Special Problems in Burns

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KEYWORDS

• Burns • Trauma • Blast injury • Toxic epidermal necrolysis
• High voltage electrical injury • Combined burns and trauma • Crush injury

KEY POINTS

- Combined burns and trauma present with a wide variety of severity and pattern, depending on the mechanism of the individual's injury. A common occurrence when caring for patients with combined burns and trauma involves adjudicating conflicting management priorities.
- Toxic epidermal necrolysis and other medical conditions associated with extensive skin slough are ideally managed in burn units.
- Blast injuries are graded complex injuries with 4 characteristics: primary injury to air-filled structures and the central nervous system; secondary injury from flying debris; tertiary injury from personnel impacting stationary objects; and quaternary injury from associated crush, burn, or blunt trauma.
- In fragmentation injury, after initial hemodynamic and airway control, practical decisions must be made about which wounds to explore and debride and which to dress and observe.
- Crush injuries are graded soft tissue injuries that are associated both with immediate trauma and secondary ischemia from compartment syndrome and ischemia-reperfusion in the hours following injury.
- Although most common chemical injuries are local only, hydrofluoric acid can cause both local tissue injury and systemic effects.
- A variety of skin-sloughing medical conditions are best managed in burn units.

INTRODUCTION

Burn units have a unique resource set, including surgical and nursing wound care expertise, critical care, and high-level trauma rehabilitation capabilities. Although this resource set evolved for the care of patients with burns, it meets the needs of a large number of nonburn medical and surgical conditions. A brief description of such medical, surgical, and traumatic conditions follows.

Disclosures: None.
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TRAUMATIC CONDITIONS

Burns are severe soft tissue trauma frequently complicated by secondary inflammation, infection, and organ failures. Associated nonburn trauma is frequently seen, depending on injury mechanism. Several nonburn traumatic conditions also fit this description and require the same resource set for successful management.

Blast Injury

Blast injuries are graded complex injuries with 4 characteristics: primary injury to air-filled structures and the central nervous system; secondary injury from flying debris; tertiary injury from personnel impacting stationary objects; and quaternary injury from associated crush, burn, or blunt trauma.[1] Blast injuries of all types can be subtle or delayed in presentation, and missed visceral injuries are especially common. Blast injury is common in war, terrorist attack, and in some high-energy industrial accidents. An understanding of the subtlety of blast injury and the frequency of missed injury is essential in successful management. Blast injury typically presents with a graded soft tissue injury and associated visceral injury from overpressure. The pulmonary and gastrointestinal injuries are particularly lethal.

Management all major soft tissue injuries includes initial hemodynamic stabilization and airway control. This topic is not discussed here. The wounds are managed with initial decompression of any tight compartments to ensure adequate perfusion. Staged debridement of devitalized soft tissue follows, which is complicated by the frequent early difficulty in discerning viable from nonviable tissues. Depending on patient stability, safety and resources of the locale, and particular characteristics of the wounds, definitive closure of wounds and rehabilitation follows. In combat or mass casualty situations, definitive care may have to wait for patient transport or distribution. During these delays, wounds can be managed with a variety of dressings or negative pressure devices. Outcomes from blast injury vary widely depending on the severity of the overall injury and the presence of associated injuries. Amputation and closed head injury are common with high-energy blast injury, but favorable outcomes can be had nonetheless.

Fragmentation Injury

Fragmentation injuries (**Fig. 1**) are a form of penetrating injury characterized by multiple foreign bodies with variable size, energy, and trajectory. They are commonly seen

Fig. 1. Fragmentation injury is frequently accompanied by occult injury to viscera and soft tissues. Missed injuries are common. Serial reexploration and debridement are important.