



(CASE REPORT)



## POSTOPERATIVE CERVICOFACIAL SUBCUTANEOUS EMPHYSEMA FOLLOWING COMBINED TONSILLECTOMY AND TRANSORAL STYLOIDECTOMY IN A PATIENT WITH EAGLE SYNDROME: A RARE CASE REPORT

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International Journal of Science and Research Archive, 2026, 20(03), 850–856

Publication history: Received on 17 August 2026; revised on 24 September 2026; accepted on 25 September 2026

Article DOI: <https://doi.org/10.30574/ijrsra.2026.20.3.1804>

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### ABSTRACT

Eagle syndrome is an uncommon condition caused by elongation of the styloid process or ossification of the stylohyoid ligament and may present with cervicofacial or pharyngeal pain, dysphagia, and otalgia. Surgical treatment is effective; however, complications following transoral styloidectomy are uncommon. We report a rare case of cervicofacial subcutaneous emphysema following bilateral tonsillectomy and transoral styloidectomy. A 52-year-old woman presented with a one-year history of right-sided neck pain radiating to the ear and aggravated by swallowing. Examination and computed tomography demonstrated an elongated right styloid process measuring approximately 3.5 cm. She underwent bilateral tonsillectomy followed by right-sided transoral styloidectomy, with approximately 1.5 cm of the distal styloid process excised. Approximately 30 minutes after surgery, she developed sudden cervicofacial swelling with crepitus. There was no airway obstruction or respiratory compromise, and oxygen saturation remained 98% on room air. Imaging was not performed because she remained clinically stable without respiratory or thoracic symptoms. She was managed conservatively with airway and cardiorespiratory observation, intravenous fluids, ceftriaxone, and restriction of oral intake. The emphysema resolved, and she was discharged after seven days. At one-month follow-up, her neck pain and otalgia had completely resolved. Deep dissection required for transoral styloid exposure may have contributed to disruption of tissue planes and facilitated air entry, although a definitive causal mechanism could not be established. This case highlights cervicofacial subcutaneous emphysema as a rare complication of combined tonsillectomy and transoral styloidectomy and emphasizes early recognition, airway and thoracic assessment, meticulous surgical technique, and conservative management in stable patients.

**Keywords:** Cervicofacial Emphysema, Eagle Syndrome, Postoperative Complication, Styloidectomy, Subcutaneous Emphysema, Tonsillectomy.

