Marburg case

Aneesh K Mehta, MD
Professor of Medicine
Emory University School of Medicine

EMORY
UNIVERSITY

Project ECHO®

Patient information (hypothetical case)

- 32 year old nurse from northern Florida, who had been recently working for international health agency that trains community health workers in Rwanda
  - Has mild eczema; otherwise healthy
  - She had been appropriately vaccinated for COVID, influenza, hepatitis-A, hepatitis-B, Tdap, and typhoid prior to leaving
  - She had been given doxycycline for malaria prophylaxis, but stopped taking about halfway through the trip due to recurrent esophagitis.

Patient information (hypothetical case)

- Mid March: Arrived in Kilgali, the capital, in central Rwanda, for training with her organization.
- April: arrived in the Nyagatare district, close to Tanzania border.
  - Primarily working to support community health workers as well as nurses in various clinics
  - Occasional helped with patient care using her own gloves and masks
- Mid-September: noticed higher number of patients presented with severe acute illnesses in one village
  - Some were found to have malaria, but not all

Patient information (hypothetical case)

- September 23, she returned to Kigali in preparation to return to US
  - Met up with other colleagues from the same NGO.
  - Some working in the Kigali district also reports seeing an increase in acute illness patients over the past 10 days
- September 26, she flew back to the US
- September 27, she arrived home
- September 28, she began to feel ill
  - Body aches, mild headaches, fevers

Patient information (hypothetical case)

- Over the next few days, she began to worsen despite hydration and symptomatic care at home
- October 2, she began to have rigors, nausea, and a new rash on her stomach
  - She drove to the local emergency room
  - She reported her symptoms and travel history
  - She denied any sick contacts since arriving in US
  - She denied any significant animal exposures in Rwanda or since returning
  - No sexual activity for >9 months
  - She did admit to not taking malaria prophylaxis

Patient information (hypothetical case)

- Given her symptoms, the ER triage immediately moved her to an isolation room and placed her on contact and droplet precautions
  - Temp = 39.2; Heart rate = 110, Resp rate = 18
  - Nasal swab negative for influenza, RSV, and SARS CoV-2
  - Labs showed a mild anemia, normal chemistries, mild elevation in liver enzymes
  - Later rapid malaria test was negative
  - Started to have some delirium and worsening abdominal pain
- Seen by ID consultant
  - Was placed on malaria treatment and admitted to ICU for concern for malaria
  - Thick and thin smears ordered as well as repeat malaria RDT

First Marburg Virus Disease Outbreak in the Republic of Rwanda

Print

Distributed via the CDC Health Alert Network
October 3, 2024, 2:15 PM ET
CDCHAN-00517

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory to inform clinicians and health departments about the Republic of Rwanda's first confirmed outbreak of Marburg virus disease (MVD) with 36 laboratory confirmed cases and 11 deaths reported as of October 2, 2024, including at least 19 cases in healthcare workers. This report summarizes CDC's recommendations for public health departments and clinicians in the United States on case identification and testing and clinical laboratory biosafety considerations. **No confirmed cases of MVD related to this outbreak have been reported in the United States or other countries outside of the Republic of Rwanda to date.** Currently, the risk of MVD in the United States is low; however, clinicians should be aware of the potential for imported cases.

Background

MVD is a rare but highly fatal viral hemorrhagic fever (VHF) caused by infection with one of two zoonotic viruses, Marburg virus or Ravn virus. Both Marburg virus and Ravn virus are within the virus family *Filoviridae*, which also includes Ebola viruses. A person infected with the Marburg virus is not contagious before symptoms appear. Symptoms may include fever, headache, muscle and joint pain, fatigue, loss of appetite, gastrointestinal symptoms, or unexplained bleeding. Marburg virus is spread through **direct contact** with broken skin or mucous membranes with the body fluids of someone who is sick with MVD, or who recently died from their infection. These body fluids include blood, urine, saliva, sweat, feces, vomit, breast milk, amniotic fluid, or semen. People can also contract MVD if they have contact with infected animals, or with needles, or with other objects or surfaces contaminated with the virus. Marburg virus is **not** spread through airborne transmission.

On September 27, 2024, the Ministry of Health of the Republic of Rwanda reported cases of MVD in health facilities in the country. These are the first known cases of MVD in Rwanda. As of October 2, 2024, Rwanda has recorded 36 laboratory confirmed cases, including 11 deaths (31% case fatality rate) from MVD. At least 19 cases are in healthcare workers, the majority of whom work in intensive care units. There are also several cases unlinked to known transmission chains, suggesting additional cases may have been undetected or unreported. Cases have been reported from seven of the 30 districts in Rwanda, with three districts (Gasabo, Kicukiro, Nyarugenge) in Kigali Province reporting the highest number of cases. Other districts reporting cases include Nyagatare, Gatsibo, Kamonyi, and Rubavu. Approximately 300 contacts to cases are being monitored in Rwanda. Investigations are ongoing to determine timeline, transmission chains, and potential source of the outbreak.

