

FREQUENTLY ASKED QUESTIONS: CRIMEAN-CONGO HAEMORRHAGIC FEVER

Q: What is a viral haemorrhagic fever?

A: A viral haemorrhagic fever is a disease which is caused by a virus and has a tendency to disturb blood clotting, so that patients may develop uncontrolled bleeding or “haemorrhaging”. Many common diseases can resemble viral haemorrhagic fever, but the term is reserved for a particular group of diseases associated with a high death rate. In Africa, these include Crimean-Congo haemorrhagic fever, Lassa fever, Marburg disease and Ebola fever. Apart from the fact that they cause similar disease, the viruses are not closely related to each other, and are transmitted in a variety of ways.

Q: What is Crimean-Congo haemorrhagic fever?

A: Crimean-Congo haemorrhagic fever is a tick-borne viral disease of humans which occurs in Africa, eastern Europe and Asia.

Q: Why does it have the name “Crimean-Congo haemorrhagic fever”?

A: A disease given the name Crimean haemorrhagic fever was first recognized on the Crimean Peninsula in 1944, although the virus which causes the disease was only identified in 1967. Meanwhile, in 1956 a virus given the name Congo was isolated from a child with fever in the former Belgian Congo (now Democratic Republic of the Congo). In 1969 it was discovered that the two viruses were the same. Consequently, the virus and the disease are called “Crimean-Congo haemorrhagic fever”. The name is often abbreviated to “CCHF”, and in South Africa the disease is commonly called “Congo fever”.

Q: Where does the virus come from?

A: The virus is transmitted mainly by *Hyalomma* ticks, which have distinctive brown and white bands on their legs, and are known in South Africa as bont-legged ticks (Afr.: bontpootbosluise). The virus can remain in the ticks for long periods, and even pass through the eggs to infect the next generation of ticks.

There are three species of *Hyalomma* in South Africa, and although they are widely distributed the ticks tend to be most numerous in the drier north-western parts of the country - the Karoo, western Free State, Northern Cape and North-West Province.

Immature *Hyalomma* ticks (larvae and nymphs) feed on ground birds such as guinea fowl, and small mammals up to the size of hares. Adult *Hyalomm*as feed on livestock such as cattle, sheep and goats, as well as wild animals such as antelope, and also ostriches.

Animals bitten by infected ticks do not develop the disease, but can circulate the virus in their blood for a few days, up to a week, and thereafter become immune to further infection. Non-infected ticks become infected if they feed on the animals during the short period when virus is in circulation, thus ensuring that the virus is perpetuated.

Q: How do humans become infected?

A: Humans can become infected from being bitten by infected ticks, or even from squashing ticks if fluid from the ticks gets into cuts and breaks in the skin, or onto mucous membranes. Fortunately immature *Hyalomm*as feed only on small animals and do not bite humans, and adult *Hyalomm*as prefer farm animals and so seldom bite humans. If humans were preferred hosts of *Hyalomma* ticks, there would be many more cases of the disease.

Humans can also become infected if blood from infected livestock or wild animals comes into contact with broken skin (cuts and abrasions) or mucous membranes during the short period that the animals have the virus in circulation. On farms, this usually happens when young animals become infected as a result of being exposed to ticks, and humans are then exposed to blood during procedures such as the castration

of calves, slaughtering of lambs, vaccination of animals, the cutting of identity notches in the ears, or the attachment of ear tags. Occasionally animals that have been reared under tick free conditions come into contact with ticks and the virus late in life, and so slaughtering mature animals can also result in human infection. Although the proportion of mature animals that will have virus in circulation may be extremely low, many thousands of animals are slaughtered each day at abattoirs. Hunting and butchering of wild animals can also be a source of human infection.

Similarly, humans can become infected if blood or blood-tinged body fluids and wastes from patients with the disease comes into contact with broken skin or mucous membranes, as occurs when medical care personnel sustain accidental needle sticks.

Q: Which people are at risk of becoming infected?

A: People who are at particular risk include those involved in the livestock industry, such as farmers and farm labourers, veterinarians, abattoir workers, persons who slaughter animals informally, and hunters.

Within abattoirs those who come into contact with fresh blood are at greatest risk. Once carcasses have been bled out and hung to mature there is a sudden increase in acidity of the meat and virus cannot be detected in the carcass. Ostriches appear to be the only birds in which there is similar circulation of detectable levels of virus in blood as occurs in mammals. There is no indication that meat processed and matured according to standard abattoir practice constitutes a danger to consumers. Half-fed ticks which detach from the hides of recently slaughtered animals may attach indiscriminately to hosts available in their environment, and thus infect slaughtermen.

