[NM-134] He huffed and he puffed and he blew his lung down: Subcutaneous Emphysema and Pneumothorax Following Tracheocutaneous Fistula Repair

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Introduction: Tracheocutaneous fistula formation is a known complication following tracheostomy decannulation. Closure of the fistula has its own risks, including respiratory distress, subcutaneous emphysema, pneumomediastinum and pneumothorax. We present a case of massive subcutaneous emphysema and bilateral pneumothoraces following tracheocutaneous fistula closure.

Case Report: A 2 year old male with congenital vocal cord paralysis and tracheostomy dependence status post decannulation presented for tracheocutaneous fistula closure. The patient was taken to the operating room and standard ASA monitors were placed. Anesthesia was induced with propofol, fentanyl and dexmedetomidine. A grade I view was obtained using a Philips 1 blade and a size 4 microcuff endotracheal tube was placed without resistance. Anesthesia was maintained with sevoflurane in 50% O2/50% N2O mix. The patient had an uneventful anesthetic intraoperative course and was extubated awake. He was transported to the recovery room in stable condition.

One hour later, the recovery room nurse called as the patient had persistent coughing, agitation, and air leak from the repair site. On examination, we noted subcutaneous emphysema. Crepitus was noted from the pectoralis to the temporalis muscles bilaterally. The patient was hemodynamically stable and oxygenating well, but air movement was audible through the fistula closure with each breath. The patient was crying and very agitated so sedation with dexmedetomidine and midazolam was given to lessen accumulation of subcutaneous emphysema. ENT evaluated the patient and decided to admit him to the intensive care unit. In the ICU, the subcutaneous emphysema worsened extending to the umbilicus and eventually to the scrotum. ENT was again called to evaluate. A chest x-ray revealed extensive subcutaneous emphysema, pneumomediastinum, moderate to large right pneumothorax and tiny left pneumothorax without evidence of tension.

The patient was taken back to the operating room for direct laryngoscopy, bronchoscopy, re-insertion of tracheostomy and chest tube insertion. During the procedure it was noted that a suture placed during fistula closure had pierced the trachea causing tracheal obstruction. The subcutaneous emphysema resolved during his hospital course and he was discharged home on post-operative day 5.

Discussion: The major concern regarding tracheocutaneous fistula closure is air leak which can track along the subcutaneous tissue planes into the mediastinum and pleural cavity, causing subcutaneous emphysema, pneumomediastinum and pneumothorax. Many surgical modifications can decrease the risk of these complications including placing a drain to allow the air to escape and multi-layer closure. Anesthesiologists can reduce the risk even further by avoiding coughing on endotracheal tubes, not using excessive force to bypass the tracheostomy stoma during intubation, and avoiding positive pressure ventilation. Given these complications, patients require close 24 hour postoperative observation so that complications can be recognized and managed immediately.

References:
1. Mohan VK et al. Pediatric Anesthesia, 2003.
2. Stern Y et al. Ann Otol Rhinol Laryngol, 1999.
