Infected Thyroglossal Duct Cyst with an Emergent Airway Threat

Case Report

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Abstract

Thyroglossal duct cyst (TDC) is a common congenital neck anomaly that typically presents as a midline neck mass and is most often diagnosed in the second decade of life. Although TDCs are generally painless and asymptomatic, infection of the cyst can lead to significant airway obstruction. We report the case of a 31-year-old male who experienced upper airway obstruction due to an acute TDC infection. We performed a curative modified Sistrunk procedure to relieve the obstruction during the acute episode. This case underscores the critical need for prompt diagnosis and intervention to prevent morbidity and mortality associated with airway emergencies in infected TDCs. We also discuss the challenges of managing an acutely infected TDC with emergent airway involvement, necessitating a more complex surgical approach.

Keywords: Thyroglossal cyst, airway obstruction, Sistrunk procedure, neck abnormalities, case report

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Introduction

Thyroglossal duct cyst (TDC) is a common congenital anomaly that typically presents as a painless anterior neck swelling during the second decade of life (1). During embryological development, the thyroid gland descends from the foramen cecum to its adult position via the thyroglossal duct, which normally obliterates by the tenth week of gestation (1). Failure or incomplete obliteration of this duct results in the formation of a TDC (1,2). Due to its anatomical relationship with the thyroid gland and foramen cecum, the swelling characteristically moves upward with swallowing and tongue protrusion (3,4).

TDC can become complicated by infection, owing to its proximity to the oral cavity, with infection rates ranging from 10% to 70% (1,5). An infected TDC may be life-threatening due to significant airway obstruction (6). Comprehensive surgical excision is the definitive treatment for TDC. The standard technique, described by Sistrunk, involves removing the cyst, the central portion of the hyoid bone, and the thyroglossal duct, as well as resecting tongue base tissue up to the foramen cecum, achieving a recurrence

rate of less than 6% (7). This procedure is typically performed in a non-infected state, as an infected TDC increases the risk of bleeding and residual tissue (7).

Case Presentation

A 31-year-old male with a history of atrial flutter presented with fever, painful anterior neck swelling, and purulent discharge from the swelling. The anterior neck swelling had been present for five years; however, this was the first episode of infection. The discharge was thick, milky, foul-smelling, and expressible upon palpation. He also reported a sensation of globus on swallowing and worsening dyspnea when lying flat. There was no noisy breathing or shortness of breath when sitting upright.

On examination, the patient's voice was breathy, but he could speak in full sentences, with no stridor observed. The midline anterior neck swelling measured 15x15 cm, extending laterally to involve levels II to IV bilaterally, with overlying skin appearing stretched and inflamed (Figure 1). A punctum was noted at the lower left aspect of the swelling. Needle aspiration yielded 10 cc of thick, seropurulent fluid. Flexible nasopharyngolaryngoscopy revealed a globular lesion at the left base of the tongue, obliterating the left vallecula and left aryepiglottic fold, with posterior displacement of the epiglottis causing supraglottic airway narrowing (Figure 2). Vocal cord mobility was asymmetric, with left vocal cord paresis on phonation, though fully compensated by the right vocal cord.

A contrast-enhanced computed tomography scan of the neck demonstrated a large, well-defined, unilocular cystic mass in the left paramedian anterior neck, measuring 9.3x11.6x10.8 cm. The mass involved both the suprahyoid and infrahyoid regions, exerting a local mass effect that narrowed the airway, suggestive of a TDC. A multidisciplinary team (MDT) discussion, involving the radiology, anesthesiology, and otorhinolaryngology departments, was held to determine the optimal approach for airway management and surgical timing. The MDT agreed to secure the airway via awake fiberoptic nasal intubation and proceed immediately with surgical intervention to excise the infected TDC.

