Severe Leptospiral Infection in Southern Israel

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In Israel, leptospirosis is endemic to the northern region, particularly in the Jordan River basin, near streams and other water bodies. The last documented leptospirosis outbreak in Israel occurred in the summer of 2018. It resulted from infected cattle shedding the pathogen into streams and natural pools popular among domestic travelers [1]. Leptospiral infections in southern Israel are uncommon, particularly owing to the scarce rainfall and the lack of natural bodies of water. Summers in southern Israel are dry and hot, and therefore the possibility of leptospiral infection might be overlooked by local practitioners.

The majority of leptospiral infection are mild or asymptomatic; however, some patients develop severe infections, with possible complications such as hepatitis, acute kidney injury, pancytopenia, and disseminated intravascular coagulation. Early diagnosis by either serological tests or polymerase chain reaction (PCR) and appropriate antibiotic treatment may prevent patients from progressing to severe illness [2].

PATIENT DESCRIPTION

A 59-year-old male was admitted to an internal medicine on July 2020 with acute hepatitis. He had been born in Ukraine and live in Israel since 1995. The patient presented to the emergency department with intermittent fever up to 40°C, chills, nausea, epigastric discomfort, and nausea that started 2 weeks prior to presentation. He also mentioned beer-colored urine and loss of desire to smoke. Two days prior to presentation, the patient noticed a lump on his back. The lump was later treated as a soft tissue abscess and was drained at a walk-in clinic. Oral cephalexin was initiated. A culture from the abscess was not obtained. Despite this treatment, the patient's symptoms persisted. Jaundice was noticed on the day before presentation.

His medical history was significant for hypertension treated with atenolol and dyslipidemia without medical treatment. He also used paracetamol (up to 2 grams daily) to reduce his fever, and cephalexin to treat his cutaneous infection. No other medications, including herbal, natural, and over-the-counter drugs, were used.

The patient lived with his wife and two children in a middle-sized town in southern Israel, which is situated in a semi-arid climate zone. He worked as a practical engineer at a semiconductor manufacturer located within his town in a clean-room manufacturing position.

The patient had a 15-pack-years smoking history, drank 2 to 3 cans of beer on weekends, and had no history of illicit drug use. The patient denied any exposure to animals, including pets, farm animals and wild animals, and denies any history of tick or other insect bites. His travel history (domestic and international) included a short visit to Ukraine in 2017. He denied and travel to water bodies, caves, or forests.

The patient was sexually active with his wife and reported a mutually monogamous relationship with her. He denied any history of unprotected sex with other partners and denied ever paying or being paid for sex. The patient also denied any history of blood transfusions and tattoos. He had no surgical history. The patient's wife claimed to have contracted Hepatitis B and C viruses from a contaminated blood transfusion in the year 2000, followed by medical treatment and full recovery. The patient claimed being negative on repeat serological tests.

On presentation, the patient's physical examination was significant for jaundice, epigastric tenderness, and marked hepatomegaly in the absence of splenomegaly. The abscess on his back appeared to be appropriately drained. Vital signs were within normal range on presentation. The rest of his physical examination including evaluation of lymph nodes, skin, chest, heart, and musculoskeletal was without any pathological findings.

The patient laboratory finding on presentation showed hemoglobin 12 grams/deciliter, platelets 56,000 /microliter, serum creatinine 2 milligram/dl, total bilirubin 12.68 mg/dl, direct bilirubin 7.42 mg/dl, albumin 2.7 g/dl, sodium 124 mEq/liter, C-reactive protein 28 mg/dl, aspartate aminotransferase 406 units/l, alanine aminotransferase 229 units/l, alkaline phosphatase 716 units/l, lactate dehydrogenase-992 µ/l. Chest radiography was within normal limits. Abdominal computed tomography with intravenous and oral contrast demonstrated hepatomegaly with peri-portal edema and portal lymphadenopathy.

Later during hospitalization, further laboratory studies were obtained, and all were non-contributory. Laboratory tests included viral hepatitis A, B, C, D, and E; human immune deficiency virus, cytomegalovirus, Epstein-Barr virus, rickettsia, and Q-fever serologies; treponema pallidum hemagglutination test, direct COOMBS test, Rose-Bengal test for brucellosis, complement levels, anti-nuclear antibodies, rheumatic factor, anti-mitochondrial and anti-smooth-muscle, anti-myeloperoxidase, anti-proteinase-3 antibodies, thick film blood microscopy, haptoglobin, and repeat blood cultures for bacteria, fungi, and parasites. Leptospiral serologies were positive for Leptospirosis Sejreo Bratislava with antibody titer of 1:200.

