Mini Review

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Current outbreak of ebola hemorrhagic fever (EHF): a general overview

Abbreviations: EHF, ebola hemorrhagic fever; MHF, marburg hemorrhagic fever; EVD, ebola virus disease; WHO, world health organization; CDC, centers for disease control; ICTV, international committee on taxonomy of viruses; ELISA, enzyme-linked immuno-sorbent assay; RT-PCR, reverse transcriptase polymerase chain reaction; TDGR, transportation of dangerous goods regulations

Introduction

Filoviridae is the only known virus family about which we have such profound ignorance. Hence, the information gathered during control efforts directed toward recent epidemics has provided considerable fundamental information about filoviruses.[1] Because of similar disease pattern, clinical symptoms and owing to largely sensationalist accounts of outbreaks,[2] Ebola hemorrhagic fever (EHF) and Marburg hemorrhagic fever (MHF) are widely recognized. However, EBOV and MARV are highly pathogenic, and have traditionally been associated with devastating outbreaks, with case fatality ranging from 25% to 90%.[3] Additionally, EBOV and MARV are considered potential bio weapons agents[4] and as such are classified as class A select agents. While the ability to conduct research on infectious EBOV and MARV is limited to a small number of high containment laboratories, extensive funding has been applied to primary research in the past decade, and progress has been made in understanding the biology of these viruses, as well as toward development of potential therapies.[5,6]

First report on an Ebola outbreak was published in Bulletin of the World Health Organization in 1978.[7] As of 2014, an epidemic of Ebola virus disease (EVD) is ongoing in West Africa. The outbreak began in Guinea in December 2013, but was not detected until March 2014, after which it spread to Liberia, Sierra Leone, Nigeria and Senegal. As of 8 September 2014, the World Health Organization (WHO) and the Centers for Disease Control (CDC) reported a total of 4,273 suspected cases and 2,288 deaths.[8] Many experts believe that the official numbers substantially understate the size of the outbreak because of families' widespread reluctance to report cases. On 28 August, the WHO reported an overall case fatality rate estimate of 52%, considerably lower than an average of rates reported from previous out breaks, with approximately 10% of the dead have been health care workers.

Many of the areas that have been infected are areas of extreme poverty without even running water or soap to help control the spread of disease. Other factors include belief in - and reliance on - traditional folk remedies, magical beliefs, and cultural practices that predispose to physical contact with the deceased, especially death customs such as washing the body of the deceased. Some hospitals lack basic supplies and are understaffed, which has increased the likelihood of staff catching the virus themselves.

According to International Committee on Taxonomy of Viruses (ICTV), EVs are - sense, single stranded RNA viruses from family Filoviridae, and genus Ebola virus. Members of this genus are called ebola viruses. Five different subspecies have been identified so far

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i.e., Ebola virus (Zaire ebolavirus) responsible for current ongoing outbreak, Sudan virus (Sudan ebolavirus), Taï Forest virus (Taï Forest ebolavirus), Bundibugyo virus (Bundibugyo ebolavirus), and Reston virus (Reston ebolavirus) non human origin.

Available evidence and the nature of similar viruses made researchers believe that the virus is zoonotic (animal-borne) with bats being the most likely reservoir; other hosts may include porcupine, gorillas, chimpanzees, and antelopes.

Reported incubation period for EHV in human is 2 to 21days after exposure, although 8-10days is most common. Primary symptoms include fever (>38.6°C or 101.5°F), severe headache, muscle pain, abdominal pain, weakness, diarrhoea, vomiting, lack of appetite and body rashes. Secondary symptoms includes haemorrhaging i.e. in about 50% of patients bleeding from inside & outside of the body occurs such as from gums, nose, injection sites and gastrointestinal tract, dehydration and significant wasting occur as the disease progresses. In severe cases, the haemorrhagic diathesis accompanied by leucopenia; thrombocytopenia; hepatic, renal and central nervous system involvement; or shock with multi-organ dysfunction have been reported.[9]

Public Health Ontario has published a sample collection and submission guideline for suspected VHFs on August 22, 2014.[10] According to that, VHFs are not indigenous to Canada, but there have been both suspected and confirmed convalescent cases, and the potential for importation of an acute case is of concern. Circumstances under which the Diagnosis of acute VHF should be considered are: Individuals who, within 3weeks before onset of fever, have either; travelled in the specific local area of a country where VHF has recently occurred (if exact travel history is unknown, risk assessment should be done through consultation with an Infectious Disease Specialist), had direct contact with blood, other body fluids, secretions, or excretions of a person or animal with VHF, or worked in a laboratory or animal facility that handles haemorrhagic fever viruses.