CDC has reached out to U.S.-based nongovernmental organizations and medical centers with staff working in the affected areas to provide guidance on education and how to conduct health assessments of U.S.-based staff before, during, and after their deployment. On October 3, 2024, CDC issued interim recommendations for public health management of U.S.-based healthcare personnel who were present in a healthcare facility in Rwanda in the previous 21 days.

There is currently no Food and Drug Administration (FDA)-approved vaccine or treatment for MVD. In the absence of early diagnosis and appropriate supportive care, MVD has a high mortality rate of 23%–90%, depending on the virus strain and the level of case management. With early intensive supportive care and fluid replacement, mortality rates might be lower.

Recommendations for Clinicians

- Systematically assess patients with exposure risk and compatible symptoms for the possibility of viral hemorrhagic fevers including MVD through a triage and evaluation process including a travel history. Early identification of MVD or other viral hemorrhagic fevers is important for providing appropriate and prompt patient care and preventing the spread of infection.
- Include MVD in the differential diagnosis for an ill person who has been to an area with an active MVD outbreak in the past 21 days, AND who has compatible symptoms (e.g., fever, headache, muscle and joint pain, fatigue, loss of appetite, gastrointestinal symptoms, or unexplained bleeding), AND has reported epidemiologically compatible risk factors like any one or more of the below, within the 21 days before symptom onset:
  - Had direct contact with a symptomatic person with suspected or confirmed MVD, or with any objects

Patient information (hypothetical case)

- October 3: ID team called state public health hotline to relay the case and concern for Marburg
  - Case discussed with CDC EOC and decided to send blood sample to the nearest CDC Laboratory Response Network (LRN) site in coordination with the State Public Health Lab
- October 4: hospital and public health authorities are notified of a presumptive positive test for Marburg virus from the LRN lab
  - Florida Public Health, CDC, Region 4 RESPTCs, and hospital start of series of calls to support the Florida hospital in the care of the patient
  - At the request of the hospital, CDC, ASPR, and NETEC arrange for transfer

Patient information (hypothetical case)

- October 5: Patient is transferred to the Region 4 Regional Emerging Special Pathogens Treatment Center (RESPTC) at Emory University Hospital and admitted to the Emory Serious Communicable Diseases Unit (SCDU)
- Exam
  - Temp = 38.5; Heart rate = 120, Resp rate = 20, SpO_2 = 93% on 3 L NP
  - Epigastric tenderness
  - Diffuse maculopapular rash on abdomen, chest, back, and buttocks
  - Waxing and waning mental status

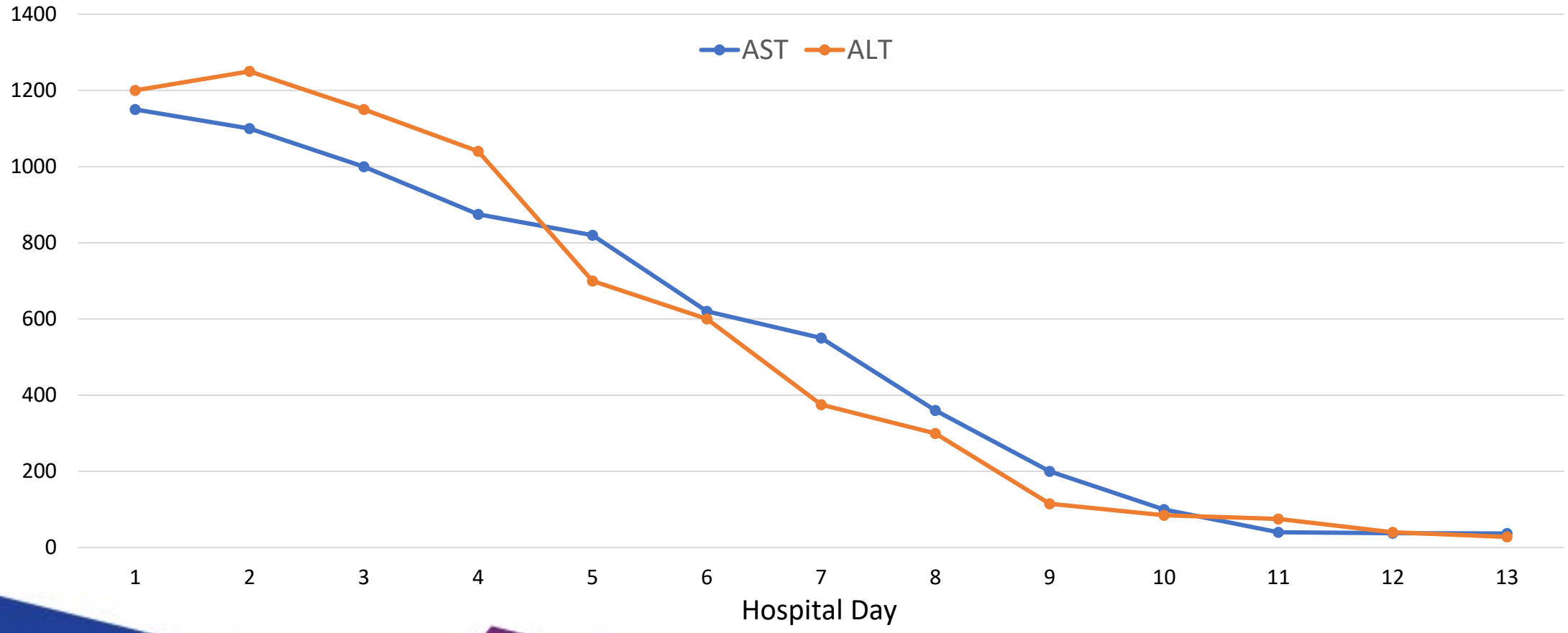
Patient information (hypothetical case)

