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Weil's disease with Hepatitis B

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Abstract

Severe leptospirosis (Weil's disease) is often associated with hepato-renal syndrome. The kidneys are one of the organs most commonly affected by Leptospira infection. Detecting co-infection of hepatitis B in patients with leptospirosis poses a diagnostic challenge. Treatment generally involves supportive care and antibiotic administration. Early initiation of hemodialysis has been linked to better outcomes in leptospirosis-related acute kidney failure.[1]

We report a case of a 32-year-old man presenting with respiratory symptoms, renal dysfunction, and a pattern of cholestatic liver disturbance diagnosed with Weil's disease. The patient showed remarkable improvement after appropriate treatment within two weeks. This case highlights the importance of recognizing leptospirosis and its various symptoms.

Introduction

Severe leptospirosis, also known as Weil's disease, is a common zoonotic infection in tropical regions, particularly in Southeast Asia, Sub-Saharan Africa, the Caribbean, and Oceania. In 2021, there were 734 reported cases of leptospirosis in Indonesia across eight provinces, with 84 reported deaths and a Case Fatality Rate (CFR) of 11.4%.[2,3]

Leptospirosis is caused by the spirochete bacteria Leptospira and is most commonly spread through exposure to the urine of infected animals, either through direct contact or contact with soil or water contaminated with urine. This often affects farmers

and livestock workers who have close contact with animal vectors such as livestock and rodents in their workplaces. High-risk populations also include those living in poor sanitation conditions and individuals engaging in water sports.[2,4]

Leptospirosis has the potential to affect all organs in the body, especially the liver, kidneys, heart, and muscles. It can lead to vasculitis, where endothelial lesions and inflammatory infiltrates occur. In infected humans, symptoms typically resemble flu-like symptoms with fever and often resolve on their own. However, some cases can become severe with kidney, liver, and heart failure, which in some instances can lead to fatal pulmonary hemorrhage, known as Weil's disease. Kidney involvement can range from a subclinical course marked by mild proteinuria, microscopic hematuria, and fewer leukocytes with abnormal sediment in the urine, to acute kidney injury. Acute Kidney Injury (AKI) can occur in 20% to 85% of patients during the septicemic phase.[1]

Treatment generally involves supportive care and antibiotic administration, although there are still uncertainties regarding some aspects of therapy. Early initiation of hemodialysis has been associated with better outcomes in leptospirosis-related acute kidney failure.[1]

This case report will discuss Acute Kidney Injury in Severe Leptospirosis accompanied by co-infection with hepatitis B.

Case Report

A 32-year-old man, a resident of Central Kalimantan, from a rural area in Kapuas, Indonesia, experienced fever for 5 days before being admitted to the hospital. His fever worsened at night and subsided after taking medication. The patient also complained of pain in the gastrocnemius area. He was treated at a private hospital for 5 days before experiencing shortness of breath and productive cough during treatment. The deterioration of kidney function led to his transfer to a referral hospital for hemodialysis.

Upon examination, it was observed that the patient's skin was yellowish and he complained of pain in the upper right abdomen. Other complaints included nausea, vomiting, and decreased appetite. His urine was tea-colored, with a frequency of 5-6 times a day with a volume of ½ - 1 glass without pain. Bowel movements were within normal limits, 1-2 times a day with a soft consistency and a yellowish-brown color. The patient had no history of hypertension, diabetes, liver disease, or heart disease.

Physical examination revealed a blood pressure of 140/80 mmHg, pulse rate of 87 beats per minute, respiratory rate of 28 breaths per minute, temperature of 36.1 C, oxygen saturation of 93% in room air, NRS: 2 (legs). There were pale conjunctiva, icteric sclera, conjunctival suffusion, normal JVP, rales in both lung fields, tenderness on palpation in

the upper right abdomen and epigastrium, without pitting edema. Laboratory results showed hemoglobin 10.6 g/dL, leukocytes 20,100/µL, platelets 81,000/µL, AST 74 U/L, ALT 84 U/L, total bilirubin 24.31 mg/dL, direct bilirubin 14.66 mg/dL, urea 301 mg/dL, creatinine 6.73 mg/dL, albumin 2.7 g/dL, sodium 129 mmol/L, potassium 3.4 mmol/L, chloride 92 mmol/L, reactive HbsAg with increased HBV-DNA, and reactive IgM anti-Leptospira.

An EKG showed a sinus rhythm of 86 beats per minute and a chest X-ray showed pneumonia. Abdominal ultrasound revealed acute liver disease with acute cholecystitis and bilateral acute renal disease.

During treatment, the patient received antibiotics, correction of hyponatremia, and underwent one session of hemodialysis. His condition started to improve after 12 days of treatment and he was allowed to go home.

