

# NEONATAL OUTCOME AND PRENATAL ANTIBIOTIC TREATMENT IN PREMATURE RUPTURE OF MEMBRANES

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## ABSTRACT:

**Aim:** To compare the neonatal outcome of infants born to mothers with history of PROM who received or did not receive antibiotics before labor.

**Methods:** This study was carried out at Queen Alia military hospital between January 2003 to June 2004, to compare neonatal outcome of babies born to mothers with history of Premature Rupture Of Membranes (PROM) who received or didn't receive antibiotics before labor. 255 newborns were included in this study. All of them were admitted to neonatal intensive care with septic work up done and intravenous antibiotic started for at least 3-4 days. These neonates were divided into two groups depending on maternal history of antibiotic intake before labor.

**Results:** The total number of neonates included in the study was 225. The maternal age  $25 \pm 10$  years. 140 cases (62%) were premature with gestational age ranging between 28-36 weeks, and 85 (38%) were full term. Neonatal death occurred in 20 cases (14%) due to severe prematurity and its complications. Duration of PROM 18-72 hours in 167 cases (74%), 72 hours -1 week in 43 cases (19%) and >1 week in 10 cases (7%). History of antibiotic intake before labor was positive in 110 cases (49%), { 60 (54.5%) of them had premature labor }, and negative in 115 cases (51%), { 80 (69.6%) of them had premature labor }. The risk of neonatal infection in our study was 4.4% in babies with maternal history of antibiotic intake compared with 11% in those whose mothers didn't.

**Conclusion:** Antibiotic treatment of women with history of PROM improves neonatal outcome by increasing pregnancy latency and in association with early detection of sepsis and its aggressive management leads to significant improvement in neonatal outcome.

**KEY WORDS:** PROM (Premature Rupture of Membranes), neonatal sepsis, prenatal antibiotics.

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## INTRODUCTION

Premature rupture of membranes (PROM) is defined as rupture of membranes before onset of labor. When this occurs before 37 weeks of gestation it's called preterm PROM. Membrane

rupture may occur for a variety of reasons. At term, weakening of the membranes may result from physiologic changes combined with shearing forces created by uterine contractions.<sup>1,2</sup> Intrauterine, especially at earlier gestational ages.<sup>3</sup> Factors associated with an increase in PROM include lower socioeconomic status, sexually transmissible infections, prior preterm delivery (especially due to PROM), vaginal bleeding, cervical colonization and cigarette smoking during pregnancy.<sup>1,4-6</sup> In many cases, however, PROM may occur in the absence of recognized risk factors.

The most significant maternal risk of term PROM is intrauterine infection the risks of which increases with the duration of membrane rupture.<sup>5, 8-10</sup> Fetal risks associated with

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PROM include umbilical cord compression and ascending infection. For patients with preterm PROM the most likely outcome is preterm delivery within one week with its associated morbidity and mortality risks such as respiratory distress, necrotizing enterocolitis, intraventricular hemorrhage and sepsis.<sup>11</sup> Many antibiotics were started to reduce maternal chorioamnionitis and neonatal complications, the most widely used ones were ampicillin, erythromycin and cephalosporin's.<sup>12</sup> Our study was carried out to see the effect of prenatal antibiotic use in mothers with history of PROM on their newborns and to compare them with the newborns of mothers with the same problem who did not receive treatment.

### PATIENTS AND METHODS

This study was carried out at Queen Alia military hospital between January 2003 to June 2004, 255 newborns were included in this study, each was born to a mother with PROM for at least 18 hours and the following information were recorded age, parity, smoking, history of chronic illness, drug intake, preterm labor, neonatal death, duration of, amniotic fluid leak, gestational age, mode of delivery and history of antibiotic use before labor.

Each neonate was admitted to neonatal intensive care with septic work up done including CBC, ESR, blood film, CRP (on admission and third day of life), blood culture and CXR.

All of them received intravenous antibiotic (ampicillin and amikacin) for 3-4 days then continued oral augmentin drops till blood culture result. Except for those who showed clinical or laboratory evidence of sepsis I.V. antibiotics were continued accordingly.

The age of mothers: included was between 16-36 years. The gestational age included was between 28-42 weeks. For the sake of studying and comparing laboratory results and complications of prematurity, we divided them into two groups on the basis of positive or negative history of taking antibiotics pre-natally.

### RESULTS

The total number of neonates included in the

study was 225. The maternal age was  $25 \pm 10$  years. History of chronic illness including hypertension and diabetes were recorded in 20 mothers (9%). None of the mothers included was having history of drug intake except in those mentioned above as treatment for D.M. and or hypertension. 140 cases (62%) were premature with gestational age ranging between 28-36 weeks, and 85 (38%) were full term.

Neonatal death occurred in 20 cases (14%) due to severe prematurity and its complications. Duration of PROM was 18-72 hours in 167 cases (74%), 72 hours -1 week in 43 cases (19%) and >1 week 10 cases (7%). Mode of delivery vaginally 145 cases (64%), instrumental 35 cases (16%), cesarean section 45 cases (20%). Maternal risks including fever, abdominal pain and vaginal discharge occurred in 113 (50%) of the mothers.

