Short communication

# Irreversible Ocular Sequelae following Lassa Fever: Clinical Evidence from a Survivor Managed at FMC Owo Isolation Centre, Ondo State, Nigeria

**Isaac Ihinmikaye[1], Olufemi Oladele Ayodeji[1], Adetumi Adetunji Subulade[2], Olalekan Ojo[3], Temitope Emmanuel Taiwo[1], Liasu Adeagbo Ahmed[4]**

1 Infection Control and Research Centre, Federal Medical Centre Owo, Ondo State, Nigeria.

2 Department Of Community Health, Federal Medical Centre Owo, Ondo State, Nigeria.

3 Department of Internal Medicine, Federal Medical Centre Owo, Ondo State, Nigeria.

4 Department of Family Medicine, Federal Medical Centre Owo, Ondo State, Nigeria.

**Corresponding author:** Isaac Ihinmikaye | **Email:** isaacihinmikaye@gmail.com | **Phone:** +234 8039352480

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## ABSTRACT

**Background:** Lassa fever continues to pose a major public health challenge in West Africa. Beyond its well-recognized systemic complications, emerging evidence shows that survivors may develop long-term sequelae affecting vital organs, including the eyes. However, severe visual impairment remains rarely documented and frequently under-recognized.

**Methods:** We present the case of a young female survivor of PCR-confirmed Lassa fever who received care at the Infection Control and Research Centre, Federal Medical Centre, Owo, Nigeria. Her acute illness was complicated by coagulopathy and hemorrhagic features, prompting close clinical monitoring during and after treatment.

**Results:** Although systemic symptoms gradually resolved with ribavirin therapy and supportive care, she developed progressive visual decline in the left eye during convalescence. Ophthalmic evaluations over time revealed vitreous hemorrhage, complicated cataract, and subsequent retinal detachment—leading to irreversible monocular blindness despite late surgical intervention. These findings highlight significant vascular and inflammatory injury likely driven by Lassa virus-induced endothelial damage and coagulation abnormalities.

**Conclusion:** This case underscores that Lassa fever is not only an acute viral threat but also a cause of lasting visual disability. Early ophthalmic assessment during hospitalization and structured follow-up for survivors could enable timely detection and intervention for eye complications. Strengthening post- discharge care and further research into viral ocular tropism and targeted therapies are urgently needed to prevent avoidable blindness in Lassa fever survivors.

***Keywords:*** *Lassa fever, Ocular sequelae, Survivor, Ribavirin, Isolation Centre, Nigeria*

## INTRODUCTION

Lassa fever (LF) remains a major viral haemorrhagic fever threat in West Africa, where it causes recurrent outbreaks with significant morbidity and mortality. The disease is caused by Lassa virus (LASV), an Arenaviridae family pathogen maintained primarily in Mastomys rodent species, whose excreta contaminate food and household environments, enabling zoonotic spillover to humans (Alikah A, Omoti A, Alikah S, 2020)

Human-to-human transmission also occurs, particularly in healthcare settings where exposure to infected blood or body fluids is common and infection prevention practices may be suboptimal (Asogun DA, Günther S, 2019)

Following an incubation period ranging from 7 to 21 days, clinical presentation varies markedly—from mild, nonspecific febrile illness to severe, life-threatening multi-organ dysfunction characterized by vascular leakage, plasma volume depletion, coagulopathy, and haemorrhage (Gary JM, Welch SR, Ritter JM, 2019)

Symptoms of disease can vary widely from mild flu-like illness to severe multi-organ dysfunction caused by fever, vascular permeability, decreased plasma volume, coagulation abnormalities, and varying degrees of hemorrhage. After an incubation period of 7-21 days, the disease symptoms may vary from mild flu-like illness to severe multi-organ dysfunctions caused by fever, vascular permeability, plasma volume depletion, coagulation abnormalities and varying degrees of hemorrhage (Happi AN, Ogunsanya OA, Ayinla AO; 2024)

Survivorship is increasingly common due to expanding access to ribavirin therapy and improved supportive care; however, long-term complications in convalescence are gaining recognition as an emerging public health challenge.

