Ebola virus disease: review and implications for dentistry in Ireland

Précis: The current Ebola virus outbreak has attracted worldwide attention. This article will cover the oral manifestations and dental implications of Ebola virus infection.

Abstract: The current Ebola outbreak in West Africa is a global health emergency with implications for all healthcare professionals. This article will review the clinical features, transmission and oral manifestations of Ebola virus infection, and discuss the implications of the current outbreak for dental practices in Ireland. Guidance for managing suspected cases and contacts is also provided.

Conclusions: Although Ebola is an alarming disease with a very high mortality rate, it is extremely unlikely that the dental team will encounter a new presentation of Ebola or that it will pose a significant transmission risk. The dental team should be aware of the Health Protection Surveillance Centre (HPSC) Algorithm for Ebola Virus Disease Risk Assessment, and it should be followed as necessary. It is advised to defer dental treatment for 21 days after possible exposure to the Ebola virus.

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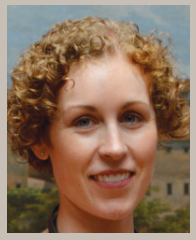
Introduction

The current Ebola outbreak in West Africa has developed into a global healthcare emergency with implications for all healthcare professionals. This article will review the clinical features, transmission and oral manifestations of Ebola virus infection, and discuss the implications of the current outbreak for dental practices in Ireland.

The Ebola virus is an RNA virus belonging to the *Filoviridae* family that was first recognised after two outbreaks of viral haemorrhagic fever in the Democratic Republic of Congo (previously Zaire) and Southern Sudan in 1976.[1] The former occurred in a village near the Ebola River, after which the virus was named. Five different species of Ebola virus are now recognised: Bundibugyo, Sudan, Zaire, Reston and Tai Forest. The Zaire strain remains the most lethal, with a mortality rate of 76%, and is the cause of the current, twenty-fifth Ebola epidemic.[1,2] The current outbreak in West Africa, which began in Guinea in March 2014, is the largest and most complex since the virus was first recognised, involving more infections and deaths than all previous outbreaks combined, and involving capital cities and major urban centres for the first time. To date, there have been 25,855 cases and 10,717 deaths[3,4] (correct on April 17, 2015), with the vast majority of cases in Guinea, Liberia and Sierra Leone. There have also been cases in Nigeria, Senegal, Mali, Spain, the United States and United Kingdom.



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Fruit bats of the *Pteropodidae* family are thought to be the natural Ebola virus hosts.[5] Animal to human transmission occurs through close contact with the blood, secretions, organs or other bodily fluids of infected animals. Human-to-human transmission occurs through direct contact with the bodily fluids of infected individuals and through contact with contaminated materials and surfaces. Traditional burial and funeral ceremonies in West Africa, where mourners have direct contact with the bodies of the deceased, are thought to have contributed to the rapid spread of disease in this outbreak. Large numbers of healthcare workers, in a part of Africa unaccustomed to dealing with Ebola, have also been affected.[5]

Clinical features

The incubation period for Ebola is two to 21 days, although typically symptoms appear eight to ten days after infection.[1,2] First symptoms include sudden onset of high fever, fatigue, myalgia, headache and sore throat. These are then followed by vomiting, diarrhoea and abdominal pain. Around the fifth to seventh day of illness, patients develop thrombocytopaenia leading to severe bleeding from many sites including nose, gingiva, gastrointestinal and genital tracts, and conjunctiva.[5,6] Treatment involves good supportive clinical care, including rehydration and treatment of organ dysfunction. There is no proven effective treatment available for Ebola as yet, although a wide range of treatments and vaccines are currently being tested.[1]

FIGURE 1: Colourised transmission electron micrograph of Ebola virus.

