

Successful treatment of theophylline toxicity with continuous venovenous haemofiltration

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Abstract

Charcoal haemoperfusion remains the treatment of choice for severe theophylline toxicity. However, this technique may not be available in most hospitals. We described a case of 62-year-old man, who presented with severe theophylline toxicity

(peak level 85 mg/L), which was treated successfully with high volume continuous venovenous haemofiltration (CVVH). We also review the literature concerning treatment of theophylline toxicity with haemofiltration.

Keywords: Theophylline toxicity, continuous venovenous haemofiltration, charcoal haemoperfusion

Introduction

Theophylline has been widely prescribed for the management of patients with chronic obstructive lung disease and asthma. Despite declining use over recent years, the occurrence of theophylline toxicity is still quite common with significant morbidity and mortality [1]. In case of life-threatening theophylline toxicity, extracorporeal elimination is recommended. Charcoal haemoperfusion is claimed to be the treatment of choice for severe theophylline toxicity [2]. Unfortunately, it is associated with increased risk of hypocalcemia and thrombocytopenia. Continuous haemofiltration or haemodialysis is an acceptable alternative for the treatment of life-threatening theophylline toxicity [3-6]. We described a case of severe theophylline toxicity, which was treated successfully with CVVH.

Case Report

A 62-year-old Chinese man, with a history of chronic obstructive pulmonary disease, was admitted with severe theophylline toxicity (peak level 85 mg/L) after consuming at least 20 tablets of 250 mg of sustained release preparation of theophylline. On admission, he complained of

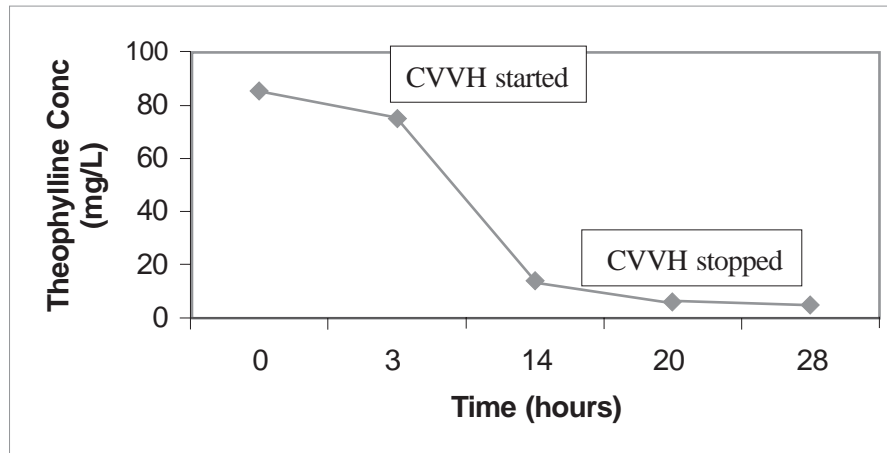
chest pain, vomiting and tremors. He was restless, agitated and tachycardic on presentation with multiple atrial and ventricular ectopics on the electrocardiogram. His blood pressure was 125/75 mmHg. The serum creatinine level was 114 mmol/L (normal 55-100 mmol/L). He was subsequently admitted to the Intensive Care Unit where he was started on high volume continuous venovenous haemofiltration using a Prisma machine and Haemosol (Hospalâ) at 2 L/hr as a replacement fluid. The patient was subsequently intubated for worsening respiratory distress. Activated charcoal was also administered via the nasogastric tube. The patient tolerated CVVH very well. There was no complication associated with CVVH. CVVH was terminated after 15 hours of treatment, when his serum theophylline level decreased to 6 mg/L. Serum theophylline levels were repeated over the next 24 hours, which did not reveal any rebound (See **Figure 1**). He was successfully extubated and was discharged with no sequelae.

Discussion

Theophylline has been used for several decades in the treatment of reversible airway obstruction. Due to its narrow therapeutic window, theophylline still remains an important cause of intoxication [1]. Intoxication may result from either acute ingestion or chronic use. The spectrum of clinical toxicity after theophylline poisoning var-

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ies widely [7]. Significant toxicity generally occurs with plasma levels > 25 mg/L. Nausea, vomiting and tachycardia are common signs of mild theophylline toxicity; seizures, ventricular arrhythmias and hypotension are life-threatening manifestations of severe toxicity [8].

Treatment of theophylline toxicity involves cardio-respiratory support, correction of electrolyte disturbances along with gastric lavage and administration of activated charcoal to facilitate drug removal. Because of high risk of seizure, emesis is contraindicated. Multiple doses of activated charcoal can be given to enhance elimination since theophylline undergoes significant enterohepatic circulation.

Patients presenting with life-threatening intoxication such as seizure, hypotension or cardiac arrhythmias are candidates for extracorporeal drug elimination. Other indications for extracorporeal drug removal are the following: a plasma level > 100 mg/L 2 h after an acute ingestion (after

initial charcoal therapy), a plasma level > 50 mg/L in chronic ingestion, and a 2-h level > 35 mg/L associated with clinical instability or high risk of adverse outcome and/or prolonged intoxication [2]. Charcoal haemoperfusion appears to be the most effective extracorporeal therapy for severe theophylline toxicity. Charcoal haemoperfusion should be considered if plasma theophylline concentrations are greater than 100 mg/L in an acute intoxication or greater than 60 mg/L in a chronic intoxication. [9]. However, access to this technique may not be available in most hospitals. In addition, charcoal haemoperfusion is associated with increased risk of bleeding and hypocalcaemia. Recent data suggest that continuous haemofiltration or haemodialysis is an acceptable alternative [3-6]. Our case report confirms that continuous venovenous haemofiltration is an effective alternative therapy to charcoal haemoperfusion in severe theophylline toxicity. This technique is usually available in most hospitals.

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