

Multi Organ Failure Following Intravenous Gasoline for Suicide: A Case Report

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Abstract- Hydrocarbons are ubiquitous in daily life and include plant and animal fats, alcohols, solvents, natural gas, petroleum derivatives. Majority of intoxication reports of hydrocarbons are due to inhalation or ingestion, but there is few reports about intravenous injection of gasoline. We report a 58 year-old man who injected gasoline intravenously for suicide. He developed soft tissue necrosis of forearm and bilateral pulmonary infiltration. He underwent fasciotomy and extensive debridement of necrotic tissues, at the operation room. He was intubated and mechanically ventilated because of acute lung injury. He developed acute kidney injury after 2 days. These symptoms seem to be due to extravasation of gasoline from vessels which lead to inflammation, cell damage and organ failure. The patient developed multi organ failure which unfortunately did not respond to our treatment and he died at day 21. Management of gasoline intoxication depends on the route of exposure. Like other types of toxications, intravenous toxication has pulmonary involvement, however in this case we had multiple organ involvement. It seems that in such cases we should consider early end organ targeted therapy to stop the future organ failure.

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Introduction

Hydrocarbons are available diverse array of chemicals composed exclusively of hydrogen and carbon atoms. Gasoline is a mixture of different hydrocarbons which is primarily composed of aliphatics. There are many reports of gasoline intoxication that usually are due to inhalation or ingestion. Pulmonary involvement is the most common presentation of gasoline intoxication (1,2). Intravenous self-injection of gasoline is rare and in this case we report a man who injected gasoline to his right antecubital vein for suicide.

Case Report

The patient was a 58 year-old man who was admitted to hospital because of an attempt to suicide with gasoline. He injected almost 10 ml of gasoline to his right antecubital vein and some amount was indeliberately injected subcutaneously. He was admitted to hospital almost 4 hours after intoxication. He had a previous

history of suicide 1 year ago. At the emergency department, patient had agitation and sinus tachycardia with the blood pressure of 90/50. Heart sounds were normal but there was some hoarseness and crackle on both lungs, with the O₂ saturation of almost 85%. ABG values were as followings: pH: 7.21, HCO₃: 16, PO₂: 51, PCO₂: 27 and lactate: 3.9. He had symptoms of acute lung injury. In laboratory examination there was not any clue about the other drugs or toxins in patients' blood. Patient's forearm was edematous and had a painful swelling for almost 20 cm around the injection area and had mottling. Patient was urgently admitted to operating room after ventilatory support, initial resuscitation and methyl prednisolone injection. At operative room, an extensive debridement was done to remove superficial necrotic tissues (Figure 1) and then he was admitted to intensive care unit. At the 2nd day, he was intubated because of acute respiratory distress syndrome and underwent mechanical ventilation. At the 4th day, he developed acute kidney injury and finally he developed multi organ failure.

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Figure 1. Skin involvement (After debridement in operating room).

During treatment, he received different medication for his organ failure but he unfortunately died at the 21st day with multi organ failure.

Discussion

Management of gasoline toxicity depends on the way of exposure. Fever and leukocytosis are common after intoxication. Pulmonary involvement is the most common organ damage. Intravenous injection of hydrocarbons can result in lipid pneumonia or vascular hydrocarbon emboli. The risk of pulmonary toxicity is determined by volatility, viscosity and surface tension. Capillary distension, alveolar hemorrhage, vascular thrombosis and bronchial necrosis lead to pulmonary injury (3). In this case gasoline, because of the mentioned characteristics, made the patients to develop ARDS (Acute Respiratory Distress Syndrome). Diagnosis is based on history and lab findings. Our patient showed bilateral opacities on arrival and bronchoalveolar lavage showed polymorphonuclear exudate. We treated the respiratory failure with lung protective strategies (mechanical ventilation), beta adrenergic agonist, corticosteroid and antibiotic (due to leukocytosis, WBC: 23000). Although Rahman *et al.* reported pancytopenia following gasoline injection, but our patient had leukocytosis as an acute phase reactant following activation of inflammatory cascade due gasoline injection (4).

The neurophysiologic effects of hydrocarbons are not completely understood but are correlated with the development of hypoxemia, fever and pneumonitis.

Symptoms include hallucinations, delirium, nystagmus and mydriasis. Our patient also showed hyperactive delirium which underwent haloperidol therapy (1,2).

Acute Kidney Injury is almost reported with hydrocarbon intoxication which usually is acute tubular necrosis and sometimes is interstitial nephritis (5). The outcome is good and requires adequate hydration, electrolyte repletion and sometimes renal replacement therapy. This patient developed acute tubular necrosis which required renal replacement therapy.

Dermatologic effects of gasoline intoxication ranges from mild skin irritation to chemical burns complicated by blistering and partial or full thickness skin necrosis (6). Hydrocarbon injection especially to the hand can result in severe disability and immediate surgical intervention will be needed. Our patient had extensive skin involvement which underwent surgical debridement of necrotic tissues at operating room. He had intact limb pulse, sensorium and movement after debridement.

Some physicians report good outcome following suicide with gasoline injection and others report fatal outcome. Although there is little documentation of non-pulmonary toxic effects of gasoline, our patient showed severe multi organ dysfunction syndrome (7,8).

In summary, gasoline injection can involve many organs in the body; especially, it can cause major lung injury since it rapidly reaches to the lungs. Skin involvement due to extravasation is also common and problematic. As there is not any specific treatment for gasoline intoxication, the management involves early resuscitation, vigorous anti-inflammatory treatment and

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end organ support until the symptoms improve. So, all physicians should be aware of serious systemic toxicity with these agents.

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