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Ebola: An Evolving Epidemic

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In March 2014, an outbreak of Ebola virus disease (EVD) in the West African country of Guinea was announced to the World Health Organization (WHO). Since that time, the outbreak has spread to four additional West African countries; and the combined suspected and confirmed cases exceed 8,000 with an estimated case mortality of approximately 70%. Predictions of greater than 20,000 probable and suspected cases by early November 2014 are anticipated.[1,2] In late September, the first case of EVD diagnosed within the United States was documented in a patient having traveled from Liberia. Following hospitalization and supportive treatment, he subsequently died nine days after initial presentation.[3]

Ebola virus, along with Marburg virus, is a member of the Filoviridae family of viruses. While the natural reservoir is likely a fruit bat, most instances of human transmission result from contact with the bodily fluids of other infected humans.[4] Together, these two agents are the most common causes of the category of disease entities, collectively known as viral hemorrhagic fever (VHF). Patients with VHF often present with a combination of nonspecific symptoms, including fever, weakness, anorexia, headaches, nausea and vomiting, diarrhea, chest pain, myalgia, and sore throat.[5] Hemorrhage, coagulation cascade activation (including disseminated intravascular coagulation), and hypotensive shock are often the clinical endpoint of the disease.[6,7] Due to the nonspecific nature of the early symptoms of EVD and other VHF, health care providers should include travel history in patients exhibiting those symptoms.[8]

Upon clinical suspicion of Ebola infection, clinicians should follow the advice of the Centers for Disease Control and Prevention (CDC) as set forth in its recently published guidelines regarding specimen collection and handling. Specifically, health care providers should follow standard, contact, and respiratory precaution procedures when in contact with patients suspected of having the disease and throughout collection and handling of specimens. Additionally, the CDC requires consultation prior to accepting specimens for diagnosis of EVD.[9] The method of diagnosis for EVD is dependent on the state of the disease course. Tests utilized include antigen-capture enzyme-linked immunosorbent assay (ELISA), IgM ELISA, and polymerase chain reaction.[10,11] The specific type of tissue required for diagnosis depends on the type of test being performed and should be confirmed with the CDC.[9]

Once a diagnosis has been made, there are still many considerations regarding patient care and laboratory testing of blood and other bodily fluids from infected patients. Treatment for EVD is primarily supportive and includes intravenous fluid replacement, electrolyte control, proper oxygenation, and blood pressure control. There are no medications, antiviral agents, or vaccines currently approved by the Food and Drug Administration for use in the treatment of EVD.[12] ZMapp is an experimental monoclonal antibody cocktail developed to bind Ebola virus proteins. The treatment has had very

limited distribution to infected patients, and its efficacy is unknown as randomized trials have not been conducted. A vaccine developed under direction of the National Institutes of Health is currently in the early stages of human testing.[13] While the CDC notes that hospitals may effectively care for patients with suspected or known Ebola virus infection, some literature suggests that patient care may be most effectively administered at locations with specially trained staff and within facilities designed to accommodate isolation requirements.[9,14] Laboratory tests may be best administered through self-contained point-of-care laboratories created within the quarantine boundaries and may require special protocols designed to minimize the risk of transmission to laboratory personnel.[15,16]

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