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THE MOST VIRULENT THREAT TO THE WORLD- EBOLA

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ABSTRACT

Ebola Virus Disease is very fatal to the living-being since its first outbreak in 1976. Ebola virus disease (also called Ebola Hemorrhagic Fever) is fatal not only to the living-beings in the world but also to the humanity and fraternity, because the people are scared of being infected and thus they want to be away from the infected or even suspected persons. In this manuscript, I have tried to make the common populace aware of the ways to prevent and control the outbreak of most virulent disease. I have also mentioned about the recent advances against EVD by the pharmaceutical research and development community. I have mentioned the recent status of Ebola-outbreak in India and the advisory & guidelines issued by the ministry of health & family welfare, India.

KEYWORDS: Ebola; Virus; Infection

INTRODUCTION

Ebola Virus Disease (EVD), first appeared in 1976 in humans, monkeys and chimpanzees. At that time, it has its presence in the name of Ebola Hemorrhagic Fever (Ebola HF). It occurs because of the infection with Ebola-Virus, first discovered in Africa. This Virus has not its origin in other continents as North America.

In African-countries, several cases of Ebola hemorrhagic fever (Ebola HF) have been reported and confirmed, and also in Gabon, Sudan, Uganda, Congo etc. Ebola Hemorrhagic Fever (Ebola HF) is a very fatal disease with mortality rate upto 90%. Humans, if come in direct contact with blood or secretions of an infected person, may be infected. This is because the virus has been found to spread through kith and kins of previously infected persons.

HISTORY

Ebola HF was first appeared in 1976 and was caused by the infection with Ebola virus, named after a river in the Democratic Republic of the Congo (Zaire) in Africa. The virus is one of the two family of RNA-Viruses called the Filoviridae.

Ebola HF virus has been identified in five types as-

- 1) Ebola-Zaire,
- 2) Ebola-Sudan,
- 3) Ebola-Ivory Coast,
- 4) Ebola-Bundibugyo,
- 5) Ebola-Reston.

Out of these five Ebola viruses, four have found to cause diseases in human beings. The fifth, Ebola –Reston has been observed to cause infection in Non-human primates. Some of the recent outbreaks have been listed below;

2003 (Nov-Dec)	Ebola-Zaire	Republic of Congo	35	29(83%)	Outbreak occurred in Mbomo and Mbandza villages located in the Mbomo district, Cuvette Ouest Departement.
2004	Ebola-Sudan	Sudan	17	7(41%)	Outbreak occurred in Yambio county of southern Sudan. This was concurrent with an outbreak of measles in the same area, and several suspected EHF cases were later reclassified as measles cases.
2007	Ebola- Zaire	Democratic Republic of the Congo	264	187(71%)	Outbreak occurred in Kasai Occidental Province. The outbreak was declared over November 20. Last confirmed case on October 4 and last death

					on October 10.
Dec 2007 -Jan 2008	Ebola- Bundibugyo	Uganda	149	37(25%)	Outbreak occurred in Bundibugyo District in Uganda. First reported occurrence of a new strain.
Nov 2008	Ebola-Reston	Philippines	6 (asymptomatic)	0(0%)	First known occurrence of Ebola- Reston in pigs. Strain closely related to earlier strains. Six workers from the pig farm and slaughterhouse developed antibodies but did not become sick.
Dec 2008- Feb 2009	Ebola- Zaire	Democratic Republic of the Congo	32	15(47%)	Outbreak occurred in the Mweka and Luebo health zones of the Province of Kasai Occidental.

TRANSMISSION

Ebola HF-virus spread in the human-being from the blood & secretions of the infected persons and then through human-to-human transmission (infected via skin or mucous membrane). Humans recovered from the virus, may also cause infection for upto 7 weeks after recovery. The workers, in hospitals, have also been observed to be infected while treating the patients with Ebola HF-virus. Ebola HF can also be spread

by the use of contaminated needles, i.e. the needles that has been used to an infected person. The Ebola HF virus is so infectious that these have been found to spread through Aerosols under laboratory-conditions.

INDICATIONS

The signs and symptoms of Ebola HF virus have not been observed same for all the suspected or confirmed EVD-patients. The following table shows the symptoms observe.

Time of infection	Most acute Symptoms in severe cases of EVD	Common Symptoms of EVD
Within a few days of becoming infected:	high fever, headache, muscle aches, stomach pain, fatigue, diarrhea	sore throat, hiccups, rash, red and itchy eyes, vomiting blood, bloody diarrhea
Within one week of becoming infected :	chest pain, shock and death	blindness, bleeding

The infection takes the lapse of 2 to 21 days to appear to be observed.

DIAGNOSIS

The diagnosis of Ebola HF virus in an infected person is very difficult. It is because, the indications (fever, headache, rashes etc.) exhibited the infected persons are found in very common diseases.

However, the suspected patients of Ebola HF virus must undergo following tests to confirm the infection.

1. ELISA (Enzyme-Linked Immunosorbent Assay)
2. Antigen Detection test
3. Electron Microscopy
4. Cell culture
5. Serum Neutralization Test
6. RT-PCR (Reverse Transcriptase Polymerase Chain Reaction) Test

TREATMENT

There is no any treatment for the infections caused by Ebola HF virus available. The R&D units are testing several vaccines and medicines, but no breakthrough has been achieved so far. In acute case, the intensive supportive care. As the infected persons have been observed to be dehydrated very frequently, the re-hydration solutions and electrolytes are supplied frequently. But, it must be ensured that the precautions to check the infection of EVD, while caring the infected patients, must be followed. The protocol must be followed in the disposal of infections materials coming out of health care units.

