

VIRAL HAEMORRHAGIC FEVER (VHF)

KEY POINTS

Patients with viral haemorrhagic fevers mainly from sub-Saharan Africa may present to our hospitals

The symptoms are very non-specific

A **Rural African Risk Assessment** is performed on all new patients with fever from areas endemic for VHF (see www.infectioncontrolservices.co.uk/forms.htm)

Then a **VHF risk assessment** (see www.infectioncontrolservices.co.uk/forms.htm) must be done using a form in the main document

All patients with an undiagnosed fever from Sub-Saharan Africa who may have VHF should be isolated until the diagnosis is made

Reduce the contacts to a minimum

Read the policy before sending any laboratory tests

For Rural African **Risk Assessment Form**, see www.infectioncontrolservices.co.uk/forms.htm

RISK ASSESSMENT FORM, see www.infectioncontrolservices.co.uk/forms.htm

AIM OF POLICY

To minimise the risk of exposure of Health Care workers and other patients to Viral Haemorrhagic Fever.

INTRODUCTION

Haemorrhagic diseases that are theoretically capable of being transmitted from man to man include Lassa, Marburg, Ebola and Congo-Crimean haemorrhagic fever. In Africa, transmission of VHF has been associated with the reuse of unsterilised needles and the provision of patient care, without appropriate barrier precautions to prevent exposure to virus-containing blood and other body fluids, such as vomitus, urine and stool. The risks associated with specific body fluids have not been defined, as most health-care workers who caught VHF had had multiple contacts with multiple fluids. Airborne transmission is thought unlikely but is considered a possibility in rare instances from patients in advanced stages of the disease. However, VHF may be transmitted by the airborne route in non-human primates. The risk to contacts is greatest from people who are bleeding, vomiting, have diarrhoea and have shock.

The increasing volume of international travel for vacation, travel by voluntary service organisations, aid workers and UN personnel to areas of conflict particularly to rural areas of Africa, increases the opportunity for the importation of these infections. Recently there were 5 cases of VHF in mainland Europe, one in the UK and 4 in Europe. All have died, despite three having received intensive care.

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INDIVIDUAL VIRUSES

Lassa

Lassa fever has been recognised since 1969 and is normally transmitted to man by urine from an infected multimammate rat entering through the skin or mucous membranes. These rats inhabit certain well-defined areas in West Africa. In Africa, clinically identified cases show a high mortality but subclinical and mild undetected infections are more common. Lassa fever may respond to an antiviral drug ribavirin.

There were 9 known cases of Lassa fever imported into the UK between 1974 and 1984, and the last documented case was admitted through UCLH in 2000.

In 1989, a case arrived in Chicago from Nigeria and there have been two cases imported into Tokyo since. A young female student visited Côte d'Ivoire and Ghana in late 1999 and returned to Germany in January 2000 with Lassa Fever.

Marburg

Marburg disease was described in 1967 following a European outbreak in which virus was transmitted to technicians from African Green Monkeys caught in Uganda, during laboratory handling of the monkeys and tissue cultures. Subsequently man-to-man transmission occurred. The definitive host is not known and several animal reservoirs have been proposed. There is no treatment.

Ebola

Ebola is separate virus in the same family as Marburg virus but outbreaks of both diseases in central Africa have yielded no known source or natural reservoir. Bats may be a vector. Major outbreaks have occurred in hospitals in central and southern Africa. In the Gabon, in 1996, an outbreak in the community affecting a hunter, his friend, a traditional healer led to 24 cases with 17 deaths. A doctor involved flew to Johannesburg for treatment and survived, but a nursing sister caring for him caught Ebola fever and died. In the outbreak in northern Uganda (August 2000-January 2001), there were 425 cases with 224 deaths (53%). A number of health care workers including one doctor died. There is no treatment.

Congo-Crimean haemorrhagic fever

Congo-Crimean haemorrhagic fever arises from a family of similar viruses that are widespread in Africa, Western Asia and in the USSR. Transmission is usually by tick-bite and man-to-man spread has only been shown to result from contact with infected blood. Strains vary in virulence, those from parts of the Middle-East, north India and Pakistan being rather more so than strains from South Africa.

