

deeper injuries compared with older children. Children younger than 2 years old, especially 6 months old or younger, have a significantly higher mortality rate than older children with burns of similar magnitude. Acute or chronic illnesses or superimposed injuries also complicate burn care and response to treatment.

Inhalation Injury

Trauma to the tracheobronchial tree often follows inhalation of heated gases and toxic chemicals produced during combustion. Although direct thermal injury to the upper airway may occur, heat damage below the vocal cords is rare. Inspired heated air is cooled in the upper airway before reaching the trachea. Reflex closure of the cords and laryngospasm also prevent full inhalation. However, evidence of direct thermal injury to the upper airway includes burns of the face and lips, singed nasal hairs, and laryngeal edema. Clinical manifestations may be delayed as long as 24 to 48 hours. Wheezing, increasing secretions, hoarseness, wet rales, and carbonaceous secretions are signs of respiratory tract involvement. Upper airway obstruction is often associated with burn shock and fluid resuscitation. In such situations, endotracheal intubation may also be necessary to preserve a patent airway.

Inhalation of carbon monoxide is suspected when the injury has occurred in an enclosed space. Mucosal erythema and edema followed by sloughing of the mucosa are manifestations of respiratory tract injury. A mucopurulent membrane replaces the mucosal lining and seriously compromises respiration and ventilation. A significant increase in mortality has been observed when inhalation injury and pneumonia are both present.

Pathophysiology

Burn injuries produce both local and systemic effects that are related to the extent of tissue destruction. In superficial burns, the tissue damage is minimal. In partial-thickness burns, there is considerable edema and more severe capillary damage. With a major burn greater than 30% TBSA, there is a systemic response involving an increase in capillary permeability, allowing plasma proteins, fluids, and electrolytes to be lost. Maximum edema formation in a small burn occurs about 8 to 12 hours after injury. After a larger burn, hypovolemia, associated with this