PREVENTION & CONTROL

1) In Human Being

As no medicine or vaccines has been developed for the purpose of effective treatment of Ebola HF virus, only the increase in awareness regarding the outbreaks of Ebola Hemorrhagic Fever virus, can deduce its infection and mortality-rate. Appropriate protection must be ensured while handling animals. The animal products must be cooked properly before their dietary uses. There must not be any physical contact with EVD infected virus. While treating the suspected or confirmed EVD patients, the personnel protective clothing must be worn as per the WHO guideline and this must be changed and disposed to treat another case of EVD. The health care workers must follow the WHO recommendations in order to control and prevent the infections.

2) In Animals

Since, no any vaccine animals against Ebola HF virus is available .Thus, only standard precautions must be followed. Routine cleansing of animal farms (using NaOCl or other detergents) must be practiced in passivating the virus. If, there is an suspicion of outbreak of EVD virus, the standard precautions and recommendations must be followed and its practice must be ensured by the Public Health Authorities.

WHO RECOMMENDATIONS & RESPONSE

First meeting of emergency committee of WHO for purpose of prevention of the 2014 outbreak was held on 6-7 August, 2014. And, it was concluded that Ebola outbreak in West Africa is an “Extraordinary event” and its prevention and control require a coordinated international response. As on 6 August, 2014, countries have reported more than 1700 cases (1050 confirmed, 45 probable and 200 + suspects) consisting more than 950 deaths. This is largest EVD outbreak ever reported. In response of this outbreak, WHO provides technical advice to countries and communities to prepare for and respond to Ebola-outbreak, as:-

Guidelines for the common populace by WHO

- Listen to and follow directives issued by your country’s respective Ministry of Health.
- If you suspect someone close to you or in your community of having Ebola virus disease, encourage and support them in seeking appropriate medical treatment in a care facility.
- When visiting patients in the hospital or caring for someone at home, hand washing with soap and water is recommended after touching a patient, being in contact with their bodily fluids, or touching his/her surroundings.

- People who have died from Ebola should only be handled using appropriate protective equipment and should be buried immediately.

WHO General Travel Advice

- Travellers should avoid all contact with infected patients.
- Health workers traveling to affected areas should strictly follow WHO-recommended infection control guidance.
- Anyone who has stayed in areas where cases were recently reported should be aware of the symptoms of infection and seek medical attention at the first sign of illness.
- Clinicians caring for travelers returning from affected areas with compatible symptoms are advised to consider the possibility of Ebola virus disease.

Ebola In INDIA

There is most viable risk of the import and outbreak of this EVD virus in India, because more than 50,000 Indian people are working in the affected nations as Sudan, Nigeria, etc. But this viable outbreak can only be prevented by vigilant preparedness and strict implementation of WHO guidelines. In India, the operation against Ebola was started in May, 2014. And the surveillance officers were advised to be vigilant against EVD by NCDC (Nation Centre For Disease Control).

If, any suspected case of EVD is observed, the samples are to be tested in laboratory of NIV, Pune. In August 2014, the Union Ministry of Health & Family Welfare declared that there is no any case of EVD has been found in India ,so far. And, also several guidelines have been issued to follow in order to prevent the import and outbreak of EVD virus as,

- Hospital Infection Control Guideline.
- Guidelines on contact tracing & management of contact
- Guidelines for sample collection, storage & transformation
- Guidelines for Health care providers
- Guidelines for Clinical case management
- Advisory for Airlines on EVD
- Health alerts on Ebola for display at Airports

Recent advances against Ebola

There is no licensed treatment or vaccine for the Ebola virus. Hospital treatment is based on giving patients intravenous fluids to stop dehydration and antibiotics to fight infections. But it is somewhat relieving that Several experimental treatments for Ebola are being developed, which have shown promising results in monkeys when given up to five days after infection. Some of those are as follows;

- Two US aid workers had been given an experimental treatment, known

as **Zmapp**, with "apparently encouraging" signs in one of them, said Prof Tom Solomon, director of the NIHR Health Protection Research Unit in Emerging and Zoonotic infections. The treatment is a mixture of three monoclonal antibodies that attack proteins on the surface of the virus.

- Another experimental drug, developed by **Tekmira Pharmaceuticals** in Canada, has been tested on monkeys and in a handful of healthy human volunteers. The drug, **TKM-Ebola**, is designed to target strands of genetic material of the virus (RNA). The drug interrupts the genetic code of the virus and prevents it from making disease-causing proteins. A small early safety trial on a small number of human volunteers was put on hold last month when regulators requested further safety data. The Fcompany is hopeful that it may get the go-ahead to continue the trial and is willing to make the drug available.
- The US-based pharmaceutical company, **Sarepta Therapeutics**, has developed a similar RNA treatment. It has been tested in healthy human volunteers in early safety trials, but has never been tried in a human patient. Scientists have been working

on a number of prototype vaccines against Ebola. The WHO says further trials would start soon and potential vaccines may be available in 2016.

CONCLUSION

The EVD-virus outbreak, this time, has been observed to be most fatal to the living-beings, about 10,00 people have died and the people around the world are terrified about it. But, amid all this, a ray of hope has emerged that some of the pharmaceutical companies are indulged in consistent research work to develop the vaccines and medicines against this ever virulent disease. Since, we know that there is no medicine to be given against the Ebola Viral Disease. Nevertheless, WHO and the health authorities of the nations have issued the guidelines and advisory for the prevention and control of the EVD-virus. Here, the world community need to be cautious about this outbreak as it is not only fatal to the living-being but also, to the humanity and fraternity in the world. So, it needs awareness and a strict implementation of the guidelines and advisory issued by World Health Organization and the Ministry of Health of the nations.

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