

Rapid communications

THE FIRST CASE OF LASSA FEVER IMPORTED FROM MALI TO THE UNITED KINGDOM, FEBRUARY 2009

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This is the first case of Lassa fever to be imported from Mali to the United Kingdom. This paper discusses the investigations, the virological analysis, the surveillance and management of contacts undertaken following a case of Lassa fever.

In February 2009, the twelfth recorded case of Lassa fever, since surveillance records are available, was imported to the United Kingdom (UK). This is the second case to be imported to the UK in 2009 and the first reported case to have acquired infection in Mali. Risk assessment of 117 UK healthcare contacts with potential direct exposure to the patient's body fluids was undertaken. Seven contacts are considered to be at high risk of infection and are being actively monitored for 21 days.

Background

Lassa fever is caused by an arenavirus and is an acute illness of between one and three weeks duration. The incubation period is usually seven to 12 days but may range between three and 21 days. About 80% of human infections in endemic areas are asymptomatic. The overall case fatality rate is 1%, although it is reported to be 15%-20% in hospitalised patients [1,2].

The natural host of Lassa virus is the multimammate rat (*Mastomys spec.*) which sheds the virus in urine and droppings. Transmission of the virus to humans usually occurs via direct or indirect contact with rodent excreta. Person-to-person transmission occurs through direct contact with blood, saliva, urine, faeces or semen [1].

Lassa fever is known to be endemic in parts of West Africa, with most cases reported from Guinea, Liberia, Sierra Leone and Nigeria. People living in rural areas of West Africa are most at risk of Lassa fever. Imported cases to the UK are rare and occur almost exclusively in individuals who have worked in endemic areas in high risk occupations such as medical or development workers [4]. Although there is some evidence of endemicity in neighbouring countries [1,3-5], this is the first case of imported Lassa fever from Mali into the UK.

Clinical case description

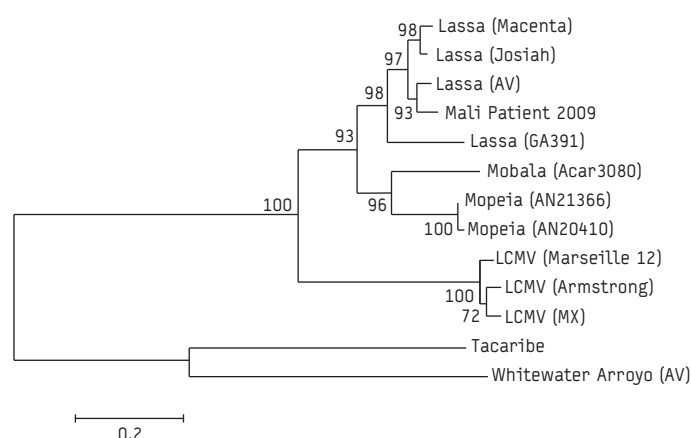
In February 2009, a man in his twenties was admitted to University College Hospital in London (UCLH) having been

medically evacuated from Mali with a 10-day history of fever and a diagnosis of falciparum malaria that did not respond to treatment. He had been in a village in southern Mali for four weeks, where he was working in remote rural conditions on the border with the Ivory Coast. He had travelled directly from the UK to Bamako, Mali and then travelled overland to southern Mali. Although precise details of possible exposure to rodents are not known, rodents including rats were seen regularly in the village.

On arrival the patient was alert and able to give a clear report on his medical history. However, he deteriorated rapidly and was transferred to a negative pressure room in the intensive care unit. He died of multi-organ failure later the same day. His malaria blood

FIGURE

Phylogenetic analysis of Arenaviruses, including the Lassa virus imported to the United Kingdom from Mali in February 2009



The tree was calculated by analysis of the 291 amino acids from the N-terminus of the lassavirus glycoprotein C using the neighbour-joining method. Bootstrap support (%) is indicated at each branch point. The virus from the patient described in this article (Mali patient 2009) is most closely related to the AV strain from Ivory Coast (Lassa AV) [7].

film and rapid antigen test were negative and a diagnosis of Lassa fever was confirmed the same night by PCR.

The patient was originally considered at low risk of Lassa fever because the disease has never been reported in Mali and is thus not considered to be endemic there. However, as he became more unwell his status was upgraded. Standard universal infection control precautions were followed and visors, but not full body protection, were worn during the attempted resuscitation.

Virological analysis

The diagnosis was confirmed in two different reverse transcription PCR (RT-PCR) assays targeting different regions of the genome and by sequencing of the 291 amino acids at the N-terminus of the Lassa virus glycoprotein C [6]. The detection of Lassa virus in two different RT-PCRs together with the characterisation of a unique part of the Lassa virus genomic sequence constituted a definitive diagnosis. Further studies including virus culture are in progress, and sequencing of the entire genome of the isolate is planned.

