



## 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

<sup>1</sup>Mochamad Ma'roef, <sup>1</sup>Ayu Prima Kusuma Putri

<sup>1</sup> Faculty of Medicine, University of Muhammadiyah Malang, Malang  
Jl. Bendungan Sutami no. 188A Malang Tel 0341\_552442 Fax 0341\_582060

Email : [ayu.endra2012@gmail.com](mailto:ayu.endra2012@gmail.com)

Received : Oct 17<sup>th</sup>2019. Revised : Oct 25<sup>th</sup>2019. Published : Dec 25<sup>th</sup>2019

DOI : <https://doi.org/10.22219/sm.Vol15.SMUMM2.10663>

### 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  $\geq 37$  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 leukocyturia 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 leukocyturia. 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

Copyright © 2019, First Author et al

This is an open access article under the CC-BY-SA license

### 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  $\geq 37$  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
Valid	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 PPRM 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
Valid	<=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.

**Table 3.** Characteristics of gestational age

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	28-30 WEEK	2	5.6	5.6
	30-32 WEEK	1	2.8	8.3
	32-34 WEEK	6	16.7	25.0
	34-36 WEEK	9	25.0	50.0
	36-37 WEEK	2	5.6	55.6
	36-38 WEEK	1	2.8	58.3
	37-38 WEEK	1	2.8	61.1 38
	38-39 WEEK	6	16.7	77.8
	39-40 WEEK	4	11.1	88.9
	40-41 WEEK	4	11.1	100.0
Total	36	100.0	100.0	

2 patients (5.6%) who had gestational age  $\leq 36$  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 4.** Characteristics of PROM patients based on leukocyturia.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NEGATIVE	26	72.2	72.2
	POSITIVE	10	27.8	100.0
	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  $\leq 36$  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 5.** The correlation between the incidence of gestational age leukocyturia

		LEUKOSITURI		Total	
		NEGATIVE	POSITIVE		
USIA_KEH AMILAN	<=36 WEEK	Count	9	9	18%
		within USIA_KEHA	50.0%	50.0%	100.0%>
	36 WEEK	MILAN			
		Count	17	1	18%
Total	% within AGE_HAMIL AN	within USIA_KEHA	94.4%	5.6%	100.0%
		MILAN			
		Count	26	10	36
			72.2%	27.8%	100.0%

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	8862 <sup>a</sup>	1	.003		
Continuity Correction <sup>b</sup>	6785	1	.009		
Likelihood Ratio	9863	1	.002		
Fisher's Exact Test				.007	.004
Linear-by-Linear Association	8615	1	.003		
N of Valid Cases	36				

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 PPRM and 18 patients had PROM. According to parity, most patients was multigravida (21 patients, 58.3%) while the remaining 15 patients (41.7%) was 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 term 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  $\text{sig} = 0,000$  which indicates that there is a very significant relationship between the incidence of PPRM with leukocyturia.

This result is consistent with Nuada's study (2004) which stated that pregnant women with leukocytes  $\geq 5$  / High Power Field had a 7.67 times greater risk of having parturition pretermus 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 TNF $\alpha$ . These cytokines will trigger prostaglandin release and so caused preterm labor. In addition, these cytokines will also change the structure of the cervix and fetal membrane, which may cause premature rupture of membranes. (Jennifer, 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 causes 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.

## REFERENCES

- Bukitwetan, P. Oktavianus Ch. Salim, Julius E Surjawijaja, Mahyunis Aidifit and Murad Lesmana. 2004. *Prevalence of asymptomatic bacteriuria in pregnant women*. J Trisakti Medicine. Pp: 7: 196-6
- Jenifer O. Fahey, CNM, MSN, MPH. Clinical Management of Intra-Amniotic Infection and Chorioamnionitis: A Review of the Literature. J Midwifery Womens Health; 53 (3): 227-235. Internet 2008 [cited: 2018 December 09]. Available from: [http://www.medscape.com/viewarticle/573988\\_2](http://www.medscape.com/viewarticle/573988_2)
- Mercer BM, Croker LG, BOENM, S bai BM.1993. *Induction versus mature amniotic fluid at 32 to 36 weeks: a randomized trial*. AMJ Obstetry Gynecology.pp: 169: 775-82
- Murti, B.2006. *Design and Sample Size for Quantitative and Qualitative Research in the Field of Health*. Yogyakarta: Gajah Mada University Press.pp.68-69
- Nuada IN, Karkata MK, Suastika K. Risks of Prematurus Parties in Pregnancy with Urinary Tract Infections. Mirror of the World of Medicine [internet]. 2004 [cited 2018 December 16]. Volume 145: 26-30; Available from: <http://www.scribd.com/doc/59919863/145RisikoPartusPrematurusIminen#download>
- POGI.2016. National Guidelines for Early Amniotic Medicine Rupture. Jakarta: <http://POGI.or.id> // publish // download // PNPk // KPD
- Prawirohardjo, S. 1992. *Kidney and Urinary Tracts in Wikrijosastro, hanifa (ed)*. Midwifery Science Third Edition. Jakarta: YBPSP Publisher