

EFFECT OF LENGTH OF PREMATURE RUPTURE OF MEMBRANES PERIOD TOWARD APGAR SCORE OF THE INFANT AND MATERNAL LEUKOCYTE SERUM IN ULIN GENERAL HOSPITAL BANJARMASIN

Yosef Dwi Cahyadi Salan^{1,2}

¹ Hadji Boejasin Hospital, Pelaihari, Kalimantan Selatan

²Specialist Program in Obstetrics and Gynecologic of Medical Faculty, Lambung Mangkurat University

Corresponding Email: salanyosef@gmail.com

Abstract: *Premature rupture of membranes (PROM) is a condition of rupture of membranes before the birth takes place. The incidence of PROM varies from 3% to 10% of all births and complicates more than 3% of pregnancies with PROM. The purpose of this study was to determine the relationship between the length of the PROM period toward the APGAR score of the infant and maternal leukocyte serum. The research design was analytic observational with retrospective cohort approach. From the result we found a correlation between PROM period with outcome of infant's APGAR score, there were a total of 89 samples fulfilling the inclusion criteria, with 57 samples of PROM<12 hours (51 with good APGAR score and 6 with bad APGAR score) and 32 samples PROM> 12 hours (16 with good APGAR score, and 16 with bad APGAR score). From the result of the correlation of leukocyte level with the length of PROM period was found total of 84 samples fulfilling the inclusion criteria, with 54 samples of PROM<12 hours (53 with normal leukocyte score and 1 with leukocytosis score) and 30 samples PROM> 12 hours (28 with normal leukocyte score, and 2 with leukocytosis score). From the analysis results we obtained a strong relationship between the length of PROM period with the infant's APGAR ($P = 0.0001$, OR 8.5), whereas in the relationship between the length of PROM period with maternal blood leukocyte level there is no significant relationship ($p = 0.599$).*

Keywords: *Premature Rupture of Membranes, APGAR, Leukocyte Serum*

INTRODUCTION

Premature rupture of membranes (PROM) is a condition of rupture of the membranes in the pregnancy before the birth sign takes place. PROM causes a direct connection between the external world and the space in the uterus, thus facilitating the occurrence of complications in the fetus at both labor and after delivery such as asphyxia, prematurity, cord compression, lung development disorders, necrotizing enterocolitis (NEC), and neurological disorders. The incidence of PROM varies from 3% to 10% of all births and create complicates more than 3% of pregnancies with PROM. Preterm labor caused by PROM occurs in 1 in 10 deliveries in the United States, and causes 50% - 75% of neonatal deaths in developing countries.¹⁻³

In the ASEAN region, Indonesia is one of the countries with the highest neonatal mortality rate when compared to neighboring countries such as Malaysia which only 10 / 100,000 live births and Singapore are only 5 / 100,000 live births. According to Indonesia Demographic and Health Survey Data (IDHS) in 2012, the number of neonatal deaths in Indonesia reached 19 deaths / 100,000 live births, infant mortality of 34 deaths / 100,000 live births and mortality rate of 43 deaths / 100,000 live births. In South Kalimantan, infant mortality rate in 2005 was ranked 5th highest in Indonesia, 41 per 1000 live birth.⁴⁻⁶

According to the Indonesian Ministry of Health's data in 2015, the proportion of death in newborns (0-6 days old) mostly due to respiratory problems (51%), prematurity (33%), congenital abnormalities (4%) and sepsis (12%). Infant mortality due to infection may be caused by PROM. PROM is one of the most frequent pregnancy complications which about 20% of cases occur before 37 weeks' gestation. Approximately 8% to 10% of patients with premature rupture of membrane have a high risk of intrauterine

infection due to an interval between ruptured membranes and prolonged labor.⁵

Pregnancy with premature rupture of membranes is still an important issue in the field of obstetrics, related to the complications of premature birth and the occurrence of chorioamnionitis infections to sepsis that increase maternal and perinatal mortality and morbidity. Increased mortality and fetal morbidity and mothers are associated with increasing length of latent period and duration of rupture of membranes until the fetus is born. Although the incidence of subclinical chorioamnionitis in PROM is quite high at around 30%, serious maternal systemic infections are rare when immediate treatment is given as early as possible. On the other hand, the incidence of neonatal sepsis reported only 2-4%.⁷⁻¹⁰

According to a study in Ethiopia, it was reported that intrauterine and intraamniotic infections in PROM cases should be considered if the period of infection occurs > 12 hours.¹² With early diagnosis and appropriate treatment, the incidence of intrauterine infections may be lowered, but intrauterine infection features are often in imminent looks, so it is necessary to give precautions to the occurrence of infection. Several ways can be done for early diagnosis of intrauterine infections, for example by detecting bacterial colonies in the amniotic sac before clinical signs of visible infection, gram staining, number of amniotic fluid leukocytes, and esterase leukocyte test. At this time, some basic laboratory parameter parameters used to detect the presence of infections such as: the number of blood leukocytes, the rate of sedimentation of blood, and the count type.^{7,11-14}

Leukocytosis is one of the signs of infection in the body of a person, in pregnant women there is an increase in leukocyte levels ranging between 15-20 thousand, but if found an increase in leukocytes exceeding 20 thousand then the

suspicion of infection in the mother getting bigger.^{14,15}

To reduce the likelihood of complications in the mother and fetus due to labor with the PROM, it is necessary to increase accuracy of diagnosis and management especially in developing countries like in Indonesia, because most pregnant women do not get adequate and adequate health services. In order to determine the diagnosis and management properly, it is necessary to analyze various data factors that can affect the condition of pregnancy with PROM. Therefore, this research analyzed the effect of length of premature rupture of membranes period toward APGAR score of the infant and maternal leukocyte serum in Ulin General Hospital Banjarmasin from 1 January 2016 to 31 December 2016

RESEARCH METHODS

The type of the research was observational analytic with retrospective cohort approach which aimed to know the relationship between length of premature rupture of membranes period toward APGAR score of the infant and maternal leukocyte serum in Ulin General Hospital

Banjarmasin from 1 January 2016 to 31 December 2016. Population and Sample of this research was all patients with diagnosis of premature rupture of membrane at Ulin General Hospital Banjarmasin on period 1 January 2016-31 December 2016 recorded in register book and medical record of Maternity Ward in Ulin General Hospital Banjarmasin. The exclusion criteria in this study are incomplete patient medical record data and pregnancy with premature rupture of preterm membranes. Collection and retrieval of data through data register, then the data register was traced to medical record and conducted recording and analyzed from medical record data.

