

BACTERIOLOGY OF PREMATURE RUPTURE OF MEMBRANES AND ASCENDING INFECTION IN PRETERM LABOUR

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SUMMARY

Bacteriological study of preterm premature rupture and term premature rupture of membranes were carried out in the Department of Obstetrics and Gynaecology of Patna Medical College Hospital in collaboration with the Department of Pathology. The aim of the present study was to investigate the development and intensity of ascending infection at various levels in the birth canal and its propagation to membranes, placenta and foetus. There were a total of 120 cases of preterm labour (28-36 weeks) with premature rupture of membranes and 80 term (37-40 weeks) labour cases with premature rupture of membranes. Culture of the high vaginal swab, amniotic fluid and nasopharyngeal swab of the neonates were done. Histological examination of the placenta and membranes were also carried out.

Regarding the bacteriological profile, the most common bacteria isolated were *E.coli* and *Klebsiella*. The incidence of positive culture of the amniotic fluid was 50% in preterm premature rupture of membranes and 25% in the term premature rupture of the membranes. The incidence of infection, however, increased with the duration of the rupture of the membranes and delivery interval. The placental inflammation was 60% in preterm premature rupture of the membranes and 25% in term premature rupture of the membranes. The impact of preterm premature rupture of the membranes on perinatal mortality was high 175 per thousand compared to 50 per thousand in term premature rupture of the membranes.

Introduction

The foetal membranes provide protection against infection. The liquor amnii has antibacterial activity due to zinc protein complex. Once the membranes are ruptured the integrity of the preg-

nancy is in jeopardy. Many complications like preterm labour, prolonged labour, dry labour, maternal infection, chorioamnitis increased intrapartum pneumonia and neonatal infection might result. Serious paediatric problems lead to high perinatal morbidity and mortality rate.

The aim of the present study was to investigate the after effects of ascending infection after preterm premature rup-

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ture of membranes, its intensity, propagation at various levels of the birth canal and ultimately affecting the foetus.

Material and Methods

The study was carried out in the Deptt. of Obstetrics and Gynaecology, Patna Medical College Hospital during the period 1986-1988. A total of 200 cases were studied. One hundred twenty cases were with preterm labour (28-36 weeks) with premature rupture of membranes and 80 cases with term labour (37-40 weeks) with premature rupture of membrane. A detail history was taken. A thorough clinical and obstetric examina-

tion was performed. Aerobic and anaerobic culture of the high vaginal swab, liquor amnii, nasopharyngeal swab of the neonates were carried out in addition to the histopathology of the placenta and membranes.

Observations

The cases were analysed according to age, parity, socio-economic status, bacteriological profile, culture of the amniotic fluid in relation to period of gestation and duration of rupture of the membrane. Placental infection, foetal morbidity and perinatal mortality were assessed in both the groups.

TABLE I

Bacteriological Profile in High Vaginal Swab Culture in Preterm and Term Labour with Premature Rupture of the Membranes

Bacterial	Preterm labour with PROM		Term labour with PROM	
	No. of cases	%	No. of cases	%
1. E. coli	30	25.00	15	18.75
2. Klebsiella	18	15.00	14*	17.50
3. Anaerobic streptococcus	14	11.66	9	11.22
4. Streptococcus Haemolyticus	14	11.66	10	12.50
5. Staphylococcus aureus	12	10.00	11	13.75
6. Bacterioid fragilis	12	10.00	6	7.50
7. Staphylococcus albus	10	8.33	7	8.75
8. Streptococcus non-haemolyticus	10	8.33	8	10.00

* The most common bacteria isolated was E. Coli and Klebsiella.

TABLE II

Bacteriological Profile of Positive Culture of Amniotic Fluid in Preterm and Term Labour With PROM

Bacteria	Preterm labour with PROM		Term labour with PROM	
	No. of cases	%	No. of cases	%
1. E. coli	28	46.66	8	40.00
2. Klebsiella	12	20.00	4	20.00
3. Bacterioid fragilis	12	20.00	4	20.00
4. Streptococcus haemolyticus	8	13.33	4	20.00

The age of the patients varied between 21 to 30 years, preterm premature labour was encountered more commonly in parous women with the gestational age of 32-33 weeks and the low socio-economic group.

The commonest bacteria isolated was *E. coli* in both the groups.

Perinatal mortality was 175 per thousand in preterm and 50 per thousand in term rupture of membranes.

TABLE V
Incidence of Placental Infection in Preterm and Term Labour with PROM

Nature of labour	Total No. of cases	Placental inflammation	
		No.	%
Preterm labour with PROM	120	72	60
Term labour with PROM	80	20	25

TABLE III
Positive Amniotic Fluid Culture in Relation to the Duration of Rupture of Membranes and Gestational Age in Weeks

Duration of hours	Gastational age in weeks		
	29-32 weeks No. of cases	33-36 weeks No. of cases	37-40 weeks No. of cases
<12 hours	3	2	3
12 to 24 hours	7	6	7
More than 24 hours	30	12	10
	40	20	20

TABLE IV
Correlation between Positive Culture of Nasopharyngeal Swab and Apgar Score of Neonates in preterm and term labour with PROM

Nature of labour	Total No. of cases	Positive nasopharyngeal swab	Apgar Score		
			0-3	4-6	7-10
Preterm labour with PROM	120	40	20	12	8
Term labour with PROM	80	4	1	1	2

TABLE VI
Incidence of Maternal and Perinatal Mortality and Morbidity in Preterm and Term Labour with PROM

Maternal and perinatal condition	Pre-term labour with PROM		Term labour with PROM	
	Number	%	Number	%
Maternal mortality	—	—	—	—
Maternal morbidity	11	9.16	4	5
Perinatal mortality	21	17.5	4	5
Perinatal morbidity	39	32.5	8	10

Discussion

The present study comprises of a total of 200 cases. It was obvious that the chance of infection was higher in preterm premature rupture of membranes compared to term premature rupture of the membranes. The most common pathogen was *E. coli* in both the groups. It is also obvious on the basis of observations that the commonest inhabitant of the vagina is *E. coli*. By and large the infection ascends from the vagina to the liquor and ultimately affects the foetus. This observation is in concordant with Pushpa *et al* (1981) and Santosh *et al* (1984). It is further suggested that increased number of colonies of the vaginal bacteria produce phospholipase A2 which frees the arachidonic acid from phospholipids and make it available for prostaglandin synthesis which initiates uterine contraction and subsequently the inflamed membranes get ruptured according to Crenshaw (1986).

Regarding the increased chances of infection of the amniotic fluid in preterm labour in the present study was (50%) compared to (25%) in term labour and is ascribed to less antibacterial activity in preterm labour on account of reduced

zinc protein complex in the liquor in preterm labour. Evans *et al* (1977) studied the bactericidal effect of amniotic fluid and concluded that least inhibition of growth was for *E. coli* and *L. monocytogenes*. The severity of chorioamnionitis is also directly proportional to duration of rupture of the membranes and delivery interval.

It is mandatory to prevent premature rupture of the membranes. As infection of lower genital tract and inflammation of the membranes are incriminated for the early rupture of the membranes, proper screening for early detection of the genital tract infection during antenatal period must be done and prompt treatment must be instituted.

Prevention of infection will go a long way to reduce perinatal mortality and morbidity.

References

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