

# HIV and AIDS

## Introduction

AIDS (Acquired Immune Deficiency Syndrome) is not one disease but a set of diseases. Not all the people who develop AIDS suffer from the same diseases but there are certain unusual illnesses that occur very frequently in AIDS. That is why it is called a *syndrome*. This syndrome is caused by a virus that affects the body's immune system (defence mechanism) making it liable to infections and cancers to which it would normally be resistant. The virus is by international consensus called *Human Immunodeficiency Virus* (HIV).

There are about 33 million people in the world living with HIV. There are 16,000 new infections everyday, of which half are in women and children. 90% of all HIV infections are in the developing world. The first report of HIV infection in India was in 1986 from Chennai. Since then, there has been an alarming increase in the prevalence of HIV and according to National AIDS Control Organization, it is 2.4% as of May 1999.

## Cause and Pathogenesis

### How does HIV weaken our Immune system?

Our blood normally contains white blood cells and red blood cells. Normally the white cells fight off and kill any germs which enter our bodies. This they do by eating up the germs and by producing chemicals called *Antibodies* which kill them. In this way our bodies fight off many different germs and we stay healthy. HIV weakens our immune system by entering and finally destroying our white cells. As more and more white cells are killed the body becomes less and less able to fight off the various germs that normally live around and within our bodies all the time. Finally people with AIDS die of one of a variety of diseases, common or rare that their bodies cannot resist.

Human immunodeficiency Virus (HIV) is a retrovirus (a type of virus) belonging to the lentil virus (slow virus) group. The mode of transmission is through unprotected penetrative sex (anal, vaginal, and oral), blood to blood Contact such as transfusion, organ transplant and through blood products. It can be transmitted by an HIV infected mother to her baby during the antenatal period, intra partum or through breast milk. Hence, the body fluids that can transmit HIV are blood, semen, vaginal fluid, and breast milk. In India, 80% of infection is through heterosexual transmission. Ninety percent of infections are among young persons in the age group of 15-39 years.

Outside the human body the virus is easily killed but once inside the body it is deadly. In fact the virus is killed outside even by merely washing with antiseptic lotions. Once the virus enters the body though it gets absorbed on to the CD4 Cells (T4 helper lymphocytes, macrophages, glial cells, and others.). The virus (RNA) enters the cell and is transcribed to proviral DNA by the reverse transcriptase enzyme. This then enters the nucleus of the CD4 lymphocyte cells and gets

integrated into the cell DNA thus hijacking the human cell, which is converted into a factory and starts manufacturing new HIV particles. These enter other CD4 Cells and destroy them and eventually the CD4 Cell count decreases to less than 200/mm. Since lymphocytes are responsible to a sizable extent for maintaining the body's immune defences the destruction of these cells results in a lowering of the body's immune status. Therefore the person succumbs to many opportunistic infections (Tuberculosis, Diarrhoea, Pneumonia etc.) caused by organisms which may not be virulent enough to produce the disease in individuals with normal immunity. This end stage condition is known as AIDS. It takes anywhere from 3-10 years for a person to progress from HIV seropositivity to AIDS.

## **Symptoms and Signs**

### **Group I**

Within 2-3 months of acquiring HIV, one goes through a seroconversion illness, where the patient develops fever, malaise, rash and lymphadenopathy (glandular swellings). The patient recovers in a few days and progresses to the next stage.

### **Group II**

Asymptomatic stage (may last from 2-10 years). During this stage the patient is free of all symptoms and except for the fact that he remains HIV Positive, there are no external signs of disease.

### **Group III**

Persistent Generalised Lymphadenopathy (PGL) (Glandular Swellings over different areas of the body).

At this stage the individuals develop Generalized Lymphadenopathy (cervical, axillary, and inguinal). The lymph nodes will be painless and the biopsy will reveal non-specific hyperplasia.

### **Group IV**

Patients may belong to any of the Sub-Groups and may progress between groups.

#### *Sub-Group A*

Constitutional symptoms like weight loss, persistent fever, cough, diarrhoea.

#### *Sub-Group B*

Neurological manifestations like dementia, peripheral neuritis.

#### *Sub-Group C*

Opportunistic Infections.

The most common in India are pulmonary tuberculosis, oropharyngeal Candidiasis, Tinea infection of the skin, extrapulmonary TB, herpes zoster, herpes simplex, PCP, CMV retinitis, toxoplasmosis, cryptococcal meningitis and cryptosporidial diarrhoea.

#### *Sub-Group D*

Secondary cancers like Kaposi's sarcoma, Non-Hodgkin's lymphoma.

#### *Sub-Group E*

Lymphoid interstitial pneumonitis.

## **Investigations and Diagnosis**

The most popular diagnostic tools are those where the specific antibodies to the virus are detected - Enzyme Linked Immuno Sorbant Assay (ELISA) and Western Blot. It takes 6-12 weeks for the antibodies to develop. This period is known as *Window Period* where the person could be infected but the test reads negative.

To identify the infection at this period there is a diagnostic tool called *Polymerase Chain Reaction* (PCR) that identifies the viral genome from almost 48 hours after infection. This is an expensive test and needs a well equipped lab and well-trained technicians. ELISA is a simple rapid test, which is cheap and sensitive. The only disadvantage is that it may show false positive results. It is ideal to confirm the results with Western blot, which is 100% specific.

To monitor the progress of the disease, tests like CD4 or CD8 Estimation and Plasma Viral Loads are performed.

## **Treatment and Prognosis**

1. Asymptomatic Stage: Psychosocial supportive counselling, nutritional counselling, antioxidants, vitamins, exercise, sleep, yoga, and meditation.
2. Early Symptomatic Stage: All opportunistic infections must be treated and in addition the patient must be given the supportive therapy, counseling and vitamin and anti-oxidant supplementation outlined above.
3. If the CD4 count is below 200 then it is advisable to start antiretroviral drugs. Several drugs are now available but the most commonly used drugs include Zidovudine (AZT or Azidothymidine), Lamivudine etc. But these may need to be taken life long, they have side effects and are expensive. But they greatly improve the quality of life and people with AIDS are now living longer. Anti retroviral drugs are not a cure for HIV infection. At this stage Chemoprophylaxis to prevent opportunistic infections also need to be given.

## **Prevention**

There is no cure or a vaccine for HIV. The only weapon we have is prevention. This can be achieved by adopting the following precautionary measures.

1. Be faithful to your partner.
2. Avoid unprotected sex with casual partners. Practise safe sex using a condom.
3. Make sure the blood for transfusion is checked for HIV and is donated by a relative or friend.
4. Make sure the needles used for the injections are sterile.