One under-recognized but potentially disabling consequence of LASV infection is ocular involvement. While conjunctivitis and other anterior segment changes have been noted during the acute phase, the true spectrum and burden of vision-threatening disease in survivors remain poorly understood

This gap in knowledge is concerning, especially in endemic communities where access to ophthalmologic care is limited and irreversible damage may go undetected.

This case report therefore highlights a rare but severe ocular sequela observed in a young survivor of confirmed Lassa fever managed at the Infection Control and Research Centre, Federal Medical Centre Owo, Ondo State, Nigeria. By documenting her clinical course, we aim to raise awareness among clinicians and policymakers of the need for early detection, timely intervention, and structured long-term ophthalmic follow-up for individuals recovering from Lassa fever.

## Materials and Methods

This case report was conducted at the Infection Control and Research Centre (ICRC) of the Federal Medical Centre, Owo (FMC), Ondo State, Nigeria. The patient was a 24-year-old female who presented with symptoms suggestive of viral haemorrhagic fever and was subsequently managed for PCR-confirmed Lassa fever.

### Study Design

A single-patient clinical case report was designed to document the diagnosis, management, and ophthalmic sequelae observed during acute illness and follow-up period. Information was obtained from clinical assessments during hospitalization and from outpatient clinic records.

### Case Management and Clinical Assessment

Upon admission, the patient underwent comprehensive clinical examination, including vital signs monitoring and systemic evaluation of cardiovascular, respiratory, abdominal, neurological, and ocular systems. Supportive therapy, ribavirin administration, antimicrobials, fluid resuscitation, blood transfusions, and symptomatic treatment followed national and institutional Lassa fever management guidelines.

### Laboratory and Diagnostic Investigations

Serial laboratory tests—including complete blood count, liver and renal function tests, electrolytes, and urinalysis—were performed during hospitalization to assess disease severity, treatment response, and complications.

Lassa virus infection was confirmed by reverse transcriptase–polymerase chain reaction (RT-PCR), with cycle threshold (CT) values recorded for both G and L genes. Malaria rapid diagnostic testing was performed to exclude co-infection.

### Ophthalmologic Evaluation

Eye examinations were conducted during hospital admission following complaints of reduced vision and repeated afterward during convalescence.

### Data Collection

Demographic data, clinical history, laboratory results, imaging records, and treatment course were extracted from the patient's medical file.

### Ethical Considerations

Patient confidentiality was ensured by anonymizing personal identifiers. Informed consent was obtained from the patient for the use of clinical information and images for research and publication purposes. Ethical approval was not required, as this is a single case report without experimental intervention

## Case Presentation

A 24-year-old female undergraduate student of University of Benin, Benin city, Edo state of Nigeria who resides in Benin City. She is Yoruba, Christian, and single. Her last menstrual period was said to be about few weeks prior to presentation.

She presented to the accident and emergency unit of the hospital following a referral from a private hospital where she presented for a few hours prior to referral. She was transferred to our isolation centre from the accident and emergency unit, as a suspected Lassa fever case with fever, abdominal pain, abnormal vaginal bleeding all of 1 week duration and bleeding from injection sites of 12 hours duration prior to presentation.

She was in her usual state of health until a week prior to presentation when she developed fever described as of insidious onset high grade, continuous, transiently relieved by antipyretics and persisted till presentation at our isolation centre. There were associated headache, malaise and anorexia. Abdominal pain located at the lower quadrants and epigastric region was insidious in onset, described as dull and burning respectively, intermittent, non-radiating, with no known aggravating or relieving factor(s) and of moderate severity. There was associated history of nausea and occasional vomiting of recently ingested food. No history of abdominal swelling, jaundice, changes in bowel habit, hematemesis or hematochezia.

Abnormal vaginal bleeding began concurrently with fever and abdominal pain. Bleeding was said to be active with no clots, necessitating the use of 3-4 sanitary pads daily. No history of irregular menstruation, menorrhagia or contraceptive use. Bleeding from puncture sites was noticed about 12 hours prior to presentation at the referring hospital, following a prolonged bleeding time.

