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Submission date: 21-Apr-2023 12:14PM (UTC+0800)

Submission ID: 2070997770

File name: 3051-3054.pdf (55.82K)

Word count: 2894

Character count: 15074

PREVALENCE OF ORAL CANDIDIASIS ON PULMONARY TUBERCULOSIS PATIENTS AT TB POLYCLINIC RSUD Dr. SOETOMO IN 2017

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(Received 7 March 2020, Revised 5 May 2020, Accepted 11 May 2020)

ABSTRACT : The proportion of tuberculosis patients in Indonesia by 2015 has increased to 14%. Data from a study conducted by the Department of Microbiology, Mahatma Gandhi Medical College & Research Institute, Pondicherry suggests that as many as 40% of tuberculosis sufferers have candida co-infection. Pulmonary tuberculosis is a bacterial infection of *Mycobacterium tuberculosis* that causes the formation of granulomas in infected lung tissue. Under immunocompromised conditions, *Candida* spp as common opportunistic microflora may turn into pathogens and invade tissue causing Oral Candidiasis. Conducted examination on the subject of research to see the clinical signs of oral candidiasis. The diagnosis of oral candidiasis is confirmed using direct mycology and culture checks. The data are presented descriptively in percentage form. From the 15 study subjects, there were 5 patients (33.3%) with oral candidiasis. Oral candidiasis is present in pulmonary tuberculosis patients using anti tuberculosis drug both category I and category II.

Key words : Pulmonary tuberculosis, oral candidiasis, anti-tuberculosis drugs, communicable disease.

INTRODUCTION

Patients with pulmonary tuberculosis (TB) in the world in 2015 reached 10.4 million people. Indonesia became the second country after India which is the largest contributor to the number of new cases of TB patients with a total of 60% cases (World Health Organization, 2016). Tuberculosis is an infection of the *Mycobacterium tuberculosis* that causes granuloma formation in infected tissue. The lungs become one of the most frequently infected (Huber *et al.*, 2015). Tuberculosis differs among infectious diseases that are transmitted almost exclusively through the air (Turner and Bothamley, 2015).

In immunocompromised conditions, *Candida* spp as a normal flora can turn into a pathogen and invade the tissue (Nugraha *et al.*, 2017; Nugraha *et al.*, 2018a). *Candida* that invades the oral cavity can cause oral candidiasis, which is a white lesion in the oral cavity with burning, sensitive, and halitosis-like symptoms (Nugraha *et al.*, 2018b). Predisposing factors for oral candidiasis include broad-spectrum antibiotic therapy, xerostomia, immune dysfunction (secondary systemic diseases such as diabetes or use of immunosuppressant drugs) and use

of dentures and HIV/AIDS (Laskaris, 2006; Dangi, Soni and Namdeo, 2010; Mensana *et al.*, 2018; Nugraha *et al.*, 2019). Data from a study conducted by the Department of Microbiology, Mahatma Gandhi Medical College & Research Institute, Pondicherry suggested that as many as 40% of TB sufferers are *Candida* co-infected, the most common type of *Candida* spp is *Candida albicans* with a percentage 50% (Kali *et al.*, 2013). Most superficial *Candida* infections only affect the mucosal surface at the site of infection, but their invasive nature can cause invasive candidiasis or severe systemic hematogenous candidiasis characterized by spread of *Candida* to almost the entire body with a tendency to make abscesses on vital organs. Systemic infections are more serious with a high mortality rate (Dabas, 2011; Moyes *et al.*, 2015).

MATERIALS AND METHODS

The study was conducted using an observational descriptive with cross sectional study. The sample of this study were all patients with pulmonary tuberculosis who suffered from oral candidiasis and met the criteria for samples at the TB Polyclinic, RSUD Dr. Soetomol during the end of July 2017 until the beginning of October 2017.

7 In this study, there are criteria that are divided into inclusion and exclusion. The inclusion of this study were patients with pulmonary tuberculosis less than 60 years old and patients who were willing to be examined for research purposes. Exclusions from this study were patients with awkward awareness and patients with other risk factors such as denture users, patients with diabetes mellitus, taking anti-hypertensive drugs, patients undergoing cancer chemotherapy and HIV patients.

