women without prelabor rupture of membrane were included in this study.

Results: The incidence of pre labor rupture of membrane in this study was 6.06%. Major risk factors for pre-labor rupture of membranes were antecedent coitus, hydramnious, smoking, cephalo-pelvic disproportion, and previous abortion. Normal delivery occurred in 70% in prelabor rupture of membrane group and in 93 % in non-prelabor rupture of membrane group. Forty-nine pregnant women with pre-labour rupture of membrane received antibiotics and twenty-four babies (48.98%) developed neonatal infection in pre-labour rupture of membrane group and only one developed infection in non-prelabour rupture. Four cases of neonatal infection was seen in neonates born from mothers with prelabor rupture of membranes < 24 hours and 20 cases of neonatal infection were seen in those neonates born from mother with pre-labor rupture of membrane >24 hours ($p < 0.05$).

Conclusion: Neonatal morbidity increases with the increase of time interval between the rupture of membrane and delivery and antibiotics given to mother of PROM does not totally protect neonates from infection.

Keywords: Pre labor rupture of membrane, major risk factors for pre-labor rupture of membranes, neonatal infection

Introduction

Pre-labor rupture of membrane (PROM) is the spontaneous rupture of membrane before the onset of labor. It is a relatively common obstetric event, occurring in approximately 5-10% of all pregnancies[1]; of these 80% occur in term pregnancy[2].

Rupture of membranes is found to be related with bacterial infection, which produces phospholipase A_2, collagenase, other proteases, and also when change in pH. Studies have shown that the changes in the elasticity of the membranes were felt to be secondary to a decrease in specific collagen make up[3].

PROM is also related with cervical incompetence, documented cervico-vaginal infection hypertensive diseases, recent coitus, malpresentation, antepartum hemorrhage and inappropriate nutrition[3-8]. PROM is found more common in low socio economic class patient with inadequate prenatal care and inadequate weight gain during pregnancy. It is presumed that focal immaturity of chorion-amnion or focal irregularity in the chorion-amnion at the microscopical level, focal degeneration of collagen superadded with bacterial infection, however mild could be the factors leading to weakness in the tensile strength of chorion-amnion, leading to PROM[9].Rupture of membrane often leads to the onset of labor. In term pregnancy, rupture of membrane leads to spontaneous labor in 70% case within 24 hours[4].

The history of leaking fluid or gushing of water from vagina is diagnostic over 90% of the time. Different tests like Nitrazine, fern, evaporation and diamine oxidase test are done to confirm PROM. Nowadays, ultrasound examination is also popular method for the diagnosis of PROM.

Chorioamnionitis occurs frequently in patients with PROM and monitoring of the patient is directed at the early recognization of infection. The overall incidence of chorioamnionitis ranges from 4.2% to 10.5%[10,11] The microorganisms most commonly found in the amniotic fluid and the placenta are Ureaplasma urealyticum, Mycoplasma hominis, Bacteroides bivius, Gardenella vaginalis, Escherichia coli, Fusibacterium species and Enterococci.[12] The other organisms responsible

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for chorioamnonitis are Klebsiella pneumonia, Staphylococcus haemolyticus.[13]

Particular attention has been given to group B streptococcus (GBS) in its relation to PROM. The organism is frequently found in patients with sub-clinical amnionitis, and it may cause overwhelming neonatal infection resulting death or severe neurological morbidity. Several tests have been proposed for the rapid diagnosis of GBS colonization of the genital tract. Unfortunately they are not sensitive enough for routine clinical use [14]. Maternal infection after PROM may be severe and has an overall mortality rate of 1 in 5400[15].

The complications of PROM for the infant are preterm delivery, infection (Pneumonia, meningitis, sepsis) pulmonary hypoplasia, limb and body deformities, umbilical cord compression, abruption and cord prolapse.[3]

Infection is a major cause of neonatal morbidity, and most frequent bacteria causing sepsis being group B Streptococcus and E. coli. One study from USA has found that among 32 cases of Septicemia, 14 cases were due to B streptococci, 7 cases were due to enterobacteriaceae, 5 cases were due to H. influenza, 3 due to L.monocytogenes and single case was due to Salmonella, Enterecocci and group C, B hemolytic streptococci.

