Legionellosis Followed by Acute Respiratory Distress Syndrome Successfully Treated with Antibiotics and Polymyxin B Hemoperfusion Therapy

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Background: *Legionella pneumophila* causes pneumonia, in most cases with extrapulmonary manifestations due to blood dissemination from the lung, and is associated with increased mortality (1). This report describes the case of a patient with septic shock caused by *Legionella pneumophila* successfully treated with Polymyxin B hemoperfusion, followed by hemodiafiltration for 72 hours.

Case report: A 34-year-old woman suffering from systemic lupus erythematosus (SLE) with previous renal involvement was admitted to the hospital for hyperpyrexia, productive cough and chest pain for about 1 week. At admission she showed hyperpyrexia (39.5°C), tachycardia, leukocytosis, increased inflammation indices and stability of hemodynamic parameters. Arterial blood gas analysis showed severe hypoxemia with respiratory alkalosis. Chest X-ray taken upon hospital admission showed extensive parenchymal consolidation that almost completely affected the left thorax.
The patient was admitted to the ICU for respiratory failure, persistent hyperpyrexia with good hemodynamic parameters and GCS 15; considering the EGA parameters, sessions of NIV and antibiotic therapy (Piperacillin-Tazobaxtam, Azithromycin and Linezolid) were started. Radiographic findings showed worsening of the pulmonary disease with complete opacification and densification of the left lung. Subsequent blood tests showed an increase in bilirubin 3.78 mg/dL, PCT 25.57 ng/mL, CRP 50.10 mg/dL, CPK 28 U/L, endotoxin activity (EA) 0.97. A reduction in MAP to 60 mmHg and an increase in serum lactate levels to 2.7 mmol/L were found.
After 24 hours from ICU admission, laboratory testing detected *Legionella* urinary antigen. Antibiotic therapy with Levofloxacin combined with Piperacillin-Tazobactam was started. Following diagnosis of refractory septic shock, unresponsive to conventional therapy, Polymyxin B hemoperfusion (PMX-HP) treatment was performed with a blood flow of 100 mL/min for 2 hours. Treatment was followed by hemodiafiltration for 72 hours due to oliguria. After 48 hours, the patient was awake and conscious with good hemodynamic parameters and improved respiratory exchange. On the tenth day the patient was transferred to the ward to continue treatment of SLE. Upon discharge, she appeared alert and cooperative, hemodynamically stable, with spontaneous diuresis. Arterial blood gas analysis showed good respiratory exchanges in spontaneous breathing with nasal cannula (O_2 5l/min): pH 7.44, pO_2 216 mmHg, pCO_2 41 mmHg. Laboratory findings showed mild leukocytosis, bilirubin 0.28 mg/dL, PCT 0.64 ng/ml, CRP 3.10 mg/dL, EA 0.53. A further decrease in serum lactate levels up to 1.3 mmol/L was found. Chest radiographic showed a reduction of the pulmonary parenchymal opacification and densification.

Conclusion: The patient with septic shock caused by *Legionella pneumophila* was successfully treated with PMX-HP, followed by hemodiafiltration for 72 hours. A significant reduction in sepsis biomarker values was detected 24 and 48 hours after treatment with PMX-HP. Consequently, there was an improvement in respiratory exchanges, hemodynamic parameters and radiographic findings. Although Toraymyxin® was designed to adsorb endotoxin, PMX-HP also acts by other mechanisms of immunomodulation. Some of these are caused by the direct elimination of endotoxin, while others derive from the direct adsorption of activated monocytes and neutrophils (2, 3, 4), contributing to the reduction of endothelial damage (5). Based on our experience, PMX-HP can be an effective therapeutic strategy in the treatment of patients with septic shock and organ dysfunction due to *Legionella*, reducing plasma levels of endotoxin, improving hemodynamics and organ function.

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