A NATIONAL EPIDEMIC

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Table of Contents

About the Author ................................................................................................. 3
Instructional Objectives ................................................................................ 3
Introduction .............................................................................................................. 3
Virus Characteristics ............................................................................................. 3
Diagnosis .................................................................................................................. 3
Clinical Manifestations and Disease Progression ................................................. 4
Prevention ............................................................................................................. 4
Treatment of the Ebola Disease ............................................................................. 4
A Few Words About the Zika Virus ......................................................................... 5
Wrapping It Up ....................................................................................................... 5
References and Suggested Readings ....................................................................... 5

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Introduction

In the recent years of 2014 and 2015 there has been much debate, speculation and argument regarding the Ebola virus. What isn’t any debate is that nursing is at the forefront of this disease. The media has had various nurses and doctors in the spotlight with regard to the earliest threat of the Zika virus; a virus that could rival that of Ebola in its severity of morbidity.

Virus Characteristics

The Ebola virus belongs to a class of viruses called Filo viruses that cause a hemorrhagic fever. Another of this kind of viruses is called Marburg virus. The Ebola virus measures 970nm and is characterized by long convoluted strands. The virus was first recognized in 1976 when epidemics of the disease broke out in the African countries of Zaire and Sudan. The mortality of these epidemics was 88% and 53% respectively and it is believed that the epidemic in Zaire was caused by the improper sterilization of needles.

There are different subtypes of the Ebola virus with each subtype given the name as to where they were first discovered. They are the subtypes of Ebola Zaire, Ebola Sudan, Ebola Bundibugyo, Ebola Tai Forest formerly known as Ebola Côte D’Ivorie, and Ebola Reston which was isolated in Reston, Virginia in the United States. The Reston subtype although dangerous to non-human primates has not been proven to affect human beings. Each of these subtypes produce a differing level of morbidity and mortality with the Sudan subtype at 50% and the Zaire subtype at 80-90%; needless to say the Zaire subtype of the virus is the most deadly form of the disease.

The Ebola virus is prevalent in the world today as of early 2016 in the African countries of Guinea, Liberia, and Sierra Leone with case number of 28,616 cases resulting in more than 11,310 deaths. Reported travel associated cases have been reported from Mali, Senegal with 2 cases and 2 deaths, and the countries with limited transmissions have been the United States, Spain and Nigeria with 25 cases and 10 deaths.

The virus is spread to humans by way of an infected animal such as primate or bat with the main reservoir being the fruit bat. When this happens it is called a spillover event. After a human becomes infected, transmission by way of human to human results from direct contact exposure from someone who has an active infection or exposure to that persons’ blood or body fluids (e.g. sweat, feces, semen, and breast milk). Exposure can also occur from contaminated needles as well.

Diagnosis

Diagnosis of the Ebola disease is verified by a variety of tests. The type of test performed is dependent on the timeline of the infection. The tests performed within a few days of clinical symptoms that appear include: Antigen-capture enzyme-linked immunosorbent assay (ELISA) test, the IgM EIISA, polymerase chain reaction and virus isolation test. The assays used later in the disease course include the IgM and IgG antibody tests. There are also tests to discover the presence of the disease postmortem including the virus isolation, polymerase chain reaction (PCR) test and immunohistochemistry testing. Ebola virus is detected in blood only after onset of symptoms, most notably fever, which accompany the rise of virus within the patient’s body. It may take up to three days after symptoms
Clinical Manifestations and Disease Progression

The Ebola virus clinically manifests on average from 8-10 days with symptoms that present without any warning at all. The initial symptoms are: fever, myalgia, headache, nausea and vomiting, abdominal pain, diarrhea, chest pain, cough and pharyngitis. Other symptoms include photophobia, lymphadenopathy, jaundice and pancreatitis. There is also a central nervous system involvement marked by somnolence, the patient can become delirious and slip into a coma. Progression of the disease is marked by tissue wasting, bruising, petechial and mucous membrane hemorrhage and rash around the body trunk occur about the 5th day of the first week. Within the second week the patient either improves; or dies as a result multi-organ system failure (MSOF). The patients that do improve and survive usually have antibodies that are present with them for 10 years at least.

