Human immunodeficiency virus and its management in dentistry
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Abstract
Human immunodeficiency virus (HIV) infection is a serious disorder affecting the immune system; the body’s normal defense against infection breaks down. Oral health care workers can contribute to the early diagnosis, prevention, and treatment of HIV. The oral health management of HIV-infected patients should focus on the provision of dental care and treatment of the oral manifestations of the disease. Despite the fact that significant advances in the pathogen and management of the oral manifestations of HIV have been made, more research is required to elucidate the long-term effects in the future.

Introduction
A case of AIDS is defined as a reliably diagnosed opportunistic diseases in an adolescent or an adult, at least moderately indicative of underlying cellular immunodeficiency and with no other known cause of any reduced resistance reported to be associated with secondary immunodeficiency and associated with immunosuppressive therapy, lymphoreticular malignancies, or starvation.[1]

Structure of virus
HIV belongs to the subgroup of family retrovirus. It is spherical enveloped virus about 90-120 nm in size. The most outer part of the virus consists of projecting knob-like structure made up of glycoproteins (GP). This constitutes the major surface component of the virus which binds to the CD4 receptors on susceptible host cells.[2] The next layer is lipid layer which present next to the outer GP layer. The nucleocapsid has an outer icosahedral shell and an inner cone-shaped core enclosing the ribonucleoproteins. The genome is diploid composed of two identical single-stranded RNA. Along with this RNA the enzyme reverse transcriptase (RT) which is the characteristic features of retrovirus. It mainly helps viral multiplication.[3]

Resistance
HIV is thermolabile being in 10 min at 60°C and in 10 seconds at 100°C. In room (20-25°C) temperature in dried blood, it may survive for 7 days. HIV is inactivated in 10 min by treatment with 50% ethanol, 35% isopropanolol, 0.5% lysol, 0.5% paraformaldehyde, a 0.3% H₂O₂, and 10% household bleach. It is also inactivated at extremes of pH (1-13). For treatment, contaminated medical instrument, a 2% solution of glutaraldehyde is useful.[1]

Transmission
Blood, blood products factor VIII, infected semen, urine, fecal materials, and rarely through saliva because only small minority of individuals harbors the virus in saliva. Immunoglobulin A (IgA) antibody which present in saliva neutralize the infectivity of virus (HIV loses its infectivity when it is exposed to mixed saliva for 30 min). Pediatric HIV infections transmitted transplacentally or through breast milk. It does not transmitted by causal or social contacts.[2]

The Robert C. Gallo discovered HIV in 1984 as exotic flower appearance. The outer envelope looks like projecting knobs made up of GP 120. It is connected to membrane which
is again made up of GP 41. The outer layer of nucleocapsid protein (p21) which is icosahedral shape. The inner layer is cone-shaped made up of protein termed p17. The RT is helped in viral multiplication. The first viral RNA is transcribed by RT into single-stranded DNA and then double-stranded DNA. (It transcribes viral code of RNA into DNA). This DNA is then integrated into host cell.[3]

**Etiopathogenesis**

Once the virus enters the blood or tissues it binds the cell which contain CD4 antigen. Because the receptor for the virus is CD4 antigen. This is primary helper or inducer T-lymphocytes. This virus also affects macrophages, monocytes, and glial cells of the central nervous system. After binding of virus to CD4 receptor, fusion of virus, and host cell takes place.[4] This is brought about by the transmembrane GP41. After fusion of virus with host cell membrane, HIV genome is uncoated and enters into the host cell. Now RT transcribes viral RNA into double-stranded DNA which is integrated into chromosome of infected host cell. Due to this, whole function of host cell is suppressed without structural damage.[2] The infected T4-cells do not appear to be produce normal amount of interferon, interleukin, and lymphokines. It will severely affect cell-mediated immunity. Although the major damage is cellular immunity and humoral mechanism also affected. The helper T-cell activity is essential for optimal B-cell function. Due to reduced T0-cells there is increase polyclonal activation of B-lymphocytes. It results in increased production of IgA and IgG Ig. These Igs that are functionally incompetent are called wasteful antibodies. These antibodies may produce allergic reactions.[1]

The monocyte-macrophage function is also affected due to lack of secretion of activation factor by T4 lymphocytes. Due to this, chemotaxis, antigen presentation, and intracellular killing by these cells are decreased. The outcome of all these events is decreased immunity of the body. It makes the affected person susceptible to vast spectrum of life-threatening opportunistic infection and malignancies. Due to this, T4:T-cell count is decreased, i.e. <200 cm. The T4:T8-cell ratio is reversed. The normal CD4, CD8 ratio is 2 but in AIDS patient it is 0.5. The integrated provirus, virus remains within the host cell without viral expression from months to year latent period.[5]