Other diseases that should be ruled out before a diagnosis of EVF can be made include: malaria, typhoid, shigellosis, cholera, leptospirosis, plague, rickettsiosis, relapsing fever, meningitis, hepatitis and other

viral haemorrhagic fevers. EVD can be diagnosed through several types of tests e.g., positive antibody-captured enzyme-linked immuno-sorbent assay (ELISA), positive antigen detection tests, positive serum neutralization test, reverse transcriptase polymerase chain reaction (RT-PCR) assay, and microscopic confirmation of viruses via observing cytopathic effects in affected tissues and cell cultures.

It is important to note that only specimens essential for diagnosis or monitoring should be obtained; by experienced staff using all necessary personal protective equipments. These PPEs should be worn by all those who are obtaining, handling and testing laboratory specimens. Glass containers are strictly avoided, and all the disposable sharp objects, such as needles, scalpel blades etc., should be placed in appropriate sharps containers immediately after use followed by autoclaving or incineration before disposal.

Because of the highly infectious nature, absence of specific drug of target and bio-safety concerns it is strictly recommended to avoid any risk of unnecessary contact and hence infected tissues from suspected individual should not be tested as a first line specimen, each sample for EHD specific testing should be submitted individually with its own separate requisition form. All the other tests requested on same requisition form will be cancelled or remain on hold depending EHD testing results. Shipping of samples must be done in accordance with the Transportation of Dangerous Goods Regulations (TDGR), as per international procedures for transport of category "A" infectious substances (UN2814).[10]

Till now there is no targeted drug or vaccine available for EHD, but patients are continuously being treated for their symptoms especially in the very early stages of the disease. Options includes extremely supportive care, maintenance of electrolytes, fluids, oxygen supply, blood pressure, transfusion of fresh blood or its components, and strict isolation of the patient to control the hospital acquired infections.

Preventive measures can help to reduce the chances of contracting the virus. Especially in a region where a VHF or an Ebola outbreak has occurred due to direct contact with the bodies of people died of either EVD, any other VHF or due to an unknown illnesses be strictly avoided.

Health care workers being at high risk should be very careful, they should follow all the recommended Infection control procedures as documented and demonstrated by OSHA, OHSA, CDC, Health Canada, WHO and all other related bodies. They should also closely monitor their health status and in-case of any symptoms developed, even minor they should seek immediate medical attention.

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Conflict of interest

The author declares no conflict of interest.

References

1. Peters CJ, LeDuc JW. An Introduction to Ebola: The Virus and the Disease. *J Infect Dis*. 1999;179 (Suppl 1):ix–xvi.

2. Semmler IA. Ebola goes pop: the filovirus from literature into film. *Lit Med*. 1998;17(1):149–174.

3. Feldmann H, Geisbert TW. Ebola haemorrhagic fever. *Lancet*. 2011;377(9768):849–862.

4. Borio L, Inglesby T, Peters CJ, et al. Hemorrhagic fever viruses as biological weapons: medical and public health management. *JAMA*. 2002;287(18):2391–2405.

5. Dias MB, Reyes–Gonzalez L, Veloso FM, et al. Effects of the USA PATRIOT Act and the 2002 Bioterrorism Preparedness Act on select agent research in the United States. *Proc Natl Acad Sci USA*. 2010;107(21):9556–9561.

6. Burki TK. USA focuses on Ebola vaccine but research gaps remain. *Lancet*. 2011;378(9789):389.

7. Ebola haemorrhagic fever in Zaire, 1976. *Bull World Health Organ*. 1978;56(2):247–270.

8. WHO: Ebola response roadmap update-8 September 2014.

9. Centre for Disease Control and Prevention.

10. Viral Hemorrhagic Fevers.