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A Case Report of Crimean Congo Hemorrhagic Fever in Ostriches in Iran

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Abstract: Crimean Congo hemorrhagic fever (CCHF) is a viral zoonosis, which is usually transmitted *via* tick bites or close contact with infected blood or tissue. This disease can cause a case fatality rate of up to 25%-30% in humans. CCHF Infection in birds is less documented. An ostrich can reproduce viruses and can also play the role of a mechanical vector, by transporting infected ticks without becoming ill. In March 2007, three butchers and one worker in an ostrich farm were infected with CCHF in central part of Iran. Considering the role ostriches play in transmitting the disease, serum samples from five ostriches of that farm were taken and sent to the laboratory for CCHF ELISA tests. The result of the IgG test was positive for one (20%) of the ostriches. At the same time, serum samples of eight sheep from the same farm were sent for IgG testing, two (25%) of which were positive. This was the first report of CCHF infection of an ostrich in Iran and tracing CCHF IgG against this ostrich and the afore-mentioned sheep may have revealed that the disease in the worker was the cause of transmission of this disease from these animals or their ticks.

Keywords: CCHF, bird, animal contact, Iran.

INTRODUCTION

Crimean Congo hemorrhagic fever (CCHF) is a viral zoonosis, which is usually transmitted *via* tick bites or close contact with infected blood or tissue [1]. This disease can cause a case fatality rate of up to 25%-30% in humans. The symptoms in livestock include only a slight viremic fever lasting one-week [2].

This disease has been reported in Africa, Asia and Eastern Europe [3]. In recent years, cases of human infection have increased, and have been reported from endemic countries such as Kenya, Mauritania, Senegal, South Africa, Kosovo, Albania, Bulgaria, Greece, Russia, Georgia, Tajikistan, Turkey, Iran, Afghanistan, and Pakistan [4]. The existence of an antibody for CCHF among domestic animals (sheep, cows, and camels) and other wild animals in Iran, was first reported in 1970 [5]. Subsequently, in several seroepidemiological studies from different parts of the country there were seropositive humans and animals for the CCHF virus [6, 7]. The first human clinical report of this disease was reported in 1999 in Iran and since then it has been reported in different regions of the country [8]. Since 2000, the National Reference Laboratory of Arboviruses and Viral Haemorrhagic Fevers of Pasteur Institute of Iran has been addressed as the national reference laboratory and the national surveillance and evaluation programs were executed [9]. Most reports during this time have been associated with Sistan Va Baluchistan province in the south east and Isfahan province in the center of Iran [8, 10]. The majority of patients with this disease in Iran include those who were in close contact with blood, secretions and tissues of infected animals [11, 12].

CCHF Infection in birds is less documented. Experimental studies to examine the nature of the virus in birds have shown that most species of birds, including domestic fowls and passerines are resistant to this disease, except Guinea fowls that contract transient viremia. Birds such as ground-frequenting are susceptible to experimental infection with this disease. Amongst birds, the ostrich is the most vulnerable to this disease [13]. In an infected ostrich, the CCHF virus remains in the blood for 1-4 days and in visceral organs such as the spleen, liver and kidney for five days. Thereafter, it can be recognized for several years through IgG antibodies [13]. An ostrich can reproduce viruses and can also play the role of a mechanical vector, by transporting infected ticks without becoming ill [13-15]. Workers in ostrich rearing farms that are rife with ticks, have a tendency to contract CCHF from the infected birds.

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The ostrich rearing industry has been established for a decade in Iran, in order to produce ostrich meat and there are now 360 ostrich rearing farms with 40 thousands ostriches. On average, more than six thousand people are engaged in the ostrich rearing industry in Iran.

MATERIALS AND METHODS

In March 2007, three butchers were infected with CCHF in Najaf Abad, Isfahan. Two weeks later, another worker in an ostrich farm in Tiran, Isfahan – 15 kms away from the previous slaughterhouse - showed hemorrhagic symptoms symptomatic of CCHF and considering the role ostriches play in transmitting the disease, serum samples from five ostriches in this farm were taken and sent to the laboratory for CCHF ELISA tests. The ostriches were 2-3 years old, were all females and were of the *Struthio Camelus Australis* species.

RESULTS

The butchers and farm worker showed malaise, bleeding, thrombocytopenia and leucopenia, as well as elevated levels of aspartate aminotransferase (AST) and alanine transferase (ALT). The infected butchers were confirmed CCHF patients by detecting CCHF specific IgM in their sera and in addition, all of them had RT-PCR positive samples. Regrettably, the blood sample of the farm worker was overlooked and not sent for testing.

The result of the IgG test was positive for one of the ostriches (20%). At the same time, serum samples of eight sheep from the same farm were sent for IgG testing, two (25%) of which were positive.

DISCUSSION

This was the first report of CCHF infection of an ostrich in Iran. Tracing CCHF IgG against this ostrich and the afore-mentioned sheep may have revealed that the disease in the farm worker was the cause of transmission of the disease from these animals or their ticks.

In 1984, CCHF infection of a worker in an ostrich slaughterhouse was reported in South Africa. The antibody against CCHF was extracted from six out of the nine ostriches the patient had worked with [14]. In another outbreak amongst ostrich slaughterhouse workers in South Africa in 1996, 17 people contracted CCHF [13].

Some countries ban all imports of ostrich meat or other products from confirmed CCHF infected countries, as they can cause great damage to this industry. Therefore, we need to carry out more research into the current status of CCHF infected ostriches and find solutions. Since the ostrich rearing industry is a new industry around the world, we have incomplete information on various aspects of the diseases of this bird.

The legal requirement is that, in infected areas, birds and animals should be treated with pesticides 14 days before sending them to the slaughterhouse [1, 15]. As humans are likely to be infected with the birds' ticks or blood, it is highly recommended that those who are associated with this industry (slaughterhouse workers, animal husbandry workers, vets, etc.) wear gloves and other protective clothing, disinfect their equipment and also use insect repellent to protect themselves. Based on the finding of this study, it is recommend that farm worker and butchers.

The aim of this study was to find potential sources of CCHF transmission to human cases. Therefore, the main aim of our survey in ostriches and sheep was to evaluate the existence of infection in these animals, which was possible with a few collected samples (five ostriches and eight sheep). It is recommended that more samples be gathered in similar outbreaks and surveys to have a better view of the prevalence of the disease in the animals. In addition, as there were five farm workers and butchers working on this farm, it was advisable to obtain blood samples from all of them, carry out laboratory tests and evaluate the prevalence of CCHF virus in ticks collected from ostriches in the farm territory to glimpse a better understanding of the epidemiology of CCHF in this farm.

It is recommended that studies should be carried out on ostrich blood samples and their ticks in Iran so that we can have a better understanding of this disease in the ostrich rearing industry.

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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