

Arenavirus outbreak with nosocomial transmission: infection control and the lessons learned

Sewlall N

Pulmonologist and Intensivist, Johannesburg

Correspondence to: Dr Nivesh Sewlall, e-mail: nivesh.sewlall@wits.ac.za

Anaesthesiology is generally practised in operating theatres, under controlled circumstances and with some degree of foresight. However, this expertise is frequently being sought in areas like the ICU and emergency department and during emergency medical evacuation. As such, a more than rudimentary knowledge of infection control principles is required.

In 2008, an outbreak of a previously unidentified haemorrhagic fever virus (arenavirus) occurred in Johannesburg.¹

A 36-year-old woman (Patient 1) presented to a hospital in Lusaka with an unidentified febrile illness. She had lived in the suburbs with a few domestic animals, but no exotic exposure was noted. Following a progressive course over three days, she deteriorated with generalised tonic-clonic seizures and was intubated with some difficulty for a deteriorating Glasgow Coma Scale (GCS) score prior to air evacuation. A paramedic and two doctors were present and only non-sterile exam gloves were worn, without masks. During the flight, the paramedic recalled handling some of the patient's secretions (including diarrhoeal stool), but denied having had contact with mucous membranes. She died shortly after admission to a private hospital in Johannesburg, with progressive generalised inflammatory capillary leak and multi-organ failure.

Full isolation was employed, as is standard practice, which included gloves, masks and gowns. At the time, she displayed a fine, erythematous, macular rash diffusely and, although being markedly thrombocytopenic, did not have overt haemorrhage. Nine days after contact with the patient, the

paramedic developed a progressive febrile illness, with increasing malaise and gastrointestinal symptomatology. He was evacuated to the same hospital in Johannesburg as the initial patient.

An epidemiologic link was identified and he became the index case (Patient 2). A presumed diagnosis of viral haemorrhagic fever (VHF) was made and full barrier isolation instituted. He died five days after admission. At this point, extensive screening for VHF was negative. Despite the negative testing, contact tracing was implemented.

Patient 3 was a nurse who had looked after Patient 1 and Patient 2. She was traced to a peripheral hospital, and died shortly thereafter.

Patient 4 was a cleaner who was involved in the terminal cleaning of the cubicle of Patient 1. She was traced to another peripheral hospital and died shortly after transfer to the central academic unit.

Patient 5 was a nurse who looked after Patient 2. Despite working with blood and secretions, adherence to protective equipment was confirmed and no specific unprotected exposure noted. She was admitted to a hastily contrived isolation unit and, four days later, was confirmed as having infection with a novel arenavirus (Lujo virus).² After a stormy course, which included mechanical ventilation and multiple complications, she underwent a protracted recovery phase, now with little residual deficit.

The principles of infection control include:

- Standard precautions (hand hygiene, gloves, and masks);
- Isolation precautions (contact, droplet, airborne, immunosuppressed patients);

- Environmental cleaning; and
- Institutional surveillance.

As with most outbreaks of this nature involving nosocomial transmission, very seldom do we note specific exposure to infected secretions or tissue. The contact is usually inadvertent and not recalled as being significant at the time. In most cases, simple adherence to standard precautions will be adequate for protection. However, great attention must be paid to the actual correct application of the precautions, as well as the correct method of removing soiled equipment. We presume that this happened in at least two cases which occurred after alarms were raised and barrier precautions instituted.

Whilst not strictly an “airborne” pathogen (like severe acute respiratory syndrome [SARS]), haemorrhagic fever viruses have been known to aerosolise, especially with coughing up of contaminated secretions. We eventually utilised particulate filter (N95) respirators, although standard mask/visor combinations are adequate. Extensive personal protective equipment, of the “space suit” type, is not required as routine.

Outbreaks of this nature are admittedly uncommon, but not rare. The “increased” vigilance and obsessive attention to standard precautions that we advocate should actually be the very basic that we all apply to the daily, routine practice of medicine. Especially in an era of multi-resistant “conventional” microorganisms, this should be non-negotiable.³ This applies to the safety of both our patients and us, as caregivers

References

1. Paweska JT, Sewlall NH, Ksiazek TG, et al. Nosocomial outbreak of novel arenavirus infection, southern Africa. *Emerg Infect Dis* 2009;15(10):1598-602
2. Brieese T, Paweska JT, McMullan LK, et al. Genetic detection and characterization of Lujo virus, a new hemorrhagic fever-associated arenavirus from southern Africa. *PLoS Pathog* 2009;5(5):e1000455. Epub 2009 May 29.
3. Haley RW, Culver DH, White JW, et al. The efficacy of infection surveillance and control programs in preventing nosocomial infection in US hospitals. *Am J Epidemiol* 1985; 121:182