ORIGINAL ARTICLE

Comparing the Degree of Direct Sputum Afb Smear-Positive With the Sedimentation in Patients Suspected of Pulmonary Tuberculosis

Wiwit Sulistyasmi[1], Almurdi[2], Renowati[2]

[1] Graduate Student of Immunology, Postgraduate School, Universitas Airlangga, 60286 Surabaya, Indonesia
[2] Health Analyst Study Program, Perintis, School of Health Science, Padang, Indonesia

ABSTRACT

Introduction: Tuberculosis (TB) is an infectious disease that can attack various organs, especially the pulmonary, which is caused by the bacteria *Mycobacterium tuberculosis*. *Mycobacterium tuberculosis* can be found through microscopic examination with direct sputum in patients suspected of pulmonary tuberculosis. In addition to the preparation of using direct sputum, smear preparation from material that has been sedimented previously or concentration on microscopic examination is increasing the discovery of acid-resistant bacteria with 4% of NaOH solution. The purpose of this study is to determine the degree of direct sputum AFB smear-positive comparison with sedimentation in patients suspected of pulmonary tuberculosis. **Methods:** The study design used was analytic research with a cross-sectional approach using direct sputum AFB smear examination with sedimentation in patients suspected of pulmonary tuberculosis. The data were analyzed using the Wilcoxon test, the results of this study showed a significant difference between the direct AFB smear examination with sedimentation which showed the value of p = 0.014. **Results:** The results of direct sputum AFB smear were negative of 67%, scanty of 4%, positive one of 6%, positive two of 6%, positive three of 17%; results in sedimentation were negative of 64%, scanty of 5%, positive one of 8%, positive two of 5%, positive three of 18%. **Conclusion:** There was a significant difference between direct sputum AFB smear with sedimentation in patients suspected of pulmonary TB.

Keywords: Tuberculosis, Direct Sputum, Sedimentation

Corresponding Author:
Wiwit Sulistyasmi, S.S.T
Email: wiwit.sulistyasmi-2019@pasca.unair.ac.id
Tel: +628-993471214

INTRODUCTION

Tuberculosis (TB) is one of the 10 diseases that cause the most deaths in the world. The prevalence of pulmonary tuberculosis in 2016 was 10.4 million, in which 1.7 million died. More than 95% of deaths from TB occur in developing countries (1). Tuberculosis disease in Indonesia in 2015 amounted to 117 per 100,000 populations (2). The prevalence of pulmonary tuberculosis in Padang is seen from suspects per regency/city. In 2014 an increase in the number of suspect selections has a range of 5.75–436.73 per 100,000 populations (3).

Tuberculosis is an acute or chronic infectious disease that primarily affects the lungs, caused by acid-fast bacilli (AFB) which are gram-positive rods (Mycobacterium tuberculosis) (4 p. 593). AFB smear microscopic examination of sputum plays a role in the TB countermeasures program to establish a diagnosis, evaluation, and follow-up of treatment from the examination of 3 specimens of sputum in the morning during (SPS) (5). The advantage of AFB smear examination with direct smears and microscopic readings is a method for the rapid examination, but there are still many weaknesses in the microscopic examination because the sputum must contain a minimum of 5000 germs/ml of sputum to obtain a positive result; the amount of tissue and mucus will also enlarge the sample volume, hence, reducing the possibility for can take the samples containing Mycobacterium tuberculosis (6).

To overcome these weaknesses and increase the effectiveness of sputum microscopic examination, sample processing by sedimentation using 4% NaOH will digest the tissue so that AFB smear will be

collected in smaller volumes and will increase the possibility of taking samples containing germs. One method for increasing the AFB smear findings on microscopic examination is by sedimentation (7). The staining technique used was Ziehl Neelsen which can detect AFB smear using a microscope (8).

Based on the description, the researchers were interested in conducting research on comparing the degree of direct sputum AFB smear-positive with sedimentation in patients suspected of pulmonary TB.

MATERIALS AND METHODS

The materials used for this study were sputum, PBS, 4% NaOH, oil immersion, carbol fuchsin, alcoholic acid, methylene blue. The tools used were sterile containers, pasteur pipettes, vortex mixers, microscope, slide/ glass objects, hot plates, alcohol lamps, centrifuges, falcon tubes (centrifuge tubes). This type of research used in this study was analytic research with a cross-sectional. The study was conducted at the Laboratory of Pulmonary Hospital in West Sumatra and the time of the study was conducted from October to April 2018. The sample in this study was patients suspected of pulmonary TB in the Pulmonary Hospital of West Sumatra as many as 100 people with total sampling techniques and samples to be taken according to inclusion and exclusion criteria.

