

# Prelabour Rupture of Membranes and Neonatal Morbidity in Level II Nursery in Kelantan

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## Summary

In view of controversial reports about the role of prelabour rupture of foetal membranes (PROM) in neonatal morbidity and to study the association of PROM with infections and meconium aspiration syndrome (MAS), a prospective case control study was conducted in a level II nursery of Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan. Of the 111 neonates with PROM studied, 18 developed clinical problems (septicaemia and other specific problems such as pneumonia, omphalitis, skin infectoin and MAS) while 5/56 of the control group developed similar problems. The difference between the two groups was not significant ( $p < 0.30$ ). There was no neonatal death. It is concluded that PROM is not associated with neonatal morbidity. Neonates with this problem alone do not need to be admitted to the neonatal nursery.

**Key words:** Prelabour rupture of foetal membranes, Neonatal morbidity.

## Introduction

Duration of rupture of foetal membranes is generally regarded as significant if it exceeds 24 hours (prelabour rupture of foetal membranes or PROM<sup>1,2</sup>). However many Western authors caution about the danger of infection after 12 hours of rupture of foetal membranes<sup>3,4</sup>. Most commonly stated complications include neonatal sepsis, cardiorespiratory depression at birth and prematurity. PROM is the risk factor which has received much attention of investigators<sup>1,2,22</sup>. Yet, the views are conflicting even in the most recent studies<sup>1,2</sup>. Many authors describe it as a very important risk factor which leads to high morbidity and mortality<sup>2,5,6</sup> whereas others consider it a minor risk factor or not a risk factor at all<sup>1,21</sup>.

To study the role of PROM as a risk factor for neonatal morbidity and mortality, and its evaluation in the context of rural population with low socio-economic status, a prospective case control study was conducted in the special care neonatal unit (SCNU), level II nursery, of Hospital Universiti Sains Malaysia (HUSM), Kubang Kerian, Kelantan.

## Subjects and Methods

This prospective case control study was conducted from January 1 to May 31, 1991 in the SCNU of HUSM. Neonates, with history of rupture of foetal membranes for a duration of 12 hours or more,

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and admitted within 24 hours of delivery, were selected for the study. The control group consisted of neonates admitted during the same period with similar criteria, but without history of PROM or any other perinatal risk factor for neonatal infection such as maternal pyrexia, foul smelling liquor, meconium staining of amniotic fluid, instrumentation during delivery, emergency Caesarean section, premature delivery, small for gestational age, or foetal hypoxia.

Based upon the duration of rupture of foetal membranes the patients were divided into two groups.

Group I -  $\geq 12$  -  $<24$  hours

Group II -  $\geq 24$  hours

Neonates having one or more of the following features were managed in intensive care (level I) nursery and therefore were not included in this study.

- a) Birth weight  $< 1.5$  kg;
- b) Gestational age  $< 32$  weeks;
- c) Requiring intensive care at the time of admission;
- d) Multiple congenital abnormalities.

A septic work-up was carried out on all the neonates included in the study. It consisted of laboratory investigations namely blood culture total and differential leucocyte count and platelet count, serum C-reactive protein (CRP), X-ray chest and urine examination. Skin, ear and umbilical swabs were taken for gram staining and culture. Cerebrospinal fluid (CSF) examination was done, when clinically indicated.

The neonates were observed closely and their clinical progress was monitored carefully. A prescribed proforma was filled during the period of admission and was completed at the time of discharge.

*Septicaemia* was diagnosed when one or more of the following were present:

- a) Bacteria isolated from specimens of blood and/or CSF and/or urine of a neonate with clinical symptoms and signs of septicaemia;
- b) Clinical signs and symptoms of infection, in the absence of established alternative explanation/diagnosis, namely temperature instability, lethargy, respiratory distress, poor sucking, vomiting/excessive aspirate through gastric tube, diarrhoea, recurrent apnoea, abdominal distension, hepatosplenomegaly or bleeding tendency along with haematological changes suggestive of infection (total leucocyte count  $\geq 25000$  or  $\leq 5000$  + CRP  $\geq 1.0$  mg% or presence of toxic granulation in peripheral blood picture or platelet count  $< 150,000$  or immature to neutrophil ratio  $> 0.2$ , when blood or other cultures were negative (clinical sepsis).

*Meconium aspiration syndrome* was diagnosed when all the following features were present:

- a) Meconium sucked out from trachea or noted in liquor;
- b) Clinical signs of respiratory distress;
- c) Radiological changes in the lungs consistent with meconium aspiration;
- d) Negative blood cultures.

*Pneumonia* was diagnosed when a clinical picture of respiratory distress, consistent with pneumonia and radiographic appearance of streaky densities, or confluent lobar opacification persisting for more than 24 hours, was present.

