Case report

Weil's disease in a young homeless man living in Lisbon

Torcato Moreira Marques ,[1] Paula Oliveira Nascimento,[1] André Almeida,[1,2] Valentina Tosatto[1]

[1]Internal Medicine Department, Hospital de Santa Marta, Centro Hospitalar Universitário de Lisboa Central, Lisboa, Portugal
[2]NOVA Medical School, Faculdade de Ciências Médicas da Universidade NOVA de Lisboa, Lisboa, Portugal

Correspondence to
Dr Torcato Moreira Marques; torcato.marques@chlc.min-saude.pt

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SUMMARY

Leptospirosis is a zoonotic disease of worldwide distribution caused by infection with *Leptospira* genus bacteria, a pathogenic spirochaete. We present the case of a 29-year-old man admitted to our hospital with fever and multiorgan failure. He provided poor information about his symptoms. No recent travel or occupational history was reported and his clinical presentation did not suggest any infectious foci. His relatives later disclosed that he had been homeless for 3 weeks in the context of behavioural changes, obtaining foodstuff from waste containers and water from rain puddles. In the setting of this epidemiology, his presentation of fever, jaundice, acute renal injury and thrombocytopaenia suggested leptospirosis. Prompt empirical antimicrobial coverage was started, alongside organ support therapy. The diagnosis was later confirmed through microscopical and molecular methods. The patient made a full recovery. Leptospirosis should be considered early in the diagnostic work-up of any patient with acute febrile illness with multiorgan system involvement, with the identification of risk factors being essential to treat early in development of the disease.

BACKGROUND

Leptospirosis is a widespread zoonosis caused by a gram negative flagellated and motile spirochaete. Water, soil, livestock, small mammals are the main reservoirs that can affect humans directly or indirectly through animal faeces and urine.[1] It infects humans through mucosal surfaces or through disrupted skin epithelia, escaping innate immune defences and proliferates in the bloodstream, disseminating to virtually all organs. It can be divided into two major phases: the first phase, designated as anicteric is usually mild, non-fatal, febrile and self limited (8–10 days), where leptospires can be found in the blood (lepstopiraemia). The second phase, the icteric phase, also known as Weil's disease, is usually more severe and potentially fatal if not treated. In this phase, leptospires can be isolated in the urine (leptospiuric phase), because of its special adherence to tubule epithelial cells. It may last several weeks if the patient survives.[2 3] Even though it is a life-threatening infection and recognised as an important cause of Weil's disease, which is characterised by multiorgan failure and carries a high mortality, most patients present only with a mild febrile illness.[4] Nevertheless, several presentations can be seen, some of which are rare,[5] challenging the prompt diagnosis needed for an early management which is crucial for a favourable outcome, particularly in patients presenting with multiorgan failure.

This zoonosis occurs in different epidemiological settings affecting populations such as rural farmers and pastoralists.[6] We herein present a severe case of leptospirosis (Weil's disease) in a homeless man with no classic risk factors.

CASE PRESENTATION

A 29-year-old man, born in West Africa, with no chronic medical conditions, presented in late August to our hospital with a history of fever (38°C), chills and myalgia that began 2 days prior. He had a history of chronic cigarette smoking, as well as occasional hashish and marijuana use. He reported having had malaria in his childhood, although he denied recent travelling, having been in his home country 10 years before this episode.

At the time, he was unemployed and homeless.

On observation, he was febrile (tympanic temperature 38.2°C), hypotensive (blood pressure 81/54 mm Hg), alert but with a poor and sometimes confused speech. Other findings on clinical examination were unremarkable.

Initial laboratory blood tests revealed normocytic anaemia (Haemoglobin 11.8 g/L, mean corpuscular volume 82 fL), neutrophilic leucocytosis (leucocytes 13, 56×10^9/L, neutrophils 11 940/μL), lymphopaenia (840/μL), thrombocytopaenia (platelets 88×10^9/L); acute renal injury with urea 62, creatinine 1.51 mg/dL, mild hyponatraemia (Na+ 133 mmol/L) and hypokalaemia (K+ 3.4 mmol/L); raised liver function tests (total bilirubin of 2.23 mg/dL, direct bilirubin of 1.48 mg/dL (aspartate transaminase 63 U/L), prothrombin time 12.5 s, elevated C-reactive protein (400.3 mg/L), creatine kinase 1241 U/L). Urinalysis revealed mildly elevated protein (50 mg/dL), a scarce number of leucocytes and red blood cells; positive cannabinoids, other drugs of abuse being negative. Blood and urine cultures were obtained. Chest X-ray, abdominal and renal ultrasound were all unremarkable. Cranioencephalic CT and lumbar puncture were not suggestive of either a central nervous system lesion or infection.

Despite substantial fluid therapy, he remained hypotensive and oliguric, as well as fever (38°C–39°C).

On the second day of admission, there was elevated erythrocyte sedimentation rate (72 mm/hour), worsening thrombocytopaenia (platelets 56 000/mm^3), renal function (urea 91, creatinine 3.66 mg/dL) and hyperbilirubinaemia, now with jaundice being clinically evident (total bilirubin 11.0 mg/dL, direct 7.93 mg/dL).

