

Case Report

Midline Neck Mass

Urgent message: Swelling of the neck is a common problem seen in the urgent care setting. Etiologies range from infectious to lymphatic to malignant. If serious conditions are not diagnosed and treated in a timely manner, complications may lead to airway compromise, sepsis, or even death. *How this article helps you: alerts you to uncommon presentations of neck masses.*

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Introduction

Swelling in various areas of the neck is frequently seen in urgent care centers. Most such swelling can be separated into three main categories: inflammatory, neoplastic, and congenital, the most common being inflammatory. Lymphatic nodal inflammation usually presents as a neck mass and is most likely to be a congenital or neoplastic disorder, depending on the patient's age. Therefore, obtaining a careful medical history and performing a thorough physical examination are necessary to narrow the differential diagnosis and determine the appropriate work-up and treatment plan. We report a case of a common midline neck mass with an uncommon presentation in an older patient with a history of cigarette smoking.

Case Presentation

A 57-year-old woman presented to our urgent care clinic with dysphagia, dysarthria, vomiting, and a midline neck mass with progressive 2-week enlargement (Figure 1). The patient was visibly uncomfortable and said that no remedy she had tried had worked. After further questioning, the patient attributed the mass to an insect bite and said that she had not experienced any recent phys-



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ical trauma. She reported that in the week prior to her presentation, she developed a fever spike that abated 2 days before she sought medical care. She said that swallowing had become more difficult and that her voice volume was markedly reduced, to a whisper.

The patient had a pertinent past medical history of hypertension, hyperlipidemia, chronic sinusitis, acute bronchitis, chronic hepatitis C, and multiple nonvenomous insect bites. Her known allergies were to latex, sulfonamides, and penicillin. She was also a 5-pack-year

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Figure 1.



Ruptured thyroglossal duct cyst with exudate 2 days after presentation to an urgent care clinic.

smoker who had recently quit. She said that she did not know of any family history of cancer.

Physical Examination

The patient’s vital signs at initial presentation were as follows:

- Temperature (temporal artery): 35.9°C (96.6°F)
- Blood pressure: 122/90 mm Hg
- Pulse: 60 beats/min
- Respiration rate: 14 breaths/min
- Body mass index: 32 kg/m²

The patient was oriented to person, place, and time. She appeared tired and uncomfortable but had no alarming changes to the cardiovascular, pulmonary, or gastrointestinal systems. Increased respiratory effort was noted, with use of accessory muscles and the tripod position. Findings on examination of the oral cavity and pharynx were negative for glandular swelling, erythema, or infection of mucous membranes. A neck examination revealed a 3.6-cm mass slightly off the midline of the neck and posterior to the hyoid bone (forcing the bone visibly anteriorly), thyroid cartilage, and cricoid cartilage. The mass was warm and tender to touch, but its mobility was difficult to assess because of the patient’s discomfort. Also noted was an indurated lesion just to the right of midline that proved to be sensitive when palpated. The thyroid was palpated and appeared to be tender.

Differential Diagnosis and Work-Up

The differential diagnosis for a midline neck mass is rather long (Table 1), but given the patient’s older age and smoking history, neoplastic causes were high on the differential and congenital causes were lower. However, given the acute presentation and recent fever, infection was most likely. Immediate blood work-up included the following:

- Complete blood count with differential
- Comprehensive metabolic panel
- Sedimentation rate
- Thyroid-stimulating hormone
- Free thyroxine (T₄)

Table 1. Differential Diagnosis^a for Midline Neck Mass

Cause	Examples
Inflammatory	
Viral	Epstein-Barr virus, mumps, human immunodeficiency virus
Bacterial	<i>Streptococcus</i> , <i>Staphylococcus</i> , <i>Actinomyces</i> , Ludwig angina
Insect, arthropod, parasite	Mosquito, spider, tick
Neoplastic	
Benign	Lipoma, hemangioma, neuroma, fibroma, adenoma, paraganglioma, schwannoma
Malignant	Metastatic, lymphoma, carcinoma, sarcoma
Congenital	Thyroglossal duct cyst, branchial cleft cyst, cystic hygroma, vascular malformations, laryngocele, ranula, dermoid cyst, thymic cyst
Traumatic	Hematoma, displaced cricoid cartilage or hyoid bone
Other	Hyperthyroid, hypothyroid, Kimura disease, Castleman disease, sarcoidosis, pseudoaneurysm

^aThis is a partial list and is not intended to be all-inclusive.

