Ebola: Viral Hemorrhagic Fever

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Ebola: A Current Challenge of Global Health

- Over the past 40 years more than 60% of emerging infectious diseases affecting people have had their origin in WILDLIFE or LIVESTOCK.
Ebola: A Current Challenge of Global Health

• Zoonotic, it can spread across communities and borders with alarming speed.
• Immediate medical action is not enough to manage the deadly disease.
• Need for cross-sectoral collaboration and communications involving multiple stakeholders.
• Human health, animal health and environmental health are all interlinked.
Ebola: A Current Challenge of Global Health

- Ebola virus is typically first spread to humans after contact with infected wildlife.
- Then spread person-to-person through direct contact with bodily fluids such as, but not limited to:
  - Blood
  - Urine
  - Sweat
  - Semen
  - Breast milk
Ebola

- October 1976: Ebola Zaire (DRC) outbreak
- 2013-2014 outbreak of EVD
  - Much common with the 1976
  - Both caused by *Zaire ebolavirus* and began in rural forest communities, where wild game is hunted for food (though no animal has been implicated as the trigger of these outbreaks).

New Eng J Med
2014 Oct 30
Ebola Outbreak of 1976

• Yambuku Mission Hospital (120-bed)
• The virus initially spread through the use of unsterilized syringes and needles.
• Of the hospital’s 17 staff members, 13 became sick, 11 died.
• The hospital was closed when the medical director and 3 Belgium missionaries died from Ebola.
Ebola Outbreak of 1976

- Yambuku Mission Hospital closes
  - Many Ebola infected people and their contacts fled to their home villages out of fear and suspicion of the nonfunctioning Western medical system, seeking treatment from traditional healers.
Ebola Outbreak of 1976

• Factors contributed to stopping Ebola spared
  • CDC
  • WHO
  • Leadership
  • Organization
  • Coordination
  • Administration
  • Logistics
  • Rapid actions
Ebola Outbreak of 2013-2014

• The epidemic in west Africa is the 25\textsuperscript{th} known outbreak since 1976.
• The first Ebola outbreak in west Africa.
• The largest and longest Ebola epidemic
• First to involve three entire countries and capital cities with more than 10,000 cases and more than 5,000 deaths.

• How could it get to this point? Synergy of several factors.
Common Findings **(Ebola in Sierra Leone)**

- Case fatality rate: 74%
- Common findings (febrile symptoms) at presentation:
  - Fever (89%)
  - Headache (80%)
  - Weakness (66%)
  - Dizziness (60%)
  - Diarrhea (51%)
  - Abdominal pain (40%)
  - Vomiting (34%)
What are the symptoms?

- Ebola symptoms usually appear within two to 21 days after being exposed to the virus. But the average is eight to 10 days, according to CDC.

- Symptoms of Ebola are:
  - Fever
  - Severe headache
  - Muscle pain
  - Diarrhea
  - Vomiting
  - Stomach pain
Ebola

• Symptom illness resembling
  • Malaria
  • Typhoid
  • Lassa fever
  • Yellow fever
  • Influenza
Hemorrhagic Symptoms

• Patients may progress to develop more severe signs or symptoms
  • Hemorrhagic symptoms (bleeding, bruising)
  • Multi-organ dysfunction
    • Hepatic damage
    • Acute kidney disease
    • CNS involvement

Leading to shock and death
Lab, Sierra Leon

• Elevated levels of
  • BUN
  • Aspartate aminotransferase
  • Creatinine
Current Ebola Epidemic

• Joel Breman and Karl Johnson, *New Eng J Med*, Oct 30, 2014 – Main priorities:
  • Adequate staff for rigorous identification
  • Surveillance
  • Care of patients and primary contacts
  • Strict isolation
  • Rapid diagnosis
  • Rapid and culturally sensitive disposal of infectious cadavers
Current Ebola Epidemic

• What is awaiting?
  • Key virologic, clinical, epidemiologic, and anthropologic description of the current outbreak in Western Africa, which will permit comparison with other Ebola outbreaks that have occurred since 1976 and help us to prepare for future outbreaks.
Ebola Vaccine

- USA
  - GlaxoSmithKline (GSK)
  - NIH
  - Johnson & Johnson
- Canada
- Russia

- The US candidate vaccine:
  - Against 3 viruses: Zaire, Sudan and Marburg strains
Public Health Measures