The serological study for HIV, hepatitis A, B and C was negative, as was the study of hepatic autoimmunity. Plasmodium was absent in his blood sample. The case was regarded as a fever of unknown origin, until we were able to ascertain the right epidemiological history with information provided by his mother on the third day of admission. She confirmed the situation of homelessness, detailing that this was related to behavioural changes and aggressiveness towards his relatives, which ultimately resulted in him leaving his family home. During his dwelling in city streets, he was reportedly drinking from water puddles and eating foodstuff from trash bins. Considering this information, suspicion was raised for leptospirosis and the patient immediately started on intravenous ceftriaxone (2 g per day), and urine samples sent to a reference laboratory for *Leptospira* testing.

Given his picture of sepsis complicated with multiorgan failure with haematological, hepatic and renal involvement, he was admitted to the intensive care unit (ICU).

Vasopressor support and correction of electrolyte disturbances were provided, without need of either ventilatory or haemodialysis. After 3 days of sustained clinical improvement the patient was transferred from the ICU to the ward. Direct examination of his urine sample under dark background microscopy revealed suspected active forms of *Leptospira* spp and DNA amplification (rt-PCR targeting LipL32) was positive for *Leptospira*. Serum antibody agglutination test (microscopic agglutination test) was also positive, with a titre of 800 to 3 of the 20 serovar tested: icterohaemorragiae, gryppotyphosa and pomona. Extensive molecular and serological work-up for other bacterial or viral causes was negative.

OUTCOME AND FOLLOW-UP

After completing 7 days of ceftriaxone, fever, chills and myalgias and renal dysfunction resolved, hyperbilirubinaemia persisting. Outpatient assessment at 2 weeks after discharge showed a complete recovery.

DISCUSSION

The clinical expression of leptospirosis which is related to diverse focal organ disfunction, includes subclinical infection, an undifferentiated febrile illness, and Weil's disease, which is compounded by jaundice, acute renal injury and haemorrhage.

The natural course of leptospirosis comprises two phases: septicemic and immune. The first stage, that lasts usually 3–10 days during which the organism may be isolated from blood culture, is characterised by a non-specific flu-like syndrome with sudden onset of high fever and conjunctival suffusion.[2 7] Humans typically became ill 7–12 days after exposure. After that, the so called immune phase (leptospiruric phase) is when the circulating antibodies can be detected and the bacteria can be isolated from the urine.[2] This stage represents the time when the circulating antibodies, or direct leptospiral invasion, affect several organs leading to a variety of symptoms which range from neurocognitive dysfunction (infectious or not), kidney injury (tubulointerstitial nephritis)[8] which varies in severity and can severely affect the haemodynamic status of the patient,[9] as well as respiratory abnormalities ranging from chest pain and dyspnoea to haemoptysis and acute respiratory distress syndrome. Liver abnormalities with disproportionately high total bilirubin are usual, resulting in jaundice that has been described as a prognostic indicator in the severity leptospirosis,[1] as well as low platelet count. Skin abnormalities include petechiae and ecchymosis as well as macular and maculopapular rash. Mild uncomplicated cases of leptospirosis usually end up with spontaneous resolution within 7–10 days without sequelae, but the difficulties of making a timely and accurate diagnosis may postpone the initiation of specific antimicrobial therapy. Weil's disease is the most severe form of leptospirosis, when high fever, significant jaundice, renal failure, hepatic necrosis, haemorrhagic diathesis and cardiorespiratory failure occur.[2] The treatment includes antimicrobial drugs as doxycycline and amoxicillin for mild disease for outpatients or, intravenous penicillin G or ceftriaxone in hospitalised patients with severe disease.[2] Its prompt initiation shortens the course of severe disease and prevents its progression, shortening the duration of illness and reducing the shedding of organisms in the urine.[2]

Homeless individuals, either living in urban or rural areas, represent a risk group that often live in inadequate conditions with limited access to sanitation and means to preserve proper bodily hygiene, as well as lack of medical aid. They face great exposure to natural elements, parasites and other vectors as well as rodents and other small mammals. Despite this, leptospirosis is an uncommon disease among homeless in developed countries,[10] even though it is one of the most widely spread zoonotic and vector-borne infections affecting homeless and marginalised people.[11] Rare cases of leptospirosis in homeless people in urban settings have been described, with one case in London and another in Tokyo, either from infected water supply used to personal hygiene[10] or contact with rodents and their faeces.[11] In the USA, a few cases of urban leptospirosis have been reported in homeless people in New York City presumably with contact with rats urine.[12] In Europe, according to European Centre for Disease Prevention and Control's 2016[13] annual epidemiological report on leptospirosis, after Croatia and Slovenia, Portugal is the European country with the third highest rate of leptospirosis per 100 000 population (0.6), mainly in rural areas. No documentation of an infection in a homeless person in an urban setting was published.

Learning points

- Leptospirosis is a worldwide prevalent zoonosis.
- High clinical suspicion is needed in order to achieve the diagnosis.
- Even in urban areas where it is uncommon, clinical presentation and epidemiology should raise the suspicion of a leptospirosis case.
- Homelessness and other high social risk situations are a risk factor for the infection in urban settings.
- Early treatment prevents disease development into advanced and life-threatening stages.

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ORCID iD
Torcato Moreira Marques http://orcid.org/0000-0003-2820-3259

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