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Prevalence And Diversity of Microbes, And Pregnancy Outcome in Women with Pre-Labor Rupture Of Membranes

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Abstract:
Introduction: *When membranes rupture before the onset of labor, it is known as premature rupture of membranes (PROM). When PROM occurs before 37 completed weeks of gestation it is termed as preterm premature rupture of membranes (p PROM)[.] In such cases, fetomaternal complications are substantial. Preterm pre-labor rupture of membranes (pPROM) causes one-third of preterm births and contributes to significant perinatal morbidity and mortality.*
Methods: *A cross sectional case control study was conducted in patients with PROM who met the following inclusion criteria: (i) singleton gestation; (ii) gestational age between 15 and 36.9 weeks. All samples were collected in a single institution between December 2017 and December 2018. Diagnosis of PROM was based on history taking, clinical findings and laboratory reports. In all cases, liquor amnii was collected with Sim's speculum, intracervical and high vaginal swabs and in cases of caesarean section, by amniocentesis just before making uterine incision. The samples were subjected to gram staining and aerobic culture and sensitivity test for detection of microorganisms. Condition of the baby at birth was observed and recorded as APGAR score at 1 and 5 minutes after birth. Birth weight and weight at discharge were recorded. Any interventions and complications were recorded till discharge. Maternal conditions and complications (if any) after delivery, till the time of discharge were observed and recorded.*
Result*: Incidence of PPH was 9.3% (n=14) in PROM cases as compared to 3% in control group. . Chrioamnionitis Incidence was higher in PROM group 40% (n=60) as compared to control group15% (n=23). Most common organism isolated was Escherisia coli 10% (n=15) followed by Staph aureus 6%(n=10). Preterm babies constituted 21% of total deliveries of PROM as compared to 6% of control group. Among PROM cases chrioamnionitis was found in 62% of preterm cases as comapared to 20% in term babies born in PROM group.neonatal mortality was also significantly high in neonates in PROM group 13% (n=20) as compared to control group 5% (n=8)*

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I. Introduction

When membranes rupture before the onset of labor, it is known as premature rupture of membranes (PROM). When PROM occurs before 37 completed weeks of gestation it is termed as preterm premature rupture of membranes (p PROM).[8] In 10-15% of PROM cases approaching term, labor may be delayed by more than 24 hours (prolonged rupture of membranes). In such cases, fetomaternal complications are substantial. Preterm pre-labor rupture of membranes (pPROM) causes one-third of preterm births and contributes to significant perinatal morbidity and mortality.[7] Microbial invasion of the amniotic cavity (MIAC) has been found in about 30% of pPROM cases,[10] and is associated with earlier gestational age at delivery.[7,10] However, the current understanding of MIAC derives largely from cultivation-dependent studies. Preterm parturition encompasses several distinct clinical phenotypes, including pPROM and preterm labor with intact membranes.33 Chorioamnionitis resulting from PROM may be life threatening. Maternal complications in PROM are increased due to sepsis and increased need for operative interventions. Perinatal complications are raised due to sepsis, gestational immaturity and asphyxia.

II. Methods

A cross sectional case control study was conducted in patients with PROM who met the following inclusion criteria: (i) singleton gestation; (ii) gestational age between 15 and 36.9 weeks. Patients were excluded from the study if: (i) delivery occurred elsewhere (ii) a major fetal chromosomal and ⁄ or congenital anomaly was present. All samples were collected in a single institution between December 2017 and December 2018.

Diagnosis of PROM was based on history taking, clinical findings and laboratory reports. In all cases, liquor amnii was collected with Sim's speculum, intracervical and high vaginal swabs and in cases of caesarean section, by amniocentesis just before making uterine incision. The samples were subjected to gram staining and aerobic culture and sensitivity test for detection of microorganisms. Condition of the baby at birth was observed and recorded as APGAR score at 1 and 5 minutes after birth. Birth weight and weight at discharge were recorded. Any interventions and complications were recorded till discharge. Maternal conditions and complications (if any) after delivery, till the time of discharge were observed and recorded.