The patient explained the background, objectives and benefits of the study and asked the patient's willingness to participate in the study. Patients were given anamnesis and filled out questionnaires. Patients who were willing to participate in the study filled out informed consent. Then an intra-oral examination of the patient is carried out, if there are clinical symptoms of oral candidiasis then taking photos and swabs on the oral mucosa using a swab stick then placed in transport media. Transport media was taken to the Balai Besar Laboratorium Kesehatan Surabaya for examination using KOH solutions and *Saboroud Dextrose Agar* (SDA). The collected data were analyzed descriptively and presented in percentage form.

RESULTS

Based on research that has been carried out at the TB Polyclinic of RSUD Dr. Soetomo Surabaya during the end of July 2017 until the beginning of October 2017, obtained 23 patients then 8 patients were excluded because it was not in accordance with the criteria of the study, so the number of respondents in this study were 15 patients. The results obtained were as follows

Tuberculosis patients at RSUD Dr. Soetomo were mostly women with a total of 9 patients (60%) while men were 6 people (40%). Based on the age range, aged 20-30 years were 2 patients (13.3%), aged 30-40 years were 3 patients (20%), and aged 40-50 years were 7 patients (46.7%) and aged 50-60 years were 3 patients (20%).

Table 4. distribution of *Candida* spp types.

Sample	Clinical features	Culture Examination			
		KOH <i>Pseudohyphae</i>	<i>Candida albicans</i>	<i>Candida tropicalis</i>	<i>Candida glabrata</i>
Patient 1	- Fissured tongue - Atrophic	+	+	+	+
Patient 2	- Coated tongue	+	-	+	-
Patient 3	- Pseudomembran	+	+	-	-
Patient 4	Coated tongue	+	+	-	-
Patient 5	- Atrophic - Coated tongue - Glossitis	+	+	-	-
Total		5	4	2	1

Table 1 : Distribution of research subjects based on gender and age.

No.	Age range	Sex		Percentage
		Female	Male	
1.	20-30 years	1	1	3 (13.3%)
2.	30-40 years	2	1	3(20%)
3.	40-50 years	5	2	7(46.7%)
4.	50-60 years	1	2	3(20%)
	Total	9(60%)	6(40%)	15(100%)

Table 2 : Prevalence of using anti-tuberculosis drugs (ATD) based on drug categories.

	Category of patients	Amount of drugs	Percentage
1.	Category I	9	60%
2.	Category II	5	33.3%
3.	Not using A TD	1	6.7%
	Total	100%	

Table 3 : Prevalence of oral candidiasis by type of ATD.

Oral Candidiasis	Category I	Category II	Not using ATD	Total
Positive	3	2	-	5(33.3%)
Negative	6	3	1	10(66.7%)
Total				15(100%)

In grouping data on tuberculosis patients based on age, the highest prevalence was found in the aged group 40-50 years and the least in the aged group 20-30 years (Table 1).

Prevalence of the use of anti-tuberculosis drugs (ATD) is based on their categories. Patients who used category I ATD treatment were 9 (60%) patients, category II ATD treatment were 5 (33.3%) patients and 1 (6.7%) patients had not used ATD (Table 2).

From the results obtained there were 5 patients (33.3%) who tested positive for oral candidiasis and 10 patients (66.7%) were negative for oral candidiasis (Table 3).

The distribution of *Candida* spp in the research subjects are displayed. In patient 1 there was not only 1 type of candida but 3 types (*Candida albicans*, *Candida tropicalis* and *Candida glabrata*). There were *Candida albicans* in 4 patients, *Candida tropicalis* in 2 patients, and *Candida glabrata* in 1 patient (Table 4).

DISCUSSION

Tuberculosis (TB) is one of the most widespread infectious diseases and is currently experiencing an increase in cases compared to previous years. One third of the world's population is estimated to be infected by *Mycobacterium tuberculosis* (Zhang *et al*, 2011). Based on data from Health Department of Surabaya in 2015, the number of pulmonary tuberculosis patients in Surabaya reached 4,739 people. The number of patients is all patients in the working area of the Health Center in Surabaya including patients found in, hospitals, prisons, private practice doctors, and clinics (Dinas Kesehatan Kota Surabaya, 2015).

This study was conducted at the beginning of July-end of October 2017 and obtained a total sample of 23 patients. Based on the sample criteria, there were 15 patients who were the study subjects and 8 patients were excluded. A total of 7 patients had Diabetes Mellitus and 1 patient aged ≥ 60 years. Samples in this study there were 6 patients male and 9 female patients.

