

# Co-infection of Leptospirosis and Crimean-Congo Hemorrhagic Fever

Arash Seifi,<sup>1</sup> Mahboubeh Hajiabdolbaghi,<sup>1</sup> and Esmaeil Mohammadnejad<sup>2,\*</sup>

<sup>1</sup>Department of Infectious Diseases, Faculty of Medicine, Tehran University of Medical Sciences, Tehran, IR Iran

<sup>2</sup>Department of Nursing, Students' Research Committee, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

\*Corresponding author: Esmaeil Mohammadnejad, Department of Nursing, Students' Research Committee, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran. Tel/Fax: +98-2166936626. E-mail: asreno1358@yahoo.com

Received 2015 August 13; Revised 2016 June 06; Accepted 2016 June 12.

## Abstract

**Introduction:** Infectious diseases are important factors affected human health over the years. At present, more than 450 diseases are known to be transmitted between animals and human. The Crimean-Congo hemorrhagic fever (CCHF) and leptospirosis are common zoonotic diseases causing fever and systemic illness. Clinical symptoms of CCHF and leptospirosis are often nonspecific; so, they may be mistaken with other infectious diseases.

**Case Presentation:** This article presents a 56-year-old woman from Guilan Province, the north of Iran and the southern coast of the Caspian Sea, who admitted to the hospital with acute fever, severe headache, thrombocytopenia, anemia, epigastric pain, myalgia, nausea and vomiting.

**Conclusions:** We recognized that the case was co-infected by CCHF and leptospirosis.

**Keywords:** Co-infection, Crimean-Congo Hemorrhagic Fever, Leptospirosis, Iran

## 1. Introduction

One of the important factors that have affected human health over the years is infectious diseases. Among these diseases, transmissible diseases between animals and humans are considered to be more significant. At present, more than 450 diseases are known to be transmitted between animals and humans. They are serious dangers to public health, economic development, business and tourism industry, especially in developing countries (1). Iran is one of the endemic regions of the Crimean-Congo hemorrhagic fever (CCHF). The most common route for transmission is contaminated pets in this region (2). In endemic regions, persons including farmers, shepherds and veterinarians who are in occupational contact with livestock and wild animals are in a high-risk group (3).

Symptoms of CCHF are often nonspecific, including sudden fever, headache, fatigue, arthralgia, myalgia, abdominal pain, nausea, diarrhea, vomiting, conjunctivitis, sore throat, jaundice, photophobia, and mood disorders. Also, CCHF has hemorrhagic symptoms (petechia, ecchymosis, epistaxis, gingival bleeding, hemoptysis, hematemesis, melena, hematuria, metrorrhagia and internal bleeding) along with hepatomegaly, lymphadenopathy, confusion, and tachycardia (4, 5). The Crimean-Congo hemorrhagic fever is a frequently missed diagnosis because the clinical symptoms of this infection are easily confused with those of other febrile illnesses including other

hemorrhagic fevers, (e.g., dengue fever). Thus, CCHF remains underdiagnosed and underreported in this region (6, 7).

Similarly, these symptoms can be observed in leptospirosis. Leptospirosis is a widespread zoonotic disease that is caused by spirochetes of the genus *Leptospira* (8). The pathogenic spirochetes are shed in the urine of host animals, and human infection can occur through either direct or indirect contact with urine of the infected animals (9).

The first report of human leptospirosis in Iran was in 1960 by researchers in Razi institute (10). The Crimean-Congo hemorrhagic fever infection was rarely reported in Iran before 1999. Since spring 1999 epidemic of this infection has been occurred in some regions of Iran especially in Sistan and Baluchistan, Southeast of Iran (6, 11). Human leptospirosis has been found in the northern provinces of Iran, particularly in Guilan and Mazandaran. Wide spread of animal leptospirosis is observed in most areas of Iran, but there is no precise information about epidemiology of this disease in Iran (12).

## 2. Case Presentation

A 56-year-old housewife from the Deilaman of Siahkal city at Guilan province with fever, chills, muscle aches, headache, heartburn and nausea/vomiting referred to the Siahkal health center. Based on these symptoms with the

suspicion of CCHF, the patient was treated by ribavirin. The patient had no history of hospitalization and bleeding (gastric-intestinal, hemoptysis, etc.). The epidemiological data of patient showed that she was farmer and had contact with ticks during past 5 - 6 days. The patient had no history of travel to the endemic areas and had no family history of the similar disease. She discharged on personal consent and came to Imam Khomeini hospital in Tehran for work-up and treatment.

