



A REVIEW ARTICLE ON HIV AND AIDS

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ABSTRACT

HIV virus was first identified in humans in 1959 which was transferred from chimpanzees to human during hunting. The virus is transmitted to other organisms when they come in contact with various fluids of infected person. There are 2 subtypes of virus: HIV-1 and HIV-2 from which the HIV-1 is more common. Infection progresses in 3 stages and worsens the symptoms and results in reduced life span of patient. No absolute cure is available for the disease but Antiretroviral Therapy (ART) improves living condition and increases life expectancy of patient.

KEYWORDS: Human immunodeficiency Virus, Origin, Transmission, Stages of infection, Symptoms, Diagnostic tests, Antiretroviral therapy.

INTRODUCTION

HIV (Human Immunodeficiency virus) is the causative agent for AIDS (Acquired immuno deficiency syndrome). This virus interferes with body's immune system. The immune system helps body to fight off infections. But this virus if left untreated, infects and kills the CD4 cells, which are a type of immune cell called T cells. Due to weakened immune system the other bacteria and viruses take advantage and worsen the situation. As a result of this body is more likely prone to other infections and cancer which further prove fatal.

TRANSMISSION OF INFECTION

An healthy adult is likely to infected with the viral infection if the person comes in contact with

1. Blood of the diseased patient
2. Semen of the diseased patient
3. Various fluids like Pre-seminal fluid, Vaginal fluid, Rectal fluid, etc.
4. Breast milk (from mother to infant)

Origin of Disease

Scientists believe that the HIV infection was transmitted from a type of chimpanzee in West Africa to humans. SIV (Simian immunodeficiency virus) is the chimpanzee version of immunodeficiency virus. It is believed that this virus was transferred and mutated to HIV in humans when they hunted SIV infected chimpanzee foe meat and came in contact with its blood. Likely the very first case of infection with HIV-1 type in human was detected in 1959 from the blood sample of a man in Kinshasa,

Democratic Republic of Congo. The genetic analysis of blood sample suggested that the person may be infected with virus in the late 1940s or early 1950s.

SIV strains were found in gorillas as well. The strain found in gorillas is known as SIVgor and it is distinct from the strain found in chimpanzees. AIDS is considered a zoonosis, an infection shared by humans and other vertebrates

Subtypes of Virus

HIV-1 and HIV-2 are two main types of the HIV virus. HIV-1 is most commonly found in affected people. About 95 percent people infected with HIV have HIV-1 infections. It (HIV-1) is easily transmitted as compared to the latter one (HIV-2). Though HIV-1 and HIV-2 are both retroviruses that similarly affect body's immune system, they vary in their genetic composition. A study revealed that their genome had only 55 percent similar identity. This means that not all tests and treatments can work for both types of HIV.

Stages of Infection

There are 3 stages of infections and severity increases as the stage of disease increases.

Stage 1 (Acute HIV infection)

Stage 2 (Chronic infection)

Stage 3 (Acquired immunodeficiency syndrome)

Stage 1: Acute HIV Infection

The earliest stage of infection is called as acute HIV, and

generally develops within 2 to 4 weeks after the patient is infected with HIV virus. In this very first stage of infection, the virus multiplies and spreads rapidly throughout the body. The HIV starts to attack and destroy the infection-fighting CD4 cells. This gradually collapses the immune system. The risk of HIV transmission is increased in the acute stage because of high levels of HIV in blood.

Stage 2: Chronic HIV Infection

This is the second stage of HIV infection also named as asymptomatic HIV or clinical latency. In this second stage of infection, the virus is in state of continuous multiplication but at very low levels. If the ART is not given to patient in this stage, the stage may advance to AIDS in about 10 years (may be more or less depending on immune system of patient).

Stage 3: AIDS

The third stage is actually called AIDS and is the most severe stage of HIV infection. In this stage, the HIV has severely damaged the immune system and the body is unable to fight to the opportunistic infections. People with HIV are diagnosed with AIDS when their CD4 count is less than 200 cells/mm.^[3]

Once the person is diagnosed with AIDS, they have a high viral load and can transmit disease to others very easily. Without treatment a person with AIDS typically survives for up to 3 years

Symptoms of Disease

Symptoms of the disease vary according to the stage of infection. Symptoms according to the stage of disease are mentioned below

Symptoms of Stage 1

1. Headache
2. Fatigue
3. A red rash that doesn't itch
4. Sore throat
5. Swollen lymph nodes

These symptoms are very similar to flu and are usually compared with it. The symptoms appears after 2-6 weeks after infection and vanishes after a week. If they are left untreated, the disease progresses to second stage.

Symptoms of Stage 2

After the person advances to the second stage of HIV infection, seroconversion process takes place and patient often feel better. In the second stage, patient may not show any other symptoms nearly for 10 years or even more (depending upon the health background of patient)

But, the virus will still be active and continue to infect new cells of body. The virus also continues to replicate itself and risk of transmission is present during this stage. If ART is not given to patient overtime, HIV will continue to severely damage the immune system.

Symptoms of Stage 3

1. Being tired all the time
2. Fever that lasts for merely about 10 days
3. Night sweats
4. Weight loss with no obvious reasons
5. Shortness of breath
6. Severe long-lasting diarrhea
7. Purplish spots on your skin
8. Swollen lymph nodes in your neck and groin region
9. Yeast infections in your mouth, throat, vagina.

These symptoms are treated and medication is given to increase the life span of the patient.

