Epidemiology and pathobiology of Lassa fever in Sierra Leone

Donald S. Grant,1,2,3, Micheal Gbakie,1, Lansana Kanneh,1 Veronica Koroma,1, Augustine Goba,1, Mambu Mamoh,1,4 John Demby Sandi,1, Ibrahim Mustapha,1, Franklyn Kanneh,1 Jeffrey G. Shaffer,5 Robert F. Garry5, John S. Shieffelin5

1Viral hemorrhagic fever program, Kenema Government Hospital, Kenema, Sierra Leone
2Ministry of Health and Sanitation, Freetown, 3University of Sierra Leone, Freetown, 4Eastern Polytechnic Institute, Kenema, 5Tulane University, New Orleans, Louisiana USA

ABSTRACT

BACKGROUND

Lassa fever is a viral hemorrhagic fever (VHF) that is endemic in Sierra Leone, Guinea, Liberia and Nigeria, with cases reported in several other West African countries. Lassa virus (LASV) family Arenaviridae is transmitted to humans by contact with the excretions of its major reservoir Mastomys natalensis. Little work has been done to determine the seroprevalence of Lassa fever in Africa and characterize its clinical risk factors.

METHODS

We carried out two studies for laying the groundwork for determining prior LASV exposure rates and its risk factors. One of the studies measured seroprevalence for LASV in the Districts of Kenema, Tonkolili, and Port Loko. Based on historical hospitalizations, we hypothesized that these districts would classify as high, medium, and low endemic areas, respectively. We also collected data on volunteer demographics, the local environment, and trapped rodents in and around households with Lassa fever cases. In a separate study, we captured and analyzed clinical and laboratory data from clinical presentations to the Kenema Government Hospital to link patient signs and symptoms with survival outcomes and characterize Lassa fever epidemiology and its risk factors.

RESULTS

In Kenema District, LASV IgG seroprevalence varied from 10% to 62%. While Kenema district remains among the highest district in terms of Lassa fever prevalence in Sierra Leone, other districts are now increasingly reporting cases. Some villages in Tonkolili have seroprevalence rates similar to those of high prevalence villages in Kenema district. While we observed high variability within each of the districts, their overall mean prevalence rates were between 12% and 18%. Some villages showed seroprevalence increases with increasing age (suggesting a long-term exposure to LASV) while others showed similar seroprevalence across age groups (suggesting a more recent introduction of LASV). Lassa fever case-fatality rates were 69%, but this estimate is likely inflated due to self-presentation bias. Self-presentation among acute Lassa cases was associated with bleeding, weakness, sore throat, vomiting, cough and abdominal pain. Significant differences were observed in each of these symptoms of Lassa fever (Table 1, 3). Case fatality rates were generally younger. More females than males presented with signs and symptoms of Lassa fever, but the sex ratio did not vary significantly with serostatus. Most patients with active LASV infection presented after 7 days of illness.

Although patients presenting to KGH with signs and symptoms of Lassa fever were all ill, subjects that presented with (Table 1) and LASV infection were at significantly increased risk of death (Table 1, 2). The majority of suspected cases continue to be from Kenema district. Patients with active LASV infection we generally younger. More females than males presented with signs and symptoms of Lassa fever, but the sex ratio did not vary significantly with serostatus. Most patients with active LASV infection presented after 7 days of illness.

Clinical signs and symptoms of patients presenting to KGH with signs and symptoms of Lassa fever (Table 1, 3). Case fatality rates were not significantly different between pregnant and non-pregnant women regardless of serostatus.

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