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Outbreak of Ebola virus click alarm for devastating epidemic

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SHORT REVIEW

ABSTRACT

Ebola viral disease formerly known as ebola hemorrhagic fever is a severe, often fatal illness in human, outbreaks having case fatality rate upto 90%.It was first noted in 1976 , and is a WHO risk group 4 pathogen, many outbreaks have occurred since then but 2014 outbreak is worst outbreak in terms of cases and fatalities. Unfortunately the infecting Ebola virus detected this outbreak is Zaire strain, the most pathogenic strain of Ebola. Health agencies are forced to term this outbreak as an "unprecedented epidemic" seeing its devastating impact.

Key Words

Ebola, global alert, Zmapp

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INTRODUCTION

Ebola haemorrhagic fever is a viral haemorrhagic fever, a severe and often fatal disease in human & non human primates [1]. Ebola was isolated in 1976 from an epidemic involving villages in Northern Zaire & Southern Sudan, smaller outbreaks have occurred subsequently. Ebola derives its name from outbreak in village near Democratic Republic of Congo near Ebola River[2]. The virus is closely related to Marburg virus. Ebola has been particularly active recently with an outbreak in Kitwit, Zaire in 1995, followed recently by scattered outbreak in Uganda, central & West Africa.

Now again the reports of horrifying outbreak of Ebola in four countries of west Africa i.e. Nigeria, Sudan, Gabon & Republic of Congo which has forced the WHO to declare an alert. Genus Ebola virus is one of the three members of the filoviridae family, along with the genus Marburg virus, these are long thread like viruses hence the name Filovirus. Ebola virus is filamentous, enveloped, single stranded, linear, non segmented, negative sense RNA virus[3].

Comprises of 5 species

1. Bundibugyo ebolavirus
2. Zaire ebolavirus
3. Reston ebolavirus
4. Sudan ebolavirus
5. Taiforest ebolavirus

Bundibugyo, Zaire and Sudan Ebolavirus have been associated with outbreaks in Africa. Species Zaire Ebolavirus (ZEBOV) is most dangerous among 5 species having 90% case fatality[2].

CURRENT OUTBREAK MARCH 2014

The horrid outbreak involves West African countries, began in Guinea in March 2014 & then spread to Liberia, sierra Leone and Nigeria. Its the most severe Ebola outbreak in terms of number of cases and fatalities, which is a public health emergency of Global concern. As of 6th Aug WHO data- Total 1779 suspected cases with 961 deaths, of which 1134 cases and 622 deaths have been laboratory confirmed to be Ebola.[4] Countries with suspected cases ravels Germany, Ghana, India, Saudi Arabia, Spain, United States[4].

TRANSMISSION

Ebola is introduced into human through close contact with the blood, secretion, organs or other body fluid of infected animals. In Africa, infection has been transmitted through handling of infected monkeys, chimpanzees and fruit bats. Ebola spread in community through human to human transmission with infectious vomiting from direct contact

with the blood, secretion, organs or other body fluid like saliva or semen. Burial ceremonies in which mourners have direct contact with the body of deceased person can play role in transmission of Ebola. It can spread through semen for upto 7weeks after recovery from illness[5].

PATHOGENESIS

Endothelial cells, phagocytes and hepatocytes are main target of the infection. After infection a secreted glycoprotien (sGP) is synthesized. sGP forms the trimeric complex, which binds the virus to endothelial cell. Also inhibits the early steps of neutrophil activation. The presence of viral particles and cell damage resulting from budding leads to release of cytokines TNF , IL-6 and IL-8.The cytopathic effect from infection in endothelial cells ,result in loss of vascular integrity[2,6].

CLINICAL FEATURES

After the incubation period of 2-21 days illness begins abruptly with fever, severe frontal headache, red eyes, malaise, drowsiness, lumbar myalgia, vomiting, nausea and diarrhoea. A maculopapular rash begins 5-7 days later on trunk and upper arms. It becomes generalized & often haemorrhagic and exfoliates during convalescence.,[1,7] The exanthema is accompanied by dark red enanthem on hard palate, conjunctivitis, scrotal and labial edema.

GI haemorrhage occurs as the severity of illness increases. There is marked leucopenia and necrosis of granulocytes. DIC and thrombocytopenia are universal and correlates with severity of disease. In fatal case patient become hypotensive, because of internal & external bleeding, develop impaired liver and kidney functions and lapse into coma. There are moderate abnormality in concentration of clotting factors & elevation of serum transaminases and amylas[1].