Diagnosis Of The Disease

Blood and Saliva testing are done to diagnose the HIV infections. The tests carried out are:

Antigen/Antibody testing

Antigen can show positive test within few days of infection but immune system requires time to produce antibodies to infection and hence may require time (2-6 weeks) to be positive. Hence a combination of Antigen/Antibody test may take 2- 6 weeks to show positive results after exposure to virus.

ELISA Test

ELISA (enzyme-linked immunosorbent assay) is used to detect the presence of HIV infection. After getting positive result of ELISA test, usually western blot test is administered to confirm the infection. Though ELISA test may show negative result, but if patient thinks that there may be HIV infection present, he/she should again get tested after one or three months. ELISA is a very sensitive to HIV infection, but antibodies are not produced immediately after infection so one may test negative within few weeks after being infected. Although, you may get negative test results, the level of virus present is high and you will be at risk of transmitting infection.

Home Tests

The home access expert test is approved by US FDA and is sold in pharmacies. It is the only approved home test kit.

Saliva Tests

By using a cotton pad, saliva is obtained from the inside of patient's cheek. It is placed in vial and submitted for testing. Results are usually available within 3 days and positive results are confirmed with blood tests.

Viral Load Test

The amount of HIV in blood is measured using viral load test. This test is generally used to monitor treatment progress and also is helpful in detecting early HIV infections. The three technologies which measure HIV viral load with same basic principle are

1. Branched DNA (bDNA)
2. NA(nucleic acid) sequence based amplification

assay

3. Reverse transcription PCR

DNA sequences that bind specifically to HIV virus are detected, although results may vary between tests.

Western Blot

The most sensitive test used to confirm ELISA test results is western blot test.

Treatment: Antiretroviral Therapy

In a standard antiretroviral therapy commonly called as ART is combination of at least 3 antiretroviral (ARV) drugs which is intended for maximal suppression of HIV virus in the body. It is also used to stop progression of HIV infection. This therapy has proven to be beneficial in reduction of large amount of death rates and sufferings when used effectively in early stages stage of infection.

Besides, risk of HIV transmission at population level is also reduced which preserve families.

According to survey by WHO and UNAIDS, 34 million people were living with HIV in 2011 and about 15 million people were in need of ART. By the end of 2012, ART was accessible to 9.7 million people in developing and under developed countries. Guidance, tools and support is provided by WHO which supports delivery and increased assay of ART within public.

Treatment 2.0 strategy was launched by WHO and UNAIDS in the year 2010, that promoted radical simplification of ART. Along with this, acceleration of treatment scale-up and integrity of prevention was done to make it universally accessible. Furthermore, WHO launched new guidelines with recommendations of ART in July 2013 for adults and adolescents.

Drugs Used In Art

Nucleoside/Nucleotide Reverse Transcriptase Inhibitors (NRTIs)

HIV virus is forced to use faulty versions of building blocks by NRTIs so that more HIV are not made by infected cells.

- Abacavir or Ziagen*
- Zidovudine or Retrovir*
- Stavudine or Zerit*
- Didanosine or Videx*
- Emtricitabine or Emtriva*
- Lamivudine or Epivir*
- Tenofovir alafenamide or Vemlidy*
- Tenofovir disoproxil fumarate or Viread*

Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs)

NNRTIs function by binding to specific protein, making HIV unable to make more copies of itself and are also called as “non-nukes”

- Delavirdine or Rescriptor*
- Rilpivirine or Edurant*

- Etravirine or Intelence*
- Doravirine or Pifeltro*
- Efavirinz or Sustiva*
- Nevirapine or Viramune*

Protease Inhibitors (PIs)

Infected cells need to put together a protein to form a new HIV virus particle. These drugs function by blocking those proteins.

- Atazanavir or Reyataz*
- Darunavir or Prezista*
- Tipranavir or Aptivus*
- Ritonavir or Norvir*
- Lopinavir + ritonavir or Kaletra*
- Fosamprenavir or Lexiva*
- Indinavir or Crixivan*
- Nelfinavir or Viracept*
- Saquinavir or Invirase* , Fortovase*

Integrase strand transfer inhibitors (INSTIs).

Integrase inhibitors act by blocking a key protein and inhibit HIV from making copies of itself. Key protein allows the virus to put its DNA into healthy cell's DNA.

- Bictegravir or combined with other drugs as Biktarvy*
- Dolutegravir o Tivicay*
- Elvitegravir or Vitekta*
- Raltegravir or Isentress*

Fusion Inhibitors

At the very first place, HIV is blocked from getting into healthy cells. The function of FIs is totally different from NRTIs, NNRTIs, PIs, and INSTIs- as these work on infected cells.

- Enfuvirtide or Fuzeon*

CCR5 Antagonist

It also stops HIV from getting into healthy cells but by blocking a specific kind of “hook” on certain cells. Ultimately, virus is not able to plug on cell.

- Maraviroc or Selzentry*

* Indicates brand name of the drug.

REFERENCES

1. <https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/19/45/hiv-aids--the-basics>.
2. <https://www.britannica.com/science/AIDS/The-origin-of-HIV>.
3. <https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/19/46/the-stages-of-hiv-infection#:~:text=The%20three%20stages,%20of%20HIV,one%20stage%20to%20the%20next>.
5. <https://www.medicalnewstoday.com/articles/323893#summary>.
6. <https://www.webmd.com/hiv-aids/understanding-hiv-symptoms>.
7. <https://www.ucsfhealth.org/conditions/hiv>.