- Labs significant for
  - Leukopenia with lymphopenia
  - Thrombocytopenia and mild anemia
  - Elevated liver enzymes, amylase and lipase
  - Significantly decreased potassium and magnesium
- Supportive care was continued
  - IV fluids with repletion of electrolytes
  - Nutrition
- IV Remdesivir

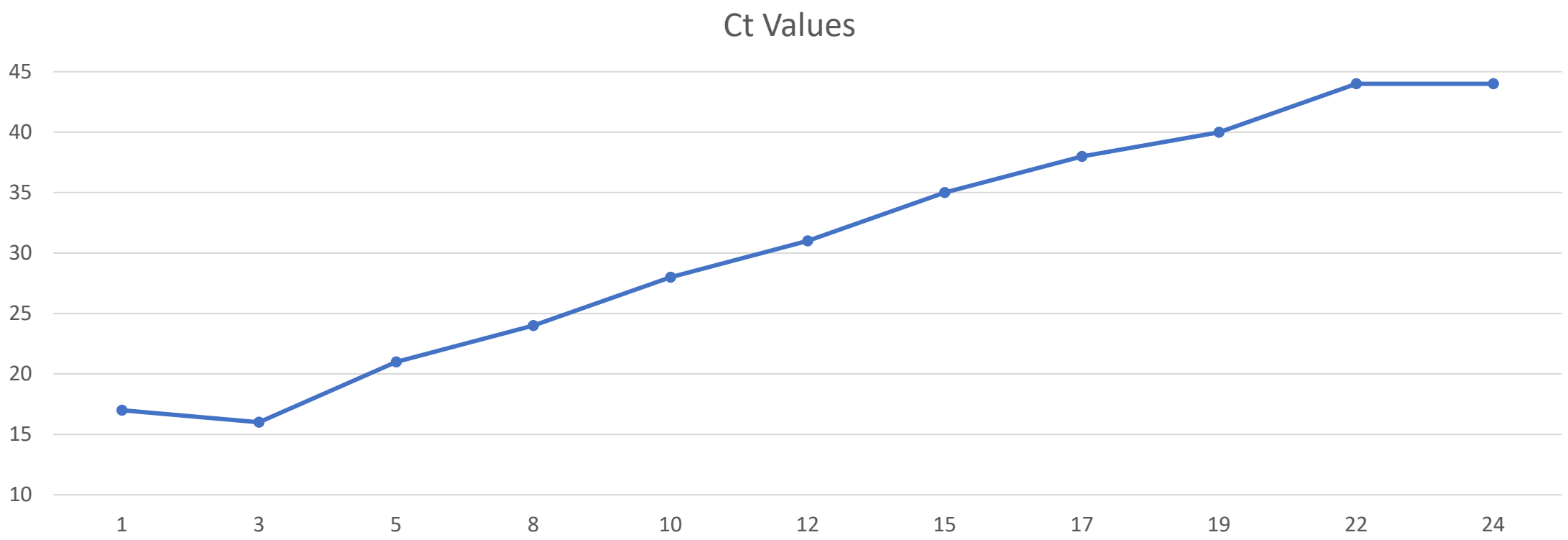
Patient information (hypothetical case)

- CDC's Viral Special Pathogen Branch Laboratory confirms Marburg virus
- Patient is offered MBP-091, an experimental monoclonal antibody, through a NETEC SPRN Expanded Access Protocol (EAP) with MAPP Biopharma
  - Patient consents to EAP
  - Starts monoclonal therapy on October 6

Liver Enzymes



Marburg virus PCR data from CDC VSPB



Patient information (hypothetical case)

- By day 7, patient was symptomatically improving
- By day 14, mostly back to baseline
- Day 24, second “undetectable” PCR test
  - Discharged coordinated between CDC, Georgia Public, Florida Public

Key Takeaways

- Primary hospital identified risk of communicable disease immediately and placed patient in isolation, protecting its staff
- Clinical team was paying attention to public health announcements (CDC HAN) and applying information to their patient
- Public health and expert resources were informed early
- Prepositioned experimental medical countermeasure protocols allowed for ready access