There was history of recent travel to Owo, a Lassa fever endemic town, about 2 weeks prior to onset of symptoms, patronage of food vendors, indwelling rodents and no use rodent-proof containers for food storage. No history of recent funeral attendance, consumption of rats or contact with person(s) with similar symptoms. No history of bleeding from craniofacial orifices, oliguria, hematuria, dysuria irrational behavior or loss of consciousness. Following onset of symptoms, she presented to a primary health centre in Benin where she was managed for malaria on outpatient basis with intramuscular and oral medications. She however presented to the referral hospital in view of its proximity to her family and persistence of symptoms where she spent 5 hours on admission. No chronic medical conditions, no previous blood transfusions and no past surgeries. No known drug allergy. No alcohol consumption, not a cigarette smoker, no illicit drug use. Review of systems was not contributory. At the accident and emergency, she was found to be anxious, febrile (39.7), dehydrated and hypotensive (80/40mmHg).

Laboratory investigations including RBG (6.9mmol), Urgent PCV (18%), PT (Negative), FBC, E/U/Cr, Lassa PCR, MP, were requested and a diagnosis of Acute Viral Illness (likely VHF) was made. Fluid resuscitation was commenced and parenteral antibiotics, antimalarial, proton pump inhibitor, antipyretics and a stat dose of IV Ribavirin (6g) were administered. A pint of whole blood was transfused on account of anaemia. She was transferred into the Infection Control and Isolation Centre (ICRC) 30hrs after presentation on suspicion of Lassa fever, as the result of Lassa PCR was being awaited. On general examination at admission, she was acutely ill-looking young female, febrile (37.8°C), mildly pale anicteric acyanosed not dehydrated no pedal edema and saturating at 96% on room air. On cardiovascular examination, she was tachycardic (PR- 101bpm) and normotensive (BP- 98/53mmHg). Respiratory examination

showed RR-22cpm and the chest was clinically clear. On abdominal examination, the abdomen was flat, moved with respiration. There was mild suprapubic and epigastric tenderness, no organomegaly, normoactive bowel sounds. No ascites

On neurological examination, she was conscious and oriented. No signs of meningeal irritation. Normal tones, reflexes, and power. Examination of the perineum showed blood-stained perineal pad.

An assessment of suspected Lassa fever complicated by anemia and disseminated intravascular coagulopathy (DIC) was made. While awaiting Lassa PCR result, she was admitted to ICRC ward, FBC + ESR, E/U/Cr, serology, and urinalysis were requested and patient was placed on IVF N/S alternate with 5% D/W 1Litre 8hourly, IV Ribavirin 1.5g daily for 6days, then 750mg daily for 3day, IV Ceftriaxone 1g 12hourly, IV Metronidazole 500mg 8hourly, IV PCM 1g 8hourly for 48hours, and PRN, IV Tranexamic Acid 500mg 8hourly, IV Vitamin K 5mg daily for 72hours. She was catheterized for strict input and output monitoring and transfuse with 2nd unit of whole blood under frusemide cover. Vital signs were closely monitored while awaiting investigation results.

Results of investigations were retrieved by the 2nd day on admission; Lassa PCR was positive with CT values of 28.56 and 26.87 on the G and L genes respectively, Rapid diagnostic test for malaria was negative, Full blood count showed mild anaemia (PCV- 28.9%) leucocytosis (WBC- 15,300/L) with predominantly neutrophilia (55.1%) and lymphocytes (37.7%) and thrombocytopenia (83,000/uL) Electrolytes were essentially normal (Na- 129 mmol/L, K- 3.5 mmol/L, HCO3- 21 mmol/L, Cl- 98 mmol/L, Ca- 2.0 mmol/L) Creatinine and urea were mildly elevated (Cr- 183umol/L, Ur- 11.8 mmol/L) Liver function test showed elevated alkaline phosphatase (553IU/L ) and alanine transferase (496IU/L) hypoalbuminemia(26g/dL) normal total protein(55g/dL) A final diagnosis of confirmed Lassa fever complicated by anaemia, thrombocytopenia, hypoalbuminemia and DIC was made for which she had the third pint of fresh whole blood while ongoing management was sustained.

