

RIFT VALLEY FEVER
National Institute for Communicable Diseases
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INTRODUCTION

Rift Valley Fever (RVF) is a viral zoonosis that can cause severe disease in a low proportion of infected humans. The virus is from the family Bunyaviridae, genus Phlebovirus.

The virus is transmitted by mosquitoes and causes outbreaks of abortion and deaths of young livestock (sheep, goats and cattle). Humans become infected from contact with infected tissues of livestock and less frequently from mosquito bite: in sub-Saharan Africa the mosquitoes which transmit the virus do not enter human dwellings but feed on livestock outdoors at night. The disease occurs throughout Africa and the Middle East Asia when exceptionally heavy rains favour the breeding of the mosquito vectors.

In 2007 severe outbreaks of RVF occurred in Somalia, Kenya, Tanzania and Sudan following heavy rains. The last outbreaks of RVF on the interior plateau of South Africa occurred in 1974-76 during prolonged heavy rains, causing 10,000 to 20,000 human cases. The virus is also thought to be endemic in the low lying coastal areas of KwaZulu-Natal where a small outbreak was recorded in a dairy herd in Empangeni in 1981. There is also evidence that the virus is endemic in the Kruger National Park and in January 1999 there was a small outbreak involving abortions in captive-bred buffaloes in Skukuza.

In 2008, fourteen small outbreaks of RVF in animals were recognized collectively from Mpumalanga, Limpopo, Gauteng and North West Provinces. In November 2009, a RVF outbreak was reported on farms along the Orange River in Northern Cape Province, causing 2 confirmed human cases. **Last week (15 Feb 2010), RVF has been confirmed on two sheep farms in the Bultfontein area, Northern Cape Province.**

TRANSMISSION TO HUMANS

- Direct or indirect contact with the blood or organs of infected animals.
- Transmitted to humans through the handling of animal tissue during slaughtering or butchering, assisting with animal births, conducting veterinary procedures, or from the disposal of carcasses or foetuses.
- Occupational groups such as herders, farmers, slaughterhouse workers and veterinarians are at higher risk of infection.
- Infects humans through inoculation, for example via a wound from an infected knife, needle-stick injuries, or through contact with broken skin, or through inhalation of aerosols produced during the slaughter of infected animals.
- Some evidence that humans may also become infected with RVF by ingesting the unpasteurised or uncooked milk of infected animals.
- Bites of infected mosquitoes, most commonly the Aedes mosquito.
- No human-to-human transmission.

CLINICAL FEATURES IN HUMANS

Typically illness is asymptomatic or mild in the vast majority of infected persons, and severe disease would be expected to occur in less than 1% of infected persons.

Mild

- The incubation period (interval from infection to onset of symptoms) for RVF varies from two to six days.
- No detectable symptoms or develop a mild form of the disease.
- A feverish syndrome with sudden onset of flu-like fever and/or muscle pain.
- Some patients develop neck stiffness, sensitivity to light, loss of appetite and vomiting; in these patients the disease, in its early stages, may be mistaken for meningitis.
- Symptoms of RVF usually last from four to seven days, after which time the immune response becomes detectable with the appearance of antibodies and the virus gradually disappears from the blood.

Severe form of RVF in humans

- A small percentage of patients develop a much more severe form of the disease.
- Complications: ocular (eye) disease (0.5-2% of patients), meningoencephalitis (less than 1%) or hemorrhagic fever (less than 1%)

Ocular

- Retinal lesions.
- Onset of the lesions in the eyes is usually one to three weeks after appearance of the first symptoms.
- Blurred or decreased vision.
- May resolve with no lasting effects within 10 to 12 weeks.
- The lesions can occur in the macula - 50% of patients will experience a permanent loss of vision.
- Death in patients with only the ocular form of the disease is uncommon.

Meningoencephalitis

- The onset of the meningoencephalitis form of the disease usually occurs one to four weeks after the first symptoms of RVF appear.
- Clinical features include intense headache, loss of memory, hallucinations, confusion, disorientation, vertigo, convulsions, lethargy and coma.
- Neurological complications can appear later (> 60 days).
- Death rate in patients who experience only this form of the disease is low, although residual neurological deficit, which may be severe, is common.

Haemorrhagic fever:

- Symptoms of this form of the disease appear two to four days after the onset of illness.
- Begin with evidence of severe liver impairment, such as jaundice.
- Subsequently signs of hemorrhage then appear such as
 - vomiting blood,
 - passing blood in the faeces,
 - a purpuric rash or ecchymoses (caused by bleeding in the skin)
 - bleeding from the nose or gums,
 - menorrhagia, and
 - bleeding from venepuncture sites.
- Case-fatality ratio for patients developing the hemorrhagic form of the disease is high at approximately 50%.

- The total case fatality rate has varied widely between different epidemics but, overall, has been less than 1% in those documented.