The patient was admitted in the isolation room of emergency department at Imam Khomeini hospital with a primary diagnosis of CCHF and treated by ribavirin. For confirmation of diagnosis, serum samples were sent to the Pasteur Institute and after 48 hours it was reported positive for the Crimean-Congo Hemorrhagic fever by real-time polymerase chain reaction. In the preliminary laboratory tests, there was a marked thrombocytopenia (platelet count =  $64 \times 1000/\text{mm}^3$ ) and other markers included white blood cell count of  $4.3 \times 1000/\text{mm}^3$ , Aspartat aminotransferase (AST) (AST= 130 IU/L), alanine aminotransferase (ALT = 89 IU/L), bilirubin (total = 1.2 mg/dL , direct = 0.4 mg/dL), creatinine = 0.8 mg/dL, LDH= 805 U/L (normal < 480), CPK=118 IU/L (normal:24 - 170), Na = 136 mEq/L, K=3.5 mEq/L and ESR = 11. The findings of abdominal and pelvic sonography and chest x-ray were normal. Based on the patient's symptoms and the existence of an outbreak of Leptospirosis in the Guilan at that time, she was also treated with the suspicion of Leptospirosis by intravenous ceftriaxone.

The serological test for leptospirosis was sent to the Razi vaccine and serum research institute. The antibody titer was 1/200 (L. Pomona = 1/200), which was suggestive of Leptospirosis. Actually, Leptospirosis is confirmed by antibody titer more than 1/800 of one serum specimen, increased the antibody titer more than 4 times in two serum specimens taken at least two weeks apart, or a negative titer-test changes to positive. The isolation ended when the 10-day treatment period was completed. Then, the patient discharged in good health condition and with needed instructions and trainings.

### 3. Discussion

The Leptospirosis has the most extensive geographical distribution among the viruses transmitted by the ticks. Contact with blood, fluids or tissues of CCHF-infected animals or humans is the most common route of transmission. Transmission to the patient's family members have also been reported (6, 13). According to the recommendations of the national technical committee of Iran, suspected CCHF cases should be referred to a hospital. On the

presumption of CCHF (based on the history, physical examination, and primary laboratory tests), treatment is recommended and concurrent blood samples are sent to the Pasteur Institute of Iran. Finally, the results are reported to the center for disease control in the ministry of health and health centers in the related province and city. In the city health center, in addition to the laboratory data, the demographic characteristics including age, sex, occupation, place of residence, and contact history are recorded for epidemiologic studies (14-16).

In this study, no case of CCHF was observed in the patient's family while in most cases reported from other countries the transmission of infection to other members of the family has also been reported. If this disease is not diagnosed because of the similarity of its signs and symptoms to some other diseases, the medical personnel particularly in operating rooms, intensive care units and emergency department will be at a higher risk for this infection. Due to the high epidemic risk and mortality, easy transmission of infection between patients and healthcare personnel, and no available effective vaccine, improving patient care strategies is recommended. For this purpose, improving diagnostic strategies, and also prevention of epidemics in medical centers with accurate isolation are recommended (17).

The following strategies can prevent the spread of disease in the community supervision on slaughters livestock: equipping and strengthening quarantine, removing ticks from livestock, and training the people who work with animals or are in contact with animal carcasses. Since this disease (CCHF) is more common in animal farm, slaughterhouse and other such places and Leptospirosis is one of the differential diagnoses of CCHF, blood samples of patients with mentioned symptoms can be sent to assay for both diseases, in endemic areas, these both diseases can be together as co-infection. As we know, this patient is the first case of co-infection of leptospirosis and CCHF in this region. We recommend that every physician should be aware of co-infection of leptospirosis and CCHF in this area, where both infections are endemic.

### Footnote

**Authors' Contribution:** Arash Seifi, Mahboubeh Hajiabdolbaghi and Esmail Mohammadnejad collected the data and drafted the manuscript. Esmail Mohammadnejad and Arash Seifi analyzed the data and helped in manuscript writing. The final manuscript was approved by all authors. All were involved in patient care.

