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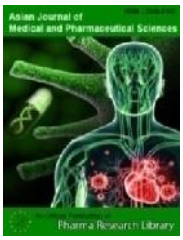

Review Article **Open Access**

Ebola Virus: A Dreadful Attack on Humans and Non Primates

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A B S T R A C T

Ebola causes Ebola haemorrhagic fever. The Ebola disease transmits from the wild animals and its spreads through human-human contact. Generally it occurs at sudden and the onset of weakness headache, sorethroat, diarrhoea, rashes, vomiting, external bleeding etc. Still now there is no amiable treatment to EVD and researches is in progress to treat the dehydration occurred oral rehydration therapy or intravenous. It mainly affects the monkeys and humans and epidemiology is seen in Africa and Germany. The 3 failovers that causes the disease in the human are merberg virus Zaire virus and Sudan virus and the 4th subtype virus is Ruston virus. It is dreadful in the monkeys. But it doesn't produce disease in already infected individuals. All these viruses are belonging to the family filoviradae. That is demonstrated by the long threads like strands of RNA. In the below article we accentuated on the clinical features diagnosis mode of transmission prevention and treatment of Ebola haemorrhagic fever. The main aim of this present article is to provide good knowledge about clinical aspects of Ebola haemorrhagic fever.

Keywords: Ebola hemorrhagic fever, Ebola Virus, Filovirus and Viral hemorrhagic accentuated.

A R T I C L E I N F O

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1. Introduction

Ebola haemorrage fever is popularly known as Ebola virus disease. It is worst condition caused due to virus of genus Ebola virus. Order- mononegavirales and belonging to family filovirdae. This virus generally spreads when the body fluids come in contact with infected person or an animal. This virus generally transmits from animals to

humans .WHO emphasizes it as one of the most virulent disease in the world. This virus transmission from the body fluids leads to high vireulence an infection progresses rapidly and its fatility rate is high and it has promoted its classification has hazard group 4 pathogen advisory commitee on dangerous pathogen(ACDP).Although several options are present for treating the ebola like recombinant proteins vaccines monoclonal antibodies. Antibody-interferon combinations are developed and the tested successfully in non-human models but no one was currently approved in the treatment of ebola in humans. One side because of lack of therapy other side prevailing of infection in African regions. The virus was highlated and there is a neend for identifyinig thearapeutic agents targeting the ebola virus.

Figure 1: Colorized Transmission electron micrograph of Ebola virus

Difference Structures and Their Classification of Ebola Virus:

Bundibugyo virus (BDBV)
Ebola virus or Zaire ebolavirus (EBOV)
Sudan virus (SUDV)
Cote d'Ivoire Ebola virus (CIEOV)
Reston Ebola virus (REBOV)

Ebola virus virion

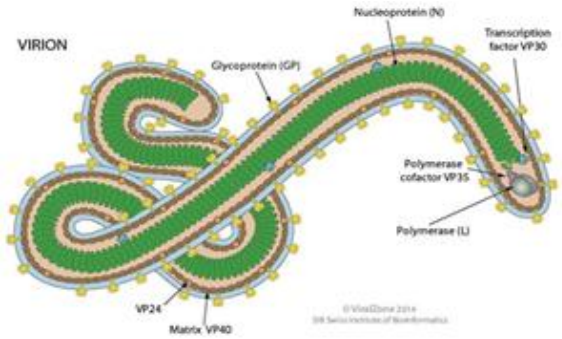

Figure 2: Structure of Ebola

- Genome 19kb long.
- Diameter 80nm; length 960nm to 1200nm.
- Four viral proteins: polymerase (L), nucleoprotein (NP), and proteins VP35 and VP30.
- Spikes formed by GP1/GP2 complexes (envelope glycoprotein)
- VP24 (membrane protein) associated with envelope
- Secretory GP: binds to antibody, possible antineutrophil activity.

Transmission:

Transmission generally approved when the infected person develops the symptom as in assymptomatic ebola virus where the level of virus is very low and the transmission occurs rarely. Current researches shows the primary mode of transmission is through physical contact or when exposed to infected body fluids. Airborne transmission generally doesn't occur. This virus can be found on sweat, tears, semen, urine, stools, saliva of infected persons. So the direct contact can be occurs through exposing to the mcous membrane or broken skin of infected person or may be exposing to the fluids of an infected persons. This include contact with the formitis of the patient clothing medical equipment etc although the virus in activate when it comes in contact with water, alcohol and soap. Some times diarrhoea coughing and vomiting that to in late stage of the disease can cause the infectious aerosols. Large scale airborne transmission is presently felt to be impropable without phenotypic changes in the virus.

