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Cervical Lymphadenopathy in a Tuberculosis-Endemic Setting : A 4-Year Histopathological and Epidemiological Study from Madagascar

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ABSTRACT

Background: *Cervical lymphadenopathy is a common reason for consultation, with etiologies that vary according to the epidemiological context. This study aimed to analyze the epidemiological and histopathological profiles of cervical lymphadenopathies at CHU/JRA.*

Methods: *this was a retrospective, descriptive, and analytical study of cervical lymph node biopsies performed between January 2022 and December 2025. Data were collected anonymously from registry logbooks, pathology request forms, and histopathology reports, and analyzed using Excel 2020© and Epi Info 7. Statistical significance was set at $p < 0.05$.*

Results: *A total of 285 cases were included, with a mean age of 29.3 ± 17 years and a female predominance (sex ratio = 0.79). Inflammatory lesions accounted for 60% of cases, with a predominance of caseo-follicular tuberculosis (54.4%). Tumoral pathologies represented 25.9% of cases. A statistically significant association was found between age and histological type (p=0.0000).*

Conclusion: *Tuberculosis remains the leading cause of cervical lymphadenopathy among young individuals in Madagascar, whereas tumoral etiologies predominate in older patients. Histopathological examination remains essential for appropriate management.*

Keywords
Cervical lymphadenopathy, Epidemiology, Histology, Lymphoma, Tuberculosis.

Introduction
Cervical lymphadenopathy is a common reason for consultation and represents a frequent diagnostic challenge in clinical practice, both in children and adults. The etiological profile varies considerably depending on the level of a country's development. In low- and middle-income countries, infectious causes predominate, particularly tuberculosis, whereas in developed countries, neoplastic etiologies, especially lymphomas and metastatic diseases, are more frequently reported.

Accurate histopathological analysis is essential to confirm the diagnosis, guide clinical management, and better understand the local epidemiological profile. The aim of this study was to determine the epidemiological and histopathological characteristics of cervical lymphadenopathy cases observed in the Departement of Pathology at the Joseph Ravoahangy Andrianavalona University Hospital Center (CHU/JRA).

Materials and Methods

This was a retrospective, descriptive, and analytical study of lymph node biopsy specimens submitted for histopathological examination to the Departement of Pathology of the Joseph Ravoahangy Andrianavalona University Hospital Center over a 4-year period, from January 2022 to December 2025.

Specimens corresponding to lymph nodes were included, while those lacking lymph node parenchyma were excluded. Data were collected from laboratory registers and pathology request forms. Data entry was performed using Microsoft Office Excel 2020©, and analysis was conducted using Epi Info 7. The statistical significance threshold was set at 0.05 ($p < 0.05$), with a 5% margin of error and $z = 1.96$. Statistical tests used included the Chi-square test and Fisher's exact test.

Results

During the study period, 285 cases of cervical lymphadenopathy were collected.

Age of Patient

Patients' ages ranged from 1 to 81 years, with a mean age of 29.3 ± 17 years. The most represented age group was 30–45 years (42.11%).

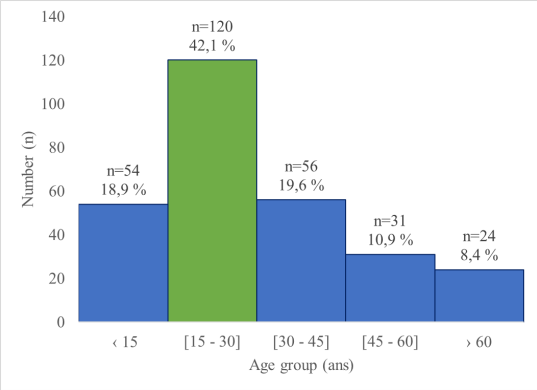

Figure 1: Distribution of patients according to age groups.

Gender

A female predominance was observed, with a sex ratio of 0.79.

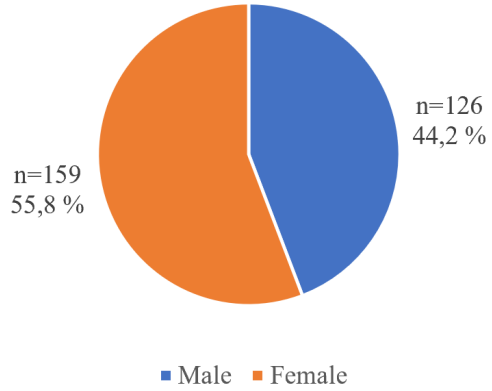

Figure 2: Distribution of patients according to gender.

Histological Types

The most frequently observed histological type was caseo-follicular tuberculosis (Figure 3), accounting for 54.4% of cases.

Table 1: Distribution according to histological types.

Histological types	Number (n)	Percentage (%)
Reactive lymphadenitis	40	14.03
Inflammatory lymphadenitis	171	60
- Chronic non-specific lymphadenitis	10	3.5
- Necrotizing lymphadenitis	6	2.1
- Caseo-follicular tuberculosis	155	54.4
Tumors	74	25.9
- Lymphomas		
• Non-Hodgkin lymphoma	24	47.1
• Hodgkin lymphoma	27	52.9
- Metastases		
• Papillary and follicular thyroid carcinoma	3	13.04
• Squamous cell carcinoma	4	17.4
• Adenocarcinoma	10	43.5
• Poorly differentiated carcinoma	4	17.4
• Melanoma	1	4.3
• Kaposi sarcoma	1	4.3