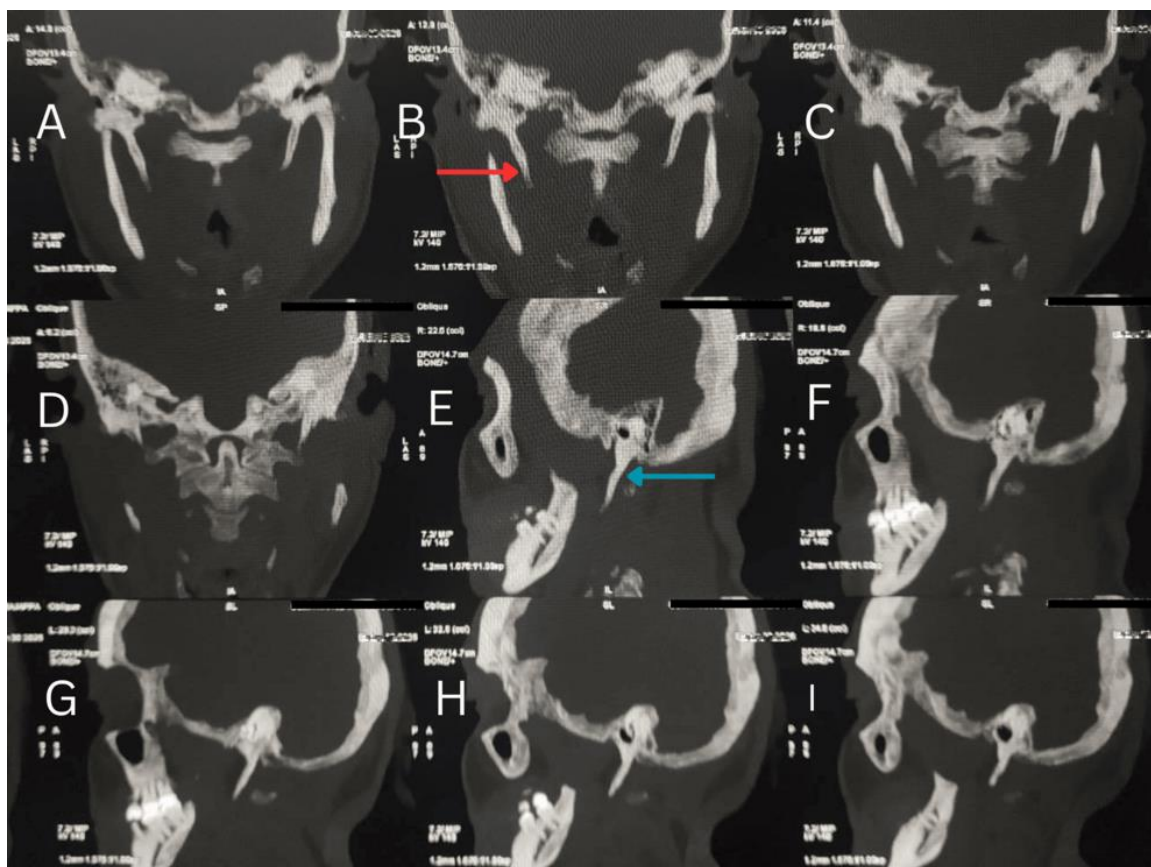
## 1 INTRODUCTION

Eagle syndrome, also known as stylohyoid complex syndrome, is an uncommon pain syndrome associated with elongation of the styloid process and/or ossification of the stylohyoid ligament [1]. It may present with unilateral cervicofacial or pharyngeal pain, often radiating to the ear and aggravated by swallowing or head movement [2]. Radiological studies have reported an elongated styloid process or stylohyoid complex in approximately 4-7.3% of the general population; however, only 4-10% of these patients are symptomatic [3]. The reported mean length of the styloid process varies among populations, with values ranging from approximately 15.4 to 18.8 mm in Asian populations and 20 to 30 mm in Caucasian populations [4]. The etiology of Eagle syndrome is considered multifactorial and has been attributed to congenital, traumatic, iatrogenic, and idiopathic factors [5].

Tonsillectomy is one of the most commonly performed procedures in otorhinolaryngology. Postoperative hemorrhage is its most recognized serious complication, whereas cervicofacial subcutaneous emphysema is a rare postoperative complication [6]. Although uncommon, post-tonsillectomy emphysema can occasionally progress to pneumomediastinum, pneumothorax, or respiratory compromise [7-10]. Cervicofacial subcutaneous emphysema most commonly develops during the immediate postoperative period or within the first few postoperative days [10].

The present report describes a patient with Eagle syndrome who developed cervicofacial subcutaneous emphysema following bilateral palatine tonsillectomy and right-sided transoral styloidectomy. The case highlights the possible mechanism, early recognition, prevention, and conservative management of this rare but potentially serious complication.

## 2 CASE PRESENTATION



**Figure 1: Non-contrast computed tomography (CT) demonstrating elongated styloid processes.** Non-contrast computed tomography (CT) images of the neck demonstrating elongation of the styloid processes in coronal (A–D) and sagittal (E–I) planes. The right styloid process measures approximately 3.5 cm. The red arrow in panel B indicates the elongated right styloid process in the coronal view, while the blue arrow in panel E indicates the same finding in the sagittal view.

A 52-year-old woman presented with a 1-year history of right-sided neck pain, which had progressively worsened during the preceding 6 months. The pain was continuous and pricking in character, radiated to the right ear, and was

aggravated by swallowing. There was no history of trauma, dental procedures, throat infection, dysphagia, dysphonia, or respiratory difficulty.