Birth asphyxia is the most common neonatal morbidity seen among PROM and reaches up to 39.8% followed by RDS seen in 27.7%[4]. Study carried out in West Bengal, India showed that 68% babies were healthy, 27% babies were asphyxiated and revived, 3.5 asphyxiated and could not revived and 1.5% babies were still born[16]. The incidence of neonatal morbidity increase as duration of PROM increases[17].

Methods and methodology

This is a prospective case control study, carried out in maternity ward of Patan hospital, Lalitpur, Nepal to find the fetal out come of PROM at term.

Study period was 3 months from Poush 2059 to Phalgun 2059. Data were collected round the clock until proposed cases were collected.

The study comprised of 100 pregnant women with PROM and 100 pregnant women without PROM admitted in the hospital having following inclusion and exclusion criteria.

Inclusion criteria:

1 Gestational age 37 weeks
2 Singleton pregnancy
3 Spontaneous rupture of membrane
4 Live fetus
5 Not in labor

Exclusion criteria

1 Twin pregnancy
2 Malpresentation
3 IUFD.
4 Gestational period < 37 weeks.

Standard questionnaires were introduced to all women with PROM after a feasibility study. Formal consent was taken from Obstetric department. Diagnosis of PROM was based on history, speculum examination and Nitrazin paper test. Time of passage of amniotic fluid (gushing of water per vaginum) before the start of pain abdomen was noted in history form. This was conformed by per speculum examination and Nitrazin paper test.

Patients were managed actively according to standard protocol of Patan Hospital aiming to deliver the baby within 24 hours of PROM as far as possible. Labor was induced with Prostaglandin gel (Dinoprostone) or with Oxytocin infusion according to cervical condition.

Crystalline Penicillin (50 lakhs stat and subsequently 25 lakhs every 4 hourly till delivery) was given to all mothers with premature rupture of membrane if the baby was not born within 24 hours of PROM.

The mothers and the baby were followed up till discharge and outcomes were noted. Every day data was entered in the master chart. Interm data analysis was done in every 15 days and final data analysis was done at the end. Final data analysis was done manually and with the help of computer. p value of < 0.05 was taken asn statistically significant

Chi square test and Z test were done to see the statistical significance of data.

Results

This study includes 100 cases of PROM and 100 cases of non-PROM. There were 140 primigravida patients and 60 cases of multigravida patients. Incidence of PROM was 4.49% in primigravida group and 1.57 % in multigravida. Total incidence of PROM in the two groups was 6.06%.

Most of the patients attended to this department were from Lalitpur district (52 PROM group and 54 non PROM group).

Discussion

Pre-labor rupture of the membrane (PROM) is one of the common and challenging problems in perinatal medicine today. Management of PROM has gone

through various cycles of masterly inactivity to immediate intervention.

The incidence of PROM in this study is 6.06%, which is higher than the incidence of 2.6%obtained in a hospital based study carried out in west Bengal India [16], Kodkany and Telang in 1989[4] reported 4.01% and 3.37% as found by Gautam in Prasuti Griha, Katmandu.[17] The present incidence is lower than 6-19% as mentioned by Doyle [18,] and 2.7-17% by Arias [19].The high incidence of PROM in above studies maybe due to inclusion of all cases of PROM irrespective of gestational age.

Majority of patients in PROM group and non-PROM were in between 20-24 age group, which is similar to the study done by Anjana Devi et al, who found majority of patients belonged to 20-29 years age group [20] and it may be due to majority of fertile women are in this age group. Women on both groups were similar in age, gravidity, education and residence.

This study shows that almost all the patients had ANC check up. Anjana Devi et al found 52% ANC attendance in PROM and 63.5% in non PROM group[20.]

