Serum Procalcitonin and Proinflammatory Cytokines in a Patient with Acute Severe Leptospirosis

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Leptospirosis is a zoonosis, with clinical manifestations ranging from the imperceptible to severe, potentially fatal renal and liver failure accompanied by haemorrhage and jaundice. In this case report of a patient with severe leptospirosis, serum levels of procalcitonin decreased ahead of any obvious clinical improvement, and thus may be useful as a prognostic marker. Levels of soluble IL-2 receptor were very high and correlated well with the clinical course.

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INTRODUCTION

Cytokines play an important role in the inflammatory response of the host to a generalized infection. Circulating levels of tumor necrosis factor α (TNF-α) have been detected in leptospirosis (1, 2). However, there are no reported data on other mediators of inflammation. In this case report, we present data on the course of serum IL-6, soluble IL-2 receptor (sIL-2R), TNF-α and procalcitonin (PCT) in a patient with an acute severe leptospirosis.

CASE REPORT

A 50-y-old patient was admitted to a primary care hospital with a high fever, severe headache and muscle pains starting 5 d earlier. These symptoms were followed by oliguria and jaundice. The patient, a municipal worker involved in installation of street signs, had been otherwise in good health except for a mild arterial hypertension and hyperlipidaemia. He had never been in the tropics, and denied having had contact with a jaundiced patient. On admission, the patient was deeply jaundiced and anuric, so was immediately transferred to our intensive care unit for further management. Malaria and viral hepatitis were ruled out. He was subfebrile, with a core temperature ranging between 37.8°C and 38.5°C during the treatment period with no correlation with the course of the illness. Antibiotic therapy was started on the day of admission with the working diagnosis of leptospirosis. However, serologic data were initially negative. On day 7, an agglutination lysis test was positive for Leptospira bratislava (titer 1 : 100). A second test on day 14 revealed positive titers for the serovars L. icterohemorrhagiae (1 : 400), L. copenhageni (1 : 400) and L. bratislava (1 : 100).

For characterization of the inflammatory host response, serum levels of PCT (Immunoluminometric Assay, BRAHMS Diagnostica, Berlin, Germany), TNF-α, IL-6 and sIL-2R (chemiluminescent enzyme immunoassay, Immulite, EURO/DPC Ltd., Gwynedd, UK; normal values are < 8.1 pg/ml, 0–21 pg/ml and < 1000 U/ml, respectively) were measured. Serum levels of sIL-2R were very high and correlated better with the course of the disease than was the case with IL-6. Levels of TNF-α were only slightly elevated. Values for serum PCT showed a marked decline ahead of those for the cytokines and before any obvious clinical improvement (Fig. 1).

The condition of the patient initially deteriorated, with a further rise in serum bilirubin (up to 743 μmol/l), haemorrhagic diathesis (reduction of platelet count to 29,000/mm^3) and cardiopulmonary dysfunction. However, after a short period of mechanical ventilation, inotropic support and haemofiltration, his condition improved and he was discharged home on day 26. On further questioning, the patient admitted that a few weeks before the acute illness he had been cleaning carrots in his cellar, which he knew had been infested by rats. This is considered the possible route of infection.

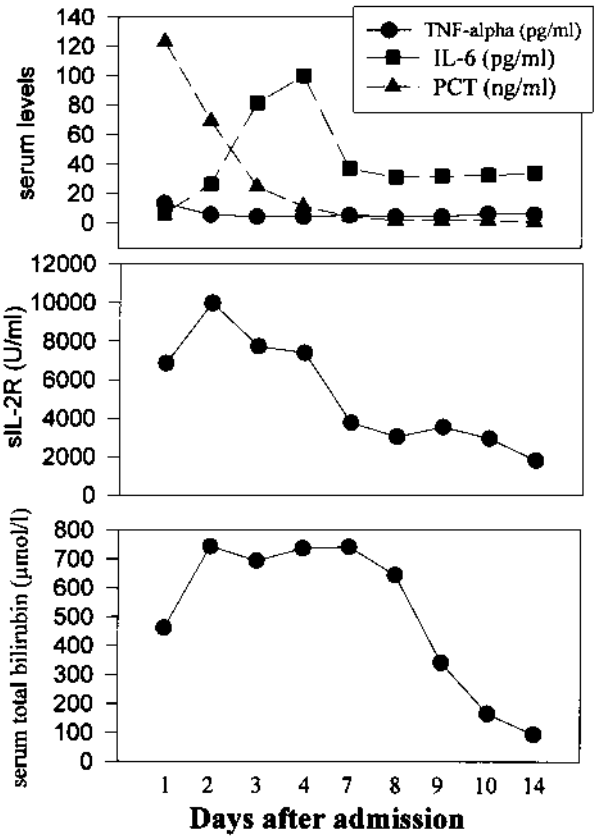

Fig. 1. Serum levels of TNF-α, IL-6, PCT, sIL-2R and total bilirubin during the patient's ICU stay.

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DISCUSSION

PCT is a polypeptide precursor of calcitonin found to be elevated in generalized, particularly bacterial, infections (3, 4). In our patient, there was a marked decline of serum PCT prior to obvious clinical improvement, leading us to suggest that this parameter may be a useful prognostic marker.

Circulating levels of TNF-α have been detected in patients with leptospirosis (1) and an association between its presence and the severity of disease has also been reported (2). However, this was not the case in our patient. Serum IL-6 was only moderately elevated and showed a delayed rise.

The serum level of sIL-2R is elevated in various disease states and is considered a marker of T-cell activation (5–8). Our finding may indicate the involvement of activated T cells in the host response to the acute leptospiral infection.

In conclusion, changing serum levels of PCT may be of prognostic value in severe leptospirosis. sIL-2R correlated very well with the clinical course. The rise in IL-6 was relatively slow, and TNF-α was not reliable in defining severity of the disease and the extent of host response. However, no generalization can be made from a single case.

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