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Case Report

Ebola virus disease – What clinician should know?

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1. Introduction

"Everyone in the world today is at risk" remarked the Nigerian government as it declared emergency after becoming the fourth and most populous African nation being infiltrated by the deadly virus.[1] Indian government too has acknowledged the distant, but possible threat of the virus reaching India through almost 45,000 Indians living in different countries affected by Ebola virus.

Health ministry maintains that the threat is still low but the measures are in place to face the situation if the virus reaches India. According to statements released by Health ministry, several precautionary measures are being taken, such as obtaining details of travellers originating from or transiting through affected countries and tracking them after their arrival. However, the fully treated patient who returned from Liberia created shock waves amongst medical fraternity.[2] Advisories have been issued to state disease surveillance units for early detection and management of travel related cases. Additionally, diagnostic facilities have been established at the National Institute of Virology in Pune and National Centre for Disease Control in Delhi (Washington Post, Indian Express and Times of India report).

Key facts about Ebola virus

- Ebola virus disease (EVD), previously identified as Ebola haemorrhagic fever, is a severe, often fatal disease in humans.
- EVD epidemics have a high case fatality rate (up to 90%)
- EVD outbreaks occur largely in inaccessible settlements in Central and West Africa (near tropical rainforests).
- The virus is spread to humans from wild animals.
- EVD spreads in the human population through human-to-human transmission.
- Fruit bats belonging to Pteropodidae family are well-thought-out to be the natural host of the Ebola virus.

2. Epidemiology & classification

The Ebola virus was first discovered in 1976 when it caused two outbreaks almost simultaneously in Sudan and in Democratic Republic of the Congo (near the Ebola River). Ebola virus is a single stranded RNA virus. Genus Ebola virus has five species named after the area in which they originated.[3]

1. Zaire Ebola virus (EBOV)
2. Sudan Ebola virus (SUDV)
3. Bundibugyo Ebola virus (BDBV)
4. Taï Forest Ebola virus (TAFV)
5. Reston Ebola virus (RESTV)

Four of these have caused illness in humans during the previous outbreaks in Africa while Reston species, found in

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Philippines and China, has been found to infect humans but without causing any disease. Viral sequencing of the strains from the current outbreak done at Institute Pasteur, France has shown strong homology (98%) with Zaïre Ebola virus.

3. Microbiology

Ebola virus establishes itself in the humans through human-to-human transmission which is regarded as the leading mode of transmission for illness outbreaks. The direct contact (broken skin or mucous membranes) with blood, organs or other bodily secretions of infected people transmits the disease in humans. The indirect contact with environment contaminated with such fluids has also been a source of infection. Sexual contact may lead to disease transmission up to seven weeks after clinical recovery.[4] Burial rituals (like bathing the body) where grievers come in close contact with bodies of infected patients are also identified to play an important role in transmission of disease.[5] Healthcare personnel coming in close contact with infected patient, contaminated hospital materials or while treating suspected or confirmed EVD patient get diseased. It occurs when infection control procedures are not strictly adhered or followed.

EBOV can endure in liquid or dried material for a number of days.[6] However, EBOV can be inactivated by ultraviolet radiation, gamma irradiation, heating for 60 min at 60 °C or boiling for 5 min. The virus is vulnerable to sodium hypochlorite and other disinfectants.[7] Freezing or refrigeration does not inactivate Ebola virus.[8]

4. Transmission

Fruit bats of African origin are considered the possible reservoir hosts for Ebola viruses. Mechanism of enzootic spread between bats and other primates (monkeys, chimpanzee), porcupines and antelopes remain unknown. However, non-human primates are considered the infectious source for humans (epizootic cycle) but they are not considered the natural host of the virus (Fig. 1).

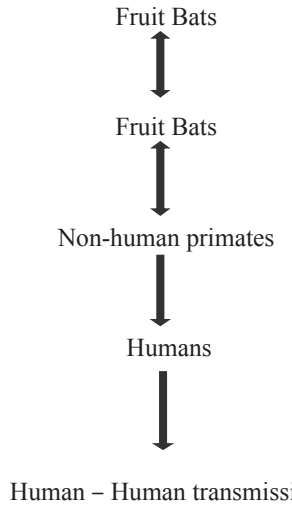

Fig. 1 – Transmission of Ebola virus.

The risk stratification of Ebola virus infection according to the type of contact with a human case has been documented in various studies[9] (Table 1).

5. Infecting fluids

Ebola viruses are highly transmissible by direct contact with infected blood, organs, tissues, secretions or other body fluids of dead or living infected animals. During previous outbreaks in Africa contagion spread to humans via handling of infected chimpanzees, fruit bats, monkeys, forest antelope and porcupines. Bushmeat (wild meat from great apes, porcupines, pouched rat) consumption has been implicated for infection spread during the current outbreak which has claimed over 1000 lives in West Africa.

6. Clinical presentation

Research has suggested that there is a low risk of spread of disease in the early (prodromal) phase which lasts around 7 days as compared to advanced stages of the disease when viral titres are considerably high.[10] The incubation period is normally 4–10 days but it can vary from 2 to 21 days. The case-fatality ratio for EBOV infection has been estimated around 50%–90%.[9]

1. General – The onset of Ebola virus disease is sudden with non-specific symptoms such as fever, fatigue, headache, myalgia and sore throat. This constitutes the early prodromal phase of the disease during which the illness progresses to involve one or more organ systems.
2. Gastrointestinal symptoms – Pain abdomen, nausea, vomiting and diarrhoea are commonly seen.
3. Respiratory symptoms include cough, chest discomfort and dyspnoea. Mucous membranes involvement can lead to conjunctival suffusion, pharyngeal injection or dysphagia.
4. Haemorrhagic manifestations – Symptoms can include epistaxis, bleeding gums, hematemesis, melena, prolonged bleeding at the injection site, haemoptysis or haematuria. Cutaneous involvement may occur in form of a maculopapular rash, petechiae or ecchymosis. Some patients develop massive internal and external haemorrhages and disseminated intravascular coagulation.[11] Patients developing haemorrhagic manifestations of the disease have been observed to have the worst outcome.

Table 1 – Risk stratification.

Risk level	Type of contact
Very low risk	Casual contact with an ambulatory and febrile patient.
Low risk	Close contact with an ambulatory and febrile patient.
Moderate risk	Close contact without an appropriate protective gear with a patient who is actively coughing, vomiting, has nosebleeds or diarrhoea.
High risk	Percutaneous, needle stick or mucosal exposure to virus-contaminated blood, bodily fluids, tissues or laboratory specimens in severely ill or known positive patients.

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