Intravenous doxycycline was initiated on presentation for 14 days. Paracetamol was halted.

Initially, the patient deteriorated, with signs of fulminant hepatitis and liver failure, including a rise in international normalized ratio and decline of blood albumin level. The patient's anemia worsened, with hemoglobin levels falling to 8.3 mg/dl and requiring a packed red-blood cells transfusion. However, the patient eventually improved, with normalization of his kidney function, near-normalization of his liver enzymes, and resolution of his symptoms following antibiotic and supportive treatment. He was discharged 16 days after admission.

COMMENT

Leptospirosis is usually seen in patients living in wet climates, or alternatively in patients living near bodies of water. While serological surveys demonstrated significant prevalence of seropositivity in dry middle eastern nations such as Egypt [3], the proximity to contaminated water bodies (e.g., Nile River and its tributaries) remains an important factor in the spread of the disease. In Pakistan, serological survey revealed greater seropositivity in wet conditions [4].

In Israel, leptospirosis is endemic to the northern part of the country, where Mediterranean climate prevails. However, leptospirosis is seldom anticipated in arid southern Israel. Our case deals with a patient from southern Israel who contracted leptospirosis from an unknown source. Although this patient could have been exposed to leptospirosis elsewhere, he denied any travel or occupational or recreational exposure that would raise a suspicion that leptospirosis would be a reasonable possibility.

Eventually, the patient was correctly diagnosed and treated despite a relatively low index of suspicion for two reasons. First, the patient's signs and symptoms, including hepatitis, acute kidney injury, and bone marrow suppression mandated considering leptospirosis as a possibility. Second, the lack of another culprit, namely a more common causative agent explaining the myriad of signs and symptoms forced us to broaden the search for a possible explanation.

The question of the source of infection in our case remains a concern, and we believe that scrutinizing it might help prevent future cases of leptospirosis where they are less anticipated. In developed nations, leptospirosis is usually associated with occupation (e.g., butchers, farm workers, veterinarians) or recreation such as kayaking, hiking, or travel to endemic countries [5]. None of those risk-associated exposures applied to our patient.

We believe there are two lessons that can be learned from our case. First, clinicians should keep an open mind and, when other reasonable and common diagnoses excluded, consider more rare options, even in the absence of apparent risk factors. In our case, early administration of appropriate treatment was important and probably lifesaving; therefore, we felt at liberty to consider unlikely options such as leptospirosis. Second, the epidemiology of infectious diseases might change as globalization and urbanization progress. Therefore, the epidemiology of certain infectious diseases might deviate from what we traditionally expect.

CONCLUSIONS

We presented a case of life-threatening hepatitis, acute kidney injury, and bone marrow suppression in a 55-year-old man. After other, more common reasons were ruled out, we found the culprit was leptospirosis, despite absence of any known risk factors. The patient was treated with intravenous doxycycline for 2 weeks and recovered. We still do not know how the patient contracted leptospirosis. Possible sources are water in his city, such as floods resulting from a leakage in the water supply of sewers. However, this is still unknown, and the absence of other cases in the city or region in the following weeks is a good argument against this theory. The case was reported to the ministry of health and is still being investigated.

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References

1. Dadon Y, Haas EJ, Kaliner E, et al. Outbreak of human leptospirosis linked to contaminated water bodies in Northern Israel, June to August 2018. *Eurosurveillance* 2018; 23 (38): 1-7.
2. Hookey JV. Leptospira and leptospirosis. *J Biol Educ* 1991; 25 (3): 169-72.
3. Ismail TF, Wasfy MO, Abdul-Rahman B, et al. Retrospective serosurvey of leptospirosis among patients with acute febrile illness and hepatitis in Egypt. *Am J Trop Med Hyg* 2006; 75 (6): 1085-9.
4. Sohail ML, Khan MS, Ijaz M, et al. Seroprevalence and risk factor analysis of human leptospirosis in distinct climatic regions of Pakistan. *Acta Trop* 2018; 181: 79-83.
5. Goarant C. Leptospirosis: risk factors and management challenges in developing countries. *Res Rep Trop Med* 2016; 7: 49-62.