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Epidemiology, symptoms, transmission, prevention, treatment, and future prospects of the Lassa fever outbreak: a potential study

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Dear Editor,

The acute viral sickness Lassa fever (LASF) can be transmitted to humans by rats. It takes place in West Africa. Avoiding contact with rats and their waste can stop primary transmission, especially in areas where outbreaks are common. Approximately 80% of infections are asymptomatic, but the remaining 20% of patients experience severe multisystem illness, and up to 15% of hospitalized cases may pass away.[1] Southeast Guinea's Guéckédou prefecture reported a possible case of hemorrhagic fever on April 20, 2022, to the local health officials. A 17-year-old female patient presented with fever and anorexia on April 12. Additionally, the subject complained chest pain and physical weakness on April 16 and 17. The case sought medical attention on April 18 and was admitted to a hospital the next day, April 19. Five days after the first symptoms appeared, the case received home care and visited two medical centers, resulting in 141 interactions that were reported. RT-PCR testing for Ebola, Marburg, and Lassa disease were carried out on a blood sample from the probable case on April 20 at the Guéckédou hemorrhagic fever laboratory. On April 20, the case tested negative for Marburg and Ebola, but on April 21, LASF was positively diagnosed. A second test was performed at the Conakry reference lab on April 22 and it came out positive once more. The same day, a LASF outbreak was announced by the minister of health and public hygiene. At this time, the case is being treated at a Guéckédou hospital. In the Guéckédou prefecture, a second confirmed case of LASF that had no epidemiological connection to the first case was announced on April 28. The victim was a man, age 24. He initially sought treatment at a private clinic on April 18 after presenting on April 16 with chest pain and insomnia. He sought treatment at the local hospital on April 28 due to symptoms like fever, headache, vomiting, thoracic pain, and bloody stools. In a Guéckédou treatment center on April 29, laboratory testing revealed that he had LASF. To identify the origins of the virus, epidemiological research is being conducted.[2] LASF is a widespread, systemic primary viral infection that is brought on by a single-stranded RNA virus.[3] Impairment or delay in cellular immunity, which results in fulminant viraemia, is the primary characteristic of lethal disease.[4] Eight to fifty-two percent of the population in Sierra Leone,[5] 4–55% in Guinea, and 21% in Nigeria[6] have antibodies to the virus.[7] Typically, 1–3 weeks after infection, the symptoms appear. Most people only have moderate ones, such as a slight fever, weakness and fatigue, and headaches. More severe signs of the condition, such as bleeding from your gums, eyes, or nose, occur in roughly 20% of cases. difficulty breathing, hurling up, your face swelling, you feel shock and back, stomach, and chest pain. The severity of LASF is more common in pregnant women. A miscarriage may result from the illness. A third of infected individuals develop some degree of deafness as a side effect of the sickness. Regardless of how severe or light their illness was, this seems to be the case. Overall, just 1% of those who contract LASF pass away. But the mortality rate increases to 30% for pregnant women who are past term. A multiorgan failure death may occur two weeks after the onset of symptoms.[6,8] There is a kind of rat known as the 'multimammate rat' that acts as the reservoir for the Lassa virus (LASV) or hosts the virus (*Mastomys natalensis*). After being infected, it is possible that this mouse may continue for the rest of its life to excrete the virus in its pee. In the savannas and woodlands of western, central, and eastern Africa, massive populations of the rat genus *Mastomys* may be found. They have a high rate of reproduction and a large number of offspring. In addition, *Mastomys* have little problem colonizing human houses and other areas where food is stored. The LASV is able to spread from contact with infected animals to humans with a reasonable amount of ease because to all of these factors. Ingestion and breathing in contaminated air are the two primary ways that humans get infected with the LASV. The virus is shed by *Mastomys* rats in their urine and feces, and infection may occur when there is direct contact with either of these liquids. This can occur when an individual handles filthy items, consumes contaminated food, or comes into touch with infected wounds or sores. Direct contact transmission is frequent among *Mastomys* rats because they frequently inhabit residential areas and scavenge on food that has been improperly stored or permitted to go bad. *Mastomys* rats can infect people when they are caught and processed, and they are occasionally eaten as food. A human may come into contact with the virus if they breathe microscopic airborne particles contaminated with infected rat excretions. Cleaning tasks like sweeping may result in this aerosol or

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airborne transmission. Because the LASV may spread from person to person following exposure to the virus in the blood, tissue, secretions, or excretions of the pathogens transmitted with it, coming into touch with infected rats is not the only way that humans can get afflicted with the disease. The LASV cannot be spread by incidental touch, even skin-to-skin contact if no body fluids are exchanged. Nosocomial transmission, also known as person-to-person transfer, takes occur often in hospital settings in which proper personal protective equipment is either not used or is not accessible. It is possible for the LASV to be transmitted via the recycling of needles as well as other infected medical items.[9] 'Community cleanliness' is the major goal of prevention in order to reduce the rat population. Regular hand washing, keeping food in rat-proof containers, keeping garbage out of the house, owning pet cats, avoiding contact with blood and other bodily fluids when caring for sick family members, adhering to safe burial practices, and wearing protective gear in a healthcare setting, such as masks and eyewear are some examples of what this entails. *Mastomys* rats are so pervasive that they cannot possibly be eliminated. Because of this, the main goal is to keep these rodents away from human dwellings.[10] When ribavirin is given late in the course of the illness, after the viraemia has peaked and physiological dysregulation has advanced to severe and frequently irreversible stages, it is ineffective.[11] Ribavirin's toxicities prevent it from being used to prevent infection, despite the fact that they are controllable and acceptable in the life-threatening condition of acute LASV infection. To treat LASF, further small-molecule medications are being tested.[12] In various animal models, the small-molecule purine analog favipiravir (T-705)[13] has been shown to be more effective than ribavirin at treating LASV infection.[13,14] After receiving a combination of favipiravir and ribavirin treatments for their LASF, two individuals recovered, although virus RNA was persistently found in their blood and semen.[15] In a phase I a human clinical trial, the new LASV viral entry inhibitor LHF-535 (Kineta) was found to be risk-free. It functions as an improved version of ST-193 (a benzimidazole derivative; SIGA), which blocks LASV entrance by concentrating on the virus's envelope glycoprotein.[16] If used within the first 6 days of the illness, ribavirin may up to 10 times lower mortality. Ribavirin is administered intravenously in doses of 30 mg/kg (maximum 2 g) as a loading dose, 16 mg/kg (maximum 1 g) every 6 hours for 4 days, and then 8 mg/kg (maximum 500 mg) every 8 hours for 6 days. Although it has been attempted on seriously ill patients, anti-LASF plasma has not yet been proven to be helpful and is not currently advised. It is essential to receive supportive care, which includes correcting fluid and electrolyte imbalances. Abortion lowers the risk of maternal death among infected pregnant women.[17] Future studies in LASF-affected areas should look for people with high levels of circulating immunoglobulin-G antibodies, or people who may have experienced clinical or subclinical infection but recovered. To identify the parameters linked to survival, identified cases must be assessed. To find out if prior LASV infection influences the likelihood of recurrence, re-infection, or clinical presentation of other diseases that exhibit with fever, they should also be monitored in a cohort study.[18] We discussed about the LASF outbreak's epidemiology, symptoms, transmission, prevention, treatment, and the future prospects.

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Guarantor

M.M.R. (corresponding author) took full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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