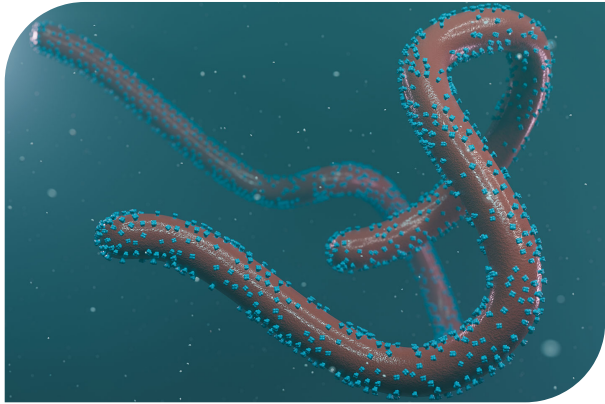


The next pandemic: Marburg?



22 April 2021 – by Priya Joi

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A deadly cousin of Ebola, Marburg can kill nine out of ten people it infects, and international travel has taken it from Africa to Europe twice in the past 40 years. Will increasing globalisation make this virus more likely to erupt around the world?

In August 1967, a cluster of patients in Marburg and Frankfurt, in Germany, and in Belgrade (then Yugoslavia, now Serbia), began showing symptoms of an infectious disease – a high fever, chills, muscle ache, and vomiting. The patients worsened over the next few days, until they began bleeding from every orifice in their body, including needle puncture wounds. In total 31 people died.

Three months after this outbreak, virologists in Marburg had discovered the first filovirus, a cousin of the equally-deadly Ebola virus. The virus had been carried by infected African green monkeys from Uganda.

Avoiding handling or eating bush meat is also critical to avoid any potential infection that could spread from animals.

After this first sighting, the virus was then mostly seen in African countries, in bat-infested caves or mines. About 40 years later, however, the virus re-emerged in Europe through a traveler returning to the Netherlands from a trip to Uganda where she had been visiting caves.

The largest known outbreak of Marburg virus, in Angola in 2004, infected over 250 people and had a 90 percent fatality rate.

Marburg virus can persist in the eyes and testes of people who have recovered, and in pregnant women it can persist in the placenta and amniotic fluid as well as breast milk. This can be extremely dangerous. In early 2021, there were reports that Ebola, closely related to Marburg, could lay dormant in people only to emerge many months after an epidemic had ended, triggering another outbreak.

DISEASE: MARBURG

Where is it circulating? Most outbreaks have been in Africa, with cases reported in Angola, the Democratic Republic of the Congo, Kenya, South Africa, Uganda and Zimbabwe. However, there have been outbreaks in Europe and the USA.

Pandemic threat: As Marburg virus can spread from human to human through contact of bodily fluids, much like Ebola. As outbreaks in Europe and the US have already shown, increasing globalisation and international travel mean that the risk for global spread is high, especially when the incubation period could be up to three weeks. This could be disastrous given its high death rate.

How is it spread? The Egyptian rousette fruit bats often harbour the virus. African green monkeys have in the past spread the virus to people in Uganda, but

pigs can also become infected and can be a source of infection. Marburg virus is spread through direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and also through any materials such as bedding, that have been contaminated with the infected fluids. As a result, health workers have often become infected by treating patients with Marburg virus. Burial ceremonies in which people have direct contact with the body can also drive the spread of the virus.

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Case fatality rate: Marburg is one of the deadliest viruses we know of, killing as many as 88% people it infects.

Incubation period: The incubation varies from as short as two days to up to 21 days, though some studies have suggested the virus can incubate for as long as 26 days.

Symptoms: Marburg virus begins with a fever, severe headache and muscle pains. This is often followed by watery diarrhoea, stomach pain, nausea and vomiting, accompanied by extreme exhaustion and lethargy. Many people go on to develop severe viral haemorrhagic fever, and in severe cases have blood in their vomit and faeces, and may bleed from their nose, gums and vagina. The onslaught of the virus is so extreme that most people die 8-9 days after infection, often because of extreme loss of blood.

Diagnosis: Marburg can be difficult to distinguish clinically from other diseases, such as malaria, typhoid fever, meningitis and other viral haemorrhagic fevers. Diagnosis can be confirmed using techniques that detect the presence of

immune response to the virus, such as antibody-capture enzyme-linked immunosorbent assay (ELISA), or the presence of virus in people presenting with symptoms, via antigen-capture detection tests, reverse transcriptase polymerase chain reaction (RT-PCR) assay, or virus isolation by cell culture. However, often none of these diagnostic tools are available in the countries with highest risk of Marburg outbreaks. In addition to having the diagnostic tests available, countries need to have laboratories that can ensure maximum biological containment conditions due to the fact that the samples are an extreme biohazard risk.

Are there vaccines or treatments, or ongoing R&D?

There are currently no specific therapeutics for Marburg virus. However, supportive care including rehydration with oral or intravenous fluids can improve survival. This can mean maintaining oxygen status and blood pressure, replacing lost blood and clotting factors, and treating any complicating infections. Potential treatments, including blood products, immune therapies and drug therapies, are currently being assessed. Marburg virus vaccine candidates are being investigated, and in 2019, for example, IAVI (the International AIDS Vaccine Initiative) began researching a recombinant vesicular stomatitis virus (VSV) vector Marburg virus vaccine candidate, called rVSVΔG-MARV-GP. Another vaccine candidate MVA-BN Filo containing both Marburg and Ebola virus antigens could potentially protect against both haemorrhagic viruses. It is currently in phase 3 trials, and seems to trigger good immunity against the Ebola Zaire strain but it has not yet been tested against Marburg virus.

HOW COULD WE LOWER THE RISK OF IT BECOMING A PANDEMIC?

Since Marburg virus can spread between people, extremely stringent infection control measures are needed to avoid people being in any contact with each other, to ensure any laboratory samples are

disposed of carefully, and to ensure safe burial procedures. Avoiding handling or eating bush meat is also critical to avoid any potential infection that could spread from animals. International travel is a major risk factor for the spread of Marburg virus beyond Africa and rapid diagnostics to ensure that cases are picked up before people carry the virus to other countries will be important.

For more on Marburg virus disease, here is WHO's fact sheet: <https://www.who.int/news-room/fact-sheets/detail/marburg-virus-disease>

TOPICS: Next pandemic Marburg

The views expressed in this article are those of the author alone and not Gavi, the Vaccine Alliance.

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