Summary

History of HIV and AIDS

The history of HIV can be traced back to sub-Saharan Africa, as far back as the 1930s.In 1959, scientists isolated a virus in a human male from the Democratic Republic of Congo. They believe this virus, which was genetically similar to HIV-1 and was called SIVcpz (Chimpanzee Simian Immunodeficiency Virus), migrated from the common chimpanzee to human beings when hunters were exposed to infected ape blood.

HIV particle composed of 2,000 copies of the viral protein p24. In 1981, the Centers for Disease Control and Prevention reported five homosexual males in California with biopsy-confirmed Pneumocystis carinii pneumonia, as well as 26 cases of Kaposi's sarcoma throughout the United States. By 1982, the CDC was able to link these opportunistic infections to a new blood-borne disease, which they called “Acquired Immune Deficiency Syndrome” or AIDS The onset, prevalence, and transmission of the disease remain dynamic and vary among and within countries and world populations. For example, sub-Saharan Africa remains the region with the highest prevalence of adult and childhood HIV cases.

The majority of these cases are transmitted through heterosexual contact or from mother to child. Alternatively, the HIV epidemic was first recognized in the United States as a disease with its transmission most associated with homosexual populations. However, current data suggests the primary mode of HIV transmission in the United States has changed from homosexual to heterosexual contact, with the fastest growing numbers of AIDS cases among young African American females (49%). Finally, in areas of Europe and Asia. HIV disproportionately affects intravenous drug abusers, men having sex with men, and sex workers.

AIDS: AIDS isn't a single disease, but rather a group of symptoms or illnesses that occur together. AIDS has been defined by the U.S. Centers for Disease Control and Prevention as occurring in a person who:

- Has a laboratory-documented HIV infection.
- Has a CD4 count less than 200 cells per mL of blood .

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- Has had one or more infections or types of cancer that do not occur regularly in the general population.These infections include Candida (a yeast infection) of the esophagus or lungs, disseminated tuberculosis, PCP pneumonia, several bouts of bacterial pneumonia, and extrapulmonary coccidiomycosis and histoplasmosis. The types of cancer include invasive cervical cancer, Kaposi's sarcoma, and certain types of lymphoma. People without HIV develop cervical cancer and lymphoma, but anyone known to be infected with HIV who then develops one of these conditions is considered to have AIDS**.**

Advanced AIDS : Anyone who has AIDS with a CD4 count less than 50 cells per mL has advanced AIDS. Survival at this stage is generally only 12 - 18 months in people not taking medications to treat AIDS.

Structure and genome: HIV is derived from the Retroviridae family of viruses and is a member of the genus, Lentivirus. Two species of this retrovirus infect human beings: HIV-1 and HIV-2. These viruses are the etiology of AIDS. HIV-1 is more virulent than HIV-2, and is responsible for the majority of global HIV infections, including the majority of infections in the United States. HIV-2 is less virulent, and is mostly confined to West Africa .

Tropism: The term viral tropism refers to which cell types HIV infects. HIV can infect a variety of immune cells such as $CD4^+$ T cells, macrophages, and microglial cells. HIV-1 entry to macrophages and $CD4^+$ T cells is mediated through interaction of the virion envelope glycoproteins (gp120) with the CD4 molecule on the target cells and also with chemokine coreceptors **.**

HIV transmission and occupational risk: Knowledge of HIV modes of transmission and its pathogenesis are essential for the prevention of HIV infection. HIV is mainly found in blood, semen, vaginal fluids, and breast milk, and is transmitted through direct contact with these fluids via sexual contact, intravenous drug use, mother-to-child transfer, or occupational exposure. The virus has also been found in small amounts in the saliva,sweat and tears of AIDS patients. Oral health care personnel, in particular, are at an increased risk for occupational exposure from a percutaneous injury because of their frequent use of needles and exposure to blood and saliva. However, no cases of HIV transmission through saliva, sweat, or tears from AIDS patients have been recorded.