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The following laboratory test findings were significant: white blood cell count, 12.3 k/ μ L; sedimentation rate, 52 mm/h, and thyroid-stimulating hormone, 0.372 mIU/mL (milli-international units per milliliter). Same-day neck ultrasonography showed a non-specific 3.6 \times 3.0 \times 2.2-cm complex, irregular nodule with both cystic and solid features. Findings on a follow-up contrast-enhanced computed tomography (CT) scan of the neck were significant for a gas and fluid collection with no solid mass (**Figure 2**). The sub-mandibular, parotid, and thyroid glands appeared normal, without evidence of cervical adenopathy.

Diagnosis and Follow-Up

The diagnosis was determined to be an infected thyroglossal duct cyst (TGDC). Given the patient’s respiratory distress, she was transferred with airway precautions for surgical incision and drainage. The cyst was drained, irrigated, and packed with gauze. Approximately 15 mL of purulent fluid was extracted and found to contain many gram-positive cocci clusters. The procedure quickly resolved her respiratory distress, dysphagia, and other airway symptoms. Subsequently, her antibiotic coverage was narrowed to doxycycline, 100 mg orally twice a day for 10 days. She was referred to an otolaryngologist for follow-up after her infection was controlled.

Discussion

Embryology

The thyroid gland begins development in the fourth week of gestation in the oral cavity. Midline epithelium on the floor of the pharynx begins to differentiate and migrate caudally to the lower neck. As the differentiated epithelium travels down the neck to its definitive position anterior to the upper trachea, it remains connected to the foramen cecum at the base of the tongue through the developing thyroglossal duct (TGD).¹ The epithelium then lobulates and becomes the bilobed thyroid gland. The thyroid gland continues to develop until around the eighth week of gestation. Normally, once the thyroid has fully developed, the TGD will regress, leaving a stand-alone gland.² However, in the case of a persistent TGD, the epithelium of the duct remains viable and the patient retains this connection to the pharynx. This duct can become infected or obstructed, causing the development of inflammation, pus, and



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Figure 2.



Sagittal computed tomography contrast-enhanced image showing a 3.5-cm thyroglossal duct cyst with fluid and gas collection on the neck.

edema, culminating in a painful mass on the midline of the neck.

Clinical Presentation and Treatment

TGDC is the most common congenital neck cyst, with a prevalence of approximately 7% of the population.^{3,4} TGDC most commonly presents in children around the age of 6 years and affects both sexes equally.¹ Only in a minority of reported cases is the patient older than 20 years.¹ In 28% of reported cases, the patient is older than 50 years, and in 10%, older than 60 years.⁵⁻⁷ The typical presentation is a painless, mobile, and asymptomatic soft mass in the anterior midline of the neck near the hyoid bone. Our patient presented with a tender and symptomatic (dysphagia and hoarseness) midline mass, which is highly atypical for her age. Vertical mobility with protrusion of the tongue on swallowing is the most specific finding for a TGDC, but this was difficult to assess in our patient because of throat tenderness.⁸ Ultrasonography and CT are helpful to narrow the diagnosis.

The immediate concern in a patient with an enlarging

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neck mass is airway compromise. Early and continuous assessment of airway patency is a critical part of the treatment plan. Initial supportive therapy may include bag-valve-mask ventilation or endotracheal intubation. If intubation is unsuccessful or not indicated, emergency cricothyrotomy and tracheostomy must be considered because clinical deterioration is unpredictable. Airway intervention will depend on the degree and location of the obstruction, as well as available expertise. In this case, the patient had increased respiratory effort because of extrinsic compression of the upper airways with continuous and spontaneous patency. After a thorough work-up and airway assessment, it was believed that bag-valve-mask ventilation, intubation, emergency cricothyrotomy, and tracheostomy were not indicated. Intervention with incision and drainage by a well-trained surgeon was chosen to relieve pressure on the airway and treat the underlying infected TGDC.