*Omphalitis* was diagnosed as the presence of inflammation around the umbilicus with pure growth of an organism from umbilical swab.

*Skin infection* means discrete pustules containing pus cells and a pure growth of *Staphylococcus aureus* or other pathogens.

Statistical analysis was performed using Chi-square test with Yates' correction. Statistical significance was defined as  $P < 0.05$ . Odd's ratio and exact 95 per cent confidence limits were calculated by using Pascal programme by ELF Franco and N Campos-Filho, Ludwig Cancer Institute, Sao Paulo, Brazil (included in the package EPIINFO).

## Results

### Patients

The total number of live births during the study period was 2677. A total of 813 neonates were admitted to the SCNU. Out of them 111 neonates fulfilled the criteria for inclusion into the study.

Group I consisted of 69 patients and group II, 42, whereas 56 neonates were in the control group. Both the study and control group were comparable in terms of birth weight, sex and postnatal age. Of the 111 neonates selected for study, 54 were male and 57 were female.

### Clinical Problems

Ten (14.49%) patients in group I, eight (19.04%) in group II and five (8.92%) in the control group were found to have evidence of infection or MAS (Table I). None of the patients died. Of the 18 patients with sepsis or MAS, 11 had additional risk factors which included maternal pyrexia, meconium staining of liquor, prematurity, small for gestational age, foul smelling liquor, Caesarean section, instrumentation during delivery and birth asphyxia.

The overall incidence rates for group I and group II were 25.77 and 15.69/1000 live births respectively. This is similar to earlier reports<sup>21</sup>. The overall prevalence rate was 13.52 per cent (111/813) of cases admitted to the SCNU. Of neonates with PROM 16.27 per cent developed sepsis or MAS, as compared to 8.93 per cent in the control group.

There was no statistically significant difference regarding neonatal morbidity between group I and group II ( $P < 0.53$ ), group I and control ( $P < 0.50$ ), group II and control ( $P < 0.25$ ), and all neonates with PROM and control ( $P < 0.30$ ). Odd's ratio (all neonates with PROM and control) was 1.97 (95% confidence limits 0.65 - 8.17).

### Septicaemia

Out of six neonates who developed sepsis, only four had PROM as the risk factor. Two others were associated with prematurity, small for gestational age, meconium staining of liquor and Caesarean section. Two of them had positive bacterial culture from blood and one from urine. The remaining three were diagnosed to have clinical sepsis. Organisms cultured included *Staphylococcus epidermidis*, group A *Streptococcus* and *Klebsiella* species.

### Meconium Aspiration Syndrome (MAS)

Five neonates were diagnosed to have MAS. All of them had history of meconium staining of liquor (n=5), maternal pyrexia (n=1), foul smelling liquor (n=1) and instrumentation during delivery (n=3).

Table I  
Clinical Problems in Neonates with PROM @ and Control Group

Clinical Problems	PROM 12- ≤24 Hours n=69	PROM ≥ 24 Hours n=42	Control  n=56
Septicaemia	3	3	2
Pneumonia	1	0	0
Omphalitis	3	2	2
MAS*	2	3	0
Skin Infection	1	0	1
Total	10	8	5

@ = Prelabour rupture of membranes

\* = Meconium Aspiration Syndrome

n = Number of neonates in that group

#### p-values

Group I & II <0.53

Group I & control <0.50

Group II & control <0.25

PROM(I+II) & control <0.30

#### Omphalitis

Five neonates developed *omphalitis*. Three of them had PROM while two had additional history of maternal pyrexia and delivery by a Caesarean section. *Staphylococcus aureus* was cultured from umbilicus of all of these neonates. Two of these babies had methicillin resistant *Staphylococcus aureus* (MRSA) infection.

#### Others

One patient was diagnosed to have bronchopneumonia. This patient also had a history of prolonged labour and Caesarean section. Another was found to have skin infection and MRSA was cultured from pustules.

#### Discussion

The results of this study are similar to some of the previous studies<sup>1, 21</sup> but differ from others<sup>2</sup>. The diversity of the results in different studies may suggest that the ability of PROM to cause infection, changes from centre to centre thus implicating some other aggravating factors as was suggested by Boo<sup>1</sup> as well as by Bhakoo and Singh<sup>1,21</sup>.

Although an odd's ratio of 1.97 (95% confidence limits 0.65-7.18) suggested some degree of relationship between PROM and neonatal morbidity, yet it is not statistically significant in our case. We would suggest that PROM in the absence of other risk factors may not need admission to the neonatal nursery. Babies with PROM may be observed in the postnatal ward where the additional benefit of maternal presence may be obtained.

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