By third day on admission, she was noticed to be febrile, still having prolonged bleeding from puncture sites and complained of abdominal pain with mild epigastric tenderness. Post-transfusion FBC revealed PCV- 30.7% WBC- 12,920 PLT- 53,000. An assessment of Lassa fever with thrombocytopenia, DIC and gastritis was made for which she was commenced on IV omeprazole 40mg 12hrly x 4/7. Fifth day on admission, she complained of inability to see with the left eye and distressing cough and noticed to have bilateral conjunctival injection, worse in the left. An assessment of suspected left conjunctival erythema was made for which the ophthalmology team was invited for review and was also commenced on oral amoxicillin-clavulanic acid. She was converted to IV amoxicillin-clavulanic acid as she was still febrile and coughing and had the fourth pint of fresh whole blood sixth day on admission. She was reviewed by the ophthalmologist on the seventh day on admission who requested for ocular ultrasound scan. Post-transfusion FBC showed PCV of 31%, WBC of 9,100cells/uL and PLT of 41,000/uL. A repeat E/U/Cr showed K- 2.1mmol/L, HCO3- 16mmol/L, Cl- 103mmol/L, Cr-71umol/L and BUN- 5.6mmol/L. A repeat LFT showed ALP- 197 IU/L, ALT- 107 IU/L, AST- 262 IU/L, Alb- 24g/L and TP- 52 g/dL. An assessment of Lassa fever complicated by thrombocytopenia, DIC, left conjunctival erythema to rule out Vitreous haemorrhage, and hypokalemia was made, for which she had IV KCL administration. Bleeding from puncture sites resolved eighth day into admission but she was still passing coke-coloured urine and was still febrile. Cough became distressing, worse on lying down particularly at night while still hematuric nineth day into admission and she was noticed to be febrile, mildly pale, icteric. A repeat FBC revealed PCV of 25.1% and PLT of 21,000/uL. A repeat E/U/Cr showed K of 2.8mmol/L. An assessment of Sepsis focus Chest to rule out Pleurisy with anemia, thrombocytopenia and DIC (resolving) was made for which she was commenced on Tab Augmentin 625mg bd $x^{1}/52$, Tab Azithromycin 500mg daily $x^{5}/7$, Syr Broncholyte 10mls tds $x^{5}/7$ and subsequently had the fifth pint of fresh whole blood following the initial PCV of 25.1%. She received the sixth pint of fresh whole blood tenth day on admission. A repeat post-ribavirin PCR was done on day 10, which was still positive with CT value of 37.20 and 33.06 on the G and L genes respectively. She was thereafter placed on ribavirin extension for five (5) days at 12.5mg/kg/day. She was also treated for malaria with oral arthemeter-lumefantrine 80/480mg x 3/7, oral antipyretic and oral zinc on account of persistent fever and other