CASE DEFINITION AND CRITERIA FOR LABORATORY TESTING

- Any person with recent close contact with livestock in or from suspected RVF areas, presenting with:
 - Flu-like illness (which may include fever, myalgia, headache or joint pains), **OR**
 - Fever and features of: encephalitis, haemorrhage, hepatitis disease and/or ocular pathology.

****Precautions – other causes for these symptoms must be excluded** such as Malaria, Crimean Congo Haemorrhagic Fever (CCHF) and Tick-Bite Fever.

DIAGNOSIS

- The virus may be detected in blood during the early phase of illness or in post-mortem tissue by RT-PCR or isolation in cell cultures or mice.
- Enzyme-linked immunoassay (ELISA) may confirm the presence of specific IgM and/or IgG antibodies to the virus.

SPECIMEN COLLECTION

- All suspected cases of RVF should have both a clotted blood (red/yellow top tube) and EDTA blood (purple top tube) specimen taken for viral detection and antibody.
- The specimens should be packaged in accordance with the guidelines for the transport of dangerous biological goods (triple packaging using absorbent material) and transported directly to:

The Special Pathogens Unit
National Institute for Communicable Diseases
No 1 Modderfontein Rd
Sandringham.

- The Unit must be contacted directly if testing is requested. Telephone Dr. Blumberg (0828076770), Dr. Weyer (0829039131), Dr. Thomas (0731708874), or the NICD Hotline (0828839920)
- The specimen should be clearly labeled with the patient's name, hospital number, date of collection, and contact numbers of the referring physician and laboratory on the outside of the package.
- Ensure that clinical details are provided - especially date of onset of illness and date of bleeding. (Include a copy of a completed case investigation form if available)
- Samples should be kept cold during transport.

TREATMENT AND VACCINE

- No specific treatment is available for these patients – most cases are mild
- Ribavirin is not recommended.
- Predominant treatment is general supportive therapy.
- Standard infection control precautions should be followed; patients do not require isolation or barrier nursing. Human to human transmission has not been demonstrated (see section on infection control).
- There are no vaccines registered in South Africa for use by the general public.

PREVENTION AND CONTROL

*****RVF IS A NOTIFIABLE DISEASE IN SOUTH AFRICA*****

Controlling RVF in animals

- Refer to Veterinary Control Guidelines – veterinary / animal vaccine is available.

Public health education and risk reduction

- During an outbreak of RVF, close contact with infected animals, particularly with their body fluids, either directly or via aerosols, has been identified as the most significant risk factor for RVF virus infection.
- In the absence of specific treatment and an effective human vaccine, raising awareness of the risk factors of RVF infection as well as the protective measures individuals can take to prevent mosquito bites, is the only way to reduce human infection and deaths.
- Public health messages for risk reduction should focus on:
 - reducing the risk of animal-to-human transmission as a result of unsafe animal husbandry and slaughtering practices. Gloves and other appropriate protective clothing should be worn and care taken when handling sick animals or their tissues.
 - reducing the risk of animal-to-human transmission arising from the unsafe consumption of fresh blood, raw milk or animal tissue. In the epizootic regions, all animal products (blood, meat and milk) should be thoroughly cooked before eating. Slaughtering of animals for consumption should be discouraged during outbreaks.
 - the importance of personal and community protection against mosquito bites through the use of impregnated mosquito nets, personal insect repellent if available, by wearing light colored clothing (long-sleeved shirts and trousers) and by avoiding outdoor activity at peak biting times of the vector species (from dusk until morning).

Infection control in health care settings

- Although no human-to-human transmission of RVF has been demonstrated, there is still a theoretical risk of transmission of the virus from infected patients to healthcare workers through contact with infected blood or tissues.
- Healthcare workers caring for patients with suspected or confirmed RVF should implement “Standard Precautions”.
- “Standard Precautions” define the work practices that are required to ensure a basic level of infection control. Standard Precautions are recommended in the care and treatment of all patients regardless of their perceived or confirmed infectious status. They cover the handling of blood (including dried blood), all other body fluids, secretions and excretions (excluding sweat), regardless of whether they contain visible blood, and contact with non-intact skin and mucous membranes.

Vector control

- Other ways in which to control the spread of RVF involve control of the vector and protection against their bites. Larviciding measures at mosquito breeding sites are the most effective form of vector control if breeding sites can be clearly identified and are limited in size and extent. During periods of flooding, however, the number and extent of breeding sites is usually too high for larviciding measures to be feasible.

REFERENCES

1. World Health Organization. Rift Valley Fever. <http://www.who.int/mediacentre/factsheets/fs207/en/>. Accessed on 5 February 2008.
2. Center for Disease Control. http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/rvf/rvf_qa.htm. Accessed on 5 February 2008.
3. Jupp PG. Mosquitoes as vectors of human disease in South Africa. SA Fam Pract 2005; 47(9):68-72.