ARTÍCULO ORIGINAL

Gac Méd Caracas 2022;130(Supl 1):S56-S59
DOI: 10.47307/GMC.2022.130.s1.11

Association Between Cytologic Features of Tuberculous Lymphadenitis and CD4 Levels

Asociación entre las características citológicas de la linfadenitis tuberculosa y los niveles de CD4

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SUMMARY

HIV infection can reduce CD4 lymphocyte count, which may lead to opportunistic infections such as tuberculosis. Lymphadenopathy is usually caused by tuberculosis and shows various cytological features. This study aims to determine the association between cytology features of tuberculous lymphadenopathy and CD4 serum level in HIV patients. This analytical study involves HIV patients with lymphadenopathy in Medan. Cytology features are acquired from cytology examination and CD4 serum level. The data were analysed using SPSS and followed by an X^2 test. Out of 97 HIV patients with lymphadenopathy, 56.9 % showed cytology features of epitheloid and lymphocytes while 43.1 % showed lymphocytes, necrosis, and eosinophilic amorphous masses. Most cases (92.2 %) showed CD4 serum levels below 200/ µL. However, there was no significant association between cytology overview on lymphadenopathy and CD4 level in HIV patients.

Keywords: *CD4, lymphadenitis, tuberculous.*

RESUMEN

La infección por VIH puede reducir el recuento de linfocitos CD4, lo que puede provocar una infección oportunista como la tuberculosis. La linfadenopatía generalmente es causada por tuberculosis y muestra varias características citológicas. Este estudio tiene como objetivo determinar la asociación entre las características citológicas de la linfadenopatía tuberculosa y el nivel sérico de CD4 en pacientes con VIH. Este estudio analítico involucra a pacientes con VIH con linfadenopatía en Medan. Las características citológicas se adquieren a partir del examen citológico y del nivel sérico de CD4. Los datos fueron analizados usando SPSS y seguidos por la prueba X2. De 97 pacientes con VIH y linfadenopatía, el 56,9 % mostró características citológicas de epitelioide y linfocitos, mientras que el 43,1 % mostró linfocitos, necrosis y masas amorfas eosinofílicas. La mayoría de los casos (92,2 %) presentaron niveles séricos de CD4 por debajo de 200/µL. Sin embargo, no hubo una asociación significativa entre la descripción general de la citología sobre la linfadenopatía y el nivel de CD4 en pacientes con VIH.

Palabras clave: *CD4, linfadenitis, tuberculosa. (feminine)*

DOI: https://doi.org/10.47307/GMC.2022.130.s1.11

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Recibido: 1 de mayo 2022
Aceptado: 5 de mayo 2022

INTRODUCTION

Lymph nodes are part of the human body's defense system. This organ plays a role in the immune system as a defense against infection and for filtering lymph fluid (1). The lymph node, also called lymphadenopathy, usually occurs after infection and about 55 % of cases are found in the head and neck area. Infectious agents that can cause lymphadenopathy are HIV (Human Immunodeficiency Virus), tuberculosis, CMV (Cytomegalovirus) filariasis, etc (2).

HIV is a world health problem today. WHO (World Health Organization) defines HIV as a retrovirus that infects, damages, and destroys the immune system so that a person is susceptible to infection. The number of HIV/AIDS patients recorded in North Sumatera in June 2012 was 1 316 people. This amount is only 10 percent of the actual number of people with HIV/AIDS (3-6).

CD4 lymphocytes are the main target of HIV infection. These cells play a central function in the immune system. The CD4 lymphocyte count can be reduced due to continuous and prolonged exposure to HIV infection, causing disruption of homeostasis and the function of immune system cells (7-10). HIV causes disease through several mechanisms, one of which is through opportunistic infections (11). One of the most common opportunistic infections is tuberculosis, which often causes lymphadenopathy. Furthermore, the Indonesia Ministry of Health reported 817 HIV cases with persistent generalized lymphadenopathy (12).

This study aims to determine the association between cytology features of tuberculous lymphadenitis and CD4 serum level in HIV patients.

