

EBOLA VIRUS DISEASE: WHAT SHOULD A DENTIST KNOW? – A BRIEF REVIEW

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ABSTRACT:

Ebola virus disease (EVD) is a severe, fatal, zoonotic, hemorrhagic disease. The current outbreak is the largest in history and has spread across continents. Consequently, it has made the WHO to declare it as a public health emergency of international concern. To our best knowledge, it is the first comprehensive review of EVD and its implications for the dental fraternity.

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الملخص العربي

مرض فيروس الإيبولا: ماذا يجب أن يعرف طبيب الأسنان؟ - استعراض مختصر

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مرض فيروس الإيبولا (EVD) هو مرض خطير و مميت، دات منشأ حيواني، كما انه مرض نزفي. الانتشار الحالي هو الأكبر على مر التاريخ حيث انه انتشر عبر القارات. نتيجة لذلك، قامت منظمة الصحة العالمية بإعلانه كحالة طوارئ للصحة العامة ذات أهمية دولية. على حد علمنا، هذا أول استعراض شامل لمرض فيروس الإيبولا وأثاره على اطباء الأسنان.

INTRODUCTION

Ebola virus disease (EVD) is a haemorrhagic fever. It is a viral disease caused by Ebola virus. It is a zoonotic virus that belongs to family Filoviridae. Its origin though unclear could be traced to fruit bats (Pteropodidae family) and they could be its reservoir. EVD is insidious in onset with flu-like symptoms and often fatal in human and in non-human primates (monkeys, gorillas and chimpanzees).¹

Since it was first recorded in 1970s in sub-Saharan Africa, there have been regular outbreaks of the epidemic. The current outbreak in West Africa has shown a reported total of 17145 confirmed, probable, and suspected cases of Ebola virus disease (EVD) 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.²

These numbers speak that though the disease is fatal, it is far behind the silent killers like diabetes and tuberculosis. However, the increase in connectivity and the transformation of the world into a global village has led to an alarm about the possible spread of current EVD outbreak.

TRANSMISSION

The Ebola virus is virulent and is highly transmittable.³ It was introduced to humans by close contact with animals.^{4, 5} In humans, the virus primarily spreads through direct contact with the infected person's body fluids (stool, urine, saliva, semen, breast milk and semen). In a convalescent male, the virus can persist in semen for at least 70 days.⁶ Contaminated objects such as needles, syringes and contaminated materials can also transmit it indirectly.⁷ It is not known to have confirmed air borne transmission in humans.⁶ The corpse of infected person and carcass of dead infected animals can also be a source of infection.

PATHOGENESIS

EVD appears to incapacitate the immune system. It evades the host immune response and replicates in various cell types such as the hepatocytes, Kupffer's cells, macrophages and endothelial cells. This results in early viremia. There is a clear upsurge in the release of pro-inflammatory cytokines from the infected cells. The resultant immune system malfunction subsequently initiates the hemorrhage in vascular system, hypotension, and drop in blood pressure. This sets the stage for shock, multi-organ failure and a typical death within ten days after the

the appearance of symptoms. The manner in which it shuts the major mechanisms in the host facilitates its uncontrolled replication.^{3, 8}

CLINICAL FEATURES

EVD has an incubation period of 2 to 21 days with shorter incubation periods in cases of exposure to contaminated material like needle stick injury.⁹ The first symptoms are high-grade fever, malaise, fatigue, body aches and sore throat.

They are followed by epigastric pain, nausea, vomiting, watery diarrhea leading to intravascular volume depletion, asthenia, headache, conjunctival injection, chest pain, Abdominal pain, arthralgias, myalgias, hiccups, delirium, Shock, hemorrhage including internal (Gastro intestinal) and external (gingival bleeding and in stools), secondary infections, meningo-encephalitis, persistent neuro-cognitive abnormalities. Children and pregnant women populations are particularly vulnerable. The survival of neonates born to mothers with EVD has not been reported.^{1,3,10-12} Malaria, typhoid fever, shigellosis, leptospirosis, yellow fever, dengue and other viral haemorrhagic fevers are among the differential diagnoses to consider in EVD infected patients.¹³

Laboratory findings include lymphocytopenia, thrombocytopenia, and elevated liver enzymes. Prothrombin and partial thromboplastin times are also increased.¹⁴ Confirmation within a few days after symptoms can be obtained with enzyme-linked immunosorbent assay (ELISA), Polymerase chain reaction (PCR) assay and virus isolation.¹⁵ EVD is primarily treated symptomatically. No approved vaccine is currently available for EVD. Supportive care is critical for the patients.

