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# Marburg Virus Disease: A Deadly Viral Zoonosis

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Marburg virus disease is a rare disease of humans and non-human primates in which haemorrhagic fever occurs. It is a zoonotic disease which has the potential to cause severe epidemics with significant case fatality rates. The case fatality rates of this disease vary from 23 – 90%. The incubation period of this viral infection is 2-21 days. Earlier this disease was known as Marburg haemorrhagic fever. This disease occurred simultaneously in laboratory workers in Marburg, Frankfurt (Germany) and Belgrade (Yugoslavia) in 1967. Infection arose when the laboratory workers were exposed to the tissues of African green monkeys. These monkeys were imported from Uganda. Several outbreaks and sporadic cases of this disease have been reported from Angola, Democratic Republic of Congo, Kenya, Uganda and South Africa.

**Causative agent**

Marburg disease viruses are long thread like viruses. They belong to family Filoviridae (*filum* means thread). This virus was isolated in guinea pigs and tissue culture from the blood and tissues of the patients.

**Transmission potential**

The infection with virus occurs due to exposure to bats. It is well documented that viruses are shed in oral secretions, faeces and urine from Egyptian rousette bats. Initially the virus spilled over from animals to humans and then person to person transmission started taking place. Human to human transmission takes place through direct contact with blood, secretions and body fluids. Transmission of virus from person to person requires extreme close contact with the infected person. Direct transmission takes place through the broken skin and mucous membranes. Body fluids like urine saliva, sweat, vomit, amniotic fluid and semen acts as the potential source of infection. Transmission can also take place through surfaces and materials contaminated with body fluids. Also, contact with dead and living infected animals including bush meat can be a source of infection.

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**Clinical manifestations**

Illness begins with high fever, chills, fatigue, conjunctivitis, severe headache, myalgia and malaise. On the third day of illness, watery diarrhoea accompanied by abdominal pain, chest pain, sore throat, nausea and vomiting is encountered. A non-itchy maculopapular rash is seen between 2 to 7 days of the onset of illness. Severe haemorrhagic manifestations are evident which include bleeding from nose, gums, gastrointestinal tract and vagina. Fresh blood is seen in vomit and faeces.

Symptoms may become severe leading to jaundice, pancreatitis, encephalitis, severe weight loss, liver failure, delirium, irritability, aggression, seizures and coma. Arthralgia, uveitis, orchitis and pericarditis are some of the complications encountered during convalescence. Disseminated intravascular coagulation, thrombocytopenia and lymphopenia are seen within 7 days of the onset of the disease. Death usually occurs due to blood loss, multiple organ dysfunction syndrome (MODS) and shock.

**Diagnosis**

Diagnosis on the basis of history, clinical signs and symptoms is often difficult as the clinical manifestations match with those of other viral haemorrhagic fevers. It can also confuse with malaria, dengue, typhoid fever, shigellosis, cholera, EHEC enteritis and rickettsia diseases. History related to occupation, travel and exposure to bats in wildlife settings is an important indicator of the infection. Antigen capture ELISA, IgM (indicate recent infection) and IgG (can be detected 8-10 days after the onset of infection and persist for up to 2 years after infection) capture ELISA and RT-PCR can be used to diagnose the infection. Electron microscopy and immunofluorescence assay can also be used for the identification of the virus. Virus isolation can be done only in high containment facilities having BSL-4 laboratories. The samples used for the testing of infection can be handled in BSL-3 laboratories. Histological techniques like immunohistology chemistry can be used for post-mortem diagnosis.

**Public health control measures**

- Till date there is no approved vaccine for this infection. So, the prevention mainly relies on the isolation of patients along with the use of personal protective equipment's (face mask, gloves, goggles, etc).

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- Avoid contact with the blood and body fluid (urine, faeces, vomit, semen, amniotic fluid, saliva, breast milk, and vaginal fluids) of infected individuals.
- Avoid contact with the items (clothes, bedding, medical instruments, etc) that have come in contact with the blood and body discharges of infected person.
- Avoid touching the dead body of the patient died from this disease.
- Avoid travelling to the areas (wildlife settings) where exposure to bats can take place.
- High level of precautions must be taken while handling the virus or samples in high containment zone.
- Early detection, contact tracing and community awareness also play an important role in the prevention and control of this infection.

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