Apart from people directly involved in the livestock industry, persons at risk of being bitten by ticks include those who live in the countryside and town dwellers who visit the countryside for occupational or recreational purposes, including hunting and hiking. People are not always aware of being bitten by ticks, and in patients with Congo fever ticks have been found attached in concealed sites, such as on the scalp and between the toes.

Occasionally, no direct evidence can be obtained to indicate that a patient with Congo fever had contact with animal blood or with ticks, and the only evidence to suggest possible exposure to infection is the fact that the patient lived in or visited an environment where such contact was possible.

Health care personnel or close associates of a patient can acquire infection from contact of broken skin or mucous membranes with blood or blood-tinged body fluids and wastes of the patient. Although spread of infection to family members has never been recorded in South Africa, it is possible. The only time that infection has been seen in groups of people is when they have been exposed together to a common source of infection, as in slaughtering animals. In contrast, there have been several instances of secondary spread of infection from patients to health care personnel, and this has usually involved needle stick injuries in hospitals.

Q: How common is the disease and how often is it fatal?

A: In brief, about 1-10 cases of Congo fever are diagnosed each year in South Africa (range 0-20), and 20-25 percent of patients die, but the death rate can be 30-50 per cent if patients do not receive proper medical attention.

More exactly, 158 cases of Congo fever have been diagnosed in southern Africa from the time that the presence of the disease was first recognized in 1981 up until the end of 2000, with one infection having occurred in Zaire, one in Tanzania, ten in Namibia and the remainder in South Africa. Most patients were employed in the livestock industry, and males constituted 129/158 of

cases.

Marginally the largest group of cases, 67/158 (42,4%), arose from known tick bite or squashing of ticks; a similar number, 66/158 (41,8%), arose from known or potential contact with fresh blood or other tissues of livestock and/or ticks; 7/158 (4,4%) nosocomial infections arose from contact with blood or items contaminated with blood of known Congo fever patients, while in 18/158 (11,4%) cases there was no direct evidence of contact with livestock or ticks, but the patients lived in or visited a rural environment where such contact was possible.

Q: What are the signs and symptoms of the disease?

A: The disease has a short incubation period followed by a very sudden onset of illness. People usually become sick within 1-3 days of being bitten by a tick, or 5-6 days (occasionally longer) after exposure to the blood of infected livestock or humans. (The short incubation period and sudden onset are among several points of distinction with tick bite fever.)

Patients abruptly develop a severe headache with sore and reddened eyes, fever with cold chills, and intense body pains, particularly involving the muscles of the lower back and thighs. The patients feel extremely unwell and usually take to their beds. Body temperatures do not necessarily remain high and may fluctuate in the course of each day. There may be nausea and vomiting, and sometimes abdominal pain and diarrhoea early in the disease. At this stage, blood tests already show disturbed liver function, and a decrease in blood platelets, which are involved in the clotting of blood.

After about 5 days patients may develop a rash of pink blotches on the body, followed by various bleeding tendencies, depending on the severity of the illness. They bruise easily, often have nose bleeds, and may pass blood in the stool and urine. Stools seldom contain fresh blood; they usually have a dark and tarry appearance. Small or large red spots of bleeding into the skin appear, and there may be large confluent areas of bleeding into the skin around injection sites and in skin folds such as in the armpits or groin. Patients may vomit blood and bleed from the gums, and women may develop heavy uterine bleeding. Blood continues to ooze from needle puncture sites. There can also be internal bleeding, including intracerebral bleeding. Patients go into a coma as liver, kidney and lung functions fail, and death occurs 5-14 days after onset of illness, usually from heart failure.

Patients who recover show sudden improvement from day 10 of illness onwards. Virus remains detectable in human blood for up to two weeks after the onset of illness, but once the results of blood tests indicate that patients' body functions have recovered, and they feel well and are no longer bleeding, they can be discharged from hospital. Although there has been no indication that virus continues to be excreted in body fluids, patients should refrain from intimate contact with other people for six weeks after recovery from the disease as a precaution against spread of infection. Convalescent patients should not undertake heavy duties during this period. After recovery patients are immune to further infection. It is not uncommon for recovered patients to remember little or nothing about the events of their illness.

Treatment essentially consists of supportive therapy, which comprises intravenous feeding of the patient and replacement of blood and clotting factors. Severely ill patients may be placed on ventilators and other life support systems. The chemotherapeutic drug ribavirin has been used to treat patients on a trial basis, but the intravenous form of the drug which is required for seriously ill patients, is virtually unobtainable since it is only produced intermittently on account of low demand.

Q: What action should be taken if a person is suspected of having the disease?

A: The disease may be suspected when a person suddenly becomes sick with headache, fever and chills, muscle pains, and possibly nausea, vomiting and diarrhoea, less than a week after being bitten by a tick, squashing ticks, or coming directly into contact with fresh blood or blood-tinged body fluids and organs

of livestock, wild animals or human Congo fever patients.