constitutional symptoms and post transfusion PCV was 33% on eleventh day on admission. She received the seventh pint of fresh whole blood following a pre-transfusion PCV of 33% twelfth day on admission while passage of melena and hematuria persisted. She started regaining clinical stability by thirteenth day on admission as fever, hematuria and melena were subsiding. A repeat FBC fourteenth day on admission showed PCV of 36% and PLT of 36,000/uL for which she was counseled on possible platelet concentrate transfusion but was unable to procure one due to financial constraints. For the above reason, she subsequently had the eight pints of fresh whole blood instead by fifteenth day on admission. She continued to improve clinically as passage of melena and coke-coloured urine resolved by eighteenth day on admission. Urinalysis showed Blood- ++, Protein- ++. A repeat FBC showed WBC- 7,530, PCV- 40%, PLT- 119,000. E/U/Cr showed Na- 127, K- 3.4, HCO3- 16, Cl- 106, Ca- 2.4, BUN- 2.5, Cr- 44. LFT showed ALP- 191, ALT- 50, AST- 70, Alb- 34, TP-70. In a stable clinical state, she was discharged home by the nineteenth day on admission with two-week clinic appointment and to have a repeat PCR test done at the follow-up visit. At her first clinic appointment, she complained of abdominal pain and passage of watery stool and was treated for enteritis with oral ciprofloxacin and metronidazole. She had a repeat PCR test done which was negative. She was then given a three-week appointment due to her examination schedule at school, but since then defaulted due largely to her school location and intense school activities at the time. She presented to the ophthalmology unit at the University College Hospital (UCH) where she spent her holiday, about a month later, on account of sudden reduction in vision in the left eye. Fundoscopic examination at presentation revealed active inflammatory process with intense activity in the anterior chamber and poor view of the fundus. An assessment of left panuvitis with vitreous hemorrhage was made. Ocular scan showed left vitreous hemorrhage, no retinal detachment. She was however referred to the vitroretinal surgeon, Eye Foundation Hospital, Ikeja, Lagos for a second opinion. At Eye Foundation Hospital, a diagnosis of complicated cataract with vitreous hemorrhage was made. She was counseled for surgery of the left eye but declined on financial ground. She was also seen at the ophthalmology clinic in this centre about a year and five months post discharge with complaint of no vision on the left eye and verbal report of ocular scan which showed retinal detachment of the left. Fundoscopic examination revealed lens opacity of the left eye and pale capped disc of the right eye with cup-disc ratio of 0.7. An assessment of left cataract with suspected retinal detachment and right eye suspicious disc was made. Ocular scan was requested, she was counseled on guarded prognosis for left eye cataract extraction and was given two-week appointment but also defaulted since then. She eventually presented to the ophthalmology department at the University of Benin Teaching Hospital (UBTH). Eye examination at presentation revealed visual acuity of 6/5 and LP on the right and left eye respectively, intraocular pressure was 18 and 15 (mmHg) on the right and left eye respectively. Ocular scan showed retinal detachment with aqueous and vitreous hemorrhage. A diagnosis of complicated cataract with suspected retinal detachment of the left eye and glaucoma of the right eye was made. She eventually had Large Incision Cataract Surgery with Posterior Chamber Intraocular Lens. Despite this intervention, the loss of vision persists on the affected eye necessitating her referral for retinal surgery.

## Discussion

Ocular involvement during the acute phase of Lassa fever has been documented, although descriptions remain limited. Reported presentations include conjunctivitis, conjunctival oedema, and subconjunctival haemorrhage, suggesting that LASV can affect the anterior segment early in the disease course

Despite these observations, the full spectrum of vision-related complications among survivors, as well as their long-term clinical implications, is still not well understood (Happi AN, Ogunsanya OA, Ayinla AO; 2024)

Insights from other viral haemorrhagic fevers indicate that eye manifestations can range from mild and self-resolving conditions—such as conjunctival injection and ocular surface irritation—to more severe inflammatory damage capable of permanent visual impairment

Indeed, temporary vision loss during convalescence has been reported, further emphasizing that visual symptoms may extend beyond the acute phase of infection (Kuthya S, Anthony CL, Fashina T, Yeh S;2021)

Evidence from survivor studies reinforces these concerns. In a Sierra Leone cohort, visual acuity was poorer among

individuals exhibiting signs of both anterior and posterior segment disease, including cataracts, glaucoma, and chorioretinal scarring—features that point to prior uveitic episodes

Experimental data from animal models provide additional biological plausibility: extensive ocular inflammation has been demonstrated in fatal LASV infection among guinea pigs, involving structures such as the anterior uvea, ciliary body, corneal endothelium, and conjunctiva, whereas survivors displayed minimal ocular pathology (Karnam S, Huang Y, Nguyen N, Yeh S;2023)

Clinical findings from an ophthalmic study in Irrua, Nigeria also support the presence of ocular abnormalities among patients with Lassa fever. Although more than 80% maintained normal presenting visual acuity, nearly one-quarter experienced adnexal changes—including ptosis, tearing, and lid oedema—and more than half displayed diffuse conjunctival injection

Less frequent but notable corneal complications, such as keratic precipitates and dendritic ulcers, were also observed

In contrast to these predominantly reversible findings, the present case demonstrates a far more devastating outcome—irreversible vision loss in one eye. Such an outcome remains rare in the existing literature, where visual impairment is typically transient

This case therefore strengthens the recognition that LASV-induced endothelial injury and coagulation abnormalities may contribute to severe ophthalmic complications, including subconjunctival and vitreous haemorrhage, and eventual structural damage within the eye.