TABLE 1

Risk assessment for contacts of patients with Lassa fever

Risk Category	Description	Action and advice
Unclear	Not sure of contact	Reassure
		Inform to contact the infection safety officer should they recall any contact
		Give general factsheet
No risk (Category 1)	No direct contact with the patient or body fluids	Inform of absence of risk
	Casual contact e.g. sharing a room with the patient, without direct contact with body fluids	Advise to call if concerned following reading fact sheet
		No further action.
Low risk (Category 2)	Direct contact with the patient (e.g. routine medical/nursing care, handling of clinical/laboratory specimens), not handling body fluids or wearing personal protective equipment appropriately	Give category 1 (general) factsheet
		Self-monitor* for fever and other symptoms compatible with Lassa fever
		Report to the safety officer if temperature $\geq 38.0^{\circ}\text{C}$, with further evaluation as necessary
High risk** (Category 3)	Unprotected exposure of skin or mucous membranes (e.g. mucosal exposure to splashes, needlestick injury) to potentially infectious blood or body fluids, including unprotected handling of clinical/laboratory specimens	Give category 2 factsheet
		Record own temperature daily for 21 days following your last contact with the patient and report this temperature to the safety officer by 12 noon each day, with further evaluation as necessary
		Give category 3 factsheet
		Inform Health Protection Unit immediately if contact reports symptoms compatible of Lassa fever and further risk assessment is required

*Level of risk according to exposure and action and advice by category.

*Contacts to be monitored for 21 days from last possible exposure to case

** Within this group, consider ribavirin prophylaxis if any extreme exposure, e.g. percutaneous injury

TABLE 2

Categorisation of contacts in the United Kingdom, Lassa fever importation, February 2009

Contacts classification	Risk category			
	Category 1 (no risk)	Category 2 (low risk)	Category 3* (high risk)	Total
Intensive care unit staff	3	14	2	19
Accident and emergency (A&E) staff	17	12	0	29
Laboratory staff	21	45	3	69
Family	1	2	2	5
Colleague in Mali	0	1	0	1
UK ambulance service**	2	0	0	2
Totals	44	74	7	125

*Within this group, ribavirin prophylaxis was considered in the case of any extreme exposure e.g. percutaneous injury

** The air ambulance medics were still in attendance whilst transferring the patient to University College Hospital in London. The patient was wrapped in a tarpaulin sheet and the UK ambulance crew adopted universal barrier precautions, hence both were considered casual contacts and not at risk (category 1).

Phylogenetic analysis showed that the virus was distinct from other Lassa virus strains but grouped most closely with a strain of Lassa virus (Lassa (AV)) isolated from a case reported from Germany in 2000 [7] (Figure). The German patient had travelled through Ivory Coast, Ghana and Burkina Faso during the incubation period and the investigations could not determine where he had acquired the virus. The British case reported here had been working close to the border with Ivory Coast.

Surveillance and management of contacts

An Incident Control Team (ICT) meeting was called by UCLH early the following day to discuss risk assessment of contacts, safe decontamination of the environment and management of the body.

Risk assessment

The ICT identified 123 people who could have come into direct contact with the Lassa virus either through contact with the case or exposure to body fluids. Almost all of these contacts were UCLH emergency care and laboratory staff. All UK based contacts were assigned to one of three categories depending upon their level of risk (no risk, low risk or high risk, see Table 1) and were managed as reported recently [8]. Contacts will be monitored for 21 days from exposure.

International contacts

The German air ambulance crew are being followed up and managed by German authorities, and the World Health Organization (WHO) is supporting health authorities in Mali in conducting field investigations and in the implementation of control measures.

Risk assessment outcome and follow up

The outcome of the UK risk assessment is shown in Table 2. None of the category 3 contacts received ribavirin prophylaxis. The evidence base for the use of ribavirin prophylaxis is limited, but category 3 contacts were given information explaining its possible benefits and side effects and were left to make an informed choice.

Discussion

In the case described here, the reported diagnosis of malaria and the fact that Mali has not been considered endemic for Lassa fever made the clinical diagnosis difficult. As a consequence, the initial risk of Lassa fever was considered low. Only when the patient developed multi-organ failure six hours after admission was the risk of Lassa fever upgraded. Universal barrier precautions were used throughout, but not the high levels of protection currently recommended for viral haemorrhagic fevers [9]. As a result, 76 hospital staff were put at risk in the space of eight hours, and three of seven category 3 contacts were laboratory staff. Although transmission to healthcare workers from imported Lassa fever cases is very rare, this can cause considerable anxiety among contacts. There is only one reported case of transmission in a hospital setting in an industrialised country, and this was a seroconversion without clinical illness in Germany [10].

This is the first Lassa virus to be characterised from Mali. The virus is closely related to isolates from neighbouring countries and was amplified using a widely used diagnostic PCR test [6]. There is serological evidence that Lassa virus is present in Mali [3,5], but this is the first proven imported case and has implications for current risk assessment in travellers returning from this area.

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