A doctor should be consulted immediately the disease is suspected, and if the doctor believes that the suspicion is justified then arrangements should be made to send blood samples (blood taken with the anti-coagulant EDTA, plus clotted blood) expeditiously to the Special Pathogens Unit of the National Institute for Virology in Johannesburg for confirmation of the diagnosis. It should be remembered that the vast majority of suspected cases prove not to be Congo fever, and if there is doubt the doctor should consult physicians specifically charged with handling viral haemorrhagic fever patients in the province concerned, or members of staff of the Special Pathogens Unit.

Certain major hospitals have been designated for the barrier-nursing of haemorrhagic fever patients in each province, and a resource directory for use by medical personnel is undergoing revision. Meantime, medical personnel who potentially have need of the information should establish for themselves what arrangements exist in their own province. Immediately Congo fever or any other haemorrhagic fever is suspected, medical personnel should ensure that they apply strict precautions against infection from blood and other body fluids. On no account should patients suspected to be suffering from any haemorrhagic fever be referred to a hospital without first discussing the case with the relevant clinicians, or specimens be sent to the Special Pathogens Unit without first contacting the Unit.

The doctor (or other health worker certified as competent to diagnose) who makes the diagnosis has a legal obligation to notify the Local Authority Health Services of the existence of the case on form GW17/5.

Q:What precautions should be applied to persons who have potentially been exposed to infection?

A: Local and provincial health officials are responsible for investigating the circumstances surrounding confirmed cases of the disease, and instituting such control measures as may be necessary. Persons in the community at large, including family members, who have been in contact with confirmed Congo fever patients, or who have been exposed to the same potential source of infection, are classified as being at zero, low, moderate or high risk according to defined criteria, and placed under appropriate observation as discussed below. Medical personnel who have been exposed to patients are separately placed under observation of the infection control officials of the institution concerned.

Contacts considered to be at high risk would, for instance, include persons who have had accidental injury with a needle contaminated with the blood of a confirmed Congo fever patient. Such persons would be placed under active observation, which consists of reporting twice a day to a designated health official to be monitored for signs and symptoms of the disease and to have their temperature recorded for a period of two weeks after last contact with the patient (calculated to exceed the incubation period of Congo fever by a wide margin of safety - the observation period would be extended to three weeks for most of the other viral haemorrhagic fevers). Low risk contacts of confirmed patients, who have not had closer than one metre face-to-face contact with the patient for instance, may be placed under passive observation, which could consist of reporting to the responsible health official daily by telephone rather than in person.

Note that persons under observation are not in quarantine and may continue with their normal duties, including attending to patients. They are only considered to be infectious once they become sick themselves. As soon as they develop signs and symptoms considered to be characteristic of the disease, or a fever of 38,5°C or greater, they are admitted to hospital as suspected cases.

Places such as abattoirs constitute a special case. Since exposure potentially occurs on a continuing basis (although the risk is actually low), there is seldom an indication for placing selected individuals under special observation. Instead, clinics attached to abattoirs should maintain a high degree of awareness of Congo fever and other diseases which can be acquired from livestock at all times, and ensure that there is appropriate investigation of sick members of staff.

Family members and co-workers of patients who become infected on farms may be placed under observation depending on their degree of potential exposure to infection, but since the ticks and virus are so widely distributed there is no logic in placing farms under quarantine.

Q: What measures can be taken to prevent exposure to infection?

A: Persons potentially exposed to tick bite can use certain pyrethroid acaricides to treat clothing such as socks and trousers (acaricides are insecticides used against ticks). Formulations which are generally available from shops that sell equipment for camping and outdoor activities, include aerosol sprays and sachets of concentrated acaricide used to prepare emulsions into which clothing is dipped.

Abattoir workers, veterinary staff, farm workers and hunters should use appropriate impervious protective clothing and gloves when engaged in activities which carry a risk of exposure to animal blood. Although it is incumbent upon employers to supply protective clothing and instruction in safety, employees must take responsibility for adhering to safety regulations.

Veterinary regulations promulgated for ostrich abattoirs require that birds should be treated with an appropriate acaricide and held in tick-free circumstances for 14 days before slaughter. Similar regulations would be impossible to implement for other livestock. Vast numbers of cattle, sheep and goats are slaughtered each day, and the costs of constructing tick-free holding pens of suitable capacity would be prohibitive, as would the costs and logistics of holding and feeding the animals and supervising the operation. A potential alternative would be the development of a veterinary vaccine that is applied to farm animals as a public health measure, but such research would require special funding.

At present there is no human vaccine, and the lack of potential demand for such a vaccine inhibits its development.

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