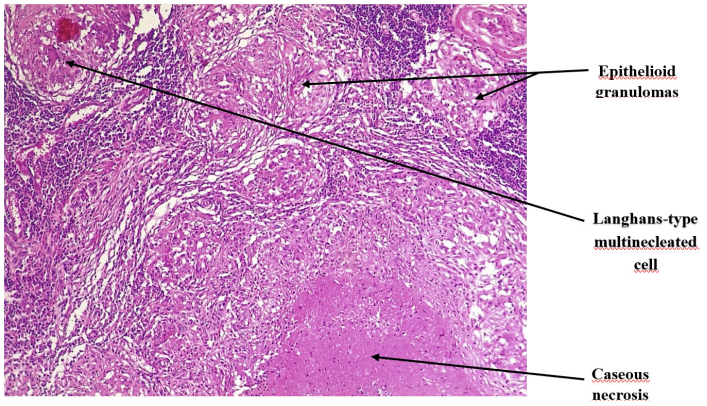

Figure 3: Caseo-follicular tuberculosis (biopsy of lymph node).

Hematein eosin stain
Magnificationx100
Source : Departement of Pathology CHU/JRA

Relationship Between Age and Histological Type

Inflammatory and reactive lesions were mainly observed in younger patients, whereas tumor pathologies were more frequent in older individuals, with a statistically significant association ($p = 0.0000$).

Relationship Between Gender and Histological Type

A female predominance was observed for tuberculosis and metastatic carcinomas, whereas lymphomas showed a male predominance. However, no statistically significant association was found ($p = 0.5347$).

Table 2 : Relationship Between Age and Histological Type.

Age group (ans) / Histological type	<15	[15 – 30]	[30 – 45]	[45 – 60]	> 60	p-value
Reactive lymphadenitis	16	13	4	4	3	p=0,0000
Chronic non-specific lymphadenitis	3	4	1	1	1	
Necrotizing lymphadenitis	0	5	0	0	1	
Caseo-follicular tuberculosis	**24**	**78**	35	14	4	
Lymphoma	11	17	7	6	10	
Metastasis	0	3	**9**	**6**	**5**	

Table 3 : Relationship Between Gender and Histological Type.

Gender / Histological type	Male	Female	p-value
Reactive lymphadenitis	18	22	p=0,5347
Chronic non-specific lymphadenitis	5	5	
Necrotizing lymphadenitis	3	3	
Caseo-follicular tuberculosis	62	**93**	
Lymphoma	**29**	22	
Secondary tumor	9	**14**	

Discussion

During the study period, 285 cases of cervical lymphadenopathy were recorded, corresponding to an annual average of 57 cases, reflecting the high frequency of this condition in our hospital setting. This recruitment rate is comparable to series from developing countries, where cervical lymphadenopathy is a frequent indication for histopathological examination due to the high prevalence of infectious diseases, particularly tuberculosis [1-3].

In contrast, in developed countries, lymph node biopsy is less systematically performed. This may be explained by early management of benign infections in primary care, increased use of fine-needle aspiration cytology combined with advanced imaging, and the lower prevalence of tuberculosis [4,5].

The study population showed a wide age range (1–81 years; mean: 29.3 ± 17 years), with a predominance of young patients, consistent with the local demographic profile. A statistically significant association between age and histological type was demonstrated ($p = 0.0000$). Inflammatory and reactive lesions predominated in children and young adults, in agreement with the literature indicating that cervical lymphadenopathy in these age groups is most often benign and related to ENT or systemic infections [4,6].

With 155 cases, tuberculosis was the leading cause of cervical lymphadenopathy in this series. This finding aligns with the local epidemiological context, characterized by a high burden of infectious diseases among young patients. It is consistent with data from high tuberculosis-endemic areas, where lymph node involvement represents the most common form of extrapulmonary tuberculosis [2,7]. This predominance may be explained by transmission dynamics, socio-economic conditions, and diagnostic delays.

In this series, necrotizing lymphadenitis was diagnosed based on the absence of epithelioid granulomas and Langhans giant cells, along with non-caseating necrosis. This entity represents a diagnostic pitfall and may correspond to Kikuchi-Fujimoto disease, a rare condition. The first Malagasy cases were reported by Andriamampionona TF et al. in 2015 [8]. Although benign and self-limiting, this disease can mimic tuberculosis or lymphoma. Its diagnosis relies on careful morphological evaluation, supplemented, when necessary, by immunohistochemical analysis [9].

Conversely, tumor pathologies such as lymphomas (24 non-Hodgkin and 27 Hodgkin cases) and metastatic lymph node involvement (23 cases) were predominantly observed in older patients. This distribution is consistent with international data showing that the risk of malignancy increases with age [4,5]. The male predominance observed in lymphomas, although not statistically significant, is consistent with global epidemiological trends reported by the International Agency for Research on Cancer [10].

In developed countries, persistent cervical lymphadenopathy in adults is more frequently of neoplastic origin, particularly metastatic, reflecting an epidemiological transition marked by a decline in infectious diseases and a relative increase in cancer incidence [4,5,11]. The differences observed with our series may be explained by the persistence of tuberculosis endemicity and the younger demographic structure of our population. This contrast highlights socio-economic, healthcare, and demographic disparities between developing and industrialized countries.

Conclusion

The epidemiology of cervical lymphadenopathy in Madagascar remains characterized by the predominance of tuberculous lymphadenitis in young individuals and the frequency of tumor processes in older patients. This distribution underscores the fundamental role of histopathological examination. Early investigation through biopsy is essential to distinguish these etiologies and to establish appropriate management strategies adapted to the local context.

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