On clinical examination, bilateral Grade I tonsillar hypertrophy was noted, with a hard, elongated bony projection palpable within the right tonsillar fossa. Computed tomography (CT) of the neck demonstrated elongation of the styloid processes. The right styloid process measured approximately 3.5 cm and was more prominent on the symptomatic side (Figure 1).

Based on the characteristic clinical symptoms, palpation findings, and radiological evidence of styloid elongation, a diagnosis of Eagle syndrome was made, and surgical management was planned.

The patient underwent bilateral tonsillectomy with right-sided styloidectomy under general anesthesia. Following completion of the bilateral tonsillectomy, the right styloid process was approached through the tonsillar fossa. The overlying soft tissues and fascial attachments were carefully dissected to expose the styloid process. The surrounding tissues overlying the superior constrictor region and adjacent fascial and ligamentous attachments were carefully released to permit adequate exposure. The styloid process was then adequately exposed and mobilized, and a surgical hook was placed around it to facilitate controlled manipulation. The elongated right styloid process measured approximately 3.5 cm. The tip of the right styloid process was excised using a bone nibbler, and approximately 1.5 cm of the distal portion was removed. Hemostasis was secured, and the operative wound was closed in two layers.

Approximately 30 minutes after completion of the procedure, the patient developed sudden swelling involving the face and neck. On palpation, crepitus was present throughout the cervicofacial region, raising suspicion of postoperative cervicofacial subcutaneous emphysema (Figure 2 and Figure 3).



**Figure 2: Postoperative cervicofacial subcutaneous emphysema. Frontal view demonstrating diffuse facial swelling.**



**Figure 3: Postoperative cervicofacial subcutaneous emphysema. Lateral view demonstrating cervicofacial swelling.**

The patient was immediately assessed for airway compromise and respiratory distress. No significant airway obstruction or respiratory compromise was identified. Her oxygen saturation was 98% on room air, and she remained clinically stable.

No post-event neck or chest radiograph or repeat CT was performed because the patient remained clinically stable and had no respiratory distress, tachypnea, or chest pain. Therefore, thoracic extension of the emphysema was not radiologically assessed.

There was no documented difficult intubation, coughing, bucking, or forceful Valsalva maneuver during extubation.

Management consisted of close airway and cardiorespiratory observation, intravenous ceftriaxone 1 g twice daily, ondansetron 4 mg as required, and intravenous fluids while the patient was kept NPO. High-flow oxygen therapy and specific antitussive therapy were not administered.

The patient was maintained NPO initially to minimize swallowing and potential increases in pharyngeal pressure, with intravenous fluids continued during this period. Oral intake was subsequently resumed, and a soft diet was advised at discharge.

The cervicofacial swelling and crepitus gradually resolved during the postoperative period, and the patient remained clinically stable. She was discharged after a 7-day hospital stay with appropriate follow-up advice.

At 1-month postoperative follow-up, the patient's presenting neck pain and otalgia had resolved.

### 3 DISCUSSION

An elongated styloid process can produce recurrent throat, facial, and neck pain, which may radiate to the ear. Patients may also present with dysphagia, headache, or foreign-body sensation. In selected patients, vascular symptoms may occur because of mechanical interaction between the elongated styloid process and adjacent vascular structures [11,12].

In the present case, the diagnosis was based on the characteristic clinical presentation, ipsilateral tenderness/palpability of the elongated styloid process, and CT evidence of marked styloid elongation.

The diagnosis of Eagle syndrome can be challenging because its clinical manifestations may overlap with other causes of cervicofacial pain, including glossopharyngeal neuralgia and superior laryngeal neuralgia. Surgical management may be performed through either an intraoral or transcervical approach, depending on the anatomy, surgeon preference, and clinical circumstances [13].

Subcutaneous emphysema following tonsillectomy is an uncommon complication. The precise mechanism has not been conclusively established, although deep dissection of the tonsillar fossa with disruption of the superior constrictor muscle and underlying fascial planes is considered a plausible mechanism [14]. Such disruption may create a pathway through which air enters the parapharyngeal and deeper cervical spaces [15].

