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CASE REPORT

Epidural Hematoma Following Hemodialysis in a Methanol Poisoned Patient; a Case Report

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Abstract

Brain injury associated with methanol toxicity can be ischemic, necrotic or hemorrhagic in nature. It most commonly affects the putamen area bilaterally; however, it can be seen in other locations. This report describes a 22-year-old intoxicated patient who developed an epidural hematoma following hemodialysis. Heparinization during hemodialysis may contribute to cerebral hemorrhagic complications in methanol poisoning. In addition, a history of head trauma may raise the incidence of post-hemodialysis hemorrhagic brain insults. Heparin-free dialysis or peritoneal dialysis can be a good option in these cases.

Key words: Hemodialysis; epidural hematoma; methanol; alcoholic intoxication

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Introduction:

Brain injury associated with methanol toxicity can be ischemic, necrotic or hemorrhagic in nature. It most commonly affects the putamen area bilaterally; however, it can be seen in other locations. The exact mechanism of these pathologies remains unknown. Possible hypotheses include a direct toxic effect of methanol or its metabolites, injury secondary to anoxia and acidosis and, more recently proposed, cerebral vasospasm induced by a large rise in intracellular calcium (1, 2). This report describes an intoxicated patient who developed an epidural hematoma and loss of consciousness following hemodialysis.

Case report:

A 22-year-old man presented to the emergency department (ED) with a history of tonic-clonic generalized seizures, loss of consciousness, and head trauma following consumption of 800 mg Tramadol. On admission the patient's vital signs were as follows: systolic blood pressure = 160 mm Hg, diastolic blood pressure = 80 mm Hg, O2 saturation = 85%, pulse rate = 106/min, respiratory rate = 24/min and axillary temperature = 37.4°C. Initial examination revealed agitation and bilateral pupil mydriasis with positive pupillary response to light. Arterial blood gas (ABG) analysis showed a high anion gap metabolic acidosis: pH = 6.80, PaCO2 = 30.4 mm Hg, HCO3 = 4.6 mEq/L, Na = 139 mEq/L, Cl = 108 mEq/L. The metabolic acidosis in this patient could not be explained solely by lactic acidosis following seizure activity so other potential causes were explored. A thorough history of the patient's family revealed that the patient drank homemade alcohol three days prior to presentation. Methanol poisoning was diagnosed on the basis of the previously mentioned history and initial evaluation and the decision was made to begin hemodialysis. Due to the history of head trauma, a computed tomography scan (CT scan) of the brain was performed prior to sending the patient to the dialysis unit (Figure 1). Protective measures including ethanol gavage, folic acid, and sodium bicarbonate were administered to the patient while waiting to begin hemodialysis. Hemodialysis was then performed for four hours. Following hemodialysis, the patient's acidosis was reduced, and the clinical features were improved. Approximately one hour later, the patient's level of consciousness decreased and unilateral mydriasis with negative pupillary light response (anisocoria) developed in the right eye. The patient was immediately intubated and brain CT scan was repeated (Figure 2). A large epidural hematoma was seen in the right fronto-parietal lobe with evidence of mass effect. The patient was taken to the operating room for hematoma evacuation.

Discussion:

Substance abuse is currently a worldwide problem. Tramadol and homemade alcohols are among the most commonly abused substances and each can result in several harmful consequences. Brain injury in methanol toxicity can be ischemic, necrotic or hemorrhagic in nature. The exact mechanism of these pathologies remains unknown. Extracorporeal removal plays a fundamental role in the management of methanol poisoning, though specific techniques and indications are not

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yet determined. Conventional hemodialysis is typically the best method to rapidly remove both alcohol and its toxic metabolites because of its widespread availability and known efficacy (3, 4). Peritoneal dialysis and other forms of continuous renal replacement therapy are inefficient and are not recommended except in specific rare situations such as cerebral hemorrhagic complications following regular hemodialysis (3, 5). Systemic heparinization during hemodialysis may contribute to the hemorrhage observed in the necrotic areas of the brain in these poisoned patients. Awareness of the potential complications of hemodialysis may assist in their prevention (6). There are numerous reports about both the different types of cerebral hemorrhagic insults in methanol poisoning and following hemodialysis, but reports of epidural hematoma (EDH) are rare (7). Most EDHs are caused by direct impact injuries to the skull (8). While it is unlikely that a false negative primary interpretation of a brain CT scan in a crowded emergency department may contribute to the occurrence of EDH secondary to hemodialysis, it is possible (9). A review of the published literature reveals that heparinization during hemodialysis may contribute to cerebral hemorrhagic complications in methanol poisoning (10, 11). Considering a positive history of head trauma even with a normal brain CT scan may also raise the incidence of this complication, though further research is needed. Heparin-free dialysis or peritoneal dialysis may be a good option in these cases.

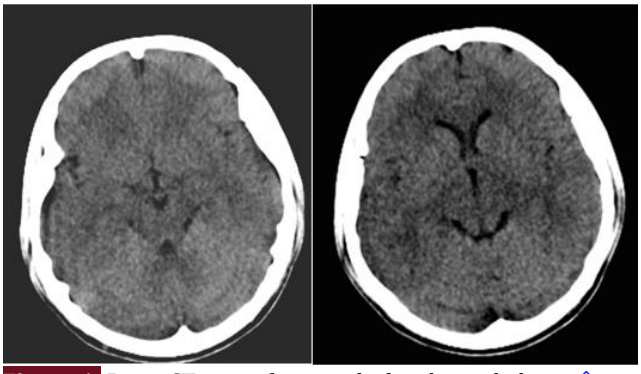

Figure 1: Brain CT scan of patient before hemodialysis. ⇧

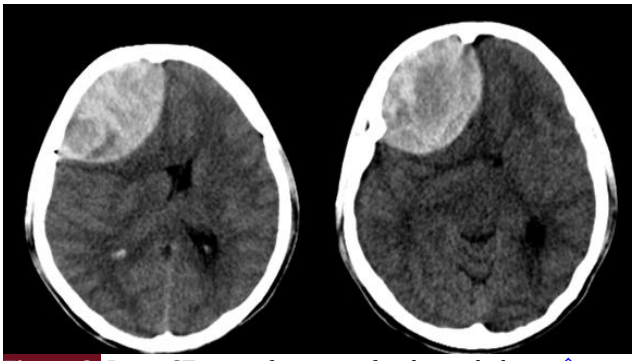

Figure 2: Brain CT scan of patient after hemodialysis. ⇧

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