The total number of TB cases in RSUD Dr. Soetomo, more male patients when compared to the number of female patients (Dinas Kesehatan Kota Surabaya, 2015). Meta-analysis of TB prevalence surveys of 2.2 million people in 28 countries provide strong evidence that the prevalence of pulmonary TB is higher among men than women (Horton *et al*, 2016). However, the prevalence of pulmonary TB sufferers in TB Polyclinic, RSUD Dr. Soetomo based on the sex distribution in research cannot be proven statistically because there are only a small number of samples. In this study, the number of male pulmonary TB patients was less than that of women, because some male patients refused to participate in this study.

Pulmonary TB patients based on age distribution were the highest results at the age of 40-50 years with a total of 7 patients (46.7%) of the total sample. Research conducted by Sani *et al*. concluded that the highest prevalence of patients with pulmonary TB was in the productive age (20-50 years). This is due to the re-activation of TB and the duration of TB exposure is longer than the age group below. In addition, most activities are outside the house so that healthy people are vulnerable to being infected by pulmonary TB sufferers. This is

exacerbated by overcrowding in most of the settlements and poor personal hygiene in developing countries .

Based on clinical examination was carried out on the intraoral patient to see the clinical symptoms of oral candidiasis. In 15 samples, there were no clinical symptoms in accordance with the clinical symptoms of oral candidiasis, the majority only had abnormalities in the oral cavity such as coated tongue, atrophy, glossitis, and fissured tongue. Coated tongue is a common problem, especially in adults, because of accumulation of epithelium, food debris, and microbes which tongue is the main reservoir of microorganisms (Scully, 2013). So that the patients with these abnormalities are still carried out for investigation using KOH solution and SDA culture as confirmation of oral candidiasis. The study conducted by Kali *et al* stated that in 30 candida co-infections in pulmonary TB patients, *Candida albicans* (50%) was the most followed by *Candida tropicalis* (20%) and *Candida glabrata* (20%).

Investigations carried out in these 5 patients were positive for candida spp. The first female patient, aged 44 years old, was diagnosed with pulmonary TB since April 18, 2017, using category IATD since April 20, 2017. There was an abnormality in intraoral, fissured and atrophy tongue. The results of investigations are positive of yeast and pseudohyphae and the types of *Candida* spp are *Candida glabrata*, *Candida tropicalis* and *Candida albicans*. The patient has undergone ATD treatment for 3 months.

The second female patient aged 26 years, was diagnosed with pulmonary TB patient since January 2017. Using the advanced stage of category I ATD. Advanced stage of ATD is given when the patient has undergone the initial stage of treatment given every day then continued with the advanced stage which is given 3 times a week. There was an abnormality in the oral cavity, coated tongue. Investigation results were positive for yeast, pseudohyphae and *Candida tropicalis* was found.

The third patient is a 51-year-old woman, a pulmonary TB patient who uses category 2 ATD. The patient used category II medicine after completing the treatment period with category I OAT. It was found pseudo membrane in the patient's oral cavity. The results of the examination were found positive yeast and pseudo hyphae and in the culture found *Candida albicans*.

The fourth male patient, 47 years old, is a patient of TB Relapse. The patient was diagnosed with pulmonary TB on April 21, 2016 and was declared cured. On April 22, 2017, there was a complaint of fever at night and in chest x-ray examination was performed and diagnosed

with TB relapse. Patients use category II ATD. There was an abnormality in the oral cavity, coated tongue. The results of the examination showed positive results of yeast and pseudohyphae and *Candida albicans* were found on culture results.

The fifth patient was a 54-year-old male, pulmonary TB patient using the advanced category I ATD since June 22 2017. It can be ascertained that patients first used the category I ATD about 2 months ago. There are abnormalities in the oral cavity, coated tongue, atrophy, and glossitis. The results of the investigation showed positive pseudohyphae and found *Candida albicans* on culture examination.

All pulmonary tuberculosis patients with a positive oral candidiasis majority did not maintain oral hygiene properly. Some patients who did not get a clinical abnormality in the oral cavity had a good oral health history. There was one patient, who had not undergone ATD treatment. However, because the comparison of the number of patients with ATD and patients who have not used OAT is only a little, it cannot be concluded that the main cause of oral candidiasis in pulmonary TB patients is due to the use of ATD.

ACKNOWLEDGEMENTS

We would like to gratitude to all the leaders and staff of RSUD Dr. Soetomo Surabaya and Balai Besar Laboratorium Kesehatan Surabaya for providing this research.

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