The Relationship Of Leukocyturia On The Incidence of Prominent Rupture of The Membrane in Preterm Pregnancy at the General Hospital of The University of Muhammadiyah Malang

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ABSTRACT

Prelabor rupture of the membrane (PROM) requires greater attention because of the high prevalence and its tendency to increase. The incidence of PROM at ≥ 37 weeks of gestation (aterm) is around 6.45-15.6% and about 2-3 percent of all single preterm pregnancies and 7.4% in twin preterm pregnancies. The purpose of this study was to determine the relationship between leukosituria and the incidence of premature rupture of membrane at<37 weeks of gestation at the General Hospital of the University of Muhammadiyah Malang during 2015-2017. This is an analytic observational research with a cross-sectional study approach. Data were analyzed with Chi Square. Out of 36 samples that fit in the inclusion criteria, 18 patients had preterm PROM while 18 others had aterm PROM. PROM mostly occurs in multigravida patients(58.3%, 21 patients). Patients with 38-39 weeks of gestation had the highest prevalence of PROM. Out of 18 Preterm PROM patients, 9 patients had leukocyuria. Only 1 aterm patients had positive leukocyturia. The result of this study showed a significant relationship between the incidence of PROM and preterm pregnancy.

Keywords: Leukocyturia, Prelabor rupture of the membrane, less than 37 weeks of gestation

INTRODUCTION

Prelabor Rupture of The Membrane (PROM) is the rupture of the amniotic membrane before the onset of labor. Premature rupture of membrane can occur at or after 37 weeks of gestation and is termed premature rupture of membranes (PROM) or aterm PROM. PROM that occurs before 37 weeks of gestation is termed preterm premature rupture of membranes (PPROM) (POGI, 2016).

PROM requires greater attention because of the high prevalence its tendency to increase. The incidence of PROM at ≥ 37 weeks of gestation (aterm) is around 6.45-15.6% and about 2-3 percent of all single preterm pregnancies and 7.4% in twin preterm pregnancies.
Many theories and hypotheses have been put forward by experts, one of which stated that infection is one possible cause of PROM, including urinary tract infection. Despite this theory, there is still a controversy whether urinary tract infection is a predisposing factor of PROM (Mercer et al, 1993). Thus, the researchers are interested in examining whether there is a specific and meaningful relationship between preterm PROM and urinary tract infection.

Previous studies conducted by Bukitwetan et al (2004) showed that out of 184 urine samples from pregnant women who came to Puskesmas Tambora for routine check up, 65 samples (35.3%) had colony counts greater than 100,000 per ml of urine. The biggest proportion was obtained in women aged 20-30 years at 72.3%. Women with gestational age more than 28 weeks had the most positive bacteriuria test (48.7%). Judging from the frequency of pregnancy, multigravida showed highest cases of bacteriuria compared to primigravida. Pyuria is mostly found in pregnant women with bacteriuria at more than 28 weeks of gestation.

The quality of health in Indonesia is still low compared to other developed countries and there are still many cases of infection. In addition, during pregnancy, there are changes in the urinary tract system, both anatomical (dilated from the ureter and the reservoir system) and physiological (the occurrence of residual urine and disruption of the process of secreting urine due to peristaltic movement and muscle tone disorders caused by hormonal changes). These changes can be a predisposing factor for occurrence of urinary tract infections (Prawiraharja, 1992).

The incidence of PPROM is associated with increased maternal and perinatal morbidity and mortality. About 1/3 of women who experience PPROM will experience potentially severe infections. Fetuses / neonates will be at a greater morbidity and mortality compared to their mothers, with incidence up to 47.9%. Premature labor with potential problems, perinatal infection, and cord compression in utero are common complications. PPROM is also associated with about 18-20% of perinatal deaths in the United States. (4). In addition to the dangers arising from PPROM, the prevalence of PROM at General Hospital of University of Muhammadiyah Malang is high. Therefore the researchers are interested in examining the relationship between leukocyturia and the incidence of preterm premature rupture of the membrane.