Prevention

Prevention of the Ebola disease is primarily based on doing things that nurses already know to do, but must pay special and careful attention to do these things well. These preventative measures are:

1. Careful hygiene measures such as meticulous hand washing;
2. Wearing the appropriate personal protective equipment (PPE) when taking care infected persons;
3. Ensuring that any person suspected of having Ebola or who presents with the signs/symptoms of Ebola is properly isolated; and
4. Avoiding direct contact with patients that have died from Ebola.

Source: CDC, 2014

Treatment of the Ebola Disease

Treatment of the Ebola disease process is mainly aimed at supportive care. The supportive measures include Intravenous fluids, oxygen and medications to maintain adequate blood pressure for end organ perfusion as well as treatment of secondary infections should they arise.

Even after recovery, Ebola might be found in some body fluids, including semen. The time it takes for Ebola to leave the semen is different for each man. For some men who survived Ebola, the virus left their semen in three months. For other men, the virus did not leave their semen for more than nine months. Based on the results from limited studies conducted to date, it appears that the amount of virus decreases over time and eventually leaves the semen.

There are however, experimental treatments that have come about as a result of the outbreak in Africa in 2014. The experimental treatment...
called ZMapp and has been created with collaboration between different companies in the United States and Canada. The treatment is not a vaccine but a treatment that uses three monoclonal antibodies that have been prepared from the Nicotiana plant. This new experimental treatment shows promise and was recently given a fast track approval by the United States Food and Drug Administration in September 2015.

The newest line of defense in war against Ebola is an experimental vaccine that is being tested by the Centers for Disease Control and the Sierra Leone Ministry of Health. The vaccine name is the rVSV-ZEBOV. The program developed is called the Sierra Leone Trial to Introduce a Vaccine against Ebola (STRIVE). The STRIVE program has enrolled roughly 6,000 volunteers to test the vaccine; most of the volunteers are health care workers and those working on the forefront of the disease treatment. The vaccine works by making a vesicular stomatitis virus carry a non-infective Ebola virus gene. This part of the Ebola virus cannot be disease causing but will trigger an immune response for protection against the disease. This vaccine is still in the early stages but may yield promise in the prevention of this most horrible disease.

A Few Words About the Zika Virus

So what lies ahead of the United States health system, nothing may pose a bigger threat in our day than the Zika virus; not for its severity illness or lethality, but for the long-term effect that it threatens our youth.

Although recently in the news, the Zika virus was first discovered in 1947 and named after the Zika Forest in Uganda. In the reporting cases of this viral disease, there have been cases of infection in Africa, Asia and Islands in the Pacific.

The Zika virus is spread primarily through the bite of the infected mosquito species called Aedes. The virus can also be spread by unprotected sex from an infected male. The disease is marked by uncharacteristic signs and symptoms of fever, rash, arthralgia, malaise and conjunctival symptoms. The disease progresses usually no later than one week and is usually not severe enough to require hospitalization with that person protected from future infections after being initially infected. The main concern for the Zika virus is the transmission of the virus from the expectant mothers to their unborn children with the resultant birth defects that occur as a result. The main birth defect is that of microcephaly with other defects such as eye defects, loss of hearing and growth retardation.

The main treatment for the Zika virus disease is that of supportive care such as fluids to prevent dehydration, pain meds such as Tylenol and rest. The main prevention strategies for Zika are to prevent the environment for mosquitoes to flourish such as taking care of open garbage containers, preventing standing water in outdoor areas and covering water containers. Other measures for prevention include wearing long sleeve shirts in the summer, using insect repellant and utilizing condom use when engaging in sexual relations with someone who is known to be recently from a Zika infected area. As of this date there is no vaccine known for the Zika Virus.

Wrapping It Up

In the face of many obstacles that our healthcare system is transitioning, we as nurses dare not give way to either fear and or ignorance of the new threats facing us in the wake of the latest Ebola and Zika emergencies. Only with determination and knowledge can we move forward and not only survive but thrive in this environment.

References and Suggested Readings


http://www.bcm.edu
