



THE UNENDING SCOURGE OF LASSA FEVER - A CAUSE FOR GLOBAL CONCERN

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HISTORICAL BACKGROUND

It all started from anonymity and confusion at the Bingham memorial hospital in Jos North-Central Nigeria when Laura Wine (an American missionary nurse) was referred from Lassa with a strange ailment that has defied all initial treatments. The word "Lassa" is the name of a village in the present day Askira/Uba local government area of Borno State, North-Eastern Nigeria. Laura died of that strange disease not long after her admission. But two of her nurses (Charlette Shaw and Lilly Pinneo) also came down with similar presentation barely a week after their contact. Miss Shaw also died but Pinneo was flown to United States of America where she recovered after nine weeks of admission at the Columbia-Presbyterian hospital in Manhattan.

What is Lassa fever?

The mystery of Lassa was unraveled when Jordi Casals and his co-workers at the Yale Arbovirus Research Unit (YARU) New Haven, Connecticut isolated Lassa virus from specimens of the first three victims. Lassa virus was thus named after Lassa village in the North eastern part of Nigeria where in 1969 an outbreak of a disease affected American missionary nurses and brought the disease to Western attention for the first time.

Lassa fever is an acute viral zoonotic illness caused by Lassa virus, a virus belonging to the arenaviridae family. These group of viruses are known to be responsible for severe haemorrhagic fever characterized by fever, muscle aches, sore throat, nausea, vomiting and, chest and abdominal pain. Lassa fever is the most frequent hemorrhagic fever observed in West Africa and is endemic in Guinea, Sierra Leone, Liberia and Nigeria. Insights from remote published records revealed clinical entities resembling Lassa fever which were recognized in the late 1930s and called "Savannah typhus" by French workers.

Clinical Presentation

About 80 percent of human infections are asymptomatic with the remainder experiencing severe multi-system disease and the virus affecting several organs in the body such as the liver, spleen and kidneys. Peak incidence was thought to be in the dry season, but data collected in Sierra Leone shows peaks in the overlap with the wet season. The symptoms and signs include fever, nausea and vomiting, chest pain, periorbital oedema, puffy face, puffy cheeks, oedema, dehydration, retrosternal pain, conjunctival injection, fainting attacks, bleeding from orifices, hypotension, shock and coma. Other signs are pleural effusion, ascites, cerebral oedema, adult respiratory distress syndrome and poor renal function. Clinically, a Lassa fever infection is difficult to distinguish from other viral hemorrhagic fevers, such as Ebola and Marburg, and from more common febrile illnesses such as malaria or typhoid fever.

Humans usually become infected with Lassa virus from exposure to excreta of infected *Mastomys* rodents, and the infection may spread further between humans through direct contact with the blood, urine, faeces, or other bodily secretions of a person with Lassa fever. Person-to-person transmission occurs in both community and health care settings, where the virus may be spread by contaminated medical equipment, such as re-used needles. Sexual transmission of Lassa virus has also been reported.

Management

Lassa fever affects both sexes and all age groups. However, children and pregnant women (including the unborn fetuses) carry worst prognosis and higher fatalities. While there is no approved therapeutic drug for Lassa fever, the antiviral drug ribavirin has been demonstrated to reduce fatality from 55% to 5%, but only if administered within 6 days of the onset symptoms. The requirement for the drug to be administered at an early stage of infection to successfully alter disease outcome limits its utility given that Lassa fever has an indolent course and is difficult to diagnose by symptoms alone, particularly in the early stages where ribavirin is most effective. Early diagnosis is still difficult in most Nigerian primary and secondary health centers. There is currently no approved/safe vaccine for Lassa fever even after several efforts.

Reservoir Host of Lassa fever

Numerous initial attempts to find a reservoir host of this infection were not initially successful. In September-October of 1972, some scientists by name: Casals, Monath and Pinneo together with investigators from the United State Centers for Disease Control solved the Lassa mystery during a community epidemic in the rural hospitals and villages of eastern Sierra Leone. They recovered Lassa virus from tissues of a rodent and hence tracking the source of infection to *Mastomys natalensis* rats (Natal Multimammate rat).

This rodent is often found around homes and farm settlements and has some unique features which include, long hairless tail, pointed rostrum and ventral surface lined by multiple mammary glands (in females) from the thorax down to its abdomen. On average it weighs 20-80g, the head to body measures about 6-17cm and the tail 6-15cm. This virulent rodent has an average life span of 2 years, breeds round the year with each pregnancy resulting in 16-20 litters. The Lassa virus exhibits persistent, asymptomatic infection with profuse urinary virus excretion in this ubiquitous rodent vector.