After successfully securing the airway, we performed a direct laryngoscopy and a modified Sistrunk procedure. Intraoperatively, the cystic mass measured 15x18 cm (Figure 3). The midline mass was adherent to the body of the hyoid bone, extending laterally to the left, and was attached to the pharyngeal mucosa. It exhibited superior lateral extension to the vallecula and pyriform fossa, and inferior extension to the suprasternal notch. The mass was decompressed intraoperatively via needle aspiration and meticulously dissected from the underlying pharyngeal mucosa. The body of the hyoid bone was divided, and dissection continued to the tongue base, where a cuff-of muscle was excised along with the specimen. Direct laryngoscopy confirmed an intact pharyngeal mucosa with no evidence of airway edema.

Postoperatively, the patient was extubated in the operating theater after careful assessment of his respiratory effort and airway patency. He was monitored in a high-dependency unit for one-day before being transferred to the general ward for two-days, remaining stable throughout his hospital stay. His recovery was uneventful. At a two-week follow-up visit,

Figure 1. Large anterior neck swelling measuring 15×15 cm, with a punctum (blue arrow) visible in the lower left portion of the mass

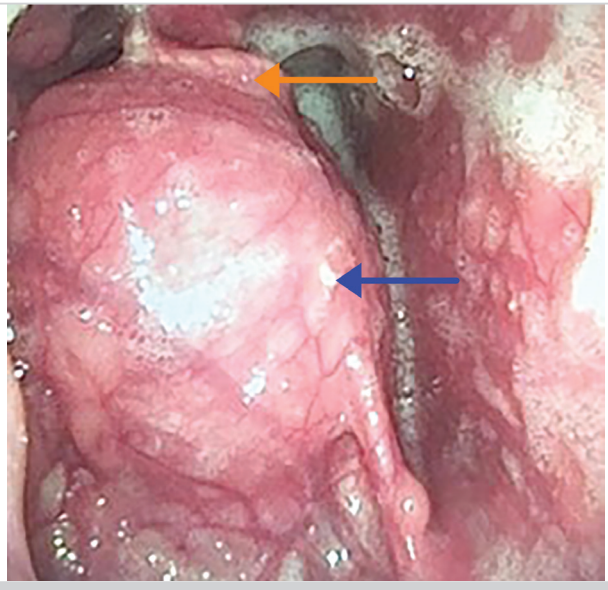

Figure 2. Flexible endoscopic examination revealed a large cystic, globular mass at the left base of the tongue, causing significant airway narrowing (blue arrow) and posterior deflection of the epiglottis (orange arrow)

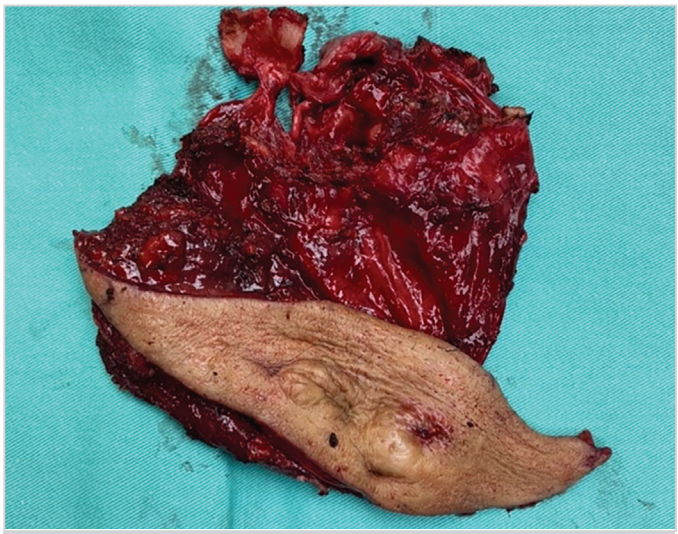

Figure 3. Postoperative specimen showing en bloc removal of the lesion, including part of the skin, tract, and body of the hyoid bone

the previously noted left vocal cord paresis had resolved. He was followed up for one-year with no evidence of recurrence. Informed consent was obtained from the patient for this case report.