RESULTS AND DISCUSSION

A total of 126 patients had been diagnosed with KPD, but only 89 patients met the inclusion criteria for association of PROM with outcome of APGAR and 84 patients who met inclusion criteria for association of PROM with maternal blood leukocyte. Data distribution of research samples can be seen in tables 1 and 2.

Table 1. Data of sample distribution of length of PROM period with infant APGAR

Parameter	Total
Age	
Age 15-35 years old	81
Age >35 years old	8
Gravid	
Primipara	45
Multipara	44
Labour Process	
Normal	63
Operative	26

Tabel 2. Data of distribution samples of distribusi sampel of KPD period and and maternal leukocytes serum levels.

Parameter	Total
Age	
Age 15-35 years old	76
Age >35 years	8
Gravid	
Primipara	41
Multipara	43
Labour Process	
Normal	59
Operative	25

Of the 120 cases of PROM for the period January 1, 2016 to December 31, 2016, there were 89 cases that met the inclusion criteria. 57 cases were PROM <12 hours, while the rest was the case of PROM > 12 hours. Of the total case group PROM <12 hours, we got 51 cases with good APGAR and 6 cases with bad APGAR. While in the case group PROM > 12 hours got 16 cases of good APGAR and 16 cases of bad APGAR.

Based on the analysis with chi square method, it was found that the relationship between the length of the infection period toward APGAR outcome of the baby with $P < 0.001$ and Odds ratio is 8.5. Thus it can be said that the length of the PROM length period affects the APGAR value of the baby APGAR with an increased risk of 8.5-fold.

PROM is one of the most common complications in pregnancy that can affect the value of the infant APGAR.⁷ The latent period is the length of time required since the rupture of the membranes to the onset of labor. The longer the latent period, the greater the risk of infection in the mother and fetus.¹³ According to Endale *et al*'s study it was reported that intra uterine or intra-amniotic infections should be considered in premature rupture if more than 12 hours.¹² In addition to intra uterine infection, the risks that may occur include placental abruption, pulmonary hypoplasia, and hypoxia and fetal distress associated with cord compression and or umbilical cord prolapse.¹⁶

Maternal neonatal morbidity with PROM was associated with ascending infection and umbilical cord compression in utero. Revathi *et al* said that the most common causes of neonatal morbidity in women with PROM were asphyxia (2%), hyperbilirubinemia (2%), sepsis (10%), meningitis (1%), and pneumonia (5%). While the cause of perinatal mortality in neonates from mothers with PROM was sepsis (1%), meningitis (1%), pneumonia (2%) and asphyxia (1%).^{17,18}

This was consistent with the research conducted by Plucinska *et al*. Of the 428 infants sampled, we found 124 infants infected with OR 1.36, meaning that the length of the PROM period could cause an increase in infant infection at 1.36 times.¹⁹ Jing Liu *et al*'s study also found that PROM can cause neonatal asphyxia, sepsis, and heart muscle damage.²⁰ F. Nili and AA Shams Ansari studies. in Tehran, Iran in April 2001-April 2002, from 163 cases of PROM, found 47% infant suffered respiratory distress and 20.45% infant had sepsis. There was a significant difference in morbidity between neonates born with PROM <24 hours compared with neonates born with PROM > 24 hours. Neonates born with PROM > 24h group were more at risk of developing pneumonia. Mortality that occurs was generally caused by respiratory failure, DIC, and sepsis shock.⁷

Of the 54 cases of PROM <12 hours, there were 53 cases with normal leukocytes which meet the inclusion criteria, and 1 case with leukocytosis,

while from 30 cases of PROM> 24 hours 28 cases, there were found with normal blood leukocytes which meet the inclusion criteria, and 2 cases with leucocytosis. The data was analyzed by chi square method with P value 0,5990. Thus it can be said that the length period of PROM does not affect the number of maternal leukocytes.

The results of this study were not in accordance with research conducted by Toto and Nili et al. In Toto's study, it was reported that there was a significant association between prolonged infection with elevated levels of maternal blood leukocytes and infant morbidity. Toto concludes that leukocytosis in mothers examined before delivery and increased leukocytes in aspirated fluid of infant stomach immediately after birth are a fairly strong predictor of infection.²¹ This is in line with a study conducted by Nili et al, there was an increase in leukocyte levels in women who had an infection due to PROM for 20.2% .⁷

The incompatibility of this study with existing theories can be attributed to the lack of number of research samples. In this study only 1 sample of leukocytosis patients in PROM <12 hours, and only got 2 samples of leukocytosis in PROM> 12 hours. In addition, the lack of records in medical record status causes some samples to be excluded due to incomplete data.

CONCLUSIONS

Based on the results of this study, it was concluded that there was a significant relationship between the length of the infection period with the outcome of APGAR infants with Odds ratio 8.5 times, and there was no significant relationship between the duration of infection with maternal blood leukocyte level. In the follow-up study, more samples are needed and recording in a more complete medical record.

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