CURRENT UPDATES

Ebola Virus Disease – An Update

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Ebola Virus Disease (EVD) is a severe, haemorrhagic febrile disease, often fatal in humans, caused by a non-segmented, negative sense RNA virus of the family Filoviridae and genus Ebolavirus. It is also known as Ebola Haemorrhagic fever. There are five species of Ebolavirus, namely Bundibugyo ebolavirus, Zaire ebolavirus, Reston ebolavirus, Sudan ebolavirus and Tai Forest ebolavirus. The Zaire species has caused multiple large outbreaks with mortality rates of 55 to 88 percent since first appearance of the disease whereas the Sudan virus has been associated with an approximate 50 percent case-fatality rate in four known epidemics: two in Sudan in the 1970s, one in Uganda in 2000, and another in Sudan in 2004 [1-5].

The disease first appeared in 1976 when two simultaneous outbreaks occurred in Sudan and Democratic Republic of Congo with reportedly a total of 602 cases and 431 deaths. The latter was in a village near Ebola river hence the disease was named as Ebola [2]. Since then, outbreaks have occurred in various parts of central and West Africa.

Till December 2013, the largest outbreak was that witnessed by Uganda in the year 2000 with 425 cases and 224 deaths [6]. In December 2013, an upsurge in cases was noted in the West African nation of Guinea starting the current epidemic which subsequently spread to neighbouring Liberia and Sierra Leone and has risen to proportions six times larger than the previous one.

A total of 17 145 confirmed, probable, and suspected cases of Ebola virus disease (EVD) have been reported in five affected countries (Guinea, Liberia, Mali, Sierra Leone, and the United States of America) and three previously affected countries (Nigeria, Senegal and Spain) up to the end of 30 November. There have been 6070 reported deaths. Reported case incidence is slightly increasing in Guinea (77 confirmed cases reported in the week to 30 November), stable or declining in Liberia (43 new confirmed cases in the 5 days to 28 November), and is still rising in Sierra Leone (537 new confirmed cases in the week to 30 November). The case fatality rate across the three most-affected countries in all cases with a recorded definitive outcome is 72%; in hospitalized patients the case fatality rate is 60% [7]. The Zaire species of the virus is held responsible for the present epidemic.

Natural History of Disease: Natural Host-Fruit bats, particularly species of the genus Hypsignathus monstrosus, Epomos franqueti and Myonycteris torquata, are considered possible natural hosts for this virus [6]. The virus is introduced into human population through close contact with the blood, secretions, organs or other body fluids of infected animals like monkeys, chimpanzees, gorillas, antelopes and porcupines who themselves are accidental hosts like human beings.

Transmission: Once introduced into the community, the disease then spreads from human to human with infection resulting from direct contact (through broken skin or mucous membrane) with the blood, secretions, organs or other bodily fluids and indirect contact with environment contaminated with such

fluids. Incubation Period-The incubation period in humans ranges from 2-21 days. Pathogenesis-The virus infects macrophages and dendritic cells causing their necrosis and release of large number of virus particles in extracellular fluid. Spread to regional lymph nodes results in further rounds of replication, followed by dissemination of virus to dendritic cells and fixed and mobile macrophages in the liver, spleen, thymus, and other lymphoid tissues [8, 9]. In addition to causing extensive tissue damage, filoviruses also induce a systemic inflammatory syndrome by inducing the release of cytokines, chemokines, and other pro-inflammatory mediators from infected macrophages and other cells producing the symptoms [8, 9]. Clinical Presentation-It includes sudden onset of fever, intense weakness, muscle pain, headache and sore throat followed by vomiting, diarrhea, rash, impaired kidney and liver function and in some cases, both internal and external bleeding. The patients become contagious only after they begin to show symptoms. Diagnosis-The diagnosis can be confirmed through laboratory tests which include various tests like ELIZA and RT-PCR assay for antibody and antigen detection. Also, serum neutralization test, electron microscopy and virus isolation by cell culture can be done. Case Fatality-The disease has a case fatality rate of 90% [6]. Carriers - Those who recover, remain infectious as long as their blood and secretions contain the virus. People have been found to shed virus in their semen even 7 weeks after the recovery.

Treatment: No specific treatment is available. Severely ill patients require intensive support care. Frequent dehydration during disease should be addressed using oral rehydration solutions or intravenous fluids

Prevention and Control: Three pronged strategy can be applied for prevention and control of this public health emergency.

I. Reducing the risk of Ebola infection in people [6] - Raising awareness of the risk factors for Ebola infection and protective measures which people can take at individual level are the only options as there is no specific vaccine or treatment. Educational public health messages can be given regarding –
   a. Reducing the risk of wildlife to human transmission - Animals should be handled with gloves and other appropriate protective clothing. Animal products should be thoroughly cooked before consumption.
   b. Reducing the risk of human to human transmission – Close physical contacts with Ebola patients should be avoided. Gloves and appropriate protective clothing should be worn when taking care of ill patients. Frequent hand washing is advised.
   c. Population should be informed about the nature of the disease and about outbreak containment measures, including safe burial of the dead.
   d. Several vaccines are being tested but none is available for clinical use.

II. Controlling infection in health care setting [6]
   a. Standard precautions should be applied consistently with all patients, regardless of their diagnosis as the symptoms are mostly non-specific. These include basic hand hygiene, respiratory hygiene, use of personal protective equipments, safe injection and safe burial practices.
   b. Health care workers taking care of infected patients should wear face protection, a clean, long sleeved gown, and gloves.
   c. Lab workers dealing with samples should also take these measures.

III. Controlling ebolavirus in domestic animals [6]
   a. Especially Reston virus is found to be apparently maintained in an animal reservoir in the Philippines. Routine cleaning and disinfection of pig and monkey farms should be done to inactivate the virus.
   b. If an outbreak is suspected, the premises should be quarantined immediately. Culling of infected animals with close supervision of burial or incineration of carcasses is necessary.
   c. Establishment of an active animal health surveillance system.

Current Epidemic and Response: The current epidemic of Ebola virus disease is the largest till date. Though in Africa, the people travelling from this region poses a threat to all other parts of the world. Same is the case with India. Many Indians are residing in affected countries. The government of India has issued alert for early detection of Ebola Virus [10]. Early detection and isolation of cases,

contact tracing and monitoring and following rigorous procedures for infection control constitute the main elements of action. The laboratory capacity has also been strengthened at the National Institute of Virology, Pune and National Centre for Disease Control, Delhi, to diagnose the disease. The details of travelers originating or transiting from Ebola virus affected area will be obtained by the government from concerned Airlines and Indian Missions and they will be tracked after their arrival in India, up to their final destination. The surveillance system would track these travelers for four weeks and detect them early in case symptoms develop. Designated facilities have been made at relevant airports/ports to manage travelers manifesting symptoms of the disease [10].

All states and Union Territory administrations have been asked to identify nodal officers and designate hospitals with isolation wards for responding to any possible cases [10].

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