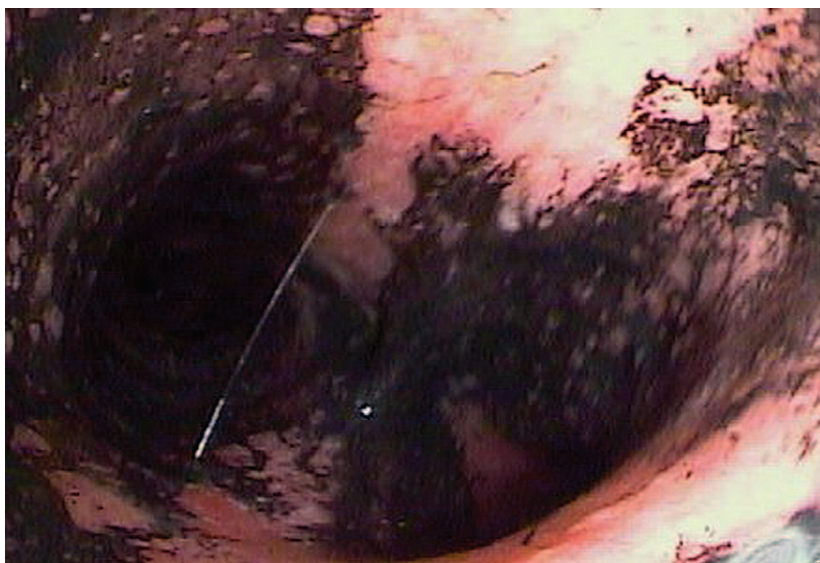


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High-frequency Percussive Ventilation for Severe Inhalation Injury

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A HEALTHY 26-yr-old with singed nares, carbonaceous tracheal secretions, and respiratory distress was intubated following a house fire. Bronchoscopy (fig.) revealed soot throughout the tracheobronchial tree consistent with severe inhalational injury. Despite ARDSNet goal-directed conventional mechanical ventilation, adequate muscle relaxation, and aerosolized pharmacotherapy of albuterol, acetylcysteine, and heparin, worsening oxygenation and ventilation ensued. High-frequency percussive ventilation (HFPV) was initiated to aid oxygenation, mechanics, and secretion clearance. Nine days later, the patient had adequate oxygenation with negligible secretions. Conventional ventilation was reinstated with extubation shortly thereafter.

HFPV has been associated with attenuated ventilator-induced lung injury, improved oxygenation at lower peak airway pressures, and hemodynamic stability among patients with inhalation injury.¹ HFPV produces small, high-frequency gas pulses that accumulate to form low-frequency tidal volume breaths in the apneic, motionless lung. This continuous laminar oxygen flow results in a *distal-to-proximal* gas concentration gradient beginning at the alveolar–arterial interface. Consequently, conventional precepts of dead space and effective alveolar ventilation have limited application to high-frequency ventilation in which diffusion becomes the principle means of gas exchange.² Because inhalation injury is predominantly a conducting and peripheral airway insult, HFPV may preferentially benefit these specific patients. A recent prospective, randomized controlled clinical trial of burn patients with inhalation injury compared conventional low tidal volume ventilation with HFPV. The study reported similar ventilator-free days for both groups; however, a statistically greater proportion (29% *vs.* 6%) of the conventional ventilation group failed to meet oxygenation or ventilation goals and required an alternate rescue modality.³

Competing Interests

The authors declare no competing interests.

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