

A Rare Complication After Microlaryngeal Surgery: Subcutaneous Emphysema and Pneumomediastinum

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Microlaryngeal surgery is a common and relatively safe otorhinolaryngological surgery. Its common complications include pain and numbness of the tongue, bruising of the lip, and chipped teeth. However, reports of subcutaneous emphysema of the neck with pneumomediastinum following microlaryngeal surgery are rare. A 69-year-old female developed swelling of her left-side cheek and neck after microlaryngeal surgery for anterior glottic web. Palpation revealed subcutaneous emphysema and computed tomography demonstrated pneumomediastinum. The patient was managed conservatively, with complete resolution of symptoms within 2 weeks. Our observations suggest that emphysema likely resulted from increased intrapharyngeal pressure secondary to coughing, vomiting, straining, or manual ventilation after extubation provoked by disruption of the pharyngeal mucosa over the left anterior tonsillar pillar during insertion of the laryngoscope. Although microlaryngeal surgery is considered a relatively safe surgical procedure, it may be associated with significant complications. The procedure should be performed carefully to prevent mucosal injury. [*J Chin Med Assoc* 2010;73(5):268–270]

Key Words: microlaryngeal surgery, pneumomediastinum, subcutaneous emphysema

Introduction

Subcutaneous emphysema develops when air enters tissue under the skin. When it occurs in the neck, the air can spread through the cervicofacial planes and reach the mediastinum, resulting in pneumomediastinum. Subcutaneous emphysema can occur suddenly during or immediately after oral and maxillofacial surgery;¹ however, reports of this complication following microlaryngeal surgery are rare. We present a case in which microlaryngeal surgery was complicated by subcutaneous emphysema and pneumomediastinum.

Case Report

A 69-year-old female presented with a husky voice and a tendency for voice fatigue of 1 year's duration. The symptoms began after the patient underwent total thyroidectomy and radiotherapy for malignant fibrous histiocytoma of the thyroid. On examination, the neck was supple and telelaryngoscopy revealed a thin anterior glottic web. Carbon dioxide laser-assisted lysis and topical mitomycin-C application of the anterior glottic web was performed through suspension laryngoscopy under general anesthesia with orotracheal intubation.



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Figure 1. Coronal computed tomography shows extensive emphysema involving the left side of the head and neck and the superior mediastinum (arrows).

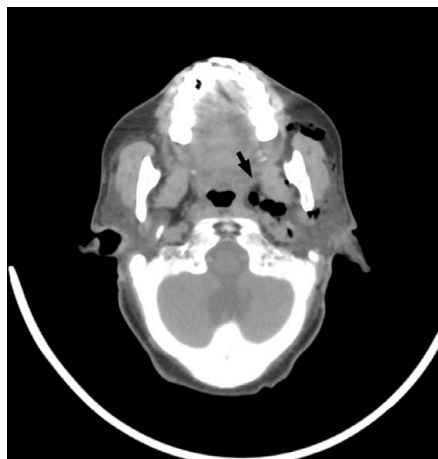


Figure 2. Axial computed tomography shows extensive emphysema of the left parapharyngeal and masticator spaces. The arrow indicates a possible area through which air could enter the neck spaces.

The anesthetic procedure was smooth. We inserted the laryngoscope quickly without difficulty, but some blood was noted in the larynx. Immediately after extubation, the patient started to cough and spit bloody sputum. Positive-pressure ventilation was administered by oxygen mask; however, the coughing and emesis persisted. Following reintubation and further examination, a laceration wound, approximately 0.5 cm in depth, with ecchymoses and bloodiness was observed on the superior aspect of the left anterior tonsillar pillar. Hemostasis was achieved by bipolar electrocoagulation. The remainder of the immediate postoperative recovery was uneventful, without coughing or emesis after extubation.