The virus is only detected in blood after the onset of symptoms. Diagnostic tests include antigen-capture enzyme-linked immunosorbent assay (ELISA)

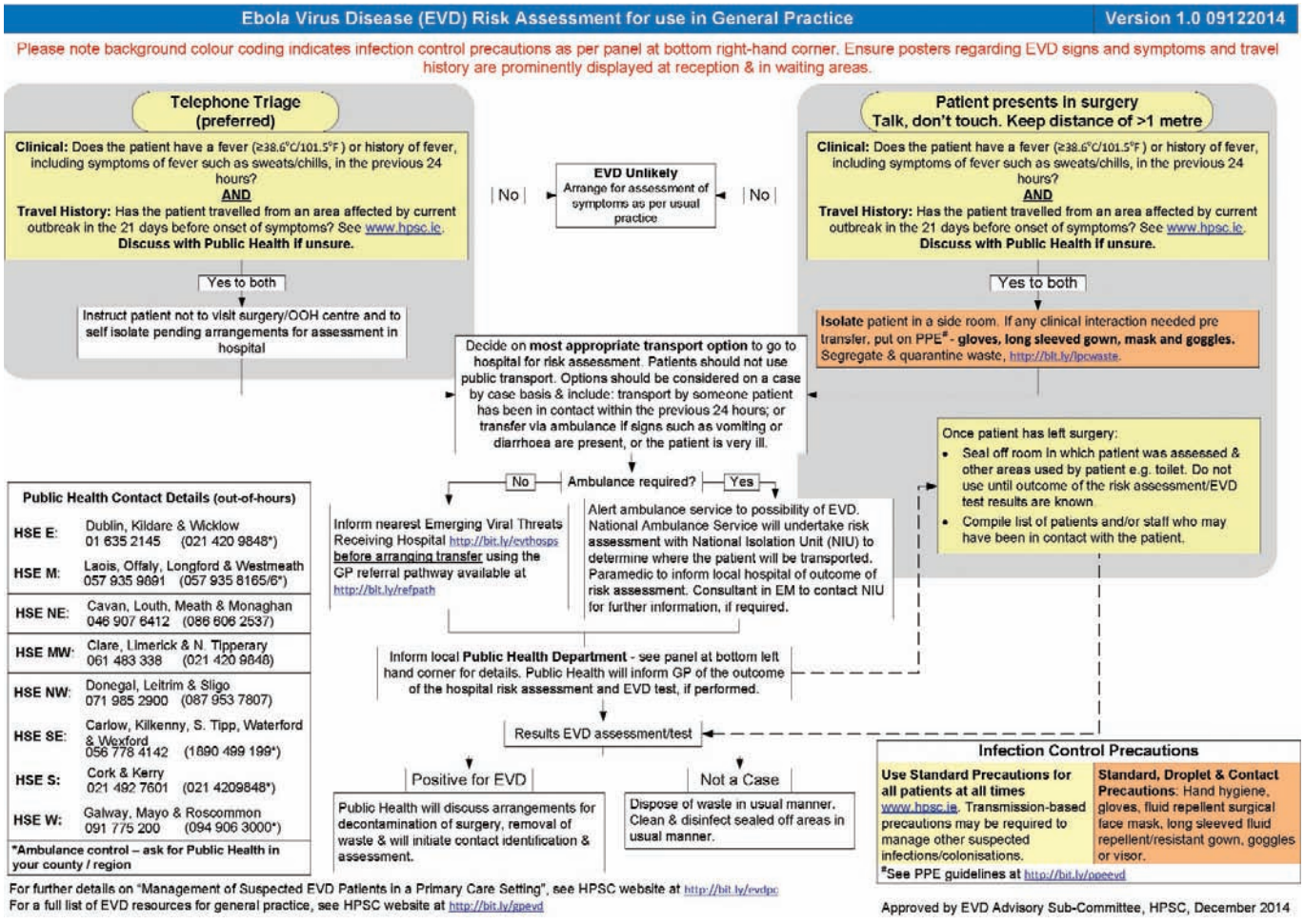

FIGURE 2: HSPC Algorithm for Ebola Virus Disease Risk Assessment for use in General Practice: http://www.hspc.ie/A-Z/Vectorborne/ViralHaemorrhagicFever/Ebola/EbolaInformationforGeneralPractitioners/File,14977,en.pdf.