Forty percent of women in PROM group and 24% of women in non PROM group had history of sexual contact 2 weeks prior to delivery of baby. These datas on sexual contact in PROM group seems to be lower that 65% as mentioned by Kodkany and Telang[4] .Our data on sexual contact in PROM group is similar with the data of 43% presented by Gautam[17]. Ekachai Kovavisarach et al did not find history of sexual contact two weeks prior to delivery as a significant risk factor [21] The rate of CPD in this study (9%) is higher than as shown by Kodkany and associates[4]. Percentage of hydramnious in this study is lower than 2% found by Gautam[17] and 5% in the study by Kodkany[4].

The mean PROM delivery interval is found to be 28.19 hrs. It means that we were unable to meet our goal to deliver the baby within 24 hours after PROM. It

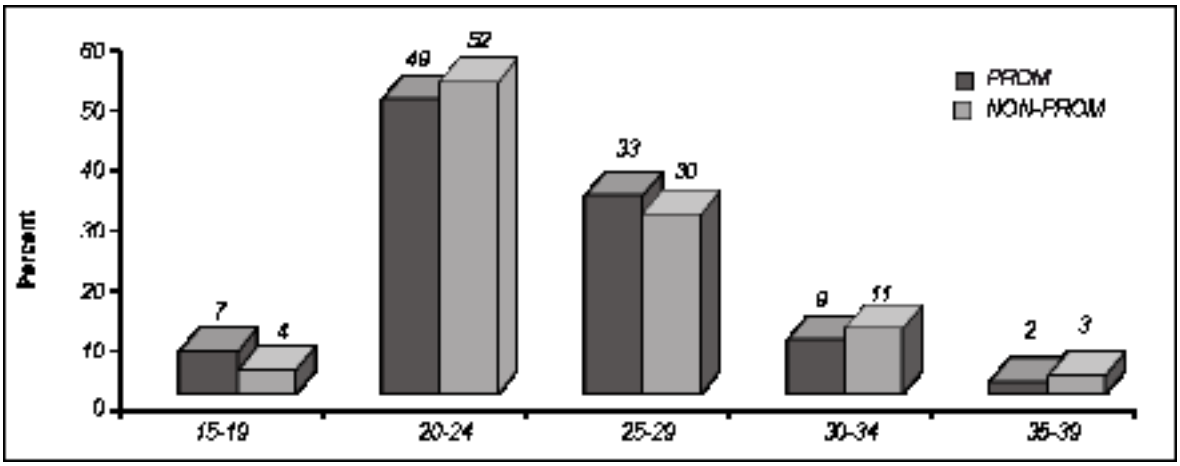

Fig 1: Majority of patients in both groups were of 20-24 years.The least no of patients were in the age group of 35-39 years.These variations were statistically insignificant.p>0.05