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VHF: TRANSMISSION OF INFECTION TO HEALTH CARE WORKERS

Before the virus was discovered, there were episodes of transmission to hospital staff of Lassa fever both in Africa and New York. Marburg and Ebola viruses may also be transmitted within hospitals in Africa to health care workers. It is thought that nosocomial transmission may occur particularly where needles are not properly sterilised between patients, and where there is a high density of infected patients, some of whom may have pulmonary disease. Transmission of Ebola and Marburg virus may occur through sexual intercourse. In one episode this occurred months after recovery from infection and Marburg virus was found to persist in the semen.

Apart from one laboratory accident where a laboratory technician injected himself with Ebola virus, there has been no documented transmission of any VHF by casual contact in the UK.

A nursing sister caught Ebola virus from a patient in the isolation unit in Johannesburg. One member of the ICU staff caring for an infected student in Germany seroconverted for Lassa fever but was entirely asymptomatic. Despite these observations, the evidence suggests that transmission of these viruses does not occur frequently through casual contact¹.

The greatest potential risk to staff is by **NEEDLESTICK INJURY** from a patient (**donor**) with VHF or contamination of open cuts by infectious blood or secretions. Marburg virus was transmitted to a nurse and doctor who attempted resuscitation of a profusely bleeding patient in Nairobi. However, many other carer contacts did not catch the disease. Therefore the routes of transmission other than by percutaneous inoculation (eg the respiratory route) are simply not known. Airborne spread has been documented in non-human primates. The risk of transmission probably increases in the terminal stages of the illness when there is a high viraemia with overt bleeding. Note that all viruses are shed in secretions for long periods after recovery from infection.

INCUBATION PERIODS

Lassa, Marburg and Ebola fevers have incubation periods which may be quite long (>15 days, perhaps as long as 21 days). CCF has an incubation period of <14 days and is transmitted by tick bite.

CLINICAL FEATURES

The features of each of these diseases are very similar. Patients will present with a history of fever, malaise, myalgia, anorexia, nausea, headache, sore throat, diarrhoea, petechial rash or bleeding (e.g. from throat, skin, gut). Pharyngitis and chest pain are characteristic early symptoms. Later the disease is characterised by prostration, hypotension, bruising and

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bleeding from nose and gums, melaena and haematemesis, thrombocytopenia, increasing haematocrit, mild DIC, respiratory distress and rapid rises in hepatic transaminases. CCF, may present as encephalitis.

Without a bleeding diathesis, the syndrome is non-specific and the diagnosis cannot be made clinically. The most important risk factors are travel to and behaviour in an endemic area. Patients who have been upcountry in Sierra Leone and lived in a tent are much more likely to have Lassa fever than those who stayed in hotels in cities. A **detailed, accurate travel history** is therefore necessary to decide the level of risk of VHF.

Patients with non-specific fever are far more likely to have malaria, typhoid or non-VHF viral illness than VHF. Sensible precautions should be taken with the blood and excreta from all febrile patients from the Tropics and every care should be taken to reduce the risk of aerosols and needlestick accidents from any blood.

Management notes

The plan of investigation and care of patients; and measures to prevent secondary transmission are based the UK Department of Health Guidelines² and guidelines issued by CDC, Atlanta.³ The risk categories represent a combination of guidelines from the Advisory Committee on Dangerous Pathogens and more recent guidance (ISBN 0-11-321860-5). These categories are used for deciding on an action plan in A/E and in the tropical medicine unit.

VHF is restricted to relatively well-defined geographical areas. A detailed history of travel and behaviour is essential to rule out exposure. Referral to current geographical information about outbreaks is essential.

DETAILED ACTION PLAN

1 RISK ASSESSMENT

A patient with the **appropriate symptom complex** (see above) where the onset and course of the fever are consistent with VHF:

Minimum risk

- Not from an area known to be endemic for VHF
- From an endemic area >21 days ago
- A patient who has left tropical Africa in the previous 3 weeks, but

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from a major city where the risk of VHF is considered negligible.

