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Case Report

Cervical pneumatocele: A case report and review of the literature [☆]

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ABSTRACT

A thyroidectomy is a safe and low-risk procedure done for a wide variety of thyroid disorders. Complications of a thyroidectomy are commonly due to damage of structures adjacent to the thyroid gland. In this case report, we present the case of a 39-year-old patient with a cervical pneumatocele a month after thyroidectomy for thyroid papillary carcinoma. The symptoms included neck swelling when speaking that resolved with rest. A follow-up neck CT scan found a collection of air anterior to the trachea most compatible with cervical pneumatocele. Exploratory surgery ensued and a pneumatocele arising from a tracheal subcutaneous fistula was cauterized. On follow-up laryngoscopy a month later, no further complications were found, and the patient reported resolution of symptoms. Tracheal injury following thyroidectomy is a rare complication and CT imaging can be helpful in diagnosing these complications and expediting management.

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Introduction

A thyroidectomy is a safe and low-risk surgical procedure commonly done for both benign symptomatic goiters and malignant thyroid diseases [1]. Common post operative complications include hypocalcemia, post-operative hematoma, wound infection, and recurrent laryngeal nerve injury [2]. One extremely rare complication is intraoperative tracheal injury. Studies show an incidence of 0.06% for tracheal injury and it is usually more common with re-exploratory surgeries where there are adhesions from the prior thyroidectomy. Typically, acute tracheal injury is managed in the operating room or

within 24 hours postoperatively. If neck swelling or subcutaneous emphysema is found later, this may be representative of delayed tracheal injury, which should be managed emergently with re-exploration if indicated. In this case report we will discuss the diagnosis and management of a delayed tracheal injury approximately 1 month post thyroidectomy.

Case report

This is the case of a 39-year-old patient with past medical history of GERD and multiple bilateral thyroid nodules on

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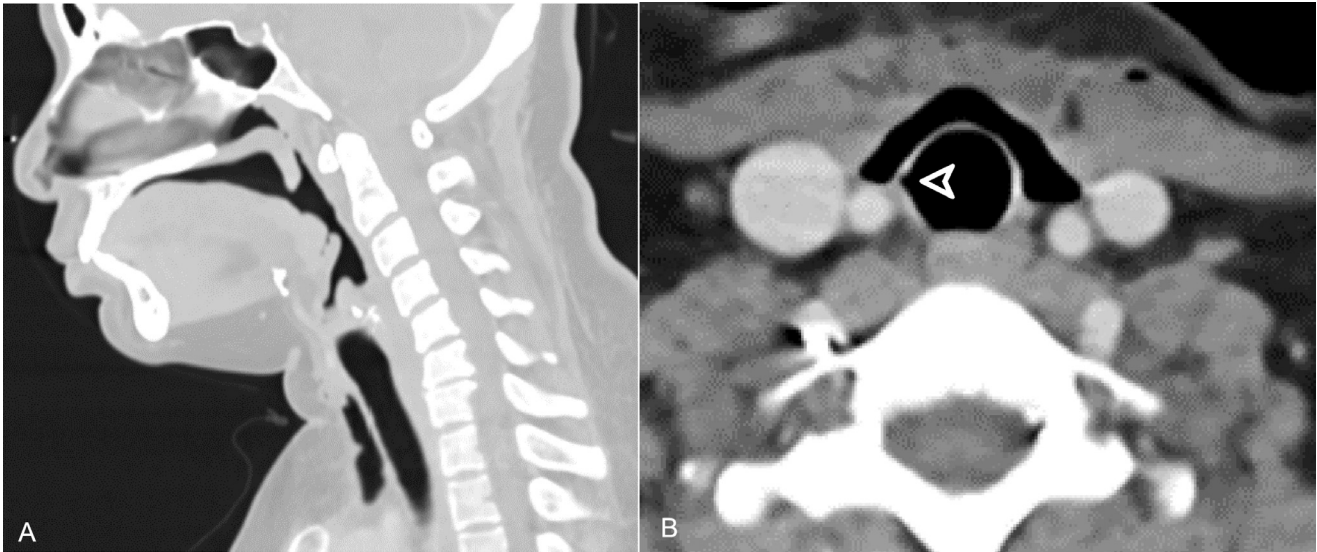


