



Lassa Fever in Makurdi, Nigeria: Outcomes during the 2017/18 Outbreak

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Authors' contributions

The work was carried out in collaboration between both authors. Author POE designed the study, wrote the protocol and made the first draft of the study. Author POE and OAA managed the literature searches. Both authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Lassa Fever is a Viral Haemorrhagic Fever with yearly outbreaks in various parts of Nigeria over the past decade. The 2017/18 outbreak has been the worst recorded in the country and we wish to report a case series of the four patients managed in Makurdi during the outbreak. All the patients had a history of fever with various symptoms which were suggestive of Viral Haemorrhagic Fever and they received intravenous ribavirin. One out of the four patients managed did not survive giving a case fatality rate of 25%.

Keywords: *Lassa fever; Makurdi; outcomes.*

1. INTRODUCTION

Lassa fever is a viral haemorrhagic disease of global health concern. The disease is endemic in West African and responsible for recurrent epidemics in parts of West Africa including

Nigeria as well as sporadic disease in Europe, Asia and America [1,2].

Lassa fever is a zoonotic infection. The multi-mammate rat, *Mastomys natalensis* has been known to be a natural host of the virus and

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rodent-to-human transmission frequently occurs among populations where the rats breed and humans are exposed to their secretions, droppings or eat the rats [3]. Human-to-human transmission also occurs especially in health care settings where proper barrier nursing and infection control practices are not maintained [4,5].

In Nigeria, there have been several outbreaks since 1969 when the virus was first identified and named after the town Lassa in Bornu state where it was found [6]. Since 1993, there have been almost yearly outbreaks mostly during the harmattan season (November to March) in Nigeria especially in Edo state and environs. Also, most of the cases are managed at the Irrua Specialist Teaching Hospital, Edo state which is the major diagnostic and treatment centre for Lassa Fever in the country [6]. The 2017/18 outbreak in Nigeria has been the worst so far as there were 431 laboratory-confirmed cases in patients from 21 states with an estimated case fatality rate of 25% [7].

We report a case-series of four patients managed for Lassa Fever at the Benue State University Teaching Hospital, Makurdi during the 2017/18 outbreak highlighting the challenges and outcome. This is to raise awareness about the disease, improve surveillance and encourage all stakeholders in the health sector to put in concerted efforts in preventing the disease and offer expertise care to anyone infected with the virus.

2. CASE 1

Mrs AJ was a 30year old Gravida 4, Para 3 (G₄P₃⁺⁰) trader who resided in Makurdi. She was referred from a private hospital to the Emergency Unit of the hospital on account of recurrent fever for 8 days and also headaches, epistaxis and jaundice for 4days. She lived in a building with plenty of rats. She admitted to being pregnant though could not remember the date of her Last Menstrual Period and was referred to the Obstetrics and Gynaecology unit (O&G unit) who made an assessment of Viral Hepatitis in a multigravida at 20 weeks. Her body temperature at presentation was 36.2°C. The Infectious Diseases Unit was subsequently invited and after their review made a diagnosis of possible Lassa Fever in pregnancy and requested that blood samples be sent to the research laboratory in Irrua for Lassa Virus Reverse Transcriptase - Polymerase Chain Reaction (RT-PCR) which

turned out to be positive (on the 4th day of admission). Serology for Hepatitis B and C viruses were negative. FBC revealed marked neutrophil leukocytosis. Urinalysis revealed microscopic haematuria and the clotting time was prolonged. She was afebrile throughout the period she was on admission. IV ribavirin was commenced after the confirmatory test but her condition kept deteriorating and she died on the 6th day of admission.

3. CASE 2

Mr GS, a 27 year old commercial driver who lives in Zakibiam, about 180 km from Makurdi. He presented with fever and petechial rashes of 6 days duration. He had a significant history of consumption of rats. Examination findings at presentation revealed a temperature of 38.4°C, subconjunctival haemorrhage and exudative pharyngitis. Blood samples sent to Irrua for Lassa virus RT-PCR turned out to be negative, Urinalysis revealed microscopic haematuria and clotting time was prolonged. He was commenced on IV ribavirin after blood samples for Lassa virus PCR were collected and his clinical condition improved steadily till discharge.

4. CASE 3

Mr AD, a 34 year old male farmer who lives in Aliade about 60 Km from Makurdi. He presented with a 2week history of recurrent fever and 4 day history of frequent passage of loose stools. He was very fond of eating rats. He had taken antimalarials and antibiotics with poor relief of the symptoms but it was the diarrhoea that necessitated his presentation to the hospital. Examination findings at presentation were unremarkable except for a temperature of 39.9°C. The clotting time was prolonged and Urinalysis revealed microscopic haematuria. He was suspected to have Lassa Fever and IV ribavirin was commenced on the day of presentation with marked resolution of the fever. However, samples for Lassa virus RT-PCR which were collected after patient commenced therapy turned out negative.

5. CASE 4

Miss KF, a 24 year old nurse who also lives in Aliade. She presented with a 10 day history of recurrent fever and 3 day history of yellowness of the eyes. She had a habit of eating rats and also took antimalarials and antibiotics with poor resolution of the symptoms but presented due to

the jaundice. She had not made contact with anyone with similar symptoms and serology for Hepatitis B and C viruses were negative. Examination findings at presentation were a temperature of 39.7°C and hepatomegaly. Investigations done include a clotting time which was prolonged and Urinalysis revealed microscopic haematuria and bilirubinuria. Liver Function Tests (LFT) done at presentation showed the transaminases and alkaline phosphatase levels were mildly elevated and they all came to normal levels after a week (at completion of ribavirin therapy). A diagnosis of Lassa Fever was considered though the Lassa virus RT-PCR result was negative and Yellow Fever was excluded following the LFT results. She received IV ribavirin for a week with complete resolution of her symptoms.