About 300,000 to 500,000 cases of Lassa fever and 5000 deaths occur yearly across West Africa. However, the scarcity of resources available for health care delivery systems and the political instability that characterize the West African countries would continue to impede efforts for the control of Lassa fever in the sub-region. In Nigeria, investigations in the 1970s and 1980s pointed to the existence of three disease-endemic zones; the northeastern, region around Lassa, the central region around Jos and the southern region

around Onitsha.

After the first outbreak in 1969, several others have occurred in different parts of West Africa. In Nigeria the outbreak of 1969 was shortly followed by another one in Jos in 1970. Subsequently, many outbreaks have occurred in different parts of the country including Zonkwa, Aba, Aboh-Mbaise, Onitsha, Lafia, Abuja, Ekpoma and many other areas. The recent and probably the most deadly outbreaks in Nigeria occurred in the year 2012; a total of 866 suspected cases of Lassa fever were reported from 21 States with 143 Laboratory confirmed and 92 deaths.

There are several challenges that have continued to hinder optimal control and management of Lassa fever. The high virulence and fatality rate of this disease is a major concern and is further complicated by the non-specific modes of presentation (mimicking some other fevers). The control of the carrier vectors is herculean. The natural habitat of these rats within and around homes and farm settlements make their eradication difficult. The inherent danger of complications that survivors and sub-clinically exposed individuals might suffer from is also a concern. Lassa fever and its lethal features qualify it as a suitable biological weapon. Unavailability of safe vaccines and cost effective and efficient rapid kit for diagnoses over half a century after identifying the disease has hampered the containment of the illness.

Although Lassa fever is mainly a disease of the developing world, several imported cases with hazardous outcomes have been reported in different parts of the world including North America, Europe and Asia etc. Growing concern of the potentials of Lassa fever virus as biological weapon is real, yet no lasting solution to this problem has been developed more than half a century of its identification.

Conclusion

The strange thing with Lassa fever is that health care workers who are suppose to work on it and take care of its victims are the worst affected. It has continued to claim the lives of many doctors, nurses, and other healthcare providers, Jordi Casals whose team was the first to isolate Lassa virus was nearly killed by it if not for Pinneo's serum that was timely given to him by his doctors. Dr. Jeanette Toup (of the Sudan interior mission) was the first medical doctor to die of Lassa fever. She died on 18th February 1970 from Lassa fever after performing two autopsies during investigation of a Lassa fever outbreak in Jos Nigeria. An accident during these examinations led to her death from the condition (which she was primarily responsible for bringing to the attention of the medical world) she was investigating. Troup cared for Miss Pinneo and her two nursing colleagues who died in Jos. Aniru Conteh was the Physician who established the world's only specialist Lassa fever isolation unit in Kenema Government Hospital, Sierra Leone and had an unparalleled expertise in the diagnosis and treatment of Lassa fever. He spent 25 years in his native Sierra Leone dedicated to treating patients with Lassa fever. Aniru Conteh died on the 4th of April 2004 of Lassa fever, a virus that he had been combating as a physician all through his life inside the ward that he was instrumental in establishing and maintaining.

Finally, the story of Lassa fever continues to make headlines even after more than half a century of the discovery of its existence, thereby necessitating the need for global alert and

QUESTION ON LASSA FEVER

BY

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1. What is Lassa fever?

Answer 1: Lassa fever is a viral haemorrhagic fever caused by the Lassa virus.

2. How was Lassa fever discovered?

Answer 2: Lassa fever was discovered in 1969 following infection among some missionary nurses in Lassa village in Borno State.

3. How does a person become infected with Lassa fever?

Answer 3: A person becomes infected through eating or drinking of food or water contaminated with blood, stool, urine of an infected rat or through contact with the body secretions of an infected person.

4. What is the name of the rodent causing Lassa fever and where can it be found?

Answer 4: *Mastomys natalensis* around homes and farm settlements.

5. How does Lassa fever present?

Answer 5: In 80% of cases, the person is asymptomatic, some may however present with fever, headache, constipation, myalgia, abdominal pain, diarrhoea, conjunctivitis. But at the terminal stage some may present with bleeding, end organ failure.

6. Who are the people at risk of Lassa fever?

Answer 6: All are at risk but healthcare workers are at a higher risk.

7. Can Lassa fever be diagnosed in Nigeria?

Answer 7: Yes there is a reference laboratory in Irrua, Edo State

8. How do you treat Lassa fever?

Answer 8: Lassa fever can be treated with an antiviral drug; ribavirin.

9. What are the complications that may arise from Lassa fever even after treatment?

Answer 9: Deafness occurs in about 15% of cases.

10. How can you prevent yourself from being infected with Lassa fever?

Answer 10: All raw foods must be well covered in bowls with covers, Village-based programmes or rodent control and avoidance. Hospital training programmes to avoid spread among health care workers. Barrier nursing. Awareness campaigns to farmers who live on the hinterland to discourage drying their grains on road shoulders along the highway. There is need for more concerted effort towards producing an effective vaccine for prevention and treatment of disease.