The clinical features in HIV infections are not primarily due to the virus but secondary to immunosuppression. According to the WHO if the individual said to HIV+ve, he/she should have at least two major signs associated with one minor sign in the absence of known secondary causes of immunosuppression. The major sign includes weight loss of >10% of body weight and chronic diarrhea of >1 month duration, prolonged fever, and minor sign includes recurrent oropharyngeal candidiasis, persistent generalized lymphadenopathy, persisted cough for >1 month, generalized pruritic dermatitis, recurrent herpes zoster, and progressive disseminated herpes simplex infection.[1]

The Centers for Disease Control, USA, classified phases of infection into following types. Group I: Acute infection, Group II: Asymptomatic infection, Group III: Persistent generalized lymphadenopathy, Group IV: Other diseases. The subgroup includes Group A: AIDS-related complex, Group B: Neurological diseases, and Group C: Secondary infectious diseases.[3]

**Laboratory Diagnosis**

The screening test is enzyme-linked immunosorbent assay and the rapid test is latex agglutination tests and dot blot test. The simple tests are particle agglutination tests, and supplemental tests are Western blot tests and immunofluorescence test. The confirmatory tests are virus isolation in detection of p24 antigen by ELISA and detection of nucleic acid by hybridization and polymerase chain reactions.[5]

The management in general includes antiretroviral therapy, bone marrow transplantation, transfer of lymphocytes, thymic grafts, inactivated anti-HIV antisera, administration, and infusion of genetically modified CD4 teens.[3]

**Management of HIV Patient in Dental Chair**

It starts with personal care such as wash hands thoroughly after each patient. Use surgical soap that contain lanolin which prevent drying and cracking of skin which could provide a portal of entry for viruses into blood stream. The antiseptics such as 3% parachlorocresol, meta xylene, or 4% chlorhexidine can be used.[6]

Protective eyeglasses or large plastic face shield should be worn. A face mask should be worn in additional to eyeglasses. It should be changed after every patient to reduce the risk of the mask itself becoming a nidus of infection. Dome-shaped masks are adequate barriers against HIV. Disposable gloves should mandatory, double gloving must be considered when the patient is known or suspected to harbor an infective organism.

Dentists or auxiliary person with exudative lesion should not perform or assist any procedures in patients suffering from HIV. Operating gowns and hair covers should be worn when patient is known or suspected to be infectious. A large plastic disposable drape is recommended because it will cover both patients and dental chair it will limit the extent of clean up procedures.

To minimize self-injury extreme caution must be used in handling sharp instruments, needles, scalpels, and blades. The holder should used to insert and remove sharp instruments. All handles and switches should be covered by plastic bags or aluminum foil and not touched by the contaminated persons. These covers should change for each patient. At the end of each procedure, clean the entire unit with freshly prepared 0.5% sodium hypochlorite or 2% glutaraldehyde.[6]

Another method of barrier protection to reduce splatter is the use of rubber dam for restorative and endodontic procedures. The waterlines are best sterilized by iodophor or diluted sodium hypochlorite. All waterlines that could became contaminated during normal use such as handpieces, ultrasonic scalars, and
three-way syringes should be flushed for 1-2 min after each patient, before practitioner leaves the office and preparing system for next day.

The handpiece also sterilized by ethylene oxide gas. This gas is used to clean both external and internal surface. This type of sterilization takes several hours to overnight. The handpieces with metal bearing turbine best sterilized by autoclaving. The contaminated instruments are best sterilized by dipping them in 2% glutaraldehyde for 10-30 min or 10% formaldehyde.

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The impression made with alginate is disinfected by any spray disinfectant then placed in sealed plastic bag for transportation to laboratory. The rubber base impressions are rinsed with dilute hypochloric solutions or chlorine compound. For impression, it is better to use disposable trays. All disposable needles syringe and often instruments are placed in a hard puncture resistant, labeled, sealed when full, and disposed properly.

**Conclusion**

Whatever the degree of disorder that happens in the human body, it manifest itself in the oral cavity too, be it AIDS, or various systemic compliances related to it. We as dentists, the guardians of oral cavity must not fail in our duty to prevent identity, diagnose, and manage this foray of orally manifested disorder to our level best which post a major threat to our society and humanity.

**References**