III. Results

In the given timeframe total of 150 patients were included as case in our study. The control group consists of 150 cases having rupture of membranes after the onset of true labor pain with duration of gestational period beyond 28 weeks. In both the groups, both booked and unbooked cases were included. Incidence of PPH was 9.3% (n=14) in PROM cases as compared to 3% in control group. P value was calculated using chi square test and it was found to be significant. Chrioamnionitis Incidence was higher in PROM group 40% (n=60) as compared to control group15% (n=23). Most common organism isolated was *Escherisia coli* 10% (n=15) followed by *Staph aureus* 6%(n=10). Preterm babies constituted 21% of total deliveries of PROM as compared to 6% of control group. Among PROM cases chrioamnionitis was found in 62% of preterm cases as comapared to 20% in term babies born in PROM group. Neonatal mortality was also significantly high in neonates in PROM group 13% (n=20) as compared to control group 5% (n=8)

	pph	**No pph**
PROM	14	136
control	5	145

	chorioamnionitis	**No chorioamnionitis**
PROM	60	90
control	23	127

	Chorioamnionitis +ve	**Chorioamnionitis -ve**
preterm	20	12
term	24	94

	preterm	**term**
PROM	32	118
CONTROL	10	140

Organism isolated	**No of cases of PROM**
Escherisia coli	15
Staph aureus	10
Klebsiella pneumoniae	5
Psuedomonas	3
Non pathogenic organism	2

IV. Discussion

PROM is one of major events which is encountered in daily obstetric care in tertiary facilities in India. Though in our study maternal mortality was nil, stress must be laid on facts that this can lead to significant maternal and neonatal mortality and morbidity due to increased risk of infection and PPH in these cases. The higher incidence of P.P.H. in PROM cases may be due to prolonged labor, increased instrumental vaginal delivery, atonic uterus, coagulation failure (rarely), etc. P.P.H. is significantly more common among PROM cases and often severe enough requiring blood transfusion. As found in our study Calkins LA[1] and Sanyal MK[6] reported higher incidence of P.P.H. in PROM cases.

Incidence of chorioamnionitis was also seen to be increased in prom cases. Pathogens detected were similar to those found in vaginal and cervical swabs (Table 5). So, it is evident that PROM cases invite ascending infections which lead to chorioamnionitis. Preterm prom carries higher risk of chorioamnionitis as seen in our study (62% vs 20%). It is comparable to results obtained by Beydoun SN[5] (58.6% in patients with PROM before 28 weeks and <22% after 36 weeks of pregnancy).

The commonest micro-organism isolated from the genital tracts of patients with PROM was E. coli (10%) followed by Staphylococcus aureus (06%). However, due to lack of facilities, organisms more commonly implicated in PROM like *Ureaplasma urealyticum, Chlamydia trachomatis, Mycoplasma hominis* and a wide variety of anaerobes could not be identified in the present study.

Our study showed that the incidence of LBW and prematurity is significantly higher in PROM than controls .The incidence of prematurity in PROM reported by Calkins LA[1], Taylor ES[2] and Gunn GC ranged

between 9-40% with an average of 20% and is comparable with the finding of 21.3% in the our study. Neonatal mortality in present study in PROM group was two times higher as compared to control group. Mortality was mainly related to prematurity and sepsis. RDS and IVH were among leading causes of neonatal mortality in this study. Total mortality in PROM group was 13%. It is comparable to the incidence reported by Gunn GC[3] in his series. Other studies show wide variation in neonatal mortality in PROM cases. It can be attributed to variation in availability of facilities in different institutions as well as managing skills of healthcare professionals.

V. Conclusion

- Incidence of chorioamnionitis was significantly higher in PROM cases and the commonest organism implicated was *E. coli* followed by *Staphylococcus aureus*.
- The incidence of chorioamnionitis amongst preterm PROM cases was significantly higher than the incidence of chorioamnionitis in term PROM cases.
- Incidence of Low Birth Weight (LBW) and preterm babies was significantly higher among PROM cases.
- Perinatal Mortality Rate was significantly higher among PROM cases.
- Perinatal mortality was significantly higher in LBW babies of PROM cases than babies weighing ≥2.5 kg in the same group.
- Perinatal mortality was significantly higher in neonates of PROM patients with latent period longer than 24 hours.

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