

# Airway Management in Trauma



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## KEYWORDS

• Airway • Trauma • Airway management

## KEY POINTS

- Airway management in trauma presents numerous unique challenges.
- A safe approach to airway management in trauma requires recognition of these anatomic and physiologic challenges.
- An approach to airway management for these complicated patients is presented based on an assessment of anatomic challenges and optimizing physiologic parameters.

## INTRODUCTION

The “ABCs” of trauma resuscitation were born from the assumption that correcting hypoxemia and hypotension reduces morbidity and mortality. Definitive care for severely injured or polytrauma patients includes the ability to provide advanced airway management in a variety of settings: in the emergency department, 20% to 30% intubations are for trauma.<sup>1,2</sup> Airway management in the trauma patient presents numerous unique challenges beyond placement of an endotracheal tube (ETT), with outcomes dependent on the provider’s ability to predict and anticipate difficulty and have a safe and executable plan.

## DOES EARLY DEFINITIVE TRAUMA AIRWAY MANAGEMENT SAVE LIVES?

Despite significant advances in prehospital care, injury prevention, and the development of trauma systems, early mortality from trauma has essentially remained

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Disclosure Statement: The authors have nothing to disclose.

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Emerg Med Clin N Am 36 (2018) 61–84

<https://doi.org/10.1016/j.emc.2017.08.006>

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unchanged.<sup>3</sup> R. Adams Cowley, founder of Baltimore's Shock Trauma Institute, defined the "golden hour" as a window to arrest the physiologic consequences of severe injury by rapidly transporting trauma patients to definitive care.<sup>4,5</sup> The "stay and play" versus "scoop and run" approach to prehospital trauma care has been a topic of debate since the early 1980s.<sup>6,7</sup> Specific to airway management, there is evidence to support the argument that advanced airway management can be performed in the prehospital setting without delaying transfer to a trauma center.<sup>8,9</sup> More recent data suggest that when performed by skilled emergency medical services (EMS) providers, advanced airway management is associated with a significant decrease in mortality.<sup>9,10</sup> In the hospital setting, delayed intubation is associated with increased mortality in noncritically injured trauma patients.<sup>11</sup>

Conversely, there is a growing body of evidence that prehospital advanced airway management may increase mortality for trauma patients in some circumstances.<sup>8,12–14</sup> How does one reconcile this seemingly conflicting data? Is endotracheal intubation (ETI) for prehospital trauma patients harmful? The answer is, "it depends." The Eastern Association for the Surgery of Trauma (EAST) practice guidelines on ETI immediately following trauma acknowledged the conflicting prehospital data, stating the following:

*"No conclusion could be reached regarding prehospital intubation for patients with traumatic brain injury, with or without RSI [rapid sequence intubation]. Diversity of patient population, differing airway algorithms, various experience among emergency medical service personnel in ETI, and differing reporting make consensus difficult."*<sup>15</sup>

It may be that the technical, procedure-focused management imperative of "getting the tube" is diverting attention away from the physiologic principles of oxygen delivery. Translated physiologically, the ABC priorities of trauma resuscitation are "stop the bleeding, maintain perfusion and oxygenate." Lifesaving oxygenation maneuvers may include a jaw thrust, temporary bag-mask ventilation (BMV), placement of a supraglottic airway device, or ETI. Advanced does not necessarily mean better.

## TRAUMA AND THE DIFFICULT AIRWAY

A "difficult airway" is defined as difficulty with laryngoscopy and intubation, BMV, supraglottic device ventilation, and/or front of neck airway (FONA) access.<sup>16,17</sup> Anatomic markers are in general poor predictors of difficulty with airway management, with 90% of difficult intubations unanticipated, prompting debate about the value of trying to predict what is usually unpredictable.<sup>18–21</sup> The pathophysiology of trauma adds an additional layer of complexity and difficulty (**Table 1**).

The "physiologically difficult airway" is used to describe nonanatomic patient factors that can influence the outcome of airway management. Uncorrected hypoxemia, hypocapnia, and hypotension can have devastating consequences in the peri-intubation period. All trauma patients should have both anatomic and physiologic factors considered, planned for, and ideally corrected as part of their airway plan.<sup>22</sup>

In patients in whom both ETI and rescue oxygenation (bag-mask or supraglottic airway ventilation) are anticipated to be difficult, most existing airway algorithms recommend an "awake" intubation approach, in which the patient maintains spontaneous respiration throughout the procedure. There are a variety of reasons why awake intubation is uncommonly used for the trauma airway, and these are discussed later in this text.

Although the difficult airway is defined with reference to an experienced airway provider with an array of available recourses, other context-related challenges, including human factors, environment, clinician experience, and skill will invariably influence

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