Infection may be a major complication in TGDC. A patent TGD connects to the oral cavity via the origin at the foramen cecum, predisposing the entire tract to infection by oral flora. Moreover, fistula formation through the skin, as in this case, also predisposes the patient to additional skin-flora infection. The most common bacteria responsible for TGDC infections include *Haemophilus influenzae*, *Staphylococcus aureus*, and *S. epidermidis*.⁵ Gram staining of our patient's cystic fluid revealed gram-positive cocci, consistent with *S. aureus* infection. Traditionally preoperative TGDC infections have been treated with antibiotics alone.^{4,9} Incision and drainage is thought to increase scarring and obscure tissue planes, making future definitive treatment of TGDC much more difficult. However, a recent study of

120 patients with infected TGDC showed that incision and drainage did not increase the postoperative risk of infection recurrence, and in fact was found to have the same recurrence rates as treatment with antibiotics alone.⁴ In actual-

ity, infection is seen in only a minority of pediatric patients with TGDC (40%), with few (12%) requiring incision and drainage.⁴ It is even more rare for adults with TGDC to present with symptoms and signs of neck infection or dysphagia,⁹ as seen in our case. The definitive treatment for TGDC is surgical excision using the Sistrunk procedure once local infection is controlled. The procedure consists of excision of the TGDC, a midline portion of the hyoid bone, the TGD tract, and a portion of the surrounding muscles of the tongue. However, even with this thorough procedure, TGDC can recur.

This case was unusual in that the patient reported that she could taste the exudate as the cyst was draining. The patient was noted to have a draining fistula just to the right of midline of the neck, which the patient initially attributed to an insect bite. These fistulas are common presentations in the draining of TGDCs, but drainage up the duct is rarely seen.¹⁰ Although the patient's report could not be corroborated with laboratory evidence, it is not unfeasible that the cyst could drain through both internal and external orifices, causing marked discomfort.

A dangerous complication of an infected TGDC that tracks to the oral cavity, as with this patient, is Ludwig angina. Ludwig angina is a severe cellulitis typically caused by a dental source of infection that invades the submandibular, sublingual, and submental spaces.¹¹ Patients with Ludwig angina may show signs of dysphagia, dehydration, dysphonia, and stridor.¹² The inflammation and edema in the neck can inflame nearby glands to the point of precipitating acute airway compromise that requires emergency airway control. Although uncommonly associated with TGDC, Ludwig angina is potentially fatal, having an 8% mortality rate, and thus must not be missed by practitioners.¹¹

The relationship between smoking and TGDC infection is currently unknown. Our patient had a 5-pack-year history and developed the cyst later in life. Given that the majority of the patients with TGDC are children, it is reasonable that very little research on the effects of smoking on TGDC formation is available.

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Conclusion

A midline neck mass in an adult patient requires a broad differential for appropriate work-up. Our patient presented with a TGDC at an uncommon age (57 years) and with an uncommon presentation. This case was

also complicated by a history of smoking and fistula formation with local infection. When there is a midline neck mass, the urgent care clinician should obtain a detailed medical history and conduct a thorough physical examination. Imaging modalities like ultrasonography and CT should also be used to differentiate between solid and cystic contents. A general laboratory work-up should be ordered to assess for infection. If appropriate, cystic fluid Gram stain and culture may also be warranted to identify the cause of infection and narrow the antibiotic coverage. Early antibiotic treatment may be sufficient in simple cases, but incision and drainage should be considered in more complicated cases and for patients at risk of airway compromise. Ludwig angina is a serious and potentially fatal complication of any infection tracking to the oral cavity and should be treated aggressively and with early airway interventions if necessary. Clinicians should also note that patients with a TGDC must ultimately be referred to a specialist for definitive surgical treatment and management. Regardless of treatment modality, patients must be informed of the potential for cyst recurrence, because it is clinically significant. ■

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