In the present case, the additional deep dissection required for transoral exposure and mobilization of the elongated styloid process may have contributed to disruption of the local tissue planes and facilitated air entry. However, because no mucosal or muscular defect was directly identified, this mechanism remains speculative.

Once air gains access to the cervical soft tissues, events that increase upper-airway pressure, including coughing, vomiting, retching, and straining, may facilitate further dissection of air through the cervical fascial planes [6]. Air may subsequently extend into the retropharyngeal and mediastinal spaces and, in severe cases, may be associated with pneumomediastinum or pneumothorax [15]. Although these complications were not clinically evident in the present patient, their potential occurrence warrants careful postoperative observation.

Sudden cervicofacial swelling accompanied by palpable crepitus following tonsillectomy should raise suspicion of subcutaneous emphysema. Clinical assessment should focus on airway patency, respiratory status, hemodynamic stability, and symptoms suggestive of thoracic extension. Plain radiography or CT of the neck and chest may be considered when the extent of emphysema is uncertain or when symptoms suggest pneumomediastinum or pneumothorax [16]. In the present case, imaging was not performed because the patient remained clinically stable and had no respiratory or chest symptoms.

The primary objectives of management are to prevent further air entry, maintain airway patency, and identify potentially serious complications at an early stage. Activities that increase upper-airway pressure, including coughing and straining, should be minimized. Broad-spectrum antibiotics are frequently reported in the management of post-tonsillectomy emphysema, although there is no standardized antibiotic regimen because available evidence is largely derived from case reports and case series [17].

Management is generally conservative in clinically stable patients and includes close airway and cardiorespiratory observation, avoidance of activities that increase upper-airway pressure, and, in selected cases, restriction of oral intake and antibiotic therapy [16]. Most reported cases resolve spontaneously over several days, although rare patients have required airway intervention or surgical management because of extensive mediastinal or thoracic involvement [17].

Prevention is an important consideration. From an anesthetic perspective, atraumatic endotracheal intubation, avoidance of unnecessary positive airway pressure, and gentle extubation may reduce potential airway trauma and pressure-related complications [16]. From a surgical perspective, meticulous dissection within the tonsillar fossa and preservation of the deeper fascial planes whenever possible are important. Avoidance of excessive coughing, vomiting, straining, and other activities associated with increased upper-airway pressure during the immediate postoperative period may also reduce further air dissection [16,18].

In the present case, the development of cervicofacial subcutaneous emphysema approximately 30 minutes after bilateral tonsillectomy and transoral styloidectomy represents a rare but clinically important postoperative event. The timing of onset, absence of documented difficult intubation or forceful extubation, and the additional deep dissection required for styloid exposure support a possible surgical contribution, although causality cannot be established. Early recognition based on sudden cervicofacial swelling and palpable crepitus, prompt clinical assessment for airway and thoracic complications, and conservative management resulted in complete clinical resolution.

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#### 4 CONCLUSION

Cervicofacial subcutaneous emphysema is a rare but potentially serious complication following tonsillectomy. Its occurrence after combined tonsillectomy and transoral styloidectomy in a patient with Eagle syndrome highlights the importance of careful dissection within the tonsillar fossa and awareness of potential communication between the surgical site and deeper cervical fascial planes. Sudden postoperative cervicofacial swelling and crepitus should prompt immediate clinical assessment for airway compromise and possible extension into the thorax. In clinically stable patients, conservative management with close observation is generally effective.

## STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

### *Disclosure of conflict of interest*

The authors declare that they have no financial or non-financial conflicts of interest.

### *Statement of ethical approval*

Ethical approval was not obtained for this case report, as it involved a single patient and written informed consent was obtained from the patient for publication of the case report.

### *Statement of informed consent*

Written informed consent was obtained from the patient for publication of this case report and the accompanying clinical/radiological images.

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