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Symptoms of initial infection: Sore throat, Fever ,Nausea and vomiting, Fatigue Swollen lymph nodes Headaches, muscle aches, joint pain and Occasionally meningitis or encephalitis.

Symptoms of later disease: enlarged lymph nodes over several areas of the body Persistent fever, night sweats, or chills, Sudden unexplained weight loss , Persistent diarrhea , Mouth sores, Persistent dry cough and Persistent oral (thrush) or vaginal yeast infections.

HIV test: Two different types of tests are used detect how far your HIV infection has progressed, and to estimate the health of your immune system. The first test: counts the number of CD4 cells in your blood, the cells of the immune system that are infected and killed by HIV. CD4 cells play a critical role in fighting off infection and disease, and their numbers decline throughout the course of HIV infection. When your CD4 count becomes very low, your risk for opportunistic infection increases. Uninfected people have a CD4 count of about 1,000. If you have a CD4 count under 200, you have AIDS. Serious opportunistic infections can occur if your CD4 counts drops below 200 .The second test: of blood test measures the amount of HIV in your blood. This test helps determine how fast your disease will progress. It also helps your doctor determine when to begin or change your drug therapy, and can help to monitor how well a particular drug or drug combination is working. Your doctor may run specific tests to determine whether you have or have had particular infections including tuberculosis, and hepatitis.

Treatment: There is currently no available vaccine or cure for HIV or AIDS. However, a vaccine that is a combination of two previously unsuccessful vaccine candidates was reported in September 2009 to have resulted in a 30% reduction in infections in a trial conducted in Thailand. Additionally, a course of antiretroviral treatment administered immediately after exposure, referred to as post-exposure prophylaxis, is believed to reduce the risk of infection if begun as quickly as possible. Current treatment for HIV infection consists of highly active antiretroviral therapy, or HAART. Current HAART options are combinations consisting of at least three drugs belonging to at least two types, or "classes," of antiretroviral agents. Typically, these classes are two nucleoside analogue reverse transcriptase inhibitors (NARTIs or NRTIs) plus either a protease inhibitor or a non-nucleoside reverse transcriptase inhibitor (NNRTI).

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Prognosis: Without treatment, the net median survival time after infection with HIV is estimated to be 9 to 11 years, depending on the HIV subtype, and the median survival rate after diagnosis of AIDS in resource-limited settings where treatment is not available ranges between 6 and 19 months

HIV/AIDS in world: During 2008 more than two and a half million adults and children became infected with HIV. By the end of the year, an estimated 33.4 million people worldwide were living with HIV/AIDS. The year also saw two million deaths from AIDS.

HIV/AIDS in Egypt: With less than 1 percent of the population estimated to be HIV-positive, Egypt is a low-HIV-prevalence country. According to the National AIDS Program (NAP), there were 1,155 people living with HIV/AIDS (PLWHA) in Egypt by the end of 2007. Among officially reported cases, heterosexual intercourse was the primary mode of transmission (49.1 percent), followed by homosexual intercourse (22.9 percent), renal dialysis (12 percent), and blood transfusion (6.2 percent), according to the NAP in an official report issued in January 2008. Injecting drug use accounted for 2.9 percent of HIV infections and mother-to-child transmission for 1.6 percent; 5.2 percent are from "unknown" causes.

Hematological Disorders

HIV infection often causes anemia, a decrease in the number of circulating red blood cells. Leukocytes are white blood cells that respond to and protect the body from infection. HIV can attack leukocytes. When the number of white blood cells decreases, a dangerous condition called leukopenia can develop, which makes the body more prone to infections.The specific type of white blood cells that respond directly to infection are called neutrophils. People with HIV often have problems with their levels of platelets, cells in the blood that help with clotting.. Pre-existing medical conditions or medical conditions resulting from HIV infection may lead to anemia or leukopenia. 1-Liver disease.2- Splenomegaly can also cause decreases in the number of platelets in the blood. 3-Kidney disease.