Discussion

Waterborne infections such as typhoid and leptospirosis are caused by poor sanitation with a high prevalence in tropical regions. Specific studies indicate a relationship between Hepatitis B and Weil's disease.[5,6] Research also reveals that leptospira may be an essential component in cases of dual infection or simultaneous infection with more than two pathogens. However, there is still a diagnostic dilemma on whether clinical manifestations are caused by hepatitis or symptoms of leptospirosis.[7]

Severe leptospirosis is characterized by dysfunction of several organs including the liver, kidneys, lungs, and brain. A patient was hospitalized for 5 days in a private hospital with fever, jaundice, and shortness of breath appearing during hospitalization, and then referred to a hospital with more comprehensive facilities for hemodialysis. The patient was diagnosed with leptospirosis and had experienced an increase in creatinine levels more than 3 times the reference value, indicating acute kidney injury. The combination of jaundice and kidney failure is known as Weil's disease. Due to liver and kidney dysfunction, the patient experienced hepatorenal syndrome due to Weil's disease (severe leptospirosis).

Our patient also had a Hepatitis B infection. It is unknown whether this is a reactivation of a previous condition or a newly acquired infection. The possibility of dual infection in our patient indicates the potential presence of two infectious agents, a rare infectious agent (Leptospira) and a common infectious agent (Hepatitis B), due to their different modes of transmission. From this case, it is important for doctors to be aware that in rare occurrences, jaundice can occur concurrently with more common causes.

Jaundice often occurs in almost all severe cases of leptospirosis, serving as a key indicator for estimating the diagnosis of the disease. Research shows that the concentrations of aspartate aminotransferase and alanine aminotransferase in serum moderately increase, which is associated with a slight increase in alkaline phosphatase levels in leptospirosis cases.[1] Jaundice is primarily caused by increased conjugated bilirubin and bile excretion disorder with intrahepatic cholestasis being the main cause. An ultrasound of the patient only revealed cholecystitis without evidence of cholestasis.[8]

Two main mechanisms associated with kidney injury triggered by Leptospira are: (1) direct nephrotoxic action of the bacteria and toxin-induced immune response, and (2) indirect effects of infection, such as dehydration, rhabdomyolysis, and hypoxia due to hemodynamic changes. The typical lesion is tubulointerstitial nephritis, characterized by interstitial edema and dense local infiltration dominated by mononuclear cells. Interstitial nephritis is a common kidney change in leptospirosis, as even in patients without acute kidney injury or tubular necrosis, this pathological picture is observed. Therefore, interstitial nephritis is more common than acute tubular necrosis.[1]

The tubular characteristics are degenerative and mainly affect the proximal convoluted tubules. Intravascular volume depletion can lead to vasomotor nephropathy due to capillary lesions and subsequent fluid and protein loss. The result of these changes is a rapid increase in blood urea and creatinine levels, which are typical in acute kidney injury. Additionally, jaundice and rhabdomyolysis are also associated with the development of acute kidney injury in leptospirosis.[1]

Weil's disease requires intensive treatment, especially regarding kidney function, including the possibility of dialysis. Early initiation of peritoneal or hemodialysis can save lives and is usually only needed in the short term. In a comparative study, rapid initiation of daily dialysis in critically ill leptospirosis patients reduced the death rate from 67 to 17%. The patient underwent hemodialysis once, followed by an improvement in urea and creatinine levels.[9]

There is no consensus on the best dialysis modality for leptospirosis, and all modalities have been used, including hemodialysis, peritoneal dialysis, and hemoperfusion. A recent review of leptospirosis cases associated with acute kidney injury in Thailand has shown that therapies such as hemodialysis and hemofiltration, compared to standard peritoneal dialysis, are associated with lower mortality rates, shorter recovery times, and faster decreases in serum bilirubin, urea, and creatinine levels.[10]

A prospective study evaluating long-term kidney function in 35 patients with acute kidney injury and leptospirosis has shown that creatinine clearance, proximal sodium reabsorption, urine acidification, and proteinuria return to normal levels by the

third month after the disease, but urine concentration remains decreased at the end of the evaluation in the sixth month. The prognosis of acute kidney injury in leptospirosis is generally favorable unless complicated by multi-organ involvement. Underlying disease complications worsen the prognosis, with mortality rates ranging from 12% to 36%.[10]

Conclusion

Cases of concurrent Hepatitis B and leptospirosis infections are rarely reported. Further research is needed to determine if this seemingly rare co-infection is actually more common but underdiagnosed due to a lack of clinical suspicion. This study highlights the importance of recognizing the symptoms of leptospirosis and managing acute kidney and liver disorders in cases of acute fever involving multiple causative pathogens, with the goal of reducing mortality rates from the same disease.

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