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CASE REPORT

Nosocomial infection of Crimean–Congo haemorrhagic fever in eastern Iran: Case report

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Summary An outbreak of Crimean–Congo haemorrhagic fever occurred in the county of Birjand in eastern Iran in November 2011. Four cases were involved in this outbreak. Two patients died after admission to hospital, one of whom was a nurse who acquired the infection nosocomially, and the others were treated successfully.

Introduction

Crimean–Congo haemorrhagic fever virus (CCHFV) is a tick-transmitted member of the Bunyaviridae family (*Nairovirus* genus) that causes severe haemorrhagic disease in humans, with a case fatality rate as high as 30–40%.[1] Abattoir workers, shepherds, veterinarians and other persons in close contact with livestock and ticks are at risk of infection.[2,3] In addition to zoonotic transmission, CCHFV can spread from person to person and is one of the rare haemorrhagic fever viruses able to cause nosocomial outbreaks in hospitals with high standards of hygiene.[4,5] Nosocomial transmission has been reported in Turkey,[6] Pakistan, Kasakhstan,[7] Iraq, United Arab Emirates, South Africa, and Iran; and in all of these cases contact with the blood and secretions of patients with CCHF is reported.[8,9] To put the issue into perspective, Iran can be regarded as an example.

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An important outbreak occurred in 2008 in Fars province in southern Iran. In this outbreak, of the 5 CCHF confirmed patients, 4 patients had direct contact with the blood and tissue of infected livestock and one patient was infected nosocomially. In 2009, 4 patients were infected nosocomially in Khorasan province, north eastern Iran. In 2012, a nosocomial outbreak occurred in Mashhad city, Khorasan-Razavi province in the north-east of Iran, in which one physician and two nurses contracted CCHF from a slaughterer in the Imam Reza hospital.[10] Tables 1—4

The findings of the outbreak are described, including the route of infection transmission of a nurse who contracted the disease in a nosocomial mode. This report surveys the relevance of residency in rural areas, and tick, livestock or fresh meat contact as risk factors of CCHF transmission.

A perspective of the outbreak

In November 2011, we faced an outbreak of CCHF in the county of Birjand, Khorasan-Jonobi province, eastern Iran. During the course of the outbreak, four patients with suspected symptoms of CCHF were admitted to the same hospital; Valiasr Hospital in Birjand.

After hospitalization, routine laboratory tests were carried out: blood counts, liver enzymes (ALT: alanine transaminase, AST: aspartate aminotransaminase), PT (prothrombin time) and PTT (partial thromboplastin time).

For serological (IgM and IgG)[11] and molecular (RT-PCR) testing,[8,12] blood samples were forwarded to the Arboviruses and Viral Haemorrhagic Fever laboratory (National Ref. Lab.), Pasteur Institute of Iran. This centre provides laboratory tests for CCHF in Iran.

Case definition

Case 1

A 61-year-old man (C1) with history of recent fresh meat contact and clinical signs such as asthenia and vomiting was admitted to the emergency unit. At the time of admission, his body temperature was 36.8 °C, respiration rate 16/min and blood pressure 110/80 mm Hg.

Three days post admission, laboratory investigations revealed a WBC and platelet count of 2400 and 17,000 respectively, a serum urea level of 81 mh/dL and PTT of 40 s. Fifteen days post admission, WBC rose to 4200, but platelet and PTT declined to 14,000 and 25 s. Nineteen days post admission, WBC and platelet count increased to 22,000 and 22,500 respectively and PTT was 30 s.

Table 1 Documentation of case 1.

PTT	Platelet	WBC	BP	RR	BT	Parameters/day
—	—	—	110/80	16/min	36.8 °C	1st day
40 s	1700	2400	—	—	—	3rd day
25 s	14,000	4200	—	—	—	15th day
30 s	22,500	22,000	—	—	—	19th day

Table 2 Documentation of case 2.

Platelet	WBC	BP	BT	Parameters/day
196,000	7400	110/80	39.5 °C	1st day
51,000	4400	—	—	3rd day
15,000	4300	—	—	4th day

The patient was treated with Ribavirin and Amikacin 400 mg. As a result of treatment, he was rehabilitated and discharged from hospital after nineteen days.

The test results were positive for IgM, while IgG and RT-PCR were negative for CCHFV.

Case 2

A 48-year-old woman (C2) with varied signs, such as fever, headache and vomiting, was admitted to the emergency unit of Valiasr hospital. She reported no history of animal or fresh meat contact, but she lived in a rural area. On initial examination, her vital signs included a body temperature of 39.5 °C and blood pressure of 110/80 mm Hg.

Baseline investigation on the day of admission showed a WBC and platelet count of 7400 and 196,000 respectively. Three days later, WBC count was 4400 and platelet count was 51,000. A day later, the number of WBC and platelets decreased to 4300 and 15,000 respectively.

A day after admission, injective Ceftriaxone was prescribed. Two days later, treatment was substituted with intravenous ciprofloxacin 400 mg and Ampibactam 3 g every 3 h. Three days post admission, the patient showed respiratory distress and injective Clindamycin 900 mg was administered and she was transferred to isolation. Four days later, she was transferred to the intensive care unit, as she was showing signs of haematemesis. In addition to chemotherapy, on the third day post admission, ten units of platelets and three units of fresh frozen plasma (FFP) were administered to the patient. After four days of hospitalization, she consequently died, with suspect diagnoses of: sepsis, disseminated intravascular coagulopathy (DIC) and food poisoning.

At the start point of the investigation, there were no samples from C2, but after tracing the route of infection in patient C3 who nursed patient C2 ten days previously; her physician was able to locate her blood sample in the sera bank of the hospital laboratory for further investigation for CCHF. After her death, laboratory investigations confirmed her infection by CCHFV. The test results were negative for IgM and IgG, while RT-PCR was positive for CCHF virus.

Case 3

A 31-year-old woman (C3) who nursed patient C2 ten days previously, was admitted to the emergency unit of Valiasr

Table 3 Documentation of case 3.

PTT	Platelet	WBC	BP	RR	BT	Parameters/day
65 s	20,000	2000	90/60	17/min	38.2 °C	1st day
58 s	112,000	4000	—	—	—	2nd day