

Ebola

A Review for Emergency Providers



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KEYWORDS

• Ebola • Zaire ebolavirus • Filovirus • Emergency department

KEY POINTS

- The current epidemic of Ebola virus is several magnitudes larger than any previous filovirus outbreak, likely due to the fact that it has spread to highly populated, urbanized areas.
- Enveloped RNA viruses, such as filoviruses, are relatively unstable and easy to inactivate with a registered disinfectant or a 10% solution of common household bleach in water.
- Early in the course of disease, nonspecific symptoms, such as fever, malaise, diarrhea, and vomiting, might not allow a care provider to distinguish Ebola virus disease (EVD) from influenza, malaria, and other more common infectious diseases.
- Data from previous Ebola outbreaks demonstrate that, once appropriate personal protective equipment and procedures are in place, transmission of the infection to health care workers drops dramatically.
- A 2-step Ebola screening process for all patients entering an emergency department (ED) should focus on exposure history followed by a symptom history in positive exposure cases. If positive, this screening should trigger a process of immediate patient isolation and the provision of appropriate personal protective equipment (PPE).
- Emergency medical services (EMS) procedures for identifying and caring for suspected Ebola patients are necessary, given that health care providers are at significant risk of transmission during the transport of a suspected Ebola patient from the scene to a hospital.
- During a public health emergency, ED personnel are often patients' first point of contact with the medical field; therefore, they must understand state-specific regulations regarding quarantine and isolation for diseases, including viral hemorrhagic fevers.
- Early, aggressive oral or intravenous fluid resuscitation improves patient outcomes.

INTRODUCTION

Communicable disease is an omnipresent fact of human life. Throughout history, dreaded diseases, such as plague, smallpox, and polio, have become part of lore

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with regard to their ability to create disability and death and to stoke panic at their mere mention. Today, EVD, with mortality rates approaching 70% among untreated patients, is as menacing and deadly. Knowledge about this filovirus, its treatment, and its prevention is growing, but the disease remains a diagnostic and treatment challenge because much of the medical community became aware of it only recently. Prior to the 2014 outbreak, it occurred in isolated parts of the world with minimal attention from the greater worldwide medical community. Now that Ebola has reached the United States, emergency care providers are on the front lines of preparation for and treatment of its victims. This article presents background information, personal and public protective strategies, and treatment recommendations for emergency physicians.

HISTORY

The earliest known filovirus infections occurred in vaccine laboratory workers in Marburg and Frankfurt, Germany, and Belgrade, Serbia (former Yugoslavia), in August 1967.^{1,2} Affected subjects suffered from malaise, myalgia, fever, headache, and gastrointestinal symptoms but tested negative for illnesses such as dysentery and typhoid fever. During later stages of the illness, many patients experienced bleeding from orifices, sometimes resulting in hemorrhagic shock. Among the 31 total cases were 7 deaths.¹ By November 1967, the infectious agent had been isolated from victims' blood, visualized by electron microscopy, and named Marburg virus after the initial location of the outbreak. Good evidence suggests that the infection had been transmitted by exposure to green monkeys (*Cercopithecus aethiops*) imported from Uganda, but the animals had been sacrificed, so the agent was never isolated directly from a monkey.² Since 1967, there have been 6 additional outbreaks and sporadic case reports of human Marburg virus infection. Of these, the most recent and serious outbreak occurred in Angola in 2004, affecting 252 patients and resulting in 227 fatalities.²

The first cases of hemorrhagic fever caused by an *Ebolavirus* species occurred in Zaire (now the Democratic Republic of Congo) in 1976.^{3,4} A total of 318 cases and 280 deaths were reported.³ An international group of investigators identified the cause as a new filovirus, now recognized as Ebola virus (EBOV, formerly named Zaire ebolavirus). In many cases, the infection was transmitted through the routine use of unsterilized needles.³ A nearly simultaneous outbreak of a different strain of ebolavirus, Sudan ebolavirus (SUDV), occurred in Sudan that same year, infecting 286 patients and causing 152 deaths.⁵ Between 1976 and 2014, there were sporadic outbreaks of disease caused by *Ebolavirus* species, mostly in remote forested areas of central Africa.⁵ The largest outbreak occurred in Uganda in 2000, infecting 425 patients and causing 225 deaths.⁵ Until recently, the threat posed by filovirus diseases in Africa was believed to be minor compared with challenges posed by malnutrition, malaria, HIV, and other infectious diseases.⁵

The current epidemic of Ebola virus is several magnitudes larger than any previous filovirus outbreak, likely because it has spread to highly populated, urbanized areas. Epidemiologic investigation indicates that the index patient was a 2-year-old child who died in December 2013 in the Meliandou village, Guéckédou prefecture, Guinea.⁶ The mode of transmission is presumed to be an animal reservoir, but the pathway has not been confirmed. On March 23, 2014, the World Health Organization (WHO) was officially notified of a rapidly evolving outbreak of EVD. During the spring and summer of 2014, the infection spread to nearby Sierra Leone, Liberia, and Nigeria.⁷ Genomic sequencing of EBOV strains in Sierra Leone demonstrated that the virus had been

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