

# NEONATAL INFECTION FOLLOWING PREMATURE RUPTURE OF AMNIOTIC MEMBRANES

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## SUMMARY

Newborns delivered to 164 mothers with premature rupture of amniotic membranes (PROM) over a 9 month period were studied. The incidence of PROM was 14.2% of total deliveries. Systemic neonatal infections were septicemia in 4.9%, acute purulent meningitis in 3.4% and pneumonia in 4.8% cases. Superficial infections included conjunctivitis in 23.1%, pyoderma in 3.6% and umbilical sepsis in 3.0% cases. PROM less than 12 hours was not associated with any systemic infections while the incidence was 4.7% between 12-72 hours and 30.7% above 72 hours of PROM. The neonatal mortality was 6.7% of which 55% was the result of infection.

## Introduction

Premature rupture of membranes (PROM) is defined as rupture of fetal membranes before the onset of labour (Akhter et al, 1980), though other definitions have also been used (Jones et al, 1975; Habel et al, 1972). Varying selection of cases has contributed to the wide range of incidence reported, 2.7 to 45% (Akhter et al, 1980; Johnson et al, 1981).

Neonatal morbidity as well as mortality have been found to be high in association with PROM (Heera, 1971). The most important complication is considered to be infection, the hazard increasing

directly as the time interval between rupture of membranes (ROM) and delivery increases (Shubeck et al, 1966). The incidence of prematurity has also been observed to be increased which also contributes to neonatal infection, and mortality (Heera, 1971). On the other hand, some workers have found no adverse effect of PROM (Habel et al, 1972).

The incidence and consequence of PROM have been noted to vary from place to place. This study aims to present the observations in a referral teaching hospital in Punjab.

## Material and Methods

Neonates born to women with PROM admitted to the department of Obstetrics in Christian Medical College, Ludhiana,

over 9 months were studied. PROM was defined as the rupture of fetal membranes before the onset of labour pains. Cases below 28 weeks of gestation and still births were excluded.

The diagnosis of rupture of membranes was made when the patient gave a definite history of watery discharge per vaginam, the watery discharge or meconium stained fluid was seen flowing through the cervical os at per-speculum examination, and the fetal membranes were noted to be missing over the presenting part during per-vaginal examination. Cases with doubtful history of premature rupture of membranes were not included.

Investigations on neonates and mothers were: Neonates - gastric aspirate cytology, culture and sensitivity, blood culture if infection was suspected, and hemoglobin, total leucocyte count, differential leucocyte count and blood film; Mothers - cervical or placental swabs when infection was suspected, blood culture if mother was febrile, and hemoglobin, total leu-

cocyte count and differential leucocyte count.

### Results

Over the 9 months study period there were a total of 1156 mothers who delivered live born babies beyond 28 weeks of gestation. The incidence of PROM was 14.2% (164 cases).

The commonest neonatal superficial infection was conjunctivitis, seen in 23.1% (38 cases). Other superficial infections included pyoderma in 3.6% (6 cases) and umbilical sepsis in 3.0% (5 cases). Systemic infections in the neonates were blood culture positive septicemia in 3.0% (5 cases), clinically diagnosed septicemia in another 1.8% (3 cases) where antibiotics had been started prior to blood culture, purulent meningitis in 3.0% (5 cases) and pneumonia in 4.8% (8 cases) respectively (Table I). ROM less than 12 hours was not associated with neonatal infection while the incidence was 30.8% with ROM above 72 hours.

TABLE - I  
SYSTEMIC NEONATAL INFECTIONS IN RELATION TO  
DURATION OF RUPTURE OF MEMBRANES

Duration of ROM in Hrs.	No. of Cases	Cases with Infection	Septicemia		Meningitis	Pneumonia
			Culture Proved	Clinical		
0-12	8	—	—	—	—	—
12-24	52	3(5.8%)	2	—	—	1
24-48	53	2*(3.8%)	1	—	1	1
48-72	22	1(4.5%)	—	—	—	1
72 & above	26	8*(30.8%)	2	3	4	4
Unknown	3	1(33.3%)	—	—	—	1
Total	164	15(9.1%)	5	3	5	8

\*Note: 6 cases had more than one systemic infection

Systemic neonatal infections were noted in 31.6%, 45.4% and 20.7% cases of PROM associated with certain known perinatal high risk factors viz. birth asphyxia, presence of foul-smelling liquor and vaginal examination(s) with ungloved hand before hospitalisation each of these being statistically significant. However, correlation with febrile illness in the mother within two weeks before delivery was not significant (Table II).

above 72 hours, 26.9% (7 cases). Infection was assessed to be the cause of death in 5 of the 11 fatal cases.

### Discussion

Relationship of rupture of amniotic membranes to the consequent fetal hazard especially with regard to infection is a matter of concern (Heera, 1971). With rupture of the membranes the clock of infection starts to tick, and from this point

TABLE - II  
RELATION OF PERINATAL RISK FACTORS TO SYSTEMIC NEONATAL INFECTIONS

Duration of ROM	Asphyxia		Foul-smelling Liquor		Unsterile Vaginal Examination		Fever in Mother	
	No.	Infection	No.	Infection	No.	Infection	No.	Infection
0-12	-	-	-	-	1	-	1	-
12-24	10	2	3	-	13	1	2	1
24-48	9	2	-	-	13	2	3	-
48-72	8	2	1	1	14	-	1	-
72 & above	9	5	5	3	15	8	6	2
Unknown	2	1	2	1	2	1	-	-
Total	38	12	11	5	58	12	13	3
%	23.2	31.6	6.7	45.4	35.4	20.7	7.9	23.1
	P<0.01*		P<0.01*		P<0.05*		P<0.05**	

\*Significant

\*\*Not significant

Preterm labour was associated with PROM in 32.9% (54 cases). This was very significantly higher than the 6.7% incidence (67 case out of 992) of prematurity among mothers without PROM in the study period. The incidence of systemic infection was significantly higher, 18.5% (10 cases) in preterms as compared to 4.5% (5 cases) in term babies ( $P<0.05$ ), and so was the mortality rate of 18.5% (10 cases) compared to 0.9% (1 case).

Neonatal mortality was 6.7% (11 cases), and was the highest with PROM

onward, isolation and protection of the fetus from external micro-organisms virtually ceases; in intervals from spontaneous rupture of membranes to delivery, the incidence of definite infection in newborns is increased with length of interval (Shubeck et al, 1966), although the relative frequency and pattern vary (Schutte et al, 1983; Pryles et al, 1963). The perinatal mortality has also been observed to be higher in association with PROM (Akhter et al, 1980; Lebherz et al, 1963).

Apart from PROM, some other peri-

natal high risk factors are intimately related with neonatal sepsis (Schutte et al, 1983). In this study, a significantly higher incidence of systemic neonatal infections was noted among cases associated with asphyxia, presence of foul-smelling liquor and unsterile vaginal examinations, though relationship with febrile illness in the mother prior to delivery was statistically not significant.

Prematurity was associated with PROM in 32.9% as compared to 6.7% in its absence. The incidence of systemic infections among preterms was significantly higher as compared to term babies. The relationship between PROM, prematurity and neonatal infection is consistent with the observations of other workers (Heera, 1971).

In conclusion, a high index of suspicion for infection should be maintained in cases with premature rupture of membranes, particularly if it occurs for over 3 days before delivery. Apart from the options of prophylactic use of antibiotics,

this will enable anticipation and prompt detection of neonatal infection and a favourable outcome of the pregnancy.

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