

A Review on Ebola Virus Disease

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Abstract

Ebola, the killer virus caused Ebola Virus Disease (EVD) formerly known as Ebola Hemorrhagic Fever (EHF) has mostly affected the underdeveloped countries. The virus family Filoviridae, among that the latest outbreak is Zaire species. The virus is scary, but it's also rare. You can get it only from direct contact with an infected person's body fluids. Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola. Diagnostic procedures as Antigen-capture enzyme-linked immune sorbent assay (ELISA) testing, IgM -ELISA, Polymerase chain reaction (PCR), Virus isolation used. No approved vaccine or medicine (e.g., antiviral drug) is available for Ebola. Recovery from Ebola depends on good supportive care and the patient's immune response.

Keywords: Ebola viral disease; Ebola hemorrhagic fever; ELISA; PCR; Antiviral drug

Introduction

Ebola virus disease (EVD) first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo. The latter occurred in a village near the Ebola River, from which the disease takes its name. The virus family Filoviridae includes 3 generation : Cuevavirus, Marburgvirus, and Ebolavirus. There are 5 species that have been identified : Zaire, Bundibugyo, Sudan, Reston and Tai Forest. The first 3, Bundibugyoebolavirus, Zaire ebolavirus, and Sudan ebolavirus have been associated with large outbreaks in Africa (Table 1).

Table 1:

Virus Family	Generations	Species
	Ebola virus	Zaire (Recent outbreak)
	Marburg virus	Bundibugyo
Filoviridae	Cueva virus	Sudan
	-	Reston
	-	Tai Forest

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Past Ebola Outbreaks

Past Ebola outbreaks have occurred in the following countries:

- Democratic Republic of the Congo (DRC)
- Gabon
- South Sudan
- Ivory Coast
- Uganda
- Republic of the Congo (ROC)
- South Africa (imported)

Recent Ebola Outbreak

- The recent Ebola epidemic is the largest in history and is affecting multiple countries in West Africa.

The 2014 Ebola Epidemic

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The death toll from the Ebola epidemic rose to 4,818 out of 13,042 known cases in eight countries

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The death toll from the Ebola epidemic rose to 4,818 out of 13,042 known cases in eight countries through by the World Health Organization (WHO). The three worst-hit countries of West Africa—Guinea, Liberia and Sierra Leone— account for the bulk, recording 4,912 deaths out of 10,114 cases, the WHO-Geneva said in its update.

The overall figures include outbreaks in Nigeria and Senegal, deemed by the WHO to be now over, as well as isolated cases in Spain, the United States and a single case in Mali. But the true toll may be three times as much: by a factor of 1.5 in Guinea, 2 in Sierra Leone and 2.5 in Liberia, while the death rate is thought to be about 70 percent of all cases. Explaining these projections, the WHO said many families are keeping infected people at home rather than putting them into isolation in treatment centers, some of which have refused patients due to overcrowding.

Risk Factors

Healthcare providers caring for Ebola patients and the family and friends in close contact with Ebola patients are at the highest risk of getting sick because they may come in contact with the blood or body fluids of sick patients. People also can become sick with Ebola after coming in contact with infected wildlife. For example, in Africa, Ebola may spread as a result of handling bush meat (wild animals hunted for food) and contact with infected bats. The virus also can be spread through contact with objects (like clothes, bedding, needles, syringes/sharps or medical equipment) that have been contaminated with the virus or with infected animals.

Pathophysiology

After entering the body, it kills cells, making some of them explode. It wrecks the immune system, causes heavy bleeding inside the body, and damages almost every organ.

The virus is scary, but it's also rare. You can get it only from direct contact with an infected person's body fluids.

Symptoms of Ebola

- Fever
- Severe headache
- Muscle pain
- Weakness
- Diarrhea
- Vomiting
- Abdominal (stomach) pain
- Unexplained hemorrhage (bleeding or bruising)

Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola, but the average is 8 to 10 days. Recovery from Ebola depends on good supportive clinical care and the patient's immune response. People who recover from Ebola infection develop antibodies that last for at least 10 years.

Virus Transmission

Because the natural reservoir host of Ebola viruses has not yet been identified, the way in which the virus first appears in a human at the start of an outbreak is unknown. However, scientists believe that the first patient becomes infected through contact with an infected animal, such as a fruit bat or primate (apes and monkeys), which is called a spillover event. Person-to-person transmission follows and can lead to large numbers of affected people. In some past Ebola outbreaks, primates were also affected by Ebola, and multiple spillover events occurred when people touched or ate infected primates.

When an infection does occur in humans, the virus can be spread in several ways to others. Ebola is spread through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth) with

- blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with Ebola
- objects (like needles and syringes) that have been contaminated with the virus
- infected fruit bats or primates (apes and monkeys)

Diagnosis

Diagnosing Ebola in a person who has been infected for only a few days is difficult, because

the early symptoms, such as fever, are nonspecific to Ebola infection and are seen often in patients with more commonly occurring diseases, such as malaria and typhoid fever.

However, if a person has the early symptoms of Ebola and has had contact with the blood or body fluids of a person sick with Ebola, contact with objects that have been contaminated with the blood or body fluids of a person sick with Ebola, or contact with infected animals, they should be isolated and public health professionals notified. Samples from the patient can then be collected and tested to confirm infection (Table 2).

- Laboratory tests used in diagnosis include:

Table 2:

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	<ul style="list-style-type: none"> • Antigen-capture enzyme-linked immune sorbent assay (ELISA) testing • IgM ELISA • Polymerase chain reaction (PCR) • Virus isolation
Later in disease course or after recovery	<ul style="list-style-type: none"> • IgM and IgG antibodies
Retrospectively in deceased patients	<ul style="list-style-type: none"> • Immunohistochemistry testing • PCR • Virus isolation

Treatment

No approved vaccine or medicine (e.g., antiviral drug) is available for Ebola.

Symptoms of Ebola are treated as they appear. The following basic interventions, when used early, can significantly improve the chances of survival:

- Providing intravenous fluids (IV) and balancing electrolytes (body salts)
- Maintaining oxygen status and blood pressure
- Treating other infections if they occur

Conclusion

Experimental vaccines and treatments for Ebola are under development, but they have not yet been fully tested for safety or effectiveness. Recovery from Ebola depends on good supportive care and the patient's immune response. People who recover from Ebola infection develop antibodies that last for at least 10 years, possibly longer. It isn't known if people who recover are immune for life or if they can become infected with a different species of Ebola.

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