METHODS

This was an analytic-descriptive study using cross-sectional research design. The location and time of this research was in the Obstetric and Gynecology Department of the General Hospital of the University of Muhammadiyah Malang during 2015-2017. The population of this study was all pregnant women who gave birth at the General Hospital of the University of Muhammadiyah Malang during 2015-2017. Samples were calculated using total sampling method of pregnant women who experienced premature rupture of the membrane at the General Hospital of University of Muhammadiyah Malang during 2015-2017. The inclusion criteria of this study were: Pregnant women with premature rupture of membranes who performed a uterine urinalysis test. Exclusion
criteria in this study were: history of polyhydramnion, macrosomy, multiple pregnancy and fetal abnormalities in the womb. Samples were selected by consecutive sampling method, namely data taken from all pregnant women who experienced premature rupture of membranes and had a bacterial urinalysis examination at the General Hospital of the University of Muhammadiyah Malang. Data were analyzed using Chi Square or Fisher's test with the help of the SPSS program.

RESULTS AND DISCUSSION

Data for the research were taken from medical records and UTI laboratory test results of pregnant women who had PROM and were treated in the Department of Obstetrics and Gynecology at the General Hospital of University of Muhammadiyah Malang during 2015-2017. 36 subjects, 18 with PROM occurred at < 36 weeks of gestation and 18 with PROM occurred at > 37 weeks of gestation.

| Table 1. Characteristics based on parity |
|----------------------------------------|
| Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|---------|---------------|--------------------|
| multigravida | 21 | 58.3 | 58.3 | 58.3 |
| primigravidae | 15 | 41.7 | 41.7 | 100.0 |
| Total | 36 | 100.0 | 100.0 |

Out of 36 PPROM patients with less than 36 weeks of gestation who had complete data, most of them were multigravida (21 patients, 58.3%) while the remaining (15 patients, 41.7%) were primigravidas.

| Table 2. Maternal characteristics based on gestational age |
|-----------------------------------------------|
| Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|---------|---------------|--------------------|
| <=36 MINGGU | 18 | 50.0 | 50.0 | 50.0 |
| >36 MINGGU | 18 | 50.0 | 50.0 | 100.0 |
| Total | 36 | 100.0 | 100.0 |

Based on the gestational age of the patients who had premature rupture of membranes, 18 (50%) had ≤ 36 weeks of gestation while 18 others (50%) had >36 weeks of gestation.
2 patients (5.6%) who had gestational age ≤36 weeks had the most early rupture of membranes i.e at 28-30 weeks gestation. Furthermore, there were only 1 patient who experienced rupture of membranes at 30-32 weeks of age (2.8%), at 32-34 weeks there were 6 patients (16.7%) and at 34-36 weeks there were 9 patients (25%). Whereas at >36 weeks of gestation it is known that most premature rupture of the membrane occurred at 38-39 weeks of gestation with a total of 6 patients (16.7%).

Table 3. Characteristics of gestational age

| Frequency | Percent | Valid Percent | Cumulative Percent |
|-----------|---------|---------------|--------------------|
| 28-30 WEEK | 2       | 5.6           | 5.6                |
| 30-32 WEEK | 1       | 2.8           | 2.8                |
| 32-34 WEEK | 6       | 16.7          | 16.7               |
| 34-36 WEEK | 9       | 25.0          | 25.0               |
| 36-37 WEEK | 2       | 5.6           | 5.6                |
| 36-38 WEEK | 1       | 2.8           | 2.8                |
| 37-38 WEEK | 1       | 2.8           | 2.8                |
| 38-39 WEEK | 6       | 16.7          | 16.7               |
| 39-40 WEEK | 4       | 11.1          | 11.1               |
| 40-41 WEEK | 4       | 11.1          | 11.1               |
| Total     | 36      | 100.0         | 100.0              |

Of the 36 patients tested, a total of 10 patients (27.8%) were tested positive for leukocyturia while 26 other patients (72.2%) did not. The unpaired categorical comparative 2x2 table Chi Square test was used to find out whether there is a relationship between the incidence of premature rupture of the membrane in <= 36 weeks of gestation with the incidence of leukocyturia. In using Chi Square, there are assumptions that must be met; namely the expected count value of <5, a maximum of only 20% of the total cells. From the output it is known that the chi square requirements are met.