When the patient returned to the ward, marked swelling of her left-side cheek and neck were observed. On palpation, there was characteristic crepitation and softness with mild tenderness. Inspection of the mouth revealed a mucosal tear in the upper region of the left tonsillar pillar. A computed tomography scan showed an extensive pneumatization of the left face and neck, with numerous air bubbles spreading down around the larynx. Inferiorly, pneumatization reached the upper mediastinum (Figures 1 and 2). The patient had no airway difficulties and her general condition was stable. Antibiotic prophylaxis was administered intravenously. The patient was followed-up in the hospital, and her symptoms began to resolve slowly. She was discharged 3 days post surgery, and her symptoms had resolved completely by the 2-week follow-up appointment.

Discussion

Subcutaneous emphysema occurs when air leaks into the tissues under the skin covering the neck or chest

wall. It can happen during trauma, infection (gas gangrene), or oral surgical procedures, when the integrity of the mucosa is breached. Subcutaneous emphysema, with or without pneumomediastinum, is a rarely reported complication of microlaryngeal surgery, and all of the reports are associated with Venturi jet ventilation.^{2,3} This complication may be caused by disruption of the pharyngeal or laryngeal mucosa.^{2,4} Disruption of the mucosal integrity of the upper aerodigestive tract can occur secondary to laryngoscope insertion and result in the leakage of gas into the surrounding tissues, leading to emphysema. Anesthesia-associated causes, including traumatic intubation, compromised anesthetic circuits, excessive manual ventilation, and positive airway pressure ventilation, should also be considered.^{1,5}

In our case, the patient suffered a laceration to the superior aspect of the left anterior pillar. Anesthesia procedures were uneventful. There was no obvious bleeding, and the pharyngeal mucosa was intact during insertion of the laryngoscope. However, a small amount of blood was noted in the larynx when we suspended the laryngoscope and exposed the vocal cords. We speculate that pharyngeal mucosa disruption occurred during insertion of the laryngoscope, creating a porous surface that acted as a route for air entry. Air can be forced into the fascial planes of the neck due to increased intrapharyngeal pressure caused by coughing, vomiting, straining, and manual ventilation after extubation.⁴⁻⁶ The air can then track through the superior constrictor pharyngeal muscle and buccopharyngeal fascia and enter the parapharyngeal and retropharyngeal neck spaces, dissecting through the cervicofacial planes. Communication between the retropharyngeal space and the mediastinum allows air to reach the mediastinum, causing pneumomediastinum.⁵

To avoid this complication, great care should be paid to the placement of the laryngoscope. After the laryngoscope is inserted into the mouth, it must be advanced smoothly alongside the endotracheal tube under vision, with the soft palate, uvula and posterior wall of the oropharynx serving as landmarks. Aggressive manipulations should be avoided to protect the mucosa of the upper aerodigestive tract from injury. Once a mucosal laceration presents, hemostasis by suture or electrocoagulation is necessary to prevent the patient from coughing, vomiting, and straining, which result in an increase in intrapharyngeal pressure and forces air into the tissues of the neck. Moreover, positive-ventilation through an oxygen mask should be avoided during the patient's anesthetic recovery.⁷

Treatment of subcutaneous emphysema and pneumomediastinum secondary to surgery is based on the severity of the condition. Most cases resolve spontaneously without significant sequelae.⁷ Therefore, management is usually conservative, with frequent assessment of the airway and the extent of the emphysema.^{1,4,5} In severe cases with airway compromise, orotracheal intubation or tracheostomy may be necessary.⁷ The mucosal breach can allow seeding of the fascial spaces of the neck with bacteria-laden secretions and, therefore, broad-spectrum antibiotic prophylaxis is recommended.^{1,4,5}

In conclusion, although rigid laryngoscopy is one of the more common procedures performed by

otolaryngologists and is considered a relatively safe surgery, it may be associated with significant complications, as observed in our case. Therefore, this procedure should be performed with a meticulous technique, and vigorous maneuvers that increase the possibility of accidental trauma to the pharyngeal mucosa should be avoided.

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