Postadenotonsillectomy Subcutaneous Emphysema

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Tonsillectomy is one of the most common surgeries performed in children.1 Postoperative complications include dehydration, emesis, and bleeding.2,3 Subcutaneous emphysema is an uncommon complication and requires prompt recognition for proper management.4 Fewer than 40 cases of subcutaneous emphysema after tonsillectomy have been described in the English literature. We describe a case and identify differential diagnoses with a similar presentation to subcutaneous emphysema.

A 5-year-old female underwent evaluation for obstructive sleep apnea symptoms. Past medical history included asthma and neonatal abstinence syndrome with no prior surgeries. Examination revealed enlarged tonsils and 60% adenoid obstruction on flexible nasopharyngoscopy. Adenotonsillectomy was scheduled. Intraoperatively, the tonsils were dissected without complication from the fossa using coblation, and adenoids were fully ablated to the choana. Hemostasis was achieved with cautery. Estimated blood loss was minimal, extubation and recovery were uneventful, and patient was discharged home 2.5 hours after surgery.

Twenty-six hours after surgery, patient presented to the emergency department due to facial swelling, pain, and itching that developed suddenly after a coughing episode. Examination showed left periorbital swelling causing partial eye closure. Swelling progressed to involve the left cheek. Palpation revealed crepitus tracking along the temporal scalp consistent with subcutaneous emphysema. She denied aerodigestive obstructive symptoms. Computed tomography scan of the orbits showed extensive subcutaneous emphysema involving the left frontoparietal and temporal scalp, peri orbital, and facial soft tissue (Figure 1). Large amounts of air could be seen extending into the deep spaces of the suprahoid neck (Figure 2). She was started on amoxicillin and cough suppressant and was admitted for observation. Swelling improved over the next 48 hours at which point patient was discharged with mild residual subcutaneous emphysema on prophylactic amoxicillin. On follow-up via telephone, 2 weeks after discharge, mother reported resolution of facial swelling and obstructive sleep symptoms.

Subcutaneous emphysema after tonsillectomy is an unusual condition that is usually self-limited but can lead to severe complications.4 Due to the rarity of the event, the mechanism remains uncertain. The most compelling hypothesis is that deep dissection leads to disruption of the tonsillar musculature. Air can then penetrate the superior pharyngeal constrictor muscles and dissect the cervicofacial plane to reach the parapharyngeal space.5,6 This air can dissect laterally into the retropharyngeal space7 from where there is potential to spread and induce pneumomediastinum and tension pneumothorax.8

Figure 1. Subcutaneous emphysema (arrows) extending into left frontoparietal and temporal scalp, peri orbital, and facial soft tissue.

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Other potential etiologies of subcutaneous emphysema include esophageal perforation. Perforation is most likely to occur at the distal cricopharyngeal muscle or inside of the piri-form sinus, both areas of anatomic weakness.\(^9\) Factors associated with esophageal perforation during intubation include poor visualization of the glottis, short, broad necks, and excessive use of force.\(^9,10\) Perforation should be suspected as the cause of subcutaneous emphysema when these factors are present, and the patient complains of dysphagia. Diagnosis can be confirmed by water-soluble esophagram.

Tracheobronchial tears can also occur secondary to intubation with an overinflated cuff. These usually present immediately after intubation and ventilation, but they can present more subtly in the postoperative period. One case series reported a delay of up to 6 days in presentation,\(^11\) and a second series found a diagnostic delay on average of 25.7 hours.\(^12\) In these patients, common presenting symptoms included subcutaneous emphysema and pneumomediastinum on chest radiographs.\(^11,12\) Diagnosis can be confirmed by bronchoscopy to visualize the mucosal injury which is most commonly found at the membranous part of the trachea.\(^11\)

Infection is a possible cause for subcutaneous emphysema and is seen in association with necrotizing fasciitis. Fortunately, necrotizing fasciitis in the pediatric population is a rare phenomenon,\(^13\) with only a few case reports described following adenotonsillectomy.\(^14\) A high index of clinical suspicion warrants surgical exploration for diagnosis and treatment with broad spectrum antibiotics.

Subcutaneous emphysema after adenotonsillectomy can generally be managed conservatively with avoidance of maneuvers that increase oropharyngeal pressure. There is no consensus on use of antibiotics; we elected to provide oral therapy to reduce risks of bacterial soft tissue seeding. This is a relatively rare condition and surgeons should keep in mind more insidious underlying disorders.

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