HEAMORRHAGIC FEVER (VIRAL)

Disease Overview

Viral hemorrhagic fevers refer to a group of illnesses that are caused by several families of viruses: arenaviruses (**Lassa**), filoviruses (**Ebola** and **Marburg**), bunyaviruses (**Crimean Congo** and **Rift Valley**), and flaviviruses.

For Ebola Virus Disease (EVD) case definitions and epidemiological risk factors, refer to EVD Outbreak

Symptoms

While some types of viral hemorrhagic fevers cause relatively mild illness, many viral hemorrhagic fevers are severe and affect multiple organ systems. Characteristically the overall vascular system is damaged, and hemorrhaging occurs.

Specific symptoms vary by the type of viral hemorrhagic fever, but initial symptoms often include marked fever, fatigue, dizziness, and muscle aches. Severe cases often have bleeding under the skin, in internal organs, or from body orifices like the mouth, eyes or ears. Shock, nervous system malfunction, coma, and seizures can occur. Renal failure occurs with some viruses. Death can also occur.

Reservoir

The viruses are maintained in nature in animal reservoirs (usually monkeys, bats, rats, mice) or insect hosts (including ticks and mosquitoes). The viruses are maintained in the geographic area where the host species are. The hosts of some viruses remain unknown, for example Ebola viruses.

Mode of Transmission

Humans are not part of the natural reservoir but become infected after contact with infected hosts. The viruses carried in animal reservoirs are introduced into humans through close contact with blood, urine, fecal matter, organs or other bodily fluids of infected animals. The viruses carried by insect vectors are most often transmitted by their bites, for example **Rift Valley** hemorrhagic fever disease. Some of these insect vectors can also spread the virus to animals other than humans, such as livestock, and people can become infected after contact with these infected animals.

For some of the viruses, humans are dead end hosts. For other viral hemorrhagic fevers, such as those that cause **Lassa**, **Ebola**, **Marburg**, and **Crimean-Congo**, humans can transmit the infection to others. This type of secondary transmission (person to person) occurs from direct contact (through broken skin or mucous membranes) with the blood or other bodily fluids or secretions (stool, urine, saliva, semen) of infected people. Infection can also occur if broken skin or mucous membranes of a healthy person come into contact with environments or objects that have become contaminated with infectious fluids such as soiled clothing, bed linen, or used needles.

Incubation Period

Lassa fever has an incubation period of 6-21 days.

Ebola and **Marburg** viral diseases probably have an incubation period of 2 -21 days.

Crimean Congo and **Rift Valley** viral diseases probably have an incubation period of 2 -10 days.

Period of Communicability

Generally, not communicable before the febrile phase, with increased communicability as illness progresses. Risk is highest during late stages of illness when the patient is vomiting, having diarrhea, or haemorrhaging. The patient will remain communicable until the virus is no longer present in blood and other bodily secretions.

Lassa virus is excreted in urine of patients 3-6 weeks from onset of illness. Infection can also spread from person to person by sexual contact through semen for up to three months after infection.

Ebola virus transmission through semen has occurred several weeks after clinical recovery. Direct contact with deceased Ebola virus disease presents a significant risk of infection in the post mortem period as well.

Risk Factors

Increased risk for acquiring/severe illness:

- Travelers to endemic areas and contact with infected animals.
- Close physical contact with blood, saliva, vomit urine and other bodily fluids or tissues of an infected person or with fomites contaminated with infected body fluids.

Surveillance Case Definition

Confirmed case

Suspect or probable case with laboratory confirmation of infection:

- detection of virus-specific RNA by reverse-transcriptase PCR from an appropriate clinical specimen (e.g. blood, serum, tissue)

AND

- demonstration of virus antigen in an appropriate clinical specimen (e.g. blood, serum, tissue) by enzyme immunoassay (EIA)

OR

One of the above criteria plus laboratory confirmation using at least one of the following:

- demonstration of virus antigen in tissue (skin, liver or spleen) by immunohistochemical or immunofluorescent techniques
- demonstration of specific IgM antibody by EIA, immunofluorescent assay or Western Blot
- demonstration of a fourfold rise in IgG serum antibody by EIA, immunofluorescent assay or Western Blot
- reverse-transcriptase PCR on an independent target gene and/or independent sample or confirmation through another reference laboratory

OR

- Isolation of virus from an appropriate clinical specimen (blood, serum, tissue, urine specimens or throat secretions)

Probable case

Clinical evidence of illness and a history within the three weeks before onset of fever of one of the following:

- travel in a specific area of a country where an outbreak of viral hemorrhagic fever (VHF) has recently occurred
- contact with a suspect, probable or confirmed case
- direct contact with blood or other body fluid secretions or excretions of a person or animal with a confirmed or probable case of VHF
- work in a laboratory or animal facility that handles hemorrhagic fever viruses