2. Pathogenisis

It is difficult to perform clinical studies in this adverse situations almost all the the data on the pathogenisis of ebola virus is taken from the laboratory experiments on guinea pig, Mice, non-human primates

Cell entry and tissue damage:

After entering the virus in the body through mucous membrane are through parentral way or by the skin effects different types of cells in this macrophages and dentritic cells are mostly effected first. Filovirus replicates fastly within the sentinel cells.If leads to necrosis and it releases a huge number of viral particles into extracellular fluids.It spreads in systemic circulation by virus induce separation type-1 interferon responses if we disseminate the lymph nodes regional lymph nodes it cause further replicates.It is followed spread through the blood stream through dentritic cells and mobile macrophages in the liver thymus and other lymph nodes.Fatal infection is characterised by multifocal necrosis in the tissue like liver and spleen.

Gatrointestinal dysfunction:

Generally the patients infected with this virus suffer with diarrohoea, vomiting. It results in volume depletion shock hypotension. research on the GI manifestations of the ebola virus along with their impact on treatment prognosis are seen.

Systemic inflammatory response:

This virus causes extensive tissue damage and also includes a systemic inflammatory syndrome helps in the release of cytokines, chemokines and other types pro inflammatory mediators macrophages. This infected macrophages release tumour necrosis factors TNF alpha interlukin (IL) macrophage chemotatic protein (MCP)-1 and nitric oxide breakdown substances of necrotic cells also helps in the releasing of above mediators.

Cagulation diffects

These symtoms may be induced in directly through the host inflammatory response. These virus infected macrophages helps in the synthesis of cell surface tissue factor. It triggers

the externsic coagulation pathway. The simultaneous occurrence of the stimuli helps to explain the rapid development and coagulopathy in the virus infection. Additional factors may also play main role are seen in the ebola virus. For an example blood samples collected from the infected monkey containing D-dymers are present in the plasma of humanbeing with infected virus. These ebola virus infected maciqus and activated protein with is increased and the platelet count does not fall until 3-4 days of the virus infection. It is suggest that the activated platelets are stick to endothelial cells.

Impairment of adaptive immunity

Ebola virus acts directly or indirectly to prevent the antigens specific immune response dentritic cells have primaru responsibilities in the stimulation of adaptive immune responses it is a majior place for filovirus replications. *In-vitro* studies proven that infected cells fails to maturate and they are unable to presnt antigens to lymphosides, to explain why thr patients dying from the ebola virus. Adaptive immunity also altered through the loss of lymphosides that support by the lethal ebola virus infection. Although the cells appears to the un infected the undergo bystander apoptosis. It is induced by the inflammatory mediators a similar phenomenon is experienced in the septic shock.

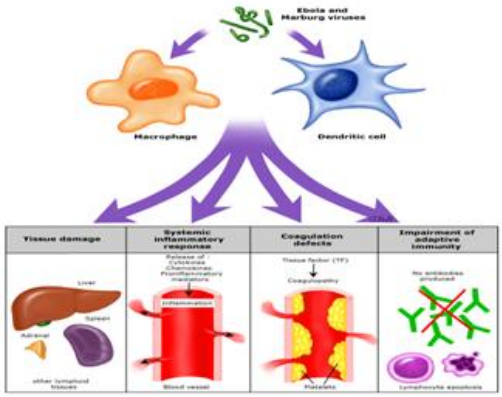

Figure 3: Pathogenisis of ebola virus

Signs and Symptoms of Ebola Virus:

Figure 4: Symptoms of Ebola virus

Rashes all over the body and reddening of the roof of the mouth. Incubation period is between 2-21 days and average will of 5-10 days The symptom includes headache, fever and it is followed by vomiting nausea and diarrhoea Impaired kidney is seen then cough, pharnigities, conjuctivities, jaundice etc is also noticed. CNS is minly involved which shows the delirum and the consciousness is decreased. At the 10^{th} day the fever may disappear sometimes the patient condition may be improved or he may die by an irreversible action. That is haemorrhage or necrosis of liver is of some other important organs. At last stage major organ necrosis are may be happened.

