

[NM-174] Elevated intracranial pressure and pneumomediastinum with tracheal rent after trauma

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Summary: This case addresses management of increased ICP with traumatic pneumomediastinum during airway evaluation.

Case: A previously healthy 11 year old female presented s/p fall from 12 feet on to concrete was intubated remotely with a 6.0mm ETT due to a GCS of 6 and blood in the airway. In the ER, evaluation revealed a depressed parietal skull fracture with extensive frontal lobe hemorrhagic contusion, cerebral edema, and a pneumomediastinum of unclear etiology; however, no tracheal, bronchial, or esophageal injury was definitively diagnosed.

After brief assessment in the PICU, the patient was brought to the OR for establishment of an ICP monitor, EVD, and microlaryngoscopy with bronchoscopy to assess the airway. Ventilation was tenuous due to a notable leak from the ETT. The Initial ICP of 12 rose rapidly during bronchoscopy to 27. Anesthesia initiated hyperventilation along with 3% NS boluses for management. To maintain CPP, the patient required boluses of phenylephrine and initiation of norepinephrine infusion. Flexible bronchoscopy after neurosurgical intervention revealed a 3 cm midline laceration of the distal trachea extending into the right mainstem bronchus. After excluding other tracheobronchial and esophageal injuries, the ETT was guided distally into the left mainstem bronchus to allow the airway injury to heal.

Discussion: Due to traumatic injury, the patient presented with two life threatening conditions: increased intracranial pressure and airway laceration with pneumomediastinum. Even though positive pressure ventilation threatened to worsen the pneumomediastinum, the patient required intubation secondary to neurologic injury. Facilitating airway evaluation through bronchoscopy required limiting hyperventilation. Thus, other measures including vasopressor titration, drainage of CSF, and 3% NS boluses were required to maintain CPP.

Typically, blunt trauma causes airway injury involving the posterior membranous portion of the trachea and the mainstem bronchus, usually within 3cm of the carina. This pattern is consistent with the patient's presentation. Management of membranous tracheal lesions is usually non-operative, while injury to the cartilaginous trachea typically requires operative management. This case demonstrates the challenge of optimizing neurologic and ventilation strategies in the face of acute traumatic brain injury with a tracheal rent.

References:

1. Barash et al. Clinical Anesthesia.
 2. Prunet et al. Cases Journal. 2008 Oct 22; 1(1):259.
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