History of antibiotic intake before labor was positive in 110 cases (49%), of them 60 (54.5%) had premature labor, and negative in 115 cases (51%), of whom 80 (69.6%) had premature labor. Table-I. The laboratory results of septic workup are summarized in Table-II.

Table-I: Maternal History and Mode of Delivery

Variable	No. of Cases	Percentage
Maternal age (mean $25 \pm 10$ yrs)	225	100%
<i>Parity</i>		
Primigravida	90	40%
>1	135	60%
Smoking During pregnancy	40	18%
<i>Duration of PROM</i>		
18-72 hrs	167	74%
72 hrs-1 week	43	19%
>1 week	15	7%
No. of preterm babies	140	62%
No. of full term babies	85	38%
<i>Mode of delivery</i>		
Vaginal	145	64%
Instrumental	35	16%
C\S	45	20%
<i>History of antibiotic intake</i>		
Positive	110	49%
Negative	115	51%

Table-II: Lab Results of infants of mothers with positive or negative history of antibiotic intake

Variable	Positive maternal history of antibiotic intake		Negative maternal history of antibiotic intake	
	Number	%	Number	%
<b>WBC</b>				
<5000	8	7.3%	48	41.7%
5000-20000	102	92.7%	67	58.3%
<b>Platelets</b>				
<150000	5	4.5%	25	21.7%
ESR <40mmHg	90	81.8	80	69.6%
<b>CPR on Admission</b>				
>6	10	9%	25	21.7%
<6	100	90.9%	90	78.3%
<b>CPR on 3rd day</b>				
>6	12	10.9%	35	30.4%
<6	98	89%	80	69.6%
<b>Blood Culture</b>				
Positive	10	9%	35	30.4%
Negative	100	90.9%	80	69.6%
<b>CXR</b>				
Normal	90	81.1%	80	69.6%
Abnormal	20	18.2%	35	30.4%

Table-III: Comparison of Complications of Pre-Maturity in Both Groups

Variable	Positive maternal history of antibiotic intake		Negative maternal history of antibiotic intake	
	Number	%	Number	%
RDS	15	25%	35	43.7%
NEC	2	3.3%	9	11.3%
IVH	4	2.4%	10	12.5%

Non of the full term babies included in our study died in both groups but 20 (8.9%) babies of the preterm ones died due to sever prematurity and it's consequent complications, although there was marked difference in the incidence of complications of prematurity among those whose mothers received anti biotic treatment and those whose mothers didn't. Table-III.

## DISCUSSION

The incidence of neonatal infection for infants born to women with PROM range from

1-2.6%<sup>13</sup> in our study it was about 4.4% in patients with positive maternal history of antibiotic intake compared with 11% in those with negative maternal history of antibiotic intake. Preterm premature rupture of fetal membranes defined as rupture before 37 weeks. Occur in 2-4% of pregnancies, is associated with intrauterine infection and increased risk of neonatal sepsis.<sup>14</sup> There are several studies in which women presenting with preterm PROM without labor were randomized to receive an antibiotic or placebo. Over all, these studies have shown that antibiotics prolonged the latency period until delivery, reduced maternal choriomnionitis and reduced neonatal complications, including respiratory distress syndrome, IVH, pneumonia and sepsis<sup>15,16</sup> as in our study newborns whose mothers received antibiotic before have good outcome.

Neonatal sepsis was defined by positive blood cultures associated with 2 positive CRP readings (CRP>6). 10(4.4%) of our patients fulfilled these criteria in those whose mothers received antibiotics compared with 25 (11%) in those whose mothers did not receive. In many studies it was found that the risk of neonatal infection was increased among mothers colonized with group B streptococci, other risk factor for neonatal infection include premature rupture of membranes >18 hours, maternal fever during labor and prematurity.<sup>17</sup> As in our study all patient of PROM >18 hours were admitted to rule out sepsis.

Antibiotic have become an important part of the recent advances in the treatment of PROM. Many studies have demonstrated that antibiotic therapy prolong pregnancy latency time and decreases maternal and neonatal morbidity<sup>3-5, 7-9, 12-16</sup>. Diagnosis of early onset neonatal sepsis and close observation for early sign of sepsis and more aggressive evaluation and early treatment has decreased the incidence of early onset sepsis associated with PROM.<sup>17,18</sup> All our cases observed clinically and CRP done twice to elicit early sign of sepsis. The most common fetal morbidly associated with PROM is respiratory distress syndrome and is related primarily to gestational age at delivery. It may

be advantageous to prolong pregnancy in order to reduce the risk of gestational age dependent morbidity.<sup>19</sup> Adjuvant treatment to expectant management have included prophylactic and therapeutic tocolysis, maternal corticosteroid administration and maternal antibiotic treatment.

Although corticosteroid administration results in significant reduction in incidence of both RDS and grade III and II intra ventricular hemorrhage in premature, but some studies showed that administration of multiple courses of antenatal betamethasone to these patients with preterm PROM is associated with an increased risk of early onset neonatal sepsis.<sup>20,21</sup>

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