



CASE REPORT

Major chemical burn injury combined with a penetrating injury of the abdomen leading to hypovolemic shock



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Summary A chemical burn is a specific type of lesion and represents a small proportion of all cutaneous burns. The incidence of such burns can be as high as 10.7%, and they account for up to 30% of all burn deaths. They require individualized treatment and management depending on the causative agent. Sometimes, a chemical burn might be complicated with other major forms of trauma, making it more difficult to manage. This report details the successful treatment of a major sulfuric acid burn complicated with an abdominal penetrating injury leading to hypovolemic shock. A 38-year-old woman presented with major second- and third-degree chemical burn injuries over her chin, anterior chest, and both upper limbs. The burns covered approximately 15% of her total body surface area and were combined with an abdominal penetrating injury and hypovolemic shock. Emergency damage control surgery was performed to stabilize the patient's vital signs. Second-stage reconstruction and debridement with skin grafting was performed when the patient had reached a relatively stable condition. At a 1-year follow-up, the patient had recovered well, capable of full-range motion over her neck and in both upper limbs and exhibiting no scar contracture. The combination of a chemical burn and trauma has a high potential morbidity and mortality rate. The initial management of this condition involves stabilization and resuscitation, as in the management of traumas without burn injuries. Damage control surgery with intensive care is the most urgent, followed by management of the burn wounds. After

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immediate treatment, management strategies are considerably similar for chemical and thermal burns.

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1. Introduction

Chemical burns are uncommon and can vary from minor to life-threatening injuries. The type of injury depends on the chemicals involved and the level of exposure. Therefore, chemical burns are more difficult to manage than thermal burns. Sometimes, they might be complicated with other traumas such as fractures, complex soft-tissue injuries, and traumatic brain injuries, increasing the morbidity and mortality rate. The key to the initial management of a burn complicated with another trauma is that the burn wounds do not interfere with the basic resuscitation and stabilization procedures, and management of the burn wound is initiated.

2. Case report

A 38-year-old woman was injured in a domestic dispute with her ex-husband. She was stabbed in her belly and splashed with sulfuric acid. Upon presentation to our emergency department, a physical examination showed one 5-cm-long, longitudinal, penetrating wound in the upper midline abdominal region, with a sharp demarcation and exposure of abdominal viscera. In addition, she exhibited second- to third-degree chemical burn injuries over her chin, anterior chest, and both upper limbs covering 15% of the total body surface area (Fig. 1). The injury severity score exceeded 16. While in the emergency department, the patient went into hypovolemic shock. Fluid resuscitation and blood transfusion were performed

after a quick initial survey. Substantial saline irrigation over the burn lesions was performed. Emergency damage control surgery was commenced, under general anesthesia and using exploratory laparoscopy, to determine the extent of bleeding. Repair of the severed inferior vena cava (IVC) and a partial gastrectomy were performed. Near-total transection of the first portion of the duodenum, and a perforation of the IVC (Fig. 2) of approximately 2.5 cm were noted during the operation. After the surgery, the patient was admitted to our intensive care unit for further treatment. Coagulopathy occurred after substantial blood transfusions because of the activation and depletion of coagulation factors secondary to tissue trauma. Empiric antibiotics with ampicillin and sulbactam were administered upon admission. In addition, we consulted a nutritional support team doctor in evaluating and managing her nutritional condition. Because of the relatively stable condition of this patient, exploratory laparoscopy with a Roux-en-Y gastrojejunostomy and primary suture of the duodenum was performed as a second-stage operation (Fig. 3). In addition, we performed early debridement of the chemical burn wound on the 3rd day postinjury. Fluid resuscitation was performed according to the Parkland formula and adjusted according to the urine output. Several skin grafting procedures were performed to cover the wound. A consultation with a psychiatrist was arranged to establish and evaluate the patient's rehabilitation program.

After 1 year of follow-up, the patient had fully recovered. She had a full range of motion in her neck and both upper limbs and exhibited no scar contracture (Fig. 4).



Figure 1 A penetrating wound in the abdominal region combined with a second- to third-degree chemical burn is shown.

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