



Cervicofacial Emphysema: A Rare and Potentially Fatal Complication of Tonsillectomy

Case Report

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Abstract

Tonsillectomy is commonly performed in otorhinolaryngology clinics and is a relatively reliable procedure. Nevertheless, several complications, most notably postoperative bleeding, have been identified. Cervicofacial emphysema following tonsillectomy is exceedingly rare. This complication can lead to high-mortality outcomes, such as necrotizing fasciitis, mediastinitis, and pneumomediastinum. In this case report, we present the diagnosis and treatment of cervicofacial emphysema that developed on the third postoperative day in a 25-year-old female patient, along with a review of the relevant literature.

Keywords: Tonsillectomy, postoperative complications, cervicofacial emphysema, pneumomediastinum, case report

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Cite this article as: Akin V, Yasan H, Irmak Ç, Tanlak E, Büyükçelik B. Cervicofacial emphysema: a rare and potentially fatal complication of tonsillectomy. *Turk Arch Otorhinolaryngol.* [Epub Ahead of Print]

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Received Date: 24.12.2024

Accepted Date: 02.03.2025

Epub: 16.06.2025

DOI: 10.4274/tao.2025.2024-12-11

Introduction

Tonsillectomy is among the most commonly performed procedures in otorhinolaryngology clinics. Although tonsillectomy is generally considered a safe operation, serious complications can occasionally occur (1,2). According to a study analyzing post-tonsillectomy complications in adult patients, the rate of any complication within the first 30 days postoperatively was found to be 21.46% (3). The most clinically significant complication after tonsillectomy is postoperative bleeding. Additionally, other well-defined complications included dental injuries, postoperative oropharyngeal

infections, Grisel's syndrome, mandibular condyle fracture, and velopharyngeal insufficiency (1,4).

Cervicofacial emphysema is an extremely rare but potentially life-threatening complication of tonsillectomy (1,5). Cervicofacial emphysema can lead to infection in deep neck spaces, upper airway obstruction, pneumomediastinum, mediastinitis, or pneumothorax (5). In this case report, we present the diagnosis and treatment of cervicofacial emphysema following tonsillectomy in an adult patient, supported by a review of the literature.



Case Presentation

A 25-year-old female patient underwent tonsillectomy due to recurrent tonsillitis under general anesthesia in the otorhinolaryngology clinic. The tonsillectomy was performed extracapsularly, using bipolar cautery for dissection. Dissection of the right palatine tonsil was challenging due to significant adhesion of the tonsillar capsule to the adjacent muscle tissue. Pus flow was intermittently noted between the capsule and the muscle during dissection. After the tonsillectomy was completed, a defect approximately 2 mm in size was noted in the muscle tissue on the right side. This defect was primarily sutured and repaired using 4-0 Vicryl sutures. Positive pressure ventilation via mask was not applied after extubation. The patient was not discharged on the day of surgery due to the observed pus flow during the procedure and was started on intravenous ampicillin-sulbactam therapy at a dose of 4×1.5 g. On the third day of the antibiotic therapy, the patient reported swelling in her right cheek after coughing. On examination, crepitus was palpated extending from the superior border of the mandible, following the sternocleidomastoid muscle down to its mid-level. There was no increase in temperature or hyperemia. Endoscopic examination of the larynx was normal. Cervical and chest radiographs obtained showed that emphysema was confined to the neck. No defect was observed in the air column of the larynx or the trachea (Figure 1). Blood test results are presented in Table 1.

Upon the consultation of an infectious diseases and clinical microbiology specialist, intravenous ciprofloxacin at a dose of 2×400 mg was added to the treatment regimen due to its efficacy against Gram-negative bacteria. An antitussive was administered to prevent coughing. During inpatient follow-up, the patient's temperature, pulse, blood pressure, respiratory rate, and oxygen saturation remained stable. The facial swelling and palpable crepitus subsided, and no additional complaints were noted. Follow-up radiographs showed no increase in the extent of emphysema. On the seventh postoperative day, the patient was discharged with oral antibiotic therapy (amoxicillin-clavulanate 2×1 g and ciprofloxacin 2×500 mg). Antibiotic therapy was discontinued on the 14th day, as follow-up tests revealed no significant infectious findings and emphysema had resolved (Figure 2).

Informed consent for this case report was obtained from the patient.