testing, electron microscopy, IgM ELISA, reverse transcriptase polymerase chain reaction (PCR) assay and virus isolation by cell culture.[1,2]

Transmission

It is generally accepted that individuals only become infectious once they have developed symptoms, as individuals with asymptomatic Ebola virus infection harbour such low levels of virus that transmission to others is very unlikely.[1,2,7,9] Current evidence shows that direct physical contact and exposure to infected body fluids are the primary modes of transmission.[9] Airborne transmission was not thought to occur; however, there is some controversy emerging, with increasing data supporting the roles of airborne and droplet transmission.[9]

The Ebola virus can be found on the skin and in the saliva, sweat, tears, breast milk, semen, urine, stool and vomit of infected patients. Direct contact, therefore, through broken skin or mucous membranes, with an infected person, or with any of these fluids from an infected person displaying symptoms of Ebola, can lead to transmission of the virus. This includes contact with contaminated clothing, bed linen, medical equipment and other items (fomite transmission), although the virus is readily inactivated by soap and water, and by alcohol.[7] The role of airborne and droplet transmission remains unclear. There is evidence that diarrhoea, vomiting and coughing, particularly in the late stages of the disease, can generate virus-laden infectious aerosols, which would make droplet and airborne transmission from Ebola cases to uninfected persons in close proximity possible.[9] The epidemiological impact of this has yet to be established but it is likely that some degree of aerosol transmission currently occurs. Larger scale airborne transmission is currently felt to be improbable without phenotypic changes in the virus.[9]

Oral manifestations

The oral manifestations of Ebola include gingival bleeding and odynophagia. Non-specific mucosal lesions, including white and red patches and aphthous-like ulceration, have also been reported. Bleeding is typically a late feature of the disease and is concomitant with bleeding from other sites.[2,6] It is therefore very unlikely that gingival bleeding would be a presenting feature.

Dental implications

It is extremely unlikely that the dental team will diagnose or treat patients with overt Ebola virus disease as these patients are too unwell to seek dental care. However, it is possible that asymptomatic patients and those in the early stage of disease with non-specific symptoms may undergo dental therapy. It is also possible that the dental team may encounter patients who have recently travelled from areas affected by Ebola. Individuals who have visited an Ebola-affected area but have had no direct contact with the disease are considered very low risk and no restrictions to medical or dental care are required. However, individuals who may have had contact with Ebola should have any non-essential treatment deferred for 21 days after the possible exposure.[7] If the patient's treatment cannot be delayed or managed with pharmaceutical methods then the regional Health Service Executive (HSE) Department of Public Health should be contacted.

The Health Protection Surveillance Centre (HPSC) advises the following risk assessment for general medical practice, which is also applicable to dental practice:[8] Ebola should be suspected in patients who have a fever ≥38.6˚C or a history of fever in the past 24 hours and have recently visited an Ebola-affected area. Telephone triage is preferred and if the patient is considered a risk then they should be advised to self-isolate and the regional HSE Department of Public Health should be contacted. In the unlikely event that a patient presents to the surgery and falls into the 'at-risk' category, then they should be isolated in a side room, physical contact avoided and a distance of more than one metre kept between them and any staff. Transfer to an appropriate centre should be arranged. The patient should not use public transport. Ambulance or transport by someone with whom the patient has been in contact in the previous 24 hours is preferable. If the patient tests positively for Ebola, then Public Health will arrange decontamination of the surgery and removal of waste.

Summary

Although Ebola is an alarming disease with a very high mortality rate, it is extremely unlikely that it will pose a significant risk of transmission in dental practice in Ireland. Gingival bleeding is a late feature occurring concurrently with bleeding from other sites, and so these patients would be too unwell to present for dental treatment. If a patient of concern does present to or contact a dental practice, then the HPSC Algorithm for Ebola Virus Disease Risk Assessment for use in General Practice should be followed. In those who may have been exposed to the virus, it is advised to defer dental treatment for 21 days after the possible exposure.

Take home messages

- The dental team is very unlikely to encounter a new presentation of Ebola.
- Treatment should be deferred for 21 days in those who may have been exposed to the virus.

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