Moderate risk

- From an known endemic area (eg certain parts of tropical Africa) within 21 days
- From an area adjacent to known areas for VHF (ie from rural areas or small towns not generally considered endemic)

High risk

- as “moderate” categories plus
- **Organ failure and haemorrhage**
- Contact with a febrile person for >4h
- Nursed a febrile person or had contact with body fluids from such a person (particularly health-care staff from rural hospitals) or contact with dead bodies.
- Any contact of confirmed cases
- Laboratory worker with contact with samples from a febrile person
- Laboratory worker who handles VHF viruses

The first step is to establish within which band of risk the patient lies.


To start this process, complete a Rural African Risk (RAR) Assessment Form (p3.7.10)

If RAR shows no risk of VHF, unless there are other compelling clinical reasons to suspect VHF, no special procedures are necessary and the patient should be managed in the usual way. The majority of patients identified in this way will have malaria or another non-VHF diagnosis.

If RAR indicates VHF is a possibility, then:

2 CALL

- The SHO/SpR in Tropical Medicine/Infectious Diseases. S/he will begin to assess using the VHF Risk Assessment Form (p3.7.11) and consult the On-call Consultant in Tropical Medicine/Infectious Diseases (air call through 020 7380 9978) who may contact the
- On-call Consultant in Virology (air call through 020 7380 9978)

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3 LOCAL ACTION

1 Management of the patient

For **moderate risk** patients, immediately take blood for a malaria screen. If this test is positive, manage the patient accordingly. If negative, discuss the case with the Consultant-in-charge (Tropical Medicine/Infectious Diseases).

Decide on

- **Source Isolation:** remove the patient in a single room, if possible with negative pressure ventilation.
- **Investigate** according to the agreed level of **suspicion**.

Approved tests on patients with moderate risk include

- Chest X-ray (on the way to the ward)
- EDTA (four tubes, one to parasitology for second malaria screen, one to haematology for full blood count, two to virology for PCR)
- Biochemistry
- Blood cultures
- Serum to be saved in virology

In the first instance do not ask for ESR or clotting

- Decisions as to whether to send serum/EDTA for VHF investigations will be made in consultation with the Consultant Virologist.

As soon as the diagnosis is entertained, specimens must be taken from patients only by experienced medical or nursing staff and not by phlebotomists or students. Care must be taken not to contaminate the external surfaces of any container. Samples must be labelled "Danger of infection" and placed in plastic bags that are sealed, then placed and transported in leakproof containers (UN602), clearly labelled "Danger of Infection". Specimens must be transported to laboratories in approved sealed containers by medical staff who will hand them over to the most senior technician available in the specimen handling areas of the laboratory with a clear description of the risk. Laboratories have a right not to process these specimens but have procedures in place for dealing with high-risk specimens. Do not send the specimens via the vacuum tube system or via the portering service.

Specimens in clinical laboratories should be handled in a class I biological

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safety cabinet in a Category III suite if possible. A blood film/dipstick malaria antigen screen will be done. Blood smears (e.g. for malaria) are not infectious after fixation in solvents. Routine procedures can be used for automated analyzers which will be disinfected as routine.

High risk (high suspicion) patients

Immediately call Consultant in Tropical Medicine/Infectious Diseases to decide on action. Isolate the patient. Use full protective clothing. Take great care if resuscitating a patient and do not perform mouth-to-mouth respiration.

2 Management of contacts (control of infection)

For moderate and **high risk** cases

- Restrict the number of staff attending the patient
- Record the names of ALL contacts (See website for Contact Tracing Sheet www.infectioncontrolservices.co.uk/forms.htm)
- One visitor who accompanied the patient to hospital may be allowed in the isolation room.
- Contact Infection Control Team

In the Outpatient department

Ill persons undergoing Outpatient evaluation are usually in the early stages of disease and are unlikely to have vomiting, diarrhoea, coughing or haemorrhage. These symptoms/signs would increase the likelihood infectivity so patients with these symptoms should be removed to an isolation room immediately. Otherwise, universal precautions (particularly avoiding the risk of Sharps injury) are sufficient⁴.

Spillages of blood, urine, faeces, or vomitus, should be treated according to the spillage policy with chlorine releasing agents in granular or liquid form (See Spillage Policy).