RESULTS

General description of study

Observational research with a cross-sectional design has been carried out in patients suspected of pulmonary TB in the Pulmonary Hospital of West Sumatra. The numbers of samples in this study were 100 respondents who fit the inclusion and exclusion criteria. Direct sputum AFB smear examination was carried out to respondents. This research was conducted on February 22 until April 2, 2018. The characteristics of respondents, in general, can be seen in the table below.

The mean age of 49.10 ± 14.046 years, the youngest age was 5 years, and the oldest age is 77 years. 68 people (68%) were males, 32 people (32%) were females. The mean of direct AFB smear results were 1.02 ± 1.589, the lowest results were 0 (negative) and the highest results were 4 (+3), 67 people (67%) were negative, 4 people (4%) were scanty, 6 people (6%) were positive one, 6 people (6%) were positive two, 17 people were positive three. The mean of the sedimentation results was 1.08 ± 1,600, the lowest result was 0 (negative) and the highest result was 4 (+3) 64 people (64%) were negative, 5 people (5%) were scanty, 8 people (8%) were positive one, 5 people (5%) were positive two, 18 people (18%) were positive three.

Table I : Distribution of Research Subjects Based on Age, Gender, Direct AFB smear Results, and Sedimentation.

	Mean ± SD	Min	Maks	F	%
Age	49.10 ± 14.046	5	77		
Gender :					
Male				68	68
Female				32	32
Direct AFB smear:	1.02 ± 1.589	0	4		
Negative				67	67
Positive :					
Scanty				4	4
+1				6	6
+2				6	6
+3				17	17
Sedimentation	1.08 ± 1.600	0	4		
Negative				64	64
Positive :					
Scanty				5	5
+1				8	8
+2				5	5
+3				18	18

Table II : Comparison of Degree of Direct Sputum AFB Smear-Positive with Sedimentation in Patients Suspected of Pulmonary TB.

	Positive		Negative		*p*-Value
	F	%	F	%	
Direct AFB Smear	33	33	67	67	0.014
Sedimentation	36	36	64	64	

Statistical Analysis

Before the results of the two variables were tested, the data were tested using the normality test using Kolmogorov-Smirnov with a value of $p = 0.00$, and the data were not normally distributed, followed by the Wilcoxon test by observing the difference in the degree of direct sputum AFB smear-positive with sedimentation in patients suspected of pulmonary TB.

The Wilcoxon test, it can be seen that the *p*-value of 0.014 means that there was a significant difference between direct sputum AFB smear with sedimentation in patients suspected of pulmonary TB. Statistically, it was found that this difference was significant ($p<0.05$).

DISCUSSION

Based on the results of the study, it was known that out of 100 respondents were more males than females that suffered from TB as many as 68 people (68%). According to the research of Nurkumalasari et al., it

was known that out of 270 respondents were found 173 respondents who were male in which 137 people (50.7%) were patients with AFB smear-positive of pulmonary tuberculosis and 36 people (26.3%) were patients with AFB smear-negative (9). This research was also conducted by Girsang et al., where the increase in AFB smear findings in males was greater than in females, which was 68 (61.71%) and 44 (39.29%) in females (10).

Based on the results of the study, it was known that more than 100 respondents who suffer from TB were at a productive age, as many as 64 (64%) respondents. According to the research by Ruditya, it was known that whose at the productive age (15-55 years) were as many as 19 people (79.2%), while 20.8% of respondents were elderly (56-65 years)(11). Based on the statistical test using the Wilcoxon test, there was a significant difference between direct AFB smear examination with sedimentation which showed a value of p = 0.014 (p<0.05). Likewise, the study from Sari showed the results that were in line with the results obtained in this study the value of p = 0.00 (p<0.05) which means there was a significant difference in the results of the examination between direct sputum AFB smear examination with sedimentation (12).

CONCLUSION

Based on the results of the study it can be concluded that: the results of direct sputum AFB smear were negative of 67%, scanty of 4%, positive one of 6%, positive two of 6%, positive three of 17%; results in sedimentation were negative of 64%, scanty of 5%, positive one of 8%, positive two of 5%, positive three of 18%. There was a significant difference between direct sputum AFB smear with sedimentation in patients suspected of pulmonary TB.

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