



## REVIEW

# Initial evaluation and management of the critical burn patient



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**Abstract** The major improvement in burn therapy is likely to focus on the early management of hemodynamic and respiratory failures in combination with an aggressive and early surgical excision and skin grafting for full-thickness burns.

Immediate burn care by first care providers is important and can vastly alter outcomes, and it can significantly limit burn progression and depth. The goal of prehospital care should be to cease the burning process as well as prevent future complications and secondary injuries for burn shock. Identifying burn patients appropriate for immediate or subacute transfer is an important step in reducing morbidity and mortality. Delays in transport to Burn Unit should be minimized.

The emergency management follows the principles of the Advanced Trauma Life Support Guidelines for assessment and stabilization of airway, breathing, circulation, disability, exposure and environment control.

All patients with suspected inhalation injury must be removed from the enclosure as soon as possible, and immediately administer high-flow oxygen. Any patient with stridor, shortness of breath, facial burns, singed nasal hairs, cough, soot in the oral cavity, and history of being in a fire in an enclosed space should be strongly considered for early intubation. Fibroscopy may also be useful if airway damage is suspected and to assess known lung damage.

Secondary evaluation following admission to the Burn Unit of a burned patient suffering a severe thermal injury includes continuation of respiratory support and management and treatment of inhalation injury, fluid resuscitation and cardiovascular stabilization, pain control and management of burn wound.

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**PALABRAS CLAVE**

Quemaduras;  
Manejo inicial;  
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inhalación

**Evaluación inicial y manejo del paciente quemado crítico**

**Resumen** Los principales avances en el tratamiento de la quemadura se centran en el manejo precoz de la disfunción hemodinámica y respiratoria junto con la excisión quirúrgica agresiva y precoz y el injerto de piel en quemaduras de espesor total.

La atención inmediata a la quemadura puede cambiar el pronóstico, limitando significativamente su progresión y profundidad. El objetivo de la asistencia prehospitalaria es detener el proceso de combustión así como prevenir posteriores complicaciones y daños secundarios al shock por quemadura. Identificar los pacientes quemados subsidiarios de traslado inmediato es importante en términos de morbilidad y mortalidad. La demora en el traslado a una Unidad de Quemados de referencia debe ser minimizada.

El manejo emergente debe ser el mismo que para cualquier otro paciente politraumatizado, con evaluación y estabilización de la vía aérea, la respiración, la circulación, la discapacidad y el control ambiental.

Todos los pacientes con sospecha de inhalación deben ser trasladados del recinto tan pronto como sea posible y administrar inmediatamente oxígeno a alto flujo. Ante un paciente con estridor, dificultad para respirar, quemaduras faciales, vibras quemadas, tos, hollín en la cavidad oral e historia de inhalación de humo en un lugar cerrado debe ser considerada la indicación de intubación precoz. La fibroscopia puede ser útil si se sospecha daño de la vía aérea y para evaluar el daño pulmonar conocido.

La valoración secundaria tras el ingreso en la Unidad de un paciente que ha sufrido una lesión térmica grave incluye la continuación del soporte respiratorio y el manejo y tratamiento del daño por inhalación, la reanimación con líquidos y la estabilización cardiovascular, el control del dolor y el manejo de la herida.

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**Introduction**

Burns remain a major cause of traumatic injury worldwide affecting all ages. Burn injuries account for more than 300,000 deaths worldwide each year.<sup>1</sup>

Major risk factors for burns include male gender, extreme youth or old age, alcohol abuse, and substandard housing residence.

In the last half century a best understanding of the principles of care burn have resulted in improved survival rates, shorter hospital stays and decreases in morbidity and mortality rates due to the development of resuscitation protocols, improved respiratory support, infection control, early nutrition enteral and early excision and burn wound closure.<sup>2-4</sup>

Other factors, including immediate prehospital care, early emergency treatment with advanced life support capability and secondary transfer to a Burn Unit have contributed to improve substantially survival of severe burns patients.<sup>5</sup>

Major burns in adult patients are defined as thermal injury-induced lesions which justify intensive care treatment for at least 3 days post-injury (Table 1).<sup>6</sup>

**Summary of pathophysiology**

The efficiency of the initial chain of medical care is essential in improving outcome, specifically in severe burns. This approach leads to a better understanding of pathophysiological mechanisms involved in burn shock.

**Table 1** Criteria for the diagnosis of major burns.<sup>5</sup>

Total body surface area burned >25% in adults or >20% at extremes of age
Full thickness burns >10%
Burns involving critical areas: hands, feet, face, neck, perineum, genital area
Inhalation injury associated
Electrical or lightning burns
Circumferential burns on the extremities or chest
Chemical burns with threat of cosmetic or functional compromise
Asociated trauma
Burns in patient with serious pre-existing disease (>ASA II)
ASA, American Society of Anesthesiologists.

Major burns cause massive tissue destruction and result in activation of a cytokine-mediated inflammatory response that leads to dramatic pathophysiologic effects at sites local and distant from the burn. The systemic effects occur in two distinct phases, a burn shock (*ebb*) phase followed by a hypermetabolic (*flow*) phase.

Generalized edema even in non-injured tissues occurs when the injury exceeds 25–30% total body surface area (TBSA). After major burn injury, continued loss of plasma into burned tissue can occur up to the first 48h or even longer.

Loss of intravascular fluid into burned areas and edema formation (in nonburned sites) can quickly result in burn shock with impaired tissue and organ perfusion. Thus, the

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