Table 4. Characteristics of PROM patients based on leukocyturia.

| Valid | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NEGATIVE | 26       | 72.2    | 72.2          | 72.2               |
| POSITIVE | 10      | 27.8    | 27.8          | 100.0              |
| Total   | 36       | 100.0   | 100.0         |                    |
Table 5. The correlation between the incidence of gestational age leukocyturia

| USIA_KEH MILAN | Count | % within |
|----------------|-------|----------|
| <=36 WEEK      |       |          |
| USIA_KEHA      | 9     | 9        | 18%   |
| MILAN          |       |          |
| 36 WEEK        |       |          |
| USIA_KEHA      | 17    | 1        | 18%   |
| MILAN          |       |          |
| Total          | 26    | 10       | 36    |

At ≤36 weeks of gestation, the number of patients experiencing positive and negative leukocyturia is balanced, each totaling 9 patients (50%), while at > 36 weeks of gestation, out of 18 patients, only 1 patient (5.6%) had leukocyturia. The remaining 17 patients (94.4%) did not have leukocyturia.

Table 6. Results of analysis between the incidence of premature rupture of the membrane with gestational age less than 36 weeks and leukocyturia.

|                   | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|-------------------|-------|----|-----------------------|----------------------|----------------------|
| Pearson Chi-Square| 8862a | 1  | .003                  |                      |                      |
| Continuity Correction | 6785 | 1  | .009                  |                      |                      |
| Likelihood Ratio  | 9863  | 1  | .002                  |                      |                      |
| Fisher's Exact Test |     |    | .007                  | .004                 |                      |
| Linear-by-Linear Association | 8615 | 1  | .003                  |                      |                      |

Based on the cross-tabulation between the incidence of premature rupture of membranes at ≤36 weeks of gestation and the incidence of leukocyturia, a fairly high difference in proportions can be seen. This is consistent with the results of the chi square test on continuity correction which produces a value of p = 0.000 which shows that there is a very significant relationship between the incidence of premature rupture of membranes in gestational age <36 weeks with leukocytes.
Preterm birth is a condition where the baby is born between >20 weeks of gestation until ≤ 37 weeks (Smail, 2014). Prematurity is a condition that causes the most fetal mortality in the world. Exactly 70% of neonates died from 36% of babies' death. In America, 12% of 4 million births are preterm and this figure reaches 15.6% of 58,000 births in Alabama. (6) While Indonesia is ranked 9th in WHO data (2010) with 158 per 100 births (Bukitwetan, 2004).

In this study, of 36 samples that fit the inclusion criteria, 18 patients had PPROM and 18 patients had PROM. According to parity, most patients were multigravida (21 patients, 58.3%) while the remaining 15 patients (41.7%) were primigravida.

2 patients (5.6%) with ≤ 36 weeks of gestation experienced the earliest rupture of the membrane at 28-30 weeks gestation. Furthermore, there were only 1 patient who experienced PROM at 30-32 weeks of age (2.8%), at 32-34 weeks there were 6 patients (16.7%) and at 34-36 weeks there were 9 patients (25%). Whereas at >37 weeks of gestation, most premature rupture of the membrane occurred during 38-39 weeks of gestation with a total of 6 patients (16.7%).

In this study out of 18 mothers with preterm labor, 9 had leukocyturia while 9 others didn’t. Only 1 patient with aterm labor had leukocyturia. The results of the analysis between the incidence of preterm labor (gestational age less than 36 weeks) with leukocyturia showed a significant relationship. This is in accordance with the results of the chi square test on continuity correction which produces a value of sig = 0.000 which indicates that there is a very significant relationship between the incidence of PPROM with leukocyturia.

This result is consistent with Nuada's study (2004) which stated that pregnant women with leukocytes ≥ 5 / High Power Field had a 7.67 times greater risk of having parturition pretermis imminens. This may occur because leukocytes are a sign of infection which will trigger the release of proinflammatory cytokines such as IL1, IL6, IL8, and TNFα. These cytokines will trigger prostaglandin release and so cause preterm labor. In addition, these cytokines will also change the structure of the cervix and fetal membrane, which may cause premature rupture of membranes. (Jenifer, 2008).

CONCLUSION

The results of this study showed a significant relationship between the incidence of pretermal childbirth and leukocyturia. This study only uses secondary data (medical record) which didn’t show definitive data of which bacteria cause the bacteriuria. In addition, the lack of laboratory results listed in the patient's medical record caused many samples to be excluded from the study. Researchers expect further research on asymptomatic bacteriuria with different methods to get better results. Researchers also expect this study to provide more information about the risk of preterm asymptomatic bacteriuria. It is expected for healthcare workers to pay more attention to
the incidence of asymptomatic bacteriuria in pregnant women so that the incidence of PROM decreases.

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