Discussion

TDCs typically present as soft, cystic masses in the cervical region, particularly along the midline from the hyoid bone to the level of the thyroid gland. They are most commonly located between the hyoid bone and thyroid gland (60%), but may also arise at any point along the thyroglossal duct tract, including the suprahyoid region (24%), suprasternal region (13%), and, rarely, the intralingual area (1-2%) (2). Due to their anatomical proximity to the oral cavity, TDCs are predisposed to secondary infections, which often manifest as painful anterior neck swelling, sometimes accompanied by a discharging fistula, fever, and dysphonia, as seen in this patient (3). Common bacterial pathogens involved in TDC infections include *Haemophilus influenzae, Staphylococcus aureus,* and *Staphylococcus epidermidis* (5).

This case highlights the atypical presentation and management challenges of a long-standing, large anterior neck mass complicated by airway compromise, an uncommon feature of TDCs. Only a few cases of TDC-related airway involvement have been reported in the literature, and in this instance, the intralaryngeal extension of the cyst was a key contributing factor. The presence of a significantly narrowed supraglottic airway, exacerbated by infection, posed a substantial management challenge. Given the risk of failed intubation under general anesthesia and the difficulty of performing a tracheostomy due to the large anterior neck swelling obscuring the surgical field, awake fiberoptic nasal intubation was chosen as the safest approach for securing the airway. This case underscores the critical importance of a meticulous, tailored anesthetic approach to maintain adequate oxygenation, further highlighting the necessity of a MDT team strategy in managing complex airway obstructions.

The traditional Sistrunk procedure, first described by Sistrunk in 1920, involves en bloc resection of the TDC along with the body of the hyoid bone and the midline root of the tongue up to the foramen cecum (8). The suprahyoid portion of the thyroglossal duct contains multiple branches at the tongue's root, and incomplete excision of this segment may lead to recurrence. However, Sistrunk himself noted that the suprahyoid ductal tissue is extremely fragile and can easily break during surgery (8). While the Sistrunk procedure is the gold standard for TDC excision, it carries risks of injury to the lingual artery, oropharyngeal breach leading to pharyngocutaneous fistula, and infection (9). Recognizing these risks, Sistrunk modified his technique in 1928, limiting resection to the tongue base muscle without extending it to the foramen cecum (9). Since then, various adaptations of the modified Sistrunk procedure have been proposed, including a muscle-sparing approach, which has demonstrated favorable outcomes (10).

In this patient, a modified Sistrunk procedure was performed with an extended dissection in the neck region due to the cyst's large size and adherence to laryngopharyngeal structures. The surgery was particularly challenging due to strong adherence of the mass to the pharyngeal mucosa, requiring meticulous dissection to prevent mucosal tearing. Additionally, the overlying unhealthy skin had to be excised, contributing to a longer operative time and increased intraoperative bleeding.

Conclusion

This case underscores the critical importance of early diagnosis and timely surgical intervention in managing TDCs complicated by acute infection and airway obstruction. The successful use of the modified Sistrunk procedure during an acute episode highlights its efficacy, even in emergency settings, reinforcing its role in preventing morbidity and mortality. Furthermore, this case illustrates the challenges associated with managing infected TDCs in airway emergencies, emphasizing the need for heightened clinical awareness and a multidisciplinary approach to optimize patient outcomes. Finally, long-term follow-up remains essential to monitor for TDC recurrence and ensure complete resolution of the condition.

Ethics

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

Footnotes

Authorship Contributions

Concept: T.H.L., S.A., S.K., Design: T.H.L., S.A., S.K., N.A.M.U., Data Collection and/or Processing: T.H.L., S.A., S.K., Analysis and/or Interpretation: T.H.L., S.A., S.K., N.A.M.U., Literature Search: T.H.L., N.A.M.U., Writing: T.H.L., N.A.M.U.

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Main Points

- Thyroglossal duct cysts (TDCs) are typically painless and asymptomatic. However, acute infection can lead to significant airway obstruction.
- If not managed promptly, airway obstruction caused by an infected TDC can result in severe morbidity and mortality. A multidisciplinary team approach is crucial for optimal outcomes.
- Even in the acute stage, an infected TDC can be effectively treated with the Sistrunk procedure, providing definitive management while simultaneously improving airway obstruction.

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