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Title	**HIV-associated lymphoma: Single center experience and literature review**
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Abstract

Background:
HIV-associated lymphoma (HAL) is a leading cause of death in individuals living with HIV/AIDS, with diffuse large B-cell lymphoma (DLBCL) and Burkitt lymphoma (BL) being the commonest subtypes.

Method:
A retrospective analysis of patients diagnosed with HAL between 2001 and 2024 at Tuen Mun Hospital was conducted, reviewing demographics, disease properties, management, and clinical outcomes.

Result:
A total of 9 cases were identified. The male-to-female ratio was 8:1, with a median age at diagnosis of 44-years-old. There were 5 cases of DLBCL and 4 cases of Burkitt lymphoma.

Clinically, all cases were diagnosed at stage 4. Central nervous system (CNS) involvement was observed exclusively in Burkitt lymphoma cases.

Interestingly, 3 DLBCL patients developed lymphoma while receiving highly active antiretroviral therapy (HAART), with mean CD4 count as high as 656 x 10^6/L at time of diagnosis. In contrast, the HIV status was revealed only after lymphoma diagnosis in all Burkitt lymphoma cases. The mean CD4 count at diagnosis of lymphoma for those not receiving HAART was 147 x 10^6/L and 157 x 10^6/L for DLBCL and Burkitt lymphoma cases, respectively.

All of our patients received HAART. Excluding 1 case opted for palliative care, CHOP and DA-EPOCH were used for DLBCL, while intensive chemotherapy (CODOX-M/IVAC, hyper-CVAD) was used for Burkitt lymphoma cases. Those receiving active treatments all had addition of Rituximab except for 1 case due to financial concern.

All 6 patients who completed treatment achieved complete remission with 100% 1-year survival rate. Excluding 1 patient who died of pneumocystis jirovecii pneumonia related to noncompliance to HAART, the other 5 cases remained in remission without relapse.

Discussion:
Since the introduction of HAART, there has been a significant reduction (79%) in the incidence of systemic non-Hodgkin lymphoma (NHL).[1] It is postulated that the immunosuppressed state plays a role in developing NHL, and HAART is associated with improved CD4 levels.[2] However, in our study, 3 DLBCL patients developed lymphoma while receiving HAART with a high CD4 count. This signifies that CD4 count is not the sole determining factor in the development of HAL, especially for DLBCL.

CHOP is historically the standard treatment for DLBCL, but DA-EPOCH is an emerging alternative in recent years. In contrast, most patients with Burkitt lymphoma who are fit are preferred to receive intensive chemotherapy especially when there is CNS or marrow involvement, as alternatives like DA-EPOCH are associated with greater risk of treatment failure in advanced disease.[3] Addition of rituximab also showed higher complete response rates.[4] Concerns of excessive toxicity associated with very low CD4 counts (<50 x 10^6) can be overcome by adequate infection prophylaxis and screening.[5]

Conclusion:

In conclusion, all cases presented as advanced disease and Burkitt lymphoma has a higher likelihood of CNS involvement. Incorporating HAART along with tailored chemotherapy and targeted agents like Rituximab can improve treatment responses, and patients who adhere to treatment generally have a favorable prognosis. Further studies are warranted to validate these findings and explore optimal treatment strategies for different subtypes of HAL.

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