METHODS

This is an analytic study involving HIV patients with lymph node enlargement in Medan. Cytologic specimens of the enlarged lymph node were obtained by using fine-needle aspiration (FNA) techniques and stained with Giemsa. Once the tuberculous infection was confirmed by FNA cytology, the CD4 serum level would be examined. Cytologic features of tuberculous lymphadenitis were assessed and divided into 2 groups. Group 1 consisted of samples with epitheloid and lymphocyte and group 2 consisted of samples with lymphocyte, necrosis, and eosinophilic amorphous masses.

Data were analysed using SPSS and presented in frequency. The association between cytologic features and CD4 level was analysed using the X^2 test.

RESULTS

This study consisted of 97 samples. There were 81 males and 16 females with co-incidence of HIV and lymphadenopathy. The majority of the samples (70.10 %) were in the 26-35 years of the age range (Table 1).

Table 1

Sample sex distribution

Characteristic	Total (n)	Percentage (%)
Sex		
Male	81	83.51
Female	16	16.49
Age		
16-25	18	18.56
26-35	68	70.10
36-45	11	11.34

Most samples in both cytology groups had a CD4 level lower than 200. Statistically, there was no significant association between cytologic features of tuberculous lymphadenitis and CD4 serum levels (Table 2).

Table 2

Association between cytologic features of tuberculous lymphadenitis and CD4 levels

Cytology	CD4 levels		Total	P
	< 200	≥ 200		
Ephitheloid and lymphocyte	48	6	54	>0.05
Lymphocyte, necrosis, and eosinophilic amorphous masses	39	4	43	
Total	87	10	97	

DISCUSSION

Mycobacterium tuberculosis-specific-CD4+ T cell protective response is mediated by IFN-γ and TNF-α that recruit monocytes and granulocytes and promote their anti-microbial activities (13-15). Polyfunctional T cells could exert immune protection against viral infections such as HIV (16). However, the role of polyfunctional T cells during Mycobacterium infection is controversial and different from that observed in chronic viral infections. High frequencies of CD4 T cells expressing cytokines simultaneously were found in adults with active TB disease, as compared to the frequency found in latent TB infection subjects (17). In fact, some authors have found a reduced frequency of polyfunctional T cells in patients with active TB disease compared to latently infected individuals, who have recovered with the anti-TB therapy (18).

This study shows that out of 97 total samples, the youngest was 16 years old and the oldest was 45 years old. The sample was mostly in the age group 26-35 years. Seventy percent of the sample was in the young adult age group which means that TB lymphadenitis patients who suffer from HIV occurred in young and productive age groups. Seventy-eight percent of patients with HIV are in the age range of 30-50 years (19).

One study analyzing the cytomorphology of lymphadenitis found 59 (53.6 %) cases of tubercular lymphadenitis and 38 (34.45 %) cases of another lymphadenitis (20). Out of 97 tubercular lymphadenitis samples in this study, 54 (55.67 %) cases showed epithelioid and lymphocyte figures. Whereas, lymphocyte and necrotic figures with eosinophilic amorphous mass were found in 43 (44.33 %) cases.

The epitheloid and lymphocyte figures with CD4 levels < 200 were 48 cases, whereas with CD4 levels ≥ 200 were 6 cases. Figures of lymphocytes and necrotic cells with eosinophilic amorphous mass and CD4 levels < 200 were 39, whereas CD4 ≥ 200 levels of 4. After statistical testing, there was no significant difference between cytological figures and CD4 levels with $p > 0.05$. This is consistent with another study that showed no significant difference between the presence of epithelioid and lymphocyte figures with eosinophilic amorphous mass and CD4 levels in tuberculous lymphadenitis cases (21).

Gupta et al. (2013) concluded that HIV-associated TB is more difficult to diagnose. The correlation of lesions with CD4 T lymphocyte counts provides information about the immune status and stage of the disease (12). In their study, Ellis et al. (2017) revealed an exponential increase in TB incidence with declining CD4 levels in adults. Skogmar (22) concluded that low CD4 levels are associated with a positive smear of tuberculous lymphadenitis and signs of wasting. In one study, CD4 counts show a significant correlation with FNAC patterns of tuberculous lymphadenitis in HIV patients (23).

CONCLUSIONS

There was no significant association between cytology features of tuberculous lymphadenitis and CD4 levels.

ACKNOWLEDGEMENTS

This study was supported by the Ministry of Research and Technology, Indonesia, number: 79/UN5.2.3.1/PPM/KP-TALENTA USU/2018.

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