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Association between Fine-needle Aspiration Cytological Features and CD4 Level in Human Immunodeficiency Virus-Associated Tuberculous Lymphadenitis Patients Admitted to Haji Adam Malik Hospital in 2017

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Abstract

BACKGROUND: World Health Organization stated that one-third of the world's population has tuberculosis with one infected person in every second. In 2015 there were 330,910 tuberculosis cases in Indonesia. This number increased compared to 2014, which amounted to 324,539 cases. HIV-positive patients with extrapulmonary tuberculosis accounted for 50% of TB cases, of which 35% were lymphadenitis. Lymph node fine-needle aspiration (FNA) is considered effective in determining the early diagnosis of lymphadenopathy.

AIM: This study aims to evaluate the association between cytological features and CD4 level in HIV-associated tuberculous lymphadenitis patients in Haji Adam Malik Hospital in 2017.

METHODS: This is an analytical study with a cross-sectional approach involving 42 samples. Cytological features were obtained by slide reviewed and CD4 level were obtained from the medical record.

RESULTS: Analysis of the association of cytological features with CD4 level association revealed p-value of 0.353.

CONCLUSION: This indicates that there is no significant association between FNA cytological features and CD4 level in HIV-associated tuberculous lymphadenitis patients.

Introduction

Tuberculosis is an infectious disease caused by Mycobacterium tuberculosis and is contagious [1]. World Health Organization stated that one-third of the world's population has tuberculosis with one infected person in every second. In 2015 there were 330,910 tuberculosis cases in Indonesia [2]. This number increased compared to 2014, which amounted to 324,539 cases [3].

Although pulmonary tuberculosis is the most common tuberculous infection, extrapulmonary tuberculosis is also an important clinical problem. The term extrapulmonary tuberculosis refers to a tuberculous infection that occurs in organs other than the lungs. Extrapulmonary tuberculosis accounts for 15-20% of all tuberculosis cases in HIV-negative patients and 50% of all tuberculosis cases in HIV-positive patients, where tuberculous lymphadenitis is the most common form (35% of all extrapulmonary tuberculosis) [4].

According to the World Health Organization (WHO), TB is considered a global emergency with 8.8 million new cases and 3.9 million cases of them are accompanied by HIV infection in 2013. HIV aggravates TB infection by increasing the reactivation and accelerating the progressiveness of tuberculosis. With low CD4 levels in patients with HIV / AIDS, the ability of the immune system against tuberculosis will decrease so that the necrotic mass will be more dominant in the pathological examination. Therefore, the increasing number of HIV cases will increase the transmission and the proliferation of Mycobacterium

tuberculosis in patients who have been previously infected [2], [5].

At the same time, HIV / AIDS is one of the health problems in the world, especially in Indonesia. According to the Indonesian Ministry of Health Surveillance report, there were 184,929 HIV / AIDS cases in 2015. Majority of HIV / AIDS cases were in the young adult group, ranged 20-29 years, with 46.4 percent of the total cases [3]. The number of these cases continues to increase from year to year. HIV / AIDS causes severe immunodeficiency which is characterised by a reduced number of CD4 levels which increases the risk of opportunistic infections and malignancies.

Cytological examination through fine needle biopsy (FNA) in the lymph node is considered effective in determining the initial diagnosis of lymphadenopathy. FNA can help in distinguishing infections from metastasis, malignancy, or lymphoma. Besides, this method is well-known, inexpensive, fast, and has a low risk. Delyuzar (2017) reported that FNA in TB lymphadenitis showed the sensitivity of 93.65% and specificity of 70.99% with AFB examination as the gold standard. The sensitivity and specificity of this examination reached 98.95% and 96.97%, respectively, with PCR as the gold standard [6].

This study aims to evaluate the association between FNA cytological features and CD4 level in HIV-associated tuberculous lymphadenitis patients admitted to Haji Adam Malik Hospital in 2017.

Material and Methods

This analytical study with cross-sectional approach was conducted between March and November 2018. All HIV-associated tuberculous lymphadenitis patients admitted to Haji Adam Malik Hospital in 2017 were included in this study. This study was approved by the Health Research Ethical Committee, Universitas Sumatera Utara, Medan, Indonesia.