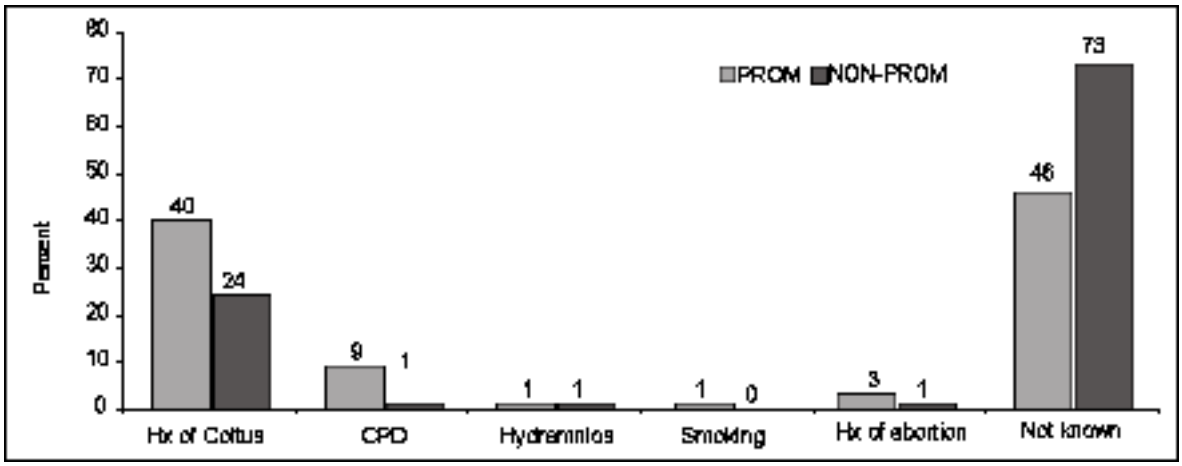

Fig 3:Main risk factor associated with PROM. Variations are statistically insignificant(p>0.05)

suggests a review in our management protocol is needed. We may need to manage the delivery more actively than before with the use of Oxytocin drip or Prostaglandin gel or both. Our delivery interval is similar to time interval as done by Hannah and colleagues [22].This time interval (26 hrs) is longer than the study done by Arulkumaran et al[23]. In the last study 44% patients were stimulated with oxytocin soon after admission, which could be the reason for shorter delivery time.

The study showed 70% spontaneous, 3.5% instrumental and 27% caesarean section delivery in PROM group and 93% spontaneous 4% instrumental and3% caesarean section in non PROM group. Anjana Devi found normal delivery in 42.5% among 104 patients in PROM group[20]. They found caesarean section in 42.2%, which is much higher than our study. The rate of caesarean section in PROM group is higher than 13 % found by Gautam[17], 19% found by Sanyal and colleagues[16]. Instrumental delivery of this study (3%) in PROM group is lower than 6% reported by Gautam [17], 12.4% stated by Devi and colleagues [20], 20.8 % by Hannah et al [22] and 9.5 % found by Sanyal and colleagues.[16] The babies in both groups had similar number of different sex and weight.

Fetal distress was found in 5 cases in PROM and in 2 cases in non PROM group. Gautam found fetal distress in 21% cases in PROM and 3 % cases in non-PROM cases[17]. he proportion of fetal distress in this study is much lower than that (10.2%) found by Hannah et al [22].

Present study showed incidence of neonatal infection in 24% cases in PROM and 1% cases in non PROM group. This rate of infection is higher than as shown by Gautam.[17] But it is lower than as shown by an Indian study.[16]

Among 24 casesof neonatal infection, septicemia was seen in 15 cases, pneumonia in 7 cases, meningitis in 2 cases. This data is similar with the data's presented by Anjana Devi et al, who showed septicemia in 11.5%, pneumonia in 5.8% and meningitis in 2.9% cases.[20]