## Conclusion

Lassa fever is not only a systemic viral illness but also a disease with end-organ (ocular) affectation. This case demonstrates that Lassa fever is not solely a systemic, life-threatening viral illness but also a disease capable of causing significant and lasting visual disability. While ocular involvement has been reported during acute infection, irreversible blindness such as seen in this patient remains rare and may easily go unrecognized without proactive surveillance

The constellation of vitreous haemorrhage, retinal detachment, and complicated cataract observed here highlights the destructive potential of LASV-mediated vascular and inflammatory injury.

Delayed access to ophthalmologic intervention—driven by financial and structural barriers—likely contributed to poor visual outcomes in this case, underscoring gaps in survivor care in resource-limited settings. Continued research on viral ocular tropism, inflammatory pathways, and early treatment strategies is essential to preventing similar outcomes in Lassa fever survivors.

## Clinical Implications

Early ophthalmologic screening should be incorporated into Lassa fever management protocols, particularly in patients with coagulopathy or visual complaints.

Post-discharge follow-up is critical, as vision-threatening complications may evolve weeks to months after recovery from the systemic disease

Multi-disciplinary collaboration—including infectious disease specialists, ophthalmologists, and public health teams—can improve awareness, timely diagnosis, and management of ocular sequelae.

Access to specialized eye care must be strengthened, with subsidized pathways for survivors who may require surgical treatments but face financial constraints.

Surveillance systems for Lassa fever survivors should monitor not only auditory and neurological deficits but also visual function, to better estimate the true burden of ocular morbidity.

Health professionals should be aware of the potential of visual impairment in survivors, ensuring early ophthalmological assessment, and long-term follow-up for affected individuals' post-recovery. Further research is also needed to explore the exact mechanisms leading to optic and retinal damage, biomarkers of risk, as well as potential therapeutic interventions whenever an ocular complication occurs.

## Recommendations:

Based on this case and existing evidence on ocular sequelae of Lassa fever, the following recommendations are proposed:

1. Routine Ophthalmologic Evaluation: All Lassa fever patients should undergo baseline eye examination during hospitalization, particularly those exhibiting haemorrhagic or neurological complications that may predispose to ocular injury.

2. Structured Post-Recovery Follow-up: Survivors should be enrolled in coordinated follow-up programs that include periodic visual assessments for early detection of delayed complications, as vision loss may progress after systemic recovery.

3. Improved Access to Specialist Care: Strengthening referral systems and providing financial support for specialized ophthalmic services—including vitreoretinal care—can reduce preventable blindness in resource-constrained settings.

4. Integration Into National Guidelines: Clinical management protocols for Lassa fever should include specific algorithms for visual assessment and referral pathways to ensure standardized survivor care.

5. Capacity Building for Health Workers: Training on recognition of ocular symptoms in viral haemorrhagic fevers can improve early identification and timely management of eye complications.

## Further Research:

Prospective studies are needed to understand viral persistence or tropism in ocular tissues, identify biomarkers for risk stratification, and evaluate therapeutic interventions such as corticosteroids or antivirals in preventing retinal damage.

## Limitations:

The limitations identified were financial barrier which initially delayed the definitive surgery, hence confounding the outcome assessment. Another limitation was the lack of histology or viral PCR in ocular tissues.However, this report describes a single clinical case; therefore, the findings may not be generalizable to all Lassa fever survivors. Access to definitive ophthalmic treatment was delayed due to financial constraints, which may have influenced the visual outcome and limited the ability to evaluate the full therapeutic potential of timely surgical intervention

Additionally, advanced diagnostic testing—such as polymerase chain reaction (PCR) or histopathologic evaluation of ocular tissues—was not performed, restricting insight into viral persistence or specific pathological mechanisms in the eye

These gaps highlight the need for more extensive clinical studies and improved survivor follow-up systems to better understand the ocular involvement in Lassa fever.

### STATEMENTS AND DECLARATIONS

**Competing interests:** The authors declare that there are no conflicts of interest related to this case report. No financial or personal relationships existed that could have influenced the work presented in this manuscript.

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