HOW CAN WE PREVENT SPREAD OF EVD?

Extensive research evidence shows that the EVD outbreaks are potential spill over into the humans from an animal source. A recent review by Sarah H et al indicated that for the purposes of identifying potential sources of transmission from animals to humans and isolating suspected virus in an animal in outbreak situations, (1) surveillance of free-ranging non-human primate mortality and morbidity should be a priority, (2) any wildlife morbidity or mortality events should be investigated and may hold the most promise for locating virus or viral genome sequences, (3) surveillance of some bat species is worthwhile to isolate and detect evidence of exposure, and (4) morbidity, mortality, and serology

studies of domestic animals should prioritize dogs and pigs and include testing for virus and previous exposure.¹⁶ Persons who come into direct contact with an infected animal, its body fluids are at risk. In affected areas one should avoid contact with or handling of wild animals, alive or dead, or their raw or undercooked meat.¹³

EVD is highly infectious, but it can be prevented. A gist of the summary of the infection prevention and control (IPC) measures by the WHO for anyone providing direct and non-direct care to patients with suspected or confirmed EVD in health-care facilities is as follows:

- Use of Hand hygiene for all patients regardless of signs and symptoms, by using alcohol hand rubs, solutions or soap and running water and single-use towels.
- Before donning gloves and wearing personal protective equipment (PPE) upon entry to the isolation area; before any clean or aseptic procedures is being performed on a patient; after any exposure risk or actual exposure with a patient's blood or bodily fluids; after touching (even potentially) contaminated surfaces, items, or equipment in the patient's surroundings; and after removal of PPE, upon leaving the isolation area.
- Prior to entering care areas, don PPE - this includes gloves, an impermeable long-sleeve gown, boots/closed-toe shoes with overshoes, and a mask and eye protection for splashes.
- Limit the use of needles and other sharp objects, cover abrasions, and wear PPE.
- Laboratory care: Ensure safe handling of laboratory samples, i.e. use of PPE, safe collection and sample processes from confirmed or suspected cases.
- Safe care of the dead: Keep the handling of human remains and dead bodies to a minimum. Wear PPE. Only trained staff should undertake the recommended procedures for burial while taking into account cultural and religious concerns.¹⁷

Epidemiological models employed to forecast considering the end of this current EVD epidemic, estimate that it should disappear within nine months and no major outbreaks (i.e., more than 10 infected cases) should be reported except in Liberia, Guinea, Sierra Leone, Nigeria, Mali and Gambia.¹⁸

EVD AND THE DENTIST

EVD presents initially with flu-like symptoms, with later demonstrations of its classical hemorrhagic fever symptoms. The initial oral findings may be sore throat and gingival bleeding in its later stages. Hence, the possibility of first diagnosing an EVD patient in a dental setting is uncommon. However, dental clinician and the staff must undertake proper infection control measures to avoid the risk of EVD transmission.

In the phase of Post clinical recovery, the patient is said to be no longer contagious. A recovered patient can transmit the virus through semen for up to 40 days and through breast milk for 15 days which is irrelevant to dental care. A study noted that the enzymes in saliva and certain conditions in the mouth appeared to inhibit the virus from surviving for long periods. The virus was found to stay in saliva during the 'acute phase of infection', not longer than 8 days.

CONCLUSION

The current EVD outbreak is the largest known outbreak. On August 8, the WHO Director-General declared this outbreak a Public Health Emergency of International Concern. The current understanding reveals that this EVD outbreak will end soon. Nevertheless, the question that lingers is, are we prepared for the next outbreak?

Increasing the awareness of risk factors among the general population will keep us prepared for EVD outbreaks. Proper knowledge and understanding about the EVD, its pathogenesis and prevention is vital for health care workers to prevent such events in the future.

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