Fig. 1 – (A) Sagittal view of head and neck CT showing pneumatocele anterior to the trachea. (B) Axial CT view of the neck showing a small defect in the right trachea (arrowhead) that communicates with the pneumatocele.

ultrasound. A fine needle aspiration (FNA) resulted in a pathologic diagnosis of papillary carcinoma and the patient underwent total thyroidectomy without any complications.

A month later, the patient had a follow up appointment, where she referred neck swelling when speaking that resolved with rest. Upon evaluation, neck fullness with phonation was noted. The patient was referred for a follow up contrast enhanced neck CT scan which found a collection of air anterior to the trachea measuring approximately $4.2 \times 3.0 \times 1.2$ cm (Fig. 1). This was most compatible with a cervical pneumatocele. There was additionally a small defect in the right trachea which appeared to communicate with the air collection (Fig. 1B).

With these findings, the patient was admitted to the hospital for an exploratory surgery where a tracheal-subcutaneous fistula causing the pneumatocele was cauterized. The patient's pneumatocele and related symptoms resolved, and the patient was discharged. On follow up laryngoscopy a month later, no further complications were found, and the patient had a good recovery with resolution of symptoms.

Discussion

Thyroid cancer has been growing at a rate faster than other cancers in recent years. This trend is partially due to increased incidental detection during imaging [3]. In 2021, over 40,000 patients received a diagnosis of thyroid cancer. Amongst the distinct types of thyroid cancer, papillary thyroid cancer makes up over 70% of the diagnoses and has a good prognosis [4]. Of the treatments available for thyroid cancer, surgery is the most common [4]. More than 100,000 thyroidectomies are performed in the United States annually with most common complications including scarring, hematoma, hypoparathyroidism, or nerve injury [5,6].

Tracheal injury following thyroidectomy is rare and risk factors include a history of thyroid disease, prolonged intubation, goiter, excessive cautery uses during surgery, wound infection, and vigorous post operative cough [7]. An uncommon presentation of tracheal injury is delayed pneumatocele formation, as in our case. The exact etiology of delayed tracheal injury is not clear, but the published literature favors devascularization as a mechanism [7]. While most of the tracheal vascular supply is posterior, the anterior tracheal wall is supplied by extensive vascular anastomoses that penetrate the soft tissue of the tracheal rings [8]. When cauterizing, thermal coagulation injury can cause neurovascular damage to the trachea, leading to necrosis in the less vascularized regions [9,10]. This is why other case reports as well as ours show injury in the anterior to anterolateral region.

While the diagnosis of tracheal injury or pneumatocele can be clinical with signs such as crepitus from subcutaneous emphysema, a CT scan offers a sensitive evaluation to localize tracheal defects and evaluate the soft tissues for additional complications such as infection or abscess formation. When evaluating a cervical CT scan, it is important to evaluate the trachea in its entirety, as defects can be subtle. At times, associated features of the tracheal defect might be occult and suggested by presence of other imaging features such as pneumomediastinum, pneumothorax, or deep cervical subcutaneous emphysema. Even though findings may be subtle, it is important for radiologists to thoroughly evaluate the trachea, as complications of missed tracheobronchial injury can lead to mediastinal infections and sepsis which have a high mortality and are indications for surgical management [11].

The management of a cervical pneumatocele from a tracheal injury depends on the size of the tracheal defect, the clinical status of the patient and comorbidities [12]. Apart from these, it is important to prioritize airway stability. These considerations will help guide whether surgery or conservative management is indicated.

Patient consent

All identifying data and details that could be linked to the patient were removed from the details of this report and the images used to present the case.

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