- Reducing the risk of wildlife-to-human transmission
- Reducing the risk of human-to-human transmission
- Outbreak containment measures
Public Health Measures

• Reducing the risk of wildlife-to-human transmission
  • From contact with infected fruit bats or monkeys/apes and the consumption of their raw meat.
  • Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.
Public Health Measures

• Reducing the risk of human-to-human transmission
  • From direct or close contact with people with Ebola symptoms, particularly with their bodily fluids.
  • Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home.
  • **Regular hand washing** is required after visiting patients in hospital, as well as after taking care of patients at home.
Public Health Measures

• **Outbreak containment measures**
  - Prompt and **safe burial** of the dead, identifying people who may have been in contact with someone infected with Ebola.
  - Monitoring the health of contacts for 21 days.
  - The importance of separating the healthy from the sick to prevent further spread.
  - The importance of **good hygiene** and maintaining a clean environment.
Epidemiologic Risk Factors to Consider when Evaluating a Person for Exposure to Ebola Virus

1. High risk
2. Some risk
3. Low (but not zero) risk
4. No identifiable risk
Epidemiologic Risk Factors to Consider when Evaluating a Person for Exposure to Ebola Virus

• High risk
  • Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids of a person with Ebola while the person was symptomatic.
  • Exposure to blood or body fluids, including but not limited to feces, saliva, sputum, urine, vomit, and semen.
  • Direct contact with a dead body without appropriate PPE (personal protective equipment).
Epidemiologic Risk Factors to Consider when Evaluating a Person for Exposure to Ebola Virus

• Some risk
  • Direct contact while using appropriate PPE with a person infected with Ebola while the person was symptomatic.
  • Close contact in households, healthcare facilities, or community settings with a person with Ebola while the person was symptomatic.
    • Close contact: not wearing appropriate PPE within 3 feet (1 meter) of a person with Ebola.
Epidemiologic Risk Factors to Consider when Evaluating a Person for Exposure to Ebola Virus

- Low (but not zero) risk
  - Having been in a country with widespread Ebola virus transmission.
  - Having brief direct contact (e.g., hand shaking) while not wearing appropriate PPE.
  - Brief proximity (e.g., the same room for brief period of time with a person with Ebola while the person is symptomatic.
Epidemiologic Risk Factors to Consider when Evaluating a Person for Exposure to Ebola Virus

- No identifiable risk
  - Contact with asymptomatic person who had contact with person with Ebola
  - Contact with a person with Ebola before the person developed symptoms.
  - Having been more than 21 days previously in a country with widespread Ebola virus.
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<th>Risk Level</th>
<th>Monitoring</th>
<th>Restricted PH Activities</th>
<th>Restricted Travel</th>
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<tr>
<td>HIGH risk</td>
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<tr>
<td>SOME risk</td>
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<td>LOW risk</td>
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<tr>
<td>NO risk</td>
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Case Evaluation - CDC

- Epidemiologic risk factor within 21 days before the onset of symptoms.
- Early recognition is critical to controlling the spread of Ebola virus.
- Lab confirmation
- If diagnosis of Ebola is being considered, the patient should be isolated in a single room (with private bathroom), and healthcare personnel should follow standard, contact, and droplet precautions, including the use of PPE.
- Infection control personnel should be contacted immediately.
Case Evaluation - CDC

• Early recognition and identification of suspected Ebola is critical.

• Think Ebola if:
  • The patient has a travel history in endemic regions
  • The patient has a history of exposure to a person with Ebola

• Malaria diagnostics should also be part of initial testing because it is a common cause of febrile illness in persons with travel history to the affected regions.
Considerations for Discharging - CDC

• Clinical judgment of the medical team is that the PUI’s (person under investigation) symptoms are not consistent with Ebola.
• The PUI is afebrile off antipyretics for 24 hours, or there is an alternate explanation for fever.
• Symptoms compatible with Ebola resolved or are accounted for by an alternative diagnosis.
• The PUI has no clinical lab results consistent with Ebola.
• The PUI will continue to be actively monitored by public health.
Synergy
Summary

• The outbreak of Ebola in West Africa is now an urgent global health concern.

• To stop the outbreak in USA, Ebola must be stopped in west Africa.