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In the A/E Department

Tropical patients with PUO in A/E should be put in a side area. A negative pressure room is not required during the early stages of illness but should be used whenever there is bleeding or other risk of aerosol.

Inpatients

Transfer to a properly ventilated side room in an isolation unit should be considered at the time of hospitalisation to avoid the need for subsequent transfer of the patient. Patients with a (moderate or high risk) diagnosis of suspected VHF must be nursed in Source Isolation by trained staff who are properly dressed

PROTECTIVE CLOTHING TO BE WORN

Moderate risk VHF

When handling the patient or collecting specimens or disposing of waste, WEAR

- Theatre clothes
- Plastic apron
- Gloves
- Dust-Mist mask (eg Technol), properly fitting
- Visor (for procedures such as collecting blood or doing suction)

High risk VHF (bleeding), in addition:

- Paper theatre gown over the plastic apron
- Theatre hat
- Theatre clothes will be changed before leaving the isolation area and discarded in a suitable waste bin kept in the anteroom (for incineration). A chain of evidence form will be used to check that all waste is incinerated.
- Protective clothing will be available in A/E

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Other Infection Control Issues Guidance can be provided by Infection Control Team

SpR microbiology will inform consultants and Infection Control Nurse as soon as practicable. The infection control nurse/doctor will provide infection control support and advice to staff in all areas where the patient the patient has visited

Spillage/contamination

Environmental surfaces or inanimate objects contaminated with blood, other body fluids, secretions or excretions should be disinfected using dichloroisocyanurate granules (for spillages) or fresh 10,000ppm free chlorine solution.


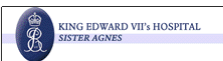






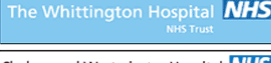
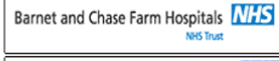


WASTE

Linen should be double-bagged in yellow bags clearly labelled at the site of use and transported directly in a dedicated sealed clinical waste bin by suitably clothed and informed personnel for incineration.¹ A tracking form (chain of evidence) will be completed and returned to the ward.

There is no evidence for transmission of haemorrhagic fever viruses to humans or animals through exposure to contaminated sewage³. The risk of such transmission would be expected to be extremely low owing to dilution and sewage treatment procedures in use in the United Kingdom. As an added precaution, however, measures should be taken to eliminate or reduce the infectivity of bulk blood, suctioned fluids, secretions, and excretions before disposal. These fluids will be treated with dichloroisocyanurate for 5 minutes or more (e.g. in a bedpan or commode) before flushing or disposal in a drain connected to a sanitary sewer. Full protective clothing will be worn to reduce exposure to splashes. Care should be taken to avoid splashing when disposing of these materials.³

Potentially infectious solid medical waste (e.g., contaminated needles, syringes, and tubing) will be placed in appropriate safe containers, then placed in sealable bins for incineration.² All items such as cutlery, crockery, books etc, which have been in the patient's room will be destroyed by incineration. Send them in yellow bags as above.

All waste and clothing to be discarded in a sealable waste bin or "Sharps Container" kept in the patient's room or annexe. All waste bins to be sealed with Hazard tape and marked "For Incineration". Special arrangement are be made to ensure these are taken to the incinerator safely. Used clinical samples of any sort to be autoclaved in Microbiology and incinerated.

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LAST OFFICES

If the patient dies, handling of the body should be minimal. The corpse should be placed in a sealed body bag, not embalmed, and cremated or buried promptly in a sealed casket according to Department of Health Guidelines.¹

EXPOSURE TO INFECTION. FOLLOW-UP OF CONTACTS

Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions from a patient with suspected VHF should immediately wash the affected skin with soap and water. Mucous membranes (e.g. conjunctiva) should be irrigated with copious amounts of water or eyewash solution. Exposed persons should receive medical evaluation and follow-up management via Occupational Health and the Infection Control Doctor in the Microbiology Department.^{1,3}

The CCDC and Microbiologists will arrange for follow-up of staff and casual contacts. A list will be made and there will be positive daily affirmation and recording of temperatures.

REUSE OF ISOLATION FACILITIES

Do NOT reuse the isolation room until it has been declared safe to do so by the Infection Control Team.

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