

## Postmortem pathological insights into Lassa fever via minimally invasive tissue sampling: A comparative study in a West African endemic region

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### Introduction

Lassa fever is a life-threatening viral hemorrhagic illness endemic to Nigeria and other parts of West Africa with thousands of deaths annually. Despite extensive research on its epidemiology and transmission, its tissue pathology, tropism and lethal pathway remain poorly understood due to the biosafety-risks associated with conventional autopsies. Minimally Invasive Tissue Sampling (MITS) offers a safer and culturally more acceptable alternative for post-mortem investigation, preserving body integrity while enabling detailed tissue analysis. This study aims to characterize the pathology and pathogenesis of Lassa fever through MITS and to compare findings with non-Lassa control cases.

### Methods

This descriptive observational, ethically approved study is being conducted in Nigeria among deceased patients with confirmed Lassa fever, alongside non-Lassa controls. Eligibility is determined by clinical or laboratory confirmation of Lassa virus infection prior to death. MITS involves ultrasonographic evaluation of intra-abdominal and intrathoracic organs, followed by tissue biopsies using Tru-Cut needles. Tissue samples are analysed through histology, immunohistochemistry (IHC), and molecular techniques. From 2022 to date, 27 MITS procedures have been completed: 22 fatal Lassa fever cases and 5 controls.

## **Results**

Preliminary findings from the 22 Lassa fever cases revealed relevant fluid accumulation in the pericardial, pleural, and peritoneal cavities by ultrasound. Jaundice was frequently observed (65%). Lassa virus was identified by immunohistochemistry in all examined organs, with the liver exhibiting the highest density and the kidneys the lowest. Microscopic analysis of the liver samples showed tissue necrosis and spots of inflammation, which does not with observed clinical manifestations and previously reported pathology. The kidneys showed no microscopic damage with rather low viral presence in the majority of cases, despite acute kidney injury diagnosed clinically. In one patient, we identified presence of Lassa virus in the brain. However, inter-patient variability exists.

## **Conclusion**

MITS proves to be a valuable, safe and culturally acceptable tool for post-mortem investigation of viral hemorrhagic fevers such as Lassa fever. In this study, MITS showed distinctive changes to the liver but no relevant damage to the kidneys. This may indicate the liver as a focus site of Lassa fever replication and pathology, while laboratory-proven kidney involvement may be linked to inflammatory cytokines rather than direct viral injury. Further research is needed to assess the role of Lassa virus as a neuroinvasive infection. These findings can support future diagnostic and therapeutic strategies and integrate MITS into outbreak response and disease surveillance efforts in resource-limited settings.