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Subcutaneous Emphysema Complicating Tonsillectomy: A Formidable Complication

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Abstract

Purpose: To report a case of subcutaneous facial and cervico-thoracic emphysema with pneumo mediastinum and pneumothorax, which is a fairly rare but very serious complication of a tonsillectomy because it can engage the patient's vital prognosis in the short term. To discuss its etiology and management. **Method**: This is a 7-year-old patient who received an adeno-tonsillectomy at Niananankoro FOMBA Hospital for upper airway obstruction on August 04, 2021. **Result**: A 7-year-old child had diffused subcutaneous emphysema in the immediate postoperative period associated with pneumomediastinum, pneumothorax. The diagnosis was clinical. The etiology of emphysema was given by the CT scan, which objectified a tracheal breach. The management was done in resuscitation in a multidisciplinary team and required a right chest drainage. **Conclusion**: Subcutaneous emphysema is a rare complication of this procedure. Its diagnosis requires searching for its etiology, and the management depends on the clinical picture.

Keywords

Subcutaneous Emphysema, Complications of Tonsillectomy, Pneumothorax,

Pneumomediastinum

1. Introduction

Tonsillectomy coupled with adenoidectomy is a common procedure in otolaryngology in children. [1]. Tonsillectomy is a relatively easy procedure, but it is not without complications [2]. The most common complications are haemorrhage, whatever the technique, with an incidence that varies from 0.5% - 10% [1]-[3]; infections, dehydration, and damage to the glossopharyngeal nerve and the carotid artery are less frequent [4]. Subcutaneous emphysema complicating tonsillectomy is an extremely rare complication, first described in 1924. From 1924 to 2021, 55 cases have been reported and it is a serious complication as it can be life-threatening [5]-[7]. Our aim is to report a case of subcutaneous facial and cervicothoracic emphysema with pneumomediastinum and pneumothorax complicating adeno tonsillectomy and to discuss its aetiology and management.

2. Observation

COC, 7-year-old male with a history of recurrent rhinopharyngitis and obstructive sleep apnoea syndrome associated with recurrent attacks of angina with a fever of 39˚C averaging 6 attacks per year for 2 years. ASLO levels exceeded 800 IU. He was admitted to our facility for a tonsillectomy combined with an adenoidectomy at the same time on 04 August 2021. We performed a tonsillectomy by dissection with a monopolar electric scalpel, following the naturally cleavable dissection plane, and an adenoidectomy with an adenotome. The operation was performed without incident under general anaesthesia with orotracheal intubation. 5 minutes after extubation, cardiac arrest occurred, which was immediately treated with resuscitation measures, cardiac massage, and a second intubation with an N˚5 intubation tube for ventilation. After 1 hour of resuscitation, the child's heart rate returned to normal. After 2 hours, the patient was extubated and admitted to intensive care with an oxygen scope for monitoring. After about 45 minutes, we noticed the onset of progressive oedema extending over the whole body and respiratory distress. This situation prompted a 3rd orotracheal intubation to avoid airway obstruction (**Figure 1**). After intubation and ventilation, a thorough examination was carried out, which revealed crepitus oedema from head to foot, respecting the sex. Auscultation revealed a decrease in vesicular murmur in the lungs, accentuated on the right. Given this picture, the diagnosis of subcutaneous emphysema with a probable pneumothorax was evoked. Because of the difficulty of imaging transport due to a lack of technical facilities, thoracic drainage was performed as an emergency with a Fr 14 gauge drain on the right on day 1 post-op. Treatment consisted of antibiotic therapy with ceftriaxone 500mg twice daily, paracetamol 500 mg 3 times daily and dexamethasone 8mg each morning. On postoperative day 2 and 24 hours after chest drainage, there was a timid regression of

the emphysema, haemodynamic stabilisation and an improvement in haematosis, allowing extubation at 24 hours post-drainage. A thoracic CT scan was performed on postoperative day 2 to investigate the aetiology, which revealed diffuse subcutaneous emphysema, bilateral pneumothorax and a pneumomediastinum with no aetiology identified due to the volume of the emphysema. The CT scan was repeated at 4 days post-op and 3 days post-chest drainage, with the identification of a 3-mm tracheal tear (Figure 2). On day 4, post-chest drainage, the emphysema had almost completely regressed, and the chest tube was clamped as it was not being produced, so it was removed the following day. The patient was discharged on day 6 post-op, which corresponded to day 2 of chest tube removal. The patient was seen as an outpatient at 14 days; the emphysema had completely disappeared (Figure 3) and the surgical wound on the tonsil had healed. The rest of the treatment consisted of nasopharyngeal disinfection with saline until 3 months after the operation. After 2 years, the postoperative course was always simple and straightforward.

Figure 1. Subcutaneous emphysema of the face, neck and thorax.