OR

Laboratory evidence of infection:

- negative stain electron microscopic identification of variola virus in an appropriate clinical specimen

Suspect case

Clinical evidence of illness

Clinical Evidence

Crimean Congo VHF: Acute viral illness consisting of sudden onset of fever, malaise, generalized weakness, anorexia, irritability, confusion, headache and pain in the limbs and groin. Fever generally lasts 5-12 days and is followed by a prolonged convalescent phase. Acute symptoms are usually accompanied by flushing, conjunctival injection and petechial or purpuric rash involving mucosal surfaces, chest and abdomen. Vomiting, abdominal pain and diarrhea are occasionally seen. Bleeding may be seen from gums, nose, lungs, uterus and GI tract. There is often thrombocytopenia, mild hematuria and proteinuria, and evidence of hepatic involvement. Severe cases may be associated with liver failure.

Lassa VHF: Acute viral illness lasting one to four weeks. Gradual onset of symptoms, including fever, headache, generalized weakness, malaise, sore throat, cough, nausea, vomiting, diarrhea, myalgia, and chest and abdominal pain. Fever may be persistent or intermittent. Inflammation and exudation of the pharynx and conjunctivae is commonly observed. Many cases are mild or asymptomatic. Severe cases may result in hypotension, shock, pleural effusion, hemorrhage, seizures, encephalopathy and proteinuria, resulting in edema of the face and neck.

Marburg VHF: Severe acute viral illness consisting of sudden onset of fever, malaise, myalgia, headache, conjunctival injection, pharyngitis, vomiting and diarrhea that can be bloody. It is often accompanied by a maculopapular or petechial rash that may progress to purpura. Bleeding from gums, nose, injection sites and GI tract occurs in about 50% of patients. Dehydration and significant wasting occur as the disease progresses. In severe cases, the hemorrhagic diathesis may be accompanied by leucopenia; thrombocytopenia; hepatic, renal and central nervous system involvement; or shock with multi-organ dysfunction.

Rift Valley VHF: Human infections with Rift Valley fever are usually associated with a brief, self-limited febrile illness. Most patients experience sudden onset of fever, malaise, severe myalgias with lower back pain, chills, headache, retro-orbital pain, photophobia and anorexia. Fever usually lasts for four days. In a minority of patients, fever returns after two or three days accompanied by return of symptoms as well as flushed face, nausea, vomiting and injected conjunctivae. Severe disease is associated with bleeding, shock, anuria and icterus. Encephalitis and retinal vasculitis can also occur.

Diagnosis and Laboratory Guidelines

Diagnosis is usually through detection of antigen or RNA and antibody IgM or IgG. Reverse-transcriptase PCR or ELISA antigen detection can be used on blood, serum or organ homogenates. Virus isolation must be carried out in a containment level 4 laboratory. The National Microbiology Laboratory is the only facility in Canada that can work with live viral haemorrhagic fever viruses.

If a hemorrhagic fever disease is suspected, contact the local Medical Officer of Health to assess risk and plan for the collection and submission of specimens for testing.

Reporting

Per Policy 2.2 Disease and Event Notification to OCMOH and Disease and Event Reporting section.

- CD Urgent Notification for all confirmed, probable and suspect cases
- Routine surveillance (RDSS) for all confirmed cases.

Case Management

Education

Case or relevant caregiver should be informed about:

- Nature of infection, length of communicable period and mode of transmission
- Hand washing
- Protective measures for hemorrhagic fever diseases. Reduce the risk of wildlife to human transmission by not handling high risk dead animals or handling their raw meat. Reduce the risk of human-to-human transmission arising from direct or close contact with infected patients, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn.

Investigation

Strict infection control precautions are required to protect those who may be exposed. Admittance to hospital may be necessary.

Exclusion/Social Distancing

See investigation.

Treatment

There is no specific treatment.

Immunization

Not applicable. There is currently no specific vaccine

Contact Management

Education

Per case management

Investigation

Close contacts should be identified and followed up appropriately (e.g., daily monitoring for a period of 21 days from last possible date of exposure). Close contacts are those who, after the onset of the case's illness:

- Had direct contact with blood, urine, secretions or fomites contaminated with blood, urine or secretions from the case.
- Cared for the case or handled specimens.
- Had direct contact with the body of the case who died of viral hemorrhagic fever.
- Had direct contact with an infected animal.

Exclusion/ Social Distancing

On a case by case basis

Prophylaxis

Not applicable

Immunization

Not applicable

Outbreak Management

Activate the local outbreak plan when an outbreak is declared.