3. Diagnosis

The diagnosis of Ebola infected person at early stage is find to be more difficult because general symtoms red eye, skin rashes are commonly seen in other sort of disease also. But the individual with ebola symtomps should be considered and they should be isolated. And the sample should be collected and undergo testing for confirmation of injection during the diagnosis the laboratory tests are given below:

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	-Antigen-capture enzyme-linked immuno sorbent assay (ELISA) testing, IgM ELISA, Polymerase chain reaction (PCR) - Virus isolation
Later in disease course or after recovery	- IgM and IgG antibodies
Retrospectively in deceased patients	-Immunohistochemistry testing, PCR, Virus isolation

Physical Examination:

Physical examination should be done by following certain precautionary isolation procedures. The main aim of this physical examination is for excluding a keen focus for sepsis. When looking for the signs of viral hamrrage like purpuric rash and other signs of bleeding.

Major signs should be taken for considered:

Fever: $>37.5^0$c- fever is most promting symtomp for about 90% of individual suffering with ebola and by this we can easily notified the epidimological context. A large variation is seen in the body temperature at the time of illness, hypothermia or normothermia is evidenced at the later stages of fatal infection but some patients initially have low fever with no symptoms.

Blood pressure: Hypotension is a indication of preterminal disease and shock due to the lack of measuring equipment it is not document in the endemic area.

Pulse rate:

Bradycardia is absorbed at the intial stage of disease and tachycardia is seen at the terminal or total infectious stage.

Respiratory rate: Tachyponea and along with tachycardia is noticed or make severe to the infection and mostly metabolic acidosis are occur where the respiratory system is also involved.

4. Prevention

At the intial stages these virus may not be highly contagious. And sometimes it may not be transmit too.

When the illness continuously progress when the fluids from the body comes through diarrhoea , vomiting may be hazard . Because of the poor equipment and unhygienic condition mostly it is restricted low economic people and isolated areas lies hospitals good medical staff etc. So strict barrier nursing procedures with use of medical rated disposal face mask, gloves, gowns etc should be weared.

Treatment:

Till now there is no well established treatment for ebola fever. It primarly includes balancing electrolytes because patients are more frequently dehydrated and coagulant factors are replaced to avoid bleeding good oxygen and blood vessels are maintained convalescent plasma. Proves to make good treatment for disease.

Vaccine:

Vaccines are not at present available to humans. The best performing ones are DNA vaccine derived from the adeno virus, vesicular stomatitis Indiana virus (VSIV) or filovirus like particles (VIP) because they protect non human primates from ebola virus induced disease. These DNA vaccines VISV based vaccines, adeno virus based vaccines have entered clinical trials and these vaccines protected the non human primates generally immunization takes place 6 months time. Researches have started the research for the quick action on the virus in 2003, a vaccine using in adeno viral (ADV) vector that carries the ebola spike protein is tested on crab eating Macaques after 28 days their noticed a challenged with the virus and it remain resistance. A vaccine which is based on attenuated recombinant vasicular stomatitis virus (VSV) vector carrying either ebola glycoprotein, marberg glycoprotein is done in 2005 and protected non human primates. Clinical trials are started in humans. Trying the vaccine on the strain of ebola makes more resemble that iffects the humans is the next step. On 6th Dec 2011 the development of ebola virus vaccine is successfully made on the mice was reported unlike other vaccine it can be freezed , dried and stored for the large peroils.An experimental vaccine is made by the researches in the canada's national laboratory in Winnipeg is used in 2009. A German scientist who might have been during a lab accident is treated by this vaccine. However ebola virus vaccines infection could never be demonstrated without a doubt. Experimentally the VSIV that expresses the glycoprotein of EBOV or SUDV is successful in non human primates models.

5. Conclusion

Finally we concluded that Ebola virus is a rare viral disease which leads to the 90% death of infected persons these virus mainly transmit when the body fluids of the infected persons comes in contact with blood of normal human. Generally the transmission of this virus occurs by the infected wild animals like gorillas, chimpanzees etc. The main aim of this review include Ebola haemorrhage fever it sign, symptoms, diagnosis, mode of transmission , prevention as well as treatment. Attempts are made in the above article to enumerate various clinical aspects of ebola haemorrhage fever. Still there is a need for beneficial for the treatment of ebola heamorrhragic fever.

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