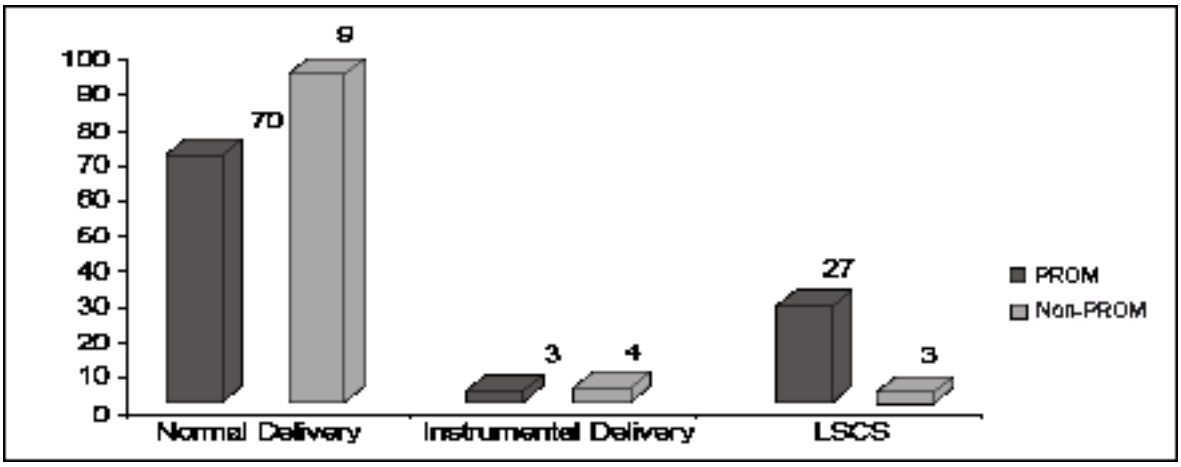

Fig 3:Type of Delivery

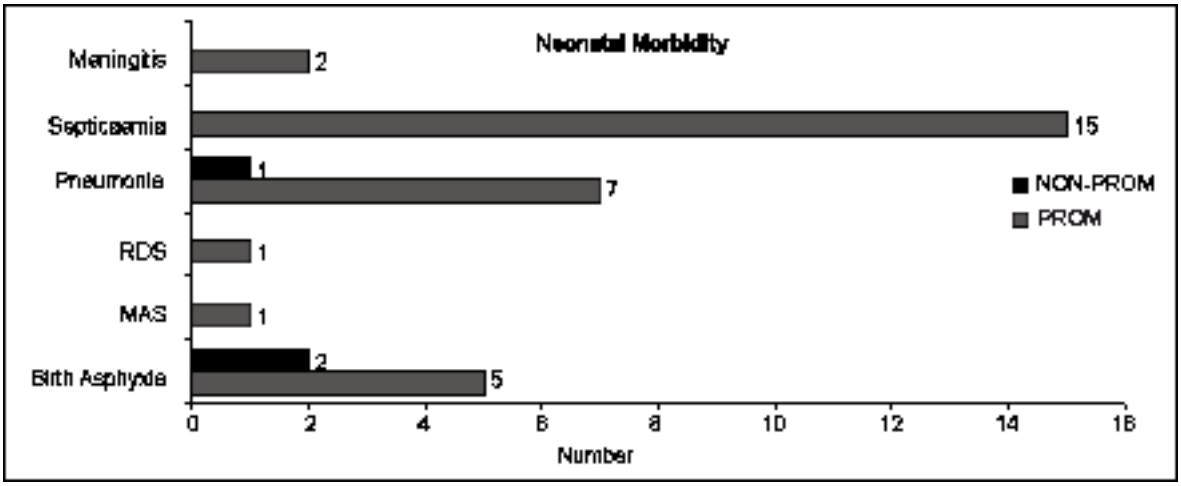

Fig 4: This table shows different types of pathologies among neonates of PROM and non PROM group.Septicaemia and Pneumonia are the commonest pathologies among neonates.($p<0.05$)0.0000026

The number of cases of neonatal infection among babies delivered by mothers with IV antibiotic (n=49) was 24. It implies that IV Penicillin given to mothers does not totally prevent infection to neonates. This is also supported by a study done by Jordhin and Hager.[24]

Nine babies from PROM group and 2 babies from non PROM group were admitted in neonatal care unit ($p>0.05$).

There were no deaths from complication in both the groups.

Limitations and conclusions

Patients taken in this study may have had problems in recalling the history and presenting the old papers relating her previous delivery and the babies born especially with infection were not followed up for long time to observe the long-term effect of PROM on them. Study shows that with the increase of time interval between the rupture of membrane and delivery, the neonatal morbidity increases. It also shows that antibiotics given to mother for PROM does not totally protect neonates from infection.

Recommendation

PROM is a high-risk obstetric condition. Active management is needed to enable delivery within 24 hrs of PROM and it offers better neonatal outcome. Prophylactic antibiotic is given to prevent neonatal infection although this study shows its limited role, so it should be tested in a large number of pregnancies to see its preventive role.

Babies born with infection should be followed for a longer period for morbidity and mortality of PROM.

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