
The Ebola Virus: Origin, Outbreaks, Treatment

The Ebola virus was first identified and classified in 1976 when a mysterious outbreak struck two Central African towns, killing a majority of its victims. The virus was discovered by Dr. Peter Piot when he was tasked to help find out why so many people were dying from an unknown and terrifying disease. The virus got its name after the Ebola River.

In between outbreaks, the virus lives in a non-human reservoir. Strong evidence suggests that this reservoir is bats, however, that is yet to be determined. The virus replicates within the bat population through something called the enzootic cycle. Occasionally, when general conditions are right, the virus can also spread to other animals. It can replicate within them and jump back and forth through mammals through the epizootic cycle, meaning, those are not typical hosts for the virus. The epizootic cycle can also involve transmission to humans, either directly from bats, other animals, or most commonly, from other people.

When this virus is transmitted through humans, it involves direct contact of broken skin or infected body fluids. Blood, feces, vomit, urine, semen, saliva, and breast milk are believed to be the most infectious. An example of person to person transmission would be a person suffering at home with undiagnosed Ebola. Someone around this person can be contaminated with this virus themselves by taking care of the infected person (ex. cleaning up vomit) and then rubbing their eyes or nose with tiny traces of this virus on their hands. The virus can even sneak in through small breaks in the skin that a person might not realize are there.

People infected with Ebola only begin to be contagious once they are symptomatic. Some initial symptoms include fever, myalgia, sore throat and chest pain. After several days of early symptoms, most patients will go on to develop GI symptoms, such as vomiting and diarrhea, along with a rash. Most patients also develop mild bleeding problems and severe hemorrhaging. After testing patients, some of the diagnostic signs of the disease include pancytopenia, elevated transaminases, and proteinuria, which can progress to renal failure. Death is usually from a combination of septic and hypoglycemic shock.

Ebola is difficult to diagnose because it has a very similar presentation to many other diseases; which include viral hemorrhagic fevers, malaria, typhoid fever, enterohemorrhagic E. coli, meningococemia, and influenza. It even looks similar to some noninfectious conditions such as HUS, TTP, and acute leukemia. When diagnosing Ebola through lab tests, it is usually confirmed by detecting Ebola RNA sequences in blood using a test called reverse transcriptase polymerase chain reaction (PCR). This test is believed to be both highly sensitive and specific when performed between days three and ten after symptom onset. Anti-body testing can also be performed when diagnosing a case outside of the three to ten-day window. It is also important to be informed about the patients travel and contact history when diagnosing Ebola.

Currently, the standard of care for Ebola is supportive treatment though things like IV fluids to treat dehydration, conventional transfusions if the patient is anemic, vasopressors to improve low blood pressure, and correction of electrolyte abnormalities. Some other forms of treatment which are more specific are experimental at this point include antibody preparations by transfusing whole blood cells or plasma from people who have survived the infection. The idea

is that if you survived Ebola, your immune system must have developed a ton of anti-Ebola antibodies which should work just as well when transfused into someone else as they did in the donor's illness. Though this approach has been done and shown to be successful in both Africa and in the United States, it still remains as an unproven treatment. There is also currently no vaccine available against Ebola, though there several in clinical trials.

Since there are no proven effective treatments or vaccines for Ebola, controlling the epidemic is all about preventing new infections. Further discussed are some methods which can prevent the spread of this virus. The first method is strict quarantine of individuals with suspected or confirmed Ebola. Isolating them will help the virus from spreading. Another method of controlling this infection is through contact tracing. This is the process of tracking down any potential contacts of a patient with suspected or confirmed Ebola and checking those contacts for symptoms themselves. If symptomatic, then tracking down all of their potential contacts. This is a very time and resource intensive process, much so in Africa than in the U.S. Another way to control this infection is by close monitoring for symptoms, including twice daily temperature checks, in any individual who has been potentially exposed to Ebola. Another method is proper use of personal protective equipment by healthcare workers when treating patients with Ebola. New infections could also be prevented in medical facilities by keeping a log of anyone entering the room of a patient quarantined of Ebola, making sure all medical equipment disposable whenever possible, avoidance of aerosol generating procedures, and properly handling a deceased patients body (which is still contagious).