Discussion

In a literature review conducted by Assiri et al. (6) in 2022, 32 cases of cervicofacial emphysema following tonsillectomy were identified. Of these cases, 11 were pediatric and 21 were adult patients. The most commonly reported symptom was swelling. Conventional radiographs were most commonly



Figure 1a. Appearance compatible with emphysema predominantly concentrated in the right submandibular area of the neck (white arrow). No defect observed in the tracheal air column



Figure 1b. No defect observed in the laryngeal and tracheal air column

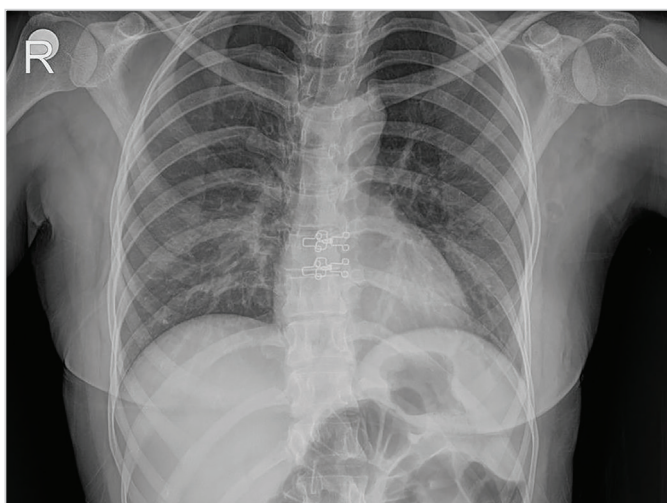


Figure 1c. No significant pathology observed in the chest on posteroanterior chest radiograph

used for diagnosis, followed by computed tomography. Antibiotic therapy was initiated in 25 patients. Additional treatment options included antitussives, steroids, laxatives, oxygen, and intravenous fluid support. Among the 32 reported cases, three required intubation, two patients underwent thoracotomy, and one required tracheotomy. The length of hospital stay ranged from 4 hours to 15 days. The authors noted that adult patients were at greater risk for emphysema, and that emphysema tended to occur later in adult cases (6).

The pathophysiology of this complication remains unclear, with several theories proposed (5,6). The first theory suggests that it may occur secondary to laryngeal or tracheal injury during intubation or high-pressure ventilation (1,6). The second theory posits that air leakage into deep neck spaces occurs as a result of damage to the tonsillar bed during the surgical procedure (1,6). Coughing, straining, and vomiting increase upper airway pressure, which predisposes for the development of emphysema (5). A third theory proposes that gases released by microorganisms may contribute to the development of emphysema (5).

The capsule of the palatine tonsils is a part of the pharyngobasilar fascia. The loose connective tissue between the capsule and the muscle facilitates easy dissection. The

pharyngobasilar fascia covers the superior constrictor muscle, and deeper within, the buccopharyngeal fascia, which is part of the visceral layer of the middle layer of the deep cervical fascia, surrounds the pharyngeal muscles and separates the neck spaces (1). In extracapsular dissection, trauma to the buccopharyngeal fascia may allow air to enter the parapharyngeal space (1,2). A history of recurrent tonsillitis and peritonsillar abscess leads to fibrosis and adhesions in the tonsil tissue and underlying muscular layers. This condition can complicate dissection and increase the risk of subcutaneous emphysema (7). To prevent the development of subcutaneous emphysema, traumatic dissection should be avoided, and activities that increase pharyngeal pressure, such as coughing, sneezing, blowing the nose, or engaging in physical activities that raise pressure, should be avoided. Manual ventilation after extubation should also be avoided (1). In our case, the development of emphysema is thought to be consistent with the second theory due to difficulty during tonsil dissection on the affected side and the formation of a defect in the muscle tissue. The absence of difficulty during intubation and the development of emphysema on the third day following coughing further supports this mechanism.

The most important finding from physical examination is the palpation of crepitus. Conventional radiographs are often used for diagnosis. The extent of emphysema can be thoroughly evaluated with computed tomography (1,2,5,8). The most important differential diagnosis is necrotizing fasciitis, which can be differentiated by the presence of infectious signs (1). In our case, since vital signs remained stable during hospitalization and radiographs showed limited emphysema, a computed tomography scan was not performed. Necrotizing fasciitis was not considered for primary differential diagnosis because of the absence of infectious signs.