## References

- Adler B, de la Pena Moctezuma A. Leptospira and leptospirosis. *Vet Microbiol.* 2010;**140**(3-4):287-96. doi: [10.1016/j.vetmic.2009.03.012](https://doi.org/10.1016/j.vetmic.2009.03.012). [PubMed: [19345023](https://pubmed.ncbi.nlm.nih.gov/19345023/)].
- Sadeghi M, Asgharzadeh SA, Bayani M, Alijanpour E, Javaniyan M, Jabbari A. Crimean congo hemorrhagic fever appearance in the north of Iran. *Caspian J Intern Med.* 2013;**4**(1):617-20. [PubMed: [24009947](https://pubmed.ncbi.nlm.nih.gov/24009947/)].
- Yilmaz R, Ozcetin M, Erkorkmaz U, Ozer S, Ekici F. Public Knowledge and Attitude toward Crimean Congo Hemorrhagic Fever in Tokat Turkey. *Iran J Arthropod Borne Dis.* 2009;**3**(2):12-7. [PubMed: [22808377](https://pubmed.ncbi.nlm.nih.gov/22808377/)].
- Yolcu S, Kader C, Kayipmaz AE, Ozbay S, Erbay A. Knowledge levels regarding crimean-congo hemorrhagic Fever among emergency healthcare workers in an endemic region. *J Clin Med Res.* 2014;**6**(3):197-204.
- Ozer A, Miraloglu M, Ekerbicer HC, Cevik F, Aloglu N. Knowledge levels about Crimean-Congo hemorrhagic fever among midwifery and nursing students in Kahramanmaraş, Turkey. *Southeast Asian J Trop Med Public Health.* 2010;**41**(1):77-84. [PubMed: [20578485](https://pubmed.ncbi.nlm.nih.gov/20578485/)].
- Mardani M, Keshtkar-Jahromi M. Crimean-Congo hemorrhagic fever. *Arch Iran Med.* 2007;**10**(2):204-14. [PubMed: [17367225](https://pubmed.ncbi.nlm.nih.gov/17367225/)].
- Metanat M, Sharifi Mood B, Masoud S. Crimean-Congo Hemorrhagic Fever: A Reemerging Disease. *Arch Clin Infec Dis.* 2014;**9**(1).
- Alavi SM, Khoshkho MM. Seroprevalence study of leptospirosis among rice farmers in khuzestan province, South west iran, 2012. *Jundishapur J Microbiol.* 2014;**7**(7):e11536. doi: [10.5812/jjm.11536](https://doi.org/10.5812/jjm.11536). [PubMed: [25368799](https://pubmed.ncbi.nlm.nih.gov/25368799/)].
- Dezfully N, Mehrabian S. Evaluation of Two Immunodiagnostic Assays (MAT and IFA) for Human Leptospirosis in Gilan Province-Iran. *Jundishapur J Microbiol.* 2012;**5**(4):582-4.
- Raofi R, Pourahamad M, Nazer M, Pournia Y, Chinikar S. Case Series of Crimean-Congo Disease: an Outbreak in South of Fars, Iran. *Journal of Babol University of Medical Sciences.* 2012;**14**(5):96-100.
- Ahmeti S, Raka L. Crimean-Congo haemorrhagic fever in Kosova : a fatal case report. *Virol J.* 2006;**3**:85. doi: [10.1186/1743-422X-3-85](https://doi.org/10.1186/1743-422X-3-85). [PubMed: [17034648](https://pubmed.ncbi.nlm.nih.gov/17034648/)].
- Alavi L, Alavi SM, Khoshkho MM. Risk Factors of Leptospirosis in Khuzestan, South West of Iran,2012. *Int J Enteric Patho.* 2013;**1**(2):68-71.
- Gozel MG, Dokmetas I, Oztop AY, Engin A, Elaldi N, Bakir M. Recommended precaution procedures protect healthcare workers from Crimean-Congo hemorrhagic fever virus. *Int J Infect Dis.* 2013;**17**(11):1046-50.
- Jabbari A, Tabasi S, Abbasi A, Alijanpour E. Crimean-congo hemorrhagic fever: treatment and control strategy in admitted patients. *Caspian J Intern Med.* 2012;**3**(2):443-4. [PubMed: [24358442](https://pubmed.ncbi.nlm.nih.gov/24358442/)].
- Sharifi-Mood B, Metanat M, Alavi-Naini R. Prevalence of crimean-congo hemorrhagic Fever among high risk human groups. *Int J High Risk Behav Addict.* 2014;**3**(1):e11520. doi: [10.5812/jjhrba.11520](https://doi.org/10.5812/jjhrba.11520). [PubMed: [24971294](https://pubmed.ncbi.nlm.nih.gov/24971294/)].
- Sharifi-Mood B, Metanat M, Rakhshani F, Shakeri A. Co-infection of Malaria and Crimean-Congo Hemorrhagic Fever. *Iran J Parasitol.* 2011;**6**(3):113-5. [PubMed: [22347306](https://pubmed.ncbi.nlm.nih.gov/22347306/)].
- Sharifi-Mood B, Metanat M, Ghorbani-Vaghei A, Fayyaz-Jahani F, Akrami E. The outcome of patients with Crimean-Congo hemorrhagic fever in Zahedan, southeast of Iran: a comparative study. *Arch Iran Med.* 2009;**12**(2):151-3.