COMPLICATIONS

It leads to many complications like multiple organ failure, severe bleeding, delirium, shock, seizures, coma and death (mortality ranges from 50 to 100 % of infected patients).Those fortunate enough to survive may have complications that take months to resolve and may experience fatigue, headache, hair loss, hepatitis, orchitis. Late in course patient become depressed with marked hyperalgesia to tactile stimulatio[1].

DIAGNOSIS

Before the diagnosis of Ebola can be made other diseases should be ruled out like malaria, typhoid, shigellosis, cholera, leptospirosis, plague, rickettsia, relapsing fever, meningitis, hepatitis and other viral hemorrhagic fever.[3] However if there is strong suspicion and reason to consider Ebola HF, patient should be isolated & following that samples should be collected and tested to confirm[1].

Diagnostic test available are:-Antigen Capture ELISA, Antibody capture ELISA (IgM & IgG), RT PCR Assay, Virus isolation and immunohistochemistry testing.[1]

PERSON UNDER INVESTIGATION (PUI)

A person who has both consistent symptoms and risk factors as follows

Clinical criteria : fever of >38.6deg Celsius or 101.5 deg F & additional symptoms such as severe headache, muscle pain , vomiting, diarrhoea and abdominal pain or unexplained haemorrhage[1].

Epidemiological risk factors: within the past 21 days before the onset of symptoms such as contact with blood , with other body fluid or human remains of a patient known to have or suspected to have EVD , residence in or travel to an area where EVD transmission is active, direct handling of bats or rodents or primates from disease endemic area[1].

PROBABLE CASE

A PUI who is in contact of an EVD case with either a high or low risk exposure[1].

CONFIRMED CASE

A case with laboratory confirmed diagnostic evidence of ebola virus infection[2].

CONTACT

High risk exposure - percutaneous eg. needle stick, mucus membrane exposure to body fluid of EVD patient, direct care or exposure to body fluids of an EVD patient without appropriate personal protective equipment(PPE). Laboratory workers processing body fluid of confirmed EVD patient without appropriate PPE, participation in funeral rites[1].

Low risk exposure- household members or other casual contacts with an EVD patients , providing patient care or casual contact without high risk exposure with EVD patient in health care facilities in EVD outbreak affected countries.[1]

TREATMENT

No specific treatment is available only supportive management can be done. Therapeutic principle involved is the reversal of dehydration, hemoconcentration, renal failure, protein, electrolyte loss or blood loss. The contribution of DIC to haemmorhagic manifestation is unknown & management should be indivisualised. Transfusion of fresh blood & platelets are frequently given. Successful management may require renal dialysis. Blood transfusions are thought to be therapeutic in Ebola. Efficiency of corticosteroids, E–amino-caproic acid, pressor amines & alpha blocking agents has not been established[7].

Drug Zmapp, which is composed of three humanized monoclonal antibodies, manufactured in plants specifically Nicotiana bind to the protein of Ebola virus, its effectiveness and safety is still under evaluatio[2]. In July 2014, an experimental treatment was used in two humans

(Nancy Writebol and Dr. Kent Brantly) however it is not known if the patients recovered from Ebola as a result of Zmapp treatment or on their own, like a small percentage of others who survived the virus. The drug is still in experimental stage.

EBOLAVIRUS VACCINE

Currently there is no vaccine available against ebola virus strains that cause Ebola hemorrhagic fever in humans. Cross protection among different EBOV subtypes in experiment animals has been reported. Inactivated vaccines have been developed with formalin or heat treatment of cell culture propagated MBGV and EBOV[6]. The biohazard associated is difficulty to ensure the safety. Immunization with purified NP (nucleoprotein) & GP (Glycoprotein) induced both humoral and cell mediated immune response in animal trials. WHO says ebola vaccine for human is not possible before 2015[6].

PREVENTION

The main way to prevent getting Ebola hemorrhagic fever is to not to travel to areas where it is endemic and by staying away from any patient who may have the disease. Medical caregivers may protect themselves from becoming affected by strict adherence to barriers to the virus (wearing gloves, goggles and mask).[1]

CONCLUSION

Ebola is a viral hemorrhagic fever normally circulating in fruit bats and non human primates like monkeys and chimpanzees mainly, humans are accidental host. It spreads through body fluids and contact with sources and commonly present with fever,malaise, rash, internal and external bleeding and is also having high case fatality. Diagnosis made on clinical suspicion can be confirmed by antigen and antibody ELISA tests. Yet now there is no treatment, no licensed vaccine. Prevention is the only cure. Active surviellance is necessary to identify sources and susceptibles.

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