The treatment of cervicofacial emphysema depends on its severity. Treatment is generally conservative as emphysema often resolves spontaneously (1,2,5). The extent of emphysema and whether the airway is affected should be regularly monitored (5). The patients should be closely followed up from a cardiopulmonary perspective. Broad-spectrum antibiotic therapy should be initiated due to the risk of mediastinitis and necrotizing fasciitis caused by oral cavity contamination (1). Patients are advised to avoid actions that increase pressure on the affected area, such as coughing, vomiting,

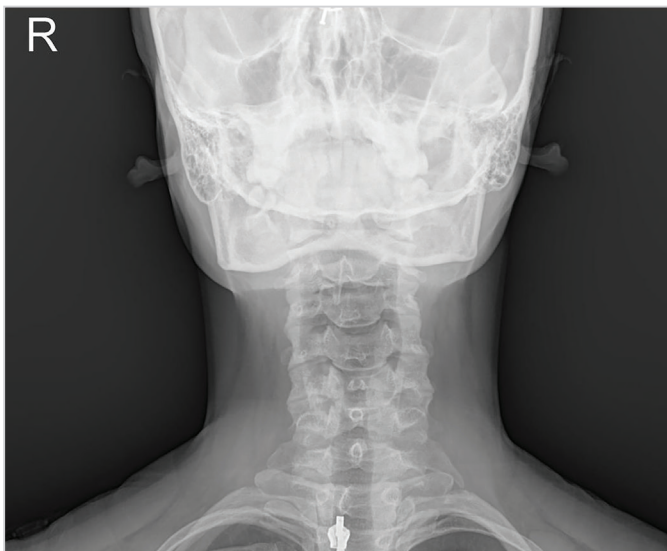


Figure 2. No findings supporting emphysema observed in the cervical radiograph

Table 1. C-reactive protein and complete blood count results during the follow-up period

Test	Postoperative day 3	Postoperative day 5	Postoperative day 7	Postoperative day 14	Reference range
Leukocyte ($10^3 \mu/L$)	9.17	8.72	5.86	3.68	3.5-9.5
Neutrophil ($10^3 \mu/L$)	6.28	5.67	3.79	1.98	1.8-6.3
Lymphocyte ($10^3 \mu/L$)	2.24	2.58	1.65	1.40	1.1-3.2
Monocyte ($10^3 \mu/L$)	0.33	0.36	0.38	0.22	0.1-0.6
C-reactive protein (mg/L)	25.5	30.3	20.4	9.7	0-5

and straining, until the emphysema resolves. If necessary, anti-tussives, laxatives, and antiemetics may be added to the treatment (2). In cases where respiration is affected, intubation or tracheotomy may be required. Although rarely, thoracotomy has been reported (1). If a significant defect is present in the surgical area, it is also recommended to repair it (1,5). In the presented case, intravenous antibiotic therapy was initiated before the development of emphysema due to the presence of pus during the intraoperative process. After the development of emphysema, the therapy spectrum was expanded based on the consultation of an infectious diseases and clinical microbiology specialist. An anti-tussive was added to treatment due to the development of emphysema following coughing. Because no new defect was observed, no additional surgical intervention was considered.

Conclusion

Tonsillectomy is a common procedure in otolaryngology clinics. Cervicofacial emphysema is a rare but potentially fatal complication of tonsillectomy. It is important for otolaryngologists to be aware of this complication, as early diagnosis and treatment are crucial.

Ethics

Informed Consent: Informed consent for this case report was obtained from the patient.

Footnotes

Authorship Contributions

Surgical and Medical Practices: V.A., Ç.I., E.T., Concept: V.A., H.Y., Ç.I., E.T., B.B., Design: V.A., H.Y., Ç.I., E.T., B.B., Data Collection and/or Processing: V.A., E.T., Analysis and/or Interpretation: V.A., H.Y., E.T., Literature Search: V.A., H.Y., Ç.I., E.T., B.B., Writing: V.A., H.Y., Ç.I., E.T., B.B.

Conflict of Interest: There is no conflict of interest to disclose.

Financial Disclosure: The authors declared that this study has received no financial support.

Main Points

- Cervicofacial emphysema is a rare but potentially fatal complication of tonsillectomy.
- Patients with cervicofacial emphysema require close monitoring.
- It is important for otolaryngologists to be aware of this complication, as early diagnosis and treatment are crucial.

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