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Clinical Diagnosis, Treatment and Prevention Strategies of HIV/AIDS-related Tumors

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Abstract: HIV/AIDS-related tumors represent a significant challenge in the global public health arena. This article systematically elaborates on the clinical characteristics, diagnosis and treatment strategies, as well as prevention and control measures of HIV/AIDS-related tumors. The HIV virus causes immune deficiency by attacking CD4+ T lymphocytes, significantly increasing the risk of tumor development. Common types include Kaposi's sarcoma, non-Hodgkin's lymphoma, and invasive cervical cancer. Clinical diagnosis and treatment need to comprehensively consider the treatment of the tumor itself and immune reconstitution, adopting a combination of surgery, radiotherapy, chemotherapy, targeted therapy, and highly active antiretroviral therapy. In terms of prevention and control, the focus should be on primary prevention, including HIV screening, early diagnosis and treatment, and regular tumor screening, to reduce the disease burden and improve patient prognosis.

Keywords: HIV/AIDS; Related tumors; Clinical diagnosis and treatment; Prevention and control measures

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1. Introduction

Acquired Immunodeficiency Syndrome (AIDS) is a severe immunodeficiency disease caused by infection with the Human Immunodeficiency Virus (HIV). Since its first discovery in 1981, HIV/AIDS has caused more than 40 million deaths worldwide, and there are still 38 million infected people currently [1]. With the widespread application of Highly Active Antiretroviral Therapy (HAART), the survival time of HIV-infected individuals has been significantly prolonged, but tumors have become one of the leading causes of death in this population [2].

HIV infection leads to a progressive decrease in CD4+ T lymphocytes, impairing the body's immune surveillance function, which significantly increases the risk of tumor development. Studies have shown

that HIV-infected individuals have a several-fold to several dozen-fold higher risk of developing certain specific cancers compared to the general population. For example, the risk of anal cancer is increased by approximately 19 times, the risk of Hodgkin's lymphoma is increased by 5–14 times, and the risk of lung cancer is increased by 2–5 times [3]. HIV/AIDS-related tumors not only have a high incidence rate but also are characterized by insidious onset, rapid progression, and atypical clinical manifestations, posing great challenges to early diagnosis and treatment.

This article aims to systematically review the clinical characteristics, diagnosis and treatment strategies, as well as prevention and control measures of HIV/AIDS-related tumors, providing references for clinicians to improve the diagnosis and treatment level of HIV/AIDS-related tumors and improve patient prognosis.

2. Clinical characteristics of HIV/AIDS-related tumors

The occurrence of HIV/AIDS-related tumors is closely related to the immune deficiency caused by HIV infection. The HIV virus continuously attacks the body's CD4+ T lymphocytes, gradually destroying the body's immune surveillance function, allowing tumor cells to escape immune clearance, thereby increasing the risk of tumor development. Common HIV-related tumors include Kaposi's sarcoma, non-Hodgkin lymphoma, invasive cervical cancer, as well as non-AIDS-defining tumors such as lung cancer, liver cancer, and anal cancer [4].

2.1. HIV-related tumors

2.1.1. Kaposi's sarcoma

It is the most common AIDS-defining tumor, induced by human herpesvirus type 8 infection. The incidence rate is significantly higher in HIV-infected individuals who have not received HAART treatment. The typical clinical manifestation is multiple nodules or plaques on the skin and mucous membranes, which can involve internal organs, and the prognosis is poor. With the popularization of HAART, the incidence rate of Kaposi's sarcoma has decreased significantly, but it is still one of the tumor types that requires the most vigilance in the HIV/AIDS population [5].

2.1.2. Non-Hodgkin's lymphoma

It is the second most common AIDS-defining tumor in HIV-infected individuals, and most are associated with Epstein-Barr virus infection. Diffuse large B-cell lymphoma is the most common type. Patients often present with systemic symptoms such as fever, progressive lymph node enlargement, night sweats, and weight loss. The lesions often involve extranodal organs, and the clinical aggressiveness is stronger. The prognosis is worse than that of non-Hodgkin's lymphoma in the general population [6].

2.1.3. Invasive cervical cancer

It is an AIDS-defining tumor, closely related to persistent infection with high-risk human papillomavirus (HPV). The incidence rate of cervical cancer in HIV-infected women is much higher than that in ordinary women, and it is more likely to progress to invasive lesions. Guidelines recommend that HIV-infected women should undergo cervical cancer screening every year for early intervention.

2.2. Non-AIDS-defining tumors

In recent years, the proportion has gradually increased, including lung cancer, liver cancer, anal cancer, etc. The occurrence of these tumors is not only related to the immune deficiency caused by HIV infection, but also related to other risk factors existing in patients themselves. For example, lung cancer is related to smoking exposure, liver cancer is related to hepatitis B and C virus infections, and anal cancer is related to high-risk HPV infection. In clinical diagnosis and treatment, it is necessary to take into account the management of underlying diseases and tumor treatment.

3. Clinical diagnosis and treatment of HIV/AIDS-related tumors

In clinical diagnosis and treatment, the treatment of HIV/AIDS-related tumors needs to comprehensively consider the treatment of the tumor itself and the patient's immune function status, and adopt a combination of surgery, radiotherapy, chemotherapy, targeted therapy, and highly active antiretroviral therapy to achieve the best therapeutic effect while reducing adverse drug reactions [7].