6. DISCUSSION

Lassa fever has been a cause of significant morbidity and mortality especially in West Africa as it accounts for an estimated 200,000 to 500,000 cases and 5000 deaths yearly in some West African countries, particularly in Nigeria, Sierra Leone, Liberia and Republic of Guinea [8]. In Nigeria, The prevalence of antibodies to the virus in Nigeria is 21% [9] as compared to 8-22% in Sierra Leone [10] and 4-55% in Guinea [11]. In the last 50 years, more than 28 states in Nigeria and the Federal Capital Territory have experienced one or more outbreaks of Lassa fever [6].

The first documented case reports of Lassa Fever outbreak in Makurdi was during the outbreak in 2013 by Achinge et al. [12]. The diagnosis was made at the Benue State University Teaching Hospital, Makurdi when a physician presented with fever and bleeding diathesis after managing a patient with similar features. Eventually both patients died and massive sensitization about the disease was done in various health facilities and communities across the state.

In Nigeria, the Irrua Specialist Teaching Hospital, Irrua which was built in 1993 has over the years managed most of the cases in Nigeria and is currently a reference centre for the diagnosis and management of Lassa Fever. However, there have been numerous suspected or confirmed cases of the disease which occur at other states and such patients also need urgent and expertise care because delay in treatment often has fatal consequences. Hence, the need for case

notification and documentation, compare treatment outcomes and ultimately harmonize Lassa Fever management across all treatment centres in the country.

The case reports above reveal a lot of about the patients with Lassa Fever who lived within the same geographical area. It is noteworthy that the only mortality recorded was the case of Lassa Fever in pregnancy giving a Case Fatality ratio of 25% which was the same ratio obtained at Irrua during the 2017/18 outbreak [7].

All the patients had a history of contact with and/or consumption of rats. The consumption of rats has been an age long practice in most parts of Benue state as it is a local delicacy. However, with the recurrent outbreaks of Lassa Fever, there has been a lot of sensitization campaigns discouraging such practices although some individuals still indulge in such practices. Rodent control and discouraging consumption of rodents should be taken very seriously in the prevention of the disease as transmission via rats has been shown here to be of great significance. Although there was no case of human-to-human transmission in this case series, all health workers should be trained and retrained periodically on Infection Prevention and Control as a measure to curb the spread of infections, including Lassa Fever in health care settings. As there is currently no vaccine for Lassa Fever, these measures should be used optimally for disease prevention.

Secondly, all the patients had a history of fever and were febrile at presentation with temperatures ranging between 38.4°C – 39.9°C, except the pregnant patient who had hypothermia (36.2°C). The absence of fever in her was most likely as a result of severe sepsis and her pregnant status which further compromised her immune status with subsequent inability to mount enough immune response to generate a fever.

It is noteworthy that all the patients presented after about a week of having fever mostly because they felt they had malaria and were taking antimalarials at home. Therefore, patients with recurrent febrile ailments should be encouraged to present early to the hospital especially in Lassa fever endemic areas. This is to ensure prompt evaluation as delay in diagnosis and commencement of ribavirin has been responsible for most of the mortalities from Lassa Fever.

In addition to the fever, each patient had different symptoms such as bleeding diathesis, jaundice, diarrhea and headache affecting various systems of the body indicating that Lassa Fever is a multi-systemic disease. Hence, all health workers, especially in endemic areas should be trained and re-trained periodically on the management of the disease in all age groups including pregnant women for best outcomes. Currently, there is a handbook by the Nigerian Center for Disease Control and Prevention on Lassa Fever which contains essential information for all cadres of health workers for ease of use. It is advised that copies should be made available to every health facility especially in areas that are prone to outbreaks.

Thirdly, all the patients had microscopic haematuria. Hence, urine testing for haematuria in suspected Lassa Fever cases should be emphasized as this could be an invaluable tool for Lassa Fever diagnosis in health facilities where confirmatory PCR test cannot be done. There have also been previous reports of microscopic haematuria [13] and gross haematuria [14] in patients with Lassa fever and clinicians should endeavour to do urinalysis for all febrile patients especially during Lassa Fever epidemics. Also, all the patients had prolonged clotting time.

Interestingly 3 of the patients tested negative to the Lassa virus PCR and there is need for further investigations to determine factors that may be responsible such as the timing of sample collection and/or high degree of genetic diversity of the virus [15]. Studies have shown that in Severe Viral Haemorrhagic Fever especially in the acute phase of the disease, there could be false negative results because the patient's plasma may contain large amounts of RT-PCR inhibitors [16,17]. Ideally, dilutions of the test sample should be done in parallel with the original sample for all suspected Lassa Fever cases with negative RT-PCR results. Also, serial sampling of the patients for Lassa virus RT-PCR during the course of the disease could help in confirming the disease [15]. All these could not be done for our patients due to the distance between the reference laboratory at Irrua and Makurdi. The diagnosis of Lassa Fever was entertained in the patients with negative RT-PCR results mostly because of the history of exposure to rats, suggestive clinical/laboratory features and positive response to ribavirin.

7. CONCLUSION

The recent (2017/18) Lassa Fever epidemic in Nigeria, which has been recorded to be the worst, had some cases in Makurdi and rodent-to-human transmission was mostly responsible. All efforts at rodent control, improving surveillance and education of all cadres of health workers as well as the general public about the disease should be intensified to prevent the disease and create a high index of suspicion amongst all health workers. Furthermore, early presentation and commencement of ribavirin should be encouraged for improved outcomes.

CONSENT

All the patients gave their consent for the case reports.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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