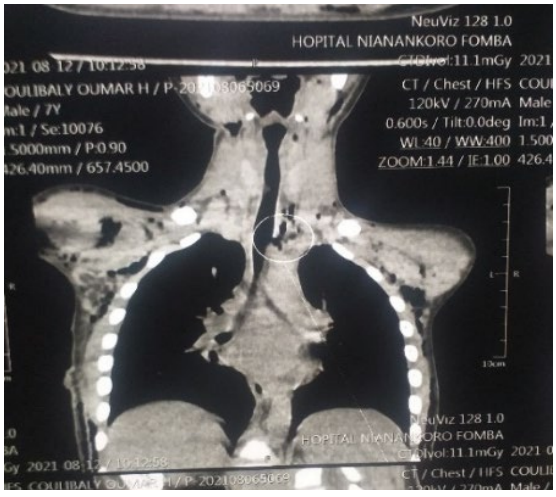

Figure 2. CT scan showing the tracheal tear opposite T2.

Figure 3. Patient completely recovered.

3. Discussion

Tonsillectomy, whether performed alone or in conjunction with adenoidectomy, is a simple, rapid and safe procedure for practitioners. However, it is not without complications [1] [4]. Thoraco-cervico-facial emphysema and pneumo-mediastinum are fairly exceptional complications of this procedure [4]-[6].

Subcutaneous emphysema is diagnosed clinically with the perception of snowy crepitations on palpation [8] [9]. In our patient, the diagnosis was made on clinical grounds. This diagnosis was confirmed by CT scan, which revealed the presence of gaseous crackles in the soft tissues. CT scans carried out under the right conditions make it possible to identify the aetiology, as was the case in our patient [8] [9]. The CT scan showed massive subcutaneous thoraco-cervico-facial emphysema associated with pneumomediastinum and bilateral pneumothorax, and a tracheal breach at the level of the 2nd thoracic vertebra (T2). The mechanism by which air penetrates subcutaneous tissue is not fully understood. The exact pathogenic mechanism remains unclear, but most authors describe two mechanisms [4] [6].

- The first is rupture along the tracheobronchial tree from a pre-existing abnormality (an alveolar bulla or laryngocele) or traumatic intubation resulting in extravasation of air into the mediastinum which travels towards the pharyngeal space [4] [6].

- The second mechanism is injury to the superior constrictor muscle and the deep cervical fascia through the tonsillar compartment. This will allow air to enter the pharyngeal space during positive pressure ventilation, when coughing, vomiting or sneezing [4] [6].

The aetiology of our emphysema was a left tracheal rupture opposite the 2nd thoracic vertebra (T2). This tracheal rupture most probably occurred during the 2nd intubation, which was carried out in an extreme emergency in the face of cardiorespiratory arrest. Positive pressure ventilation promoted air diffusion into the mediastinum and other organs. Iatrogenic tracheal lesions due to orotracheal intubation are rare, with an incidence of 0.0005%. Tearing of the tracheobronchial mucosa may occur during passage of the endotracheal tube, excessive cuffing of the tube, excessively high alveolar pressure or ventilator malfunction during intu-

bation. Congenital dehiscence of the mucosa, such as bullae, clefts or laryngoceles, can also predispose to the development of emphysema [5].

It should be noted that paediatric anaesthesia is delicate and more demanding than in adults in terms of equipment and human resources [10].

Finally, to prevent the occurrence of emphysema after tonsillectomy, the surgeon must perform meticulous surgical dissection of the tonsils to avoid any injury to the parapharyngeal muscles and avoid activities that would increase pharyngeal pressure. Avoid manual ventilation after extubation.

Emphysema can be treated in a number of ways:

- Conservative treatment is based on antibiotics to prevent the spread of flora from the oral cavity to the mediastinum, analgesics, corticosteroids, oxygen therapy and air humidification under strict supervision in an intensive care unit. Conservative treatment is indicated when the emphysema is benign [5] [8] [10]-[13].

- The surgical methods usually used are incision and drainage, thoracotomy for drainage, intubation and tracheostomy. Tracheostomy has the advantage of reducing respiratory distress and provides an outlet for air trapped subcutaneously and in the inter-muscular spaces [4] [5] [7] [12]. In the Anglo-Saxon literature review of a series of 30 cases, 3 patients underwent intubation and one patient underwent thoracotomy [7]. In contrast, Vroh Bi chose tracheostomy as the treatment for emphysema [12] [14].

In our case, the treatment was a combination of conservative and surgical means, including intubation, right-sided chest drainage, antibiotic therapy, corticosteroids and analgesics for 6 days. The patient's uncomplicated postoperative recovery is testimony to the success of the treatment.

4. Conclusion

Tonsillectomy is a common ENT procedure, and although the technique is well-mastered, it can be complicated. Steps must be taken to minimise the occurrence of this complication. These include meticulous dissection of the tonsil capsule, gentle intubation, and adequate preparation of the patient before surgery to ensure compliance with the hygiene and dietary measures that accompany tonsillectomy. There is also a need to train the staff involved in the procedure and to improve the technical facilities for better postoperative management.

Conflicts of Interest

There are no financial or professional conflicts of interest associated with this work. To carry out this study, the patient's parents were informed and we obtained informed consent from them.

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