3.1. Treatment of the tumor itself

3.1.1. Surgical treatment

For early-stage, localized HIV/AIDS-related tumors, surgical treatment is an effective method. Surgery can remove tumor tissue, reduce tumor burden, and improve patient survival. However, strict indications for surgery should be mastered, and the patient's immune function status and surgical risks should be fully evaluated.

3.1.2. Radiotherapy

Radiotherapy is a treatment method that uses radiation to kill tumor cells. For HIV/AIDS-related tumors that cannot be surgically removed or recur after surgery, radiotherapy can be used as an effective palliative treatment method to relieve patient symptoms and improve quality of life.

3.1.3. Chemotherapy

Chemotherapy is a treatment method that uses chemical drugs to kill tumor cells. For advanced, metastatic HIV/AIDS-related tumors, chemotherapy is one of the main treatment methods. Commonly used chemotherapy drugs include vincristine, bleomycin, doxorubicin, paclitaxel, etc. However, chemotherapy drugs have certain toxic and side effects, and close monitoring of patient adverse reactions is required; the treatment plan should be adjusted in a timely manner [8].

3.1.4. Targeted therapy

Targeted therapy is a treatment method that targets specific targets of tumor cells. Compared with traditional chemotherapy drugs, targeted therapy has the advantages of high specificity and low toxicity and side effects. Currently, targeted therapy drugs for HIV/AIDS-related tumors are constantly being developed, such as vascular endothelial growth factor inhibitors for Kaposi's sarcoma and CD20 monoclonal antibodies for non-Hodgkin's lymphoma.

3.2. Immune reconstitution

Highly Active Antiretroviral Therapy (HAART) is the cornerstone of HIV/AIDS treatment. By inhibiting HIV replication, it reconstructs the patient's immune function and reduces the risk of opportunistic infections and tumor development. Studies have shown that HAART can significantly reduce the tumor incidence rate in HIV/AIDS patients and improve patient survival [9].

In the treatment of HIV/AIDS-related tumors, HAART should be initiated as early as possible and continued throughout the treatment process. At the same time, close monitoring of the patient's CD4+ T lymphocyte count and HIV viral load is required, and the treatment plan should be adjusted in a timely manner to ensure the therapeutic effect [10].

3.3. Selection of treatment plans

The treatment plan for HIV/AIDS-related tumors should be formulated based on the patient's specific conditions, including factors such as tumor type, stage, patient's immune function status, and physical condition. When selecting a treatment plan, the effectiveness and safety of the treatment should be fully considered, and the relationship between the therapeutic effect and adverse drug reactions should be balanced [11].

For early-stage, localized tumors, surgical treatment or radiotherapy should be prioritized, combined with HAART treatment. For advanced, metastatic tumors, a comprehensive treatment plan combining chemotherapy, targeted therapy, and HAART treatment should be adopted. For patients with severely impaired immune function, HAART treatment should be given first, and tumor treatment should be carried out after immune function is reconstructed [12].

4. Prevention and control measures of HIV/AIDS-related tumors

Primary prevention is the core of reducing the disease burden of HIV/AIDS-related tumors. Comprehensive prevention and control measures should be adopted, including HIV screening, early diagnosis and treatment, and regular tumor screening, to achieve early detection, early diagnosis, and early treatment of tumors, and ultimately improve the long-term survival prognosis of patients.

4.1. HIV screening, early diagnosis and treatment

HIV screening, early diagnosis, and treatment are key measures to prevent HIV/AIDS-related tumors. Through extensive HIV screening, HIV-infected individuals can be detected in a timely manner, and HAART treatment can be initiated as early as possible to inhibit HIV replication, reconstruct the patient's immune function, and reduce the risk of tumor development [13].

At the same time, follow-up management of HIV-infected individuals should be strengthened, and regular monitoring of CD4+ T lymphocyte counts and HIV viral loads should be conducted to ensure that patients take their medications regularly and maintain a state of viral suppression. Studies have shown that regular medication intake and maintenance of viral suppression in HIV-infected individuals can significantly reduce the risk of tumor development [14].

4.2. Regular tumor screening

Regular tumor screening is an important means for early detection of HIV/AIDS-related tumors. An individualized tumor screening plan should be formulated based on factors such as the patient's age,

gender, duration of HIV infection, and CD4+ T lymphocyte count. For HIV-infected individuals, regular cervical cancer screening (such as Pap smear test, HPV testing), anal cancer screening (such as digital rectal examination, anoscopy), and lymphoma screening (such as lymph node biopsy, bone marrow aspiration) should be conducted. Early detection, early diagnosis, and early treatment can significantly improve the treatment effect of HIV/AIDS-related tumors and improve patient prognosis.

5. Conclusion

HIV/AIDS-related tumors are an important challenge in the global public health field. They have a high incidence rate, rapid disease progression, and difficult treatment, posing a serious threat to the lives and health of patients. With the widespread application of HAART, the survival time of HIV-infected individuals has been significantly prolonged, but tumors have become one of the leading causes of death in this population. The clinical diagnosis and treatment of HIV/AIDS-related tumors need to comprehensively consider the treatment of the tumor itself and the patient's immune function status, and adopt a combination of surgery, radiotherapy, chemotherapy, targeted therapy, and HAART. At the same time, primary prevention should be strengthened, including HIV screening, early diagnosis and treatment, and regular tumor screening, to reduce the disease burden and improve patient prognosis.

In the future, further research on HIV/AIDS-related tumors is needed to deeply explore their pathogenesis, develop more effective treatment methods and prevention measures, improve the diagnosis and treatment level of HIV/AIDS-related tumors, and bring more hope to patients.

Disclosure statement

The authors declare no conflict of interest.

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