Alterations in hematopoiesis: The potential for HIV infection of primitive hematopoietic cells themselves, directly suppressing hematopoiesis

has been addressed in multiple different experimental settings. While direct infection of stem cells does not occur, alterations in stem cell number and function have been documented. Indirect effects on hematopoietic cells due to infection of cells other than the stem/progenitor fraction have been documented.

1 - Anemia of chronic disease (ACD): often occurs and results from the impairment of red cell production in the bone marrow. This impairment is due to the release of inhibitory substances (cytokines) and inappropriately low levels of the hormone erythropoietin. Drug therapy can cause blood complications by suppressing the bone marrow. Infections associated with HIV or tumors in the marrow can cause anemia

2-Platelates And Coagulation Disorders:

1-Thrombosis: Previous reports indicate that venous thrombosis is an infrequent problem in patients with HIV infection. Despite this, various HIV-related factors have been proposed as potentially thrombogenic and an HIV-related hypercoagulability has been suggested. In addition, various coagulation abnormalities have been reported in HIV-infected patients. HIV infection has also been associated with endothelial dysfunction. Although for the most part asymptomatic, elevated d-dimer levels have been found in HIV-infected patients, suggesting the existence of a prethrombotic state. Thrombotic microangiopathy (TMA) is also a well recognized complication of HIV disease, seen in 1.4% of affected patients before the introduction of HAART

2- Thrombocytopenia: In one early series of patients with AIDS , thrombocytopenia in 40 percent .. ITP typically arises early in the course of HIV infection and can be seen before other manifestations of AIDS,, Both hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP) have been described. When compared to TTP, HUS is more likely to present at later stages of HIV disease, Apart from thrombocytopenia, these have included a prolonged APTT due to the presence of lupus anticoagulant, an increased prevalence of protein S and heparin cofactor II deficiency.

3-White Blood Cells Disorders:

LUCOPENIA: CD4 cells are a type of lymphocyte (white blood cell). They are an important part of the immune system. CD4 cells are sometimes called T-cells. , also called CD4+, are "helper" cells.. When HIV infects

humans, the cells it infects most often are CD4 cells. The virus becomes part the cells, and when they multiply to fight an infection, they also make more copies of HIV.When someone is infected with HIV for a long time; the number of CD4 cells they have (their CD4 cell count) goes down. This is a sign that the immune system is being weakened. The lower the CD4 cell count, the more likely the person will get sick. Most health care providers prescribe drugs to prevent opportunistic infections at the following CD4 levels

- Less than 200: pneumocystis pneumonia (PCP)
- Less than 100: toxoplasmosis and cryptococcosis
- Less than 75: mycobacterium avium complex (MAC)

4- Hematological Neoplasm

Lymphoma: Lymphoma has traditionally been considered a late manifestation of HIV infection, more likely to occur in the setting of significant immune suppression with CD4 cells below 200/mm . lymphoma is seen in all population groups at risk for HIV. AIDS-related lymphoma is more common in men than in women. All age groups are affected, and lymphoma is the most common malignancy in HIV infected children

5-Hemophagocytic Syndrome

The hemophagocytic syndrome is an uncommon complication of HIV infection that is characterized by proliferation of histiocytes and phagocytosis of marrow blood cell precursors. It typically presents with fever, pancytopenia, lymphadenopathy, and splenomegaly.

6-Blood vessles: antiretroviral therapy may have both detrimental and beneficial influences on cardiovascular risk factors -- worsening atherosclerosis while improving inflammation

7-Stem Cells in HIV Infection: Strategies to overcome this problem and regenerate vigorous HIV-specific immunity focus on two basic goals: 1) To provide additional anti-HIV protection to developing cells; or 2) To enhance generation of specific T cell subsets.