CD4 level was obtained from the medical record and categorised into below 200 cells/μL and 200 cell/μL or above. Cytological features of tuberculous lymphadenitis were obtained by FNA method and the FNA cytology slides were independently reviewed by two pathologists. Cytological features were categorised into necrosis, epithelioid with necrosis, epithelioid without necrosis, and absence of epithelioid and necrosis. Data were analysed using Microsoft Excel software and presented in tables.

Results

Forty-two HIV-associated tuberculous lymphadenitis patients were obtained from 232 lymphadenitis patients. Baseline characteristics of HIV-associated tuberculous lymphadenitis patients were summarised in Table 1.

Table 1: Baseline characteristics of HIV-associated tuberculous lymphadenitis patients

Characteristics		N = 42	Percentage (%)
Gender	Male	32	76.1
	Female	10	23.9
Age	0-10		
	11-20	1	
	21-30	17	2.6
	31-40	19	40.4
	41-50	2	45.2
	51-60	3	4.7
	61-70		7.1
	71-80		

Based on Table 1, most of the HIV-associated tuberculous lymphadenitis patients were men (76.1%) and were diagnosed in 31-40 years of age (45.2%).

The distribution of CD4 level in HIV-associated tuberculous lymphadenitis patients was summarised in Table 2.

Table 2: CD4 level in HIV-associated tuberculous lymphadenitis patients

CD4 level	N = 42	Percentage (%)
≥ 200 cell /μL	9	21.4
< 200 cell /μL	33	78.6

Based on Table 2, HIV-associated tuberculous lymphadenitis patients with CD4 level below 200 cell/μL were found in 33 patients (78.6%), and with CD4 level above 200, cell/μL were found in 9 patients (21.4%).

The distribution of FNAB cytological features in HIV-associated tuberculous lymphadenitis patients was summarised in Table 3.

Table 3: FNAB cytological features in HIV-associated tuberculous lymphadenitis patients

FNAB cytological features	N = 42	Percentage (%)
Necrosis	9	21.4
Epithelioid with necrosis	27	64.3
Epithelioid without necrosis	4	9.5
No epithelioid and necrosis	2	4.8

Based on Table 3, the most common FNA cytological feature of HIV-associated tuberculous lymphadenitis was epithelioid with necrosis (64.3%), followed by only necrosis (21.4%), epithelioid without necrosis (9.5%), and without epithelioid and necrosis (4.8%).

Association between FNA cytological features and CD4 level were presented in Table 4.

Table 4: Association between FNA cytological features and CD4 level

FNA cytological features	CD4 level			P
	≥ 200 cell/μL	< 200 cell/μL	Total	
Necrosis	1	8	9	0.353
Epithelioid	8	23	31	
Total	9	31	40	

Table 4 showed that the association between FNA cytological features and CD4 level is not significant.

Necrotic feature with CD4 level 200 cell/μL or above was found in only 1 patient. Epithelioid feature with CD4 level 200 cell/μL or above was found in 8 patients. Epithelioid feature with a CD4 level below 200 cell/μL was found in 23 patients.

Discussion

Of all the samples in this study, most TB lymphadenitis patients were men and were in the 31-40 age group. These results were by Singh, et al., (2016) and Jayshree, et al., (2015) [7], [8]. Most HIV-associated tuberculous lymphadenitis patients in Haji Adam Malik Hospital showed CD4 level below 200 cell/μL and this is in line with Lakshmi, et al., (2017) [9]. The most common cytological features found in HIV-associated tuberculous lymphadenitis patients were epithelioid features with necrosis, followed by only necrosis. This finding is in line with Singh, et al., (2016) and Gupta (1993) [7], [10].

The most typical feature found in cytology of tuberculous lymphadenitis patients is the presence of epithelioid granuloma. However, in cases of tuberculous lymphadenitis accompanied by immunodeficiency condition, such as HIV, epithelioid granuloma features are absence due to low immunity, so the only feature found is necrosis [11]. This is contrary to the current study, where 23 of 31 cases with CD4 levels below 200 showed epithelioid, which may be caused by many factors, including the development phase of tuberculous lesions in the tissue. This finding indicates that there is no significant relationship between FNA cytological features and CD4 levels in HIV-associated tuberculous lymphadenitis patients, which is also following Sutoyo (2011) [12].

In conclusion, there is no significant association between FNAB cytological features and CD4 level in patients with HIV-associated tuberculous lymphadenitis.

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