



Letter to the Editor

Marburg Virus Disease in Tanzania: The most recent outbreak

Dear Editor

Marburg virus (MARV) is a member of the filoviridae family causing viral haemorrhagic fever. After conducting laboratory tests in response to reports of cases and fatalities in the nation's north-western Kagera district, Tanzania today verified its first-ever cases of the Marburg Virus Disease [1]. Following the onset of symptoms such as fever, vomiting, bleeding, and kidney failure in eight persons, Tanzania's National Public Health Laboratory examined samples to identify the illness's source. Of the eight cases, five have resulted in death, one of whom was a healthcare worker [1]. The other three are still being treated. A total of 161 contacts have been found and are being kept under vigilance [1]. With Case Fatality Rate ranging from 24.0% to 90.0%, high virulence and symptomatic management, community engagement has become quintessential in containing the outbreak [2].

1. Epidemiology

The first ever case of MVD was recognised in 1967 after simultaneous outbreaks in Marburg and Frankfurt in Germany; and in Belgrade, Serbia, when laboratory workers in Behringwerke were working with tissue or tissue cultures of infected *Chlorocebus aethiops* with inadequate PPE. The exact location in Uganda from which the infected grivets were imported to the laboratory still remains unexposed. Out of the 31 personnel (25 primary and six secondary infections) who manifested severe symptoms, seven of them died [3]. Recent outbreaks in Equatorial Guinea in February 2023 reported 11 fatalities out of 29 suspected cases [4]. (Table 1). However, new data reports spread of virus within 90 of the center and there is an increased suspicion of chain of transmission among undetected contacts [4].

The timeline of recent events related to the MVD outbreak has been shown in Fig. 1.

2. Signs and symptoms

The incubation period is 2–21 days. The presenting symptoms of MARV mimic Enteric Fever or malaria, making it a diagnostic hurdle. The disease exacerbates as a rapid progression from non-specific symptoms to severe symptoms like tachypnea, coma, convulsions, shock-like features to MODS, DIC and ultimately, death. Although haemorrhagic presentation is a touchstone of MVD, it manifests in only one-third of the patients at the peak.

3. Possible risks and precautionary measures

3 cases of laboratory accidents have been reported in Russia in the years 1988, 1991, 1995, in which, the first two perished. Indicative of being extremely bio-hazardous (Risk Group 4 pathogen), laboratory

testing of samples should be conducted only by trained staff, under biosafety level 4-equivalent containment, maintaining strict standards and protocols.

Sporadic cases have also been reported in people who gave a travel history to a cave inhabited by *Rousettus aegyptiacus* bat colony in Uganda. People visiting such caves fall under high risk of exposure, thus, they should take proper protective practices like wearing masks, gloves, PPE or quarantine in suspected cases. Experimental inoculation of pigs with different Ebola viruses have shown that they are susceptible to infection and can shed the virus (amplifier). Other animals should be considered as potent amplifiers unless stated otherwise as a precautionary measure. Further, pig farms should be under strict surveillance so that pigs aren't infected by fruit bats. When there are reported cases of outbreak, animal products (like meat, blood, etc.) should be properly cooked before consumption.

While the exact mode of transmission from animals to humans still remains under the microscope, human-to-human transmission is via direct contact with blood or other bodily fluids of infected people, and with surfaces or materials that are contaminated with the same. HCW might contract the infection in cases of unintentional exposure. Direct contact with an infected deceased person's body during cremation might also cause transmission of the virus. Antibody fluorescence test showed that the sperm of an infected male hosted infectious material. His wife contracted the disease via sexual intercourse [5]. Safer sex for at least 12 months from the onset or symptoms, or till the semen tests negative twice for Marburg virus has been recommended by WHO to male survivors.

Certain immune-privileged sites (like testicles, eye) have shown

Table 1

Table 1: Marburg virus cases with deaths from 1967 to 2023 AD.

Year	Place	Cases	Deaths	CFR
1967	Marburg, West Germany	31	7	23
1975	South Africa	3	1	33
1980	Kenya	2	1	50
1987	Kenya	1	1	100
1988	Koltsovo, Soviet Union	1	1	100
1990	Koltsovo, Soviet Union	1	1	100
1998–2000	Democratic Republic of Congo	154	128	83
2004–2005	Angola	374	329	88
2007	Uganda	4	1	25
2008	Uganda and Netherlands	1	1	100
2012	Uganda	18	9	50
2014	Uganda	1	1	100
2017	Uganda	3	3	100
2021	Guinea	1	1	100
2022	Ghana	4	3	75
2023	Equatorial Guinea	11	29	264
2023	Tanzania	8	5	63

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MARBURG VIRUS OUTBREAK

Timeline of recent outbreak



Fig. 1. Timeline showing the recent trends of Marburg Disease Virus outbreak in 2023.

persistence of MARV even after recovery. Relapse cases in the absence of re-infection, although rare, have been reported.

4. Available treatment modalities

No specific therapy is available for MARV infection. Management is done by balancing fluids and electrolytes in case of dehydration, administration of anticoagulants to prevent and control DIC (in early stages), administration of procoagulants (in late stages) to control haemorrhaging, administration of antifungal or antiviral drugs to prevent or treat secondary infections, pain management, etc. Several clinical trials have been conducted on monoclonal antibodies that were developed for Ebola virus disease under expanded access licence. In addition to this Zabdeno and Mvabea were granted authorisations by EMA in 2020. These vaccines are said to be effective against the filoviridae group (same as MARV), however the clinical efficacy has still not been established.

5. Future scopes for research

1. Studies need to be conducted to confirm if the Egyptian rousettes are actual or intermediate hosts of MARV
2. Factors like heavy rain after prolonged period of arid weather have been shown to be associated with EVD, similar triggering factors of MVD in the human population needs to be studied.
3. All the natural maintenance host of MARV must be identified.

6. Conclusion

Marburg virus infection has the potential to cause a global pandemic. A global initiative must be taken to devise proper management and vaccines for this virus. Due to absence of vaccines targeted against the virus and specific antiviral drugs, the virus poses an imminent threat to human life. Without proper management protocols and treatment, this might lead to high CFR and mortality. Thorough research must be conducted about pathogenesis and vaccine development in order to stop the next global pandemic.

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Consent

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Declaration of competing interest

We hereby declare that there is no conflict of interest among all the authors of this manuscript.

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