International Journal of Otolaryngology and Head & Neck Surgery, 2025, 14(3), 129-136
https://www.scirp.org/journal/ijohns
ISSN Online: 2168-5460
ISSN Print: 2168-5452

Acute Suppurative Thyroiditis in a Case with Atypical Third/Fourth Branchial Cleft Cyst: A Case Report

Sultan Khalid Kadasah[1], Abdullah Al Helali[2], Saud Abdulwahab Aldhabaan[3], Faisal A. Alkenani[4], Dalia Alqarni[5*], Maha Alaklabi[5], Reema Alsaluli[5], Amirah Alqawba[5], Naif Alqarni[5], Manar Almnabhi[5]

[1]Department of Surgery, College of Medicine, University of Bisha, Bisha, Saudi Arabia
[2]Otolaryngology Department, Abha Children Hospital & Aseer Central Hospital, Abha, Saudi Arabia
[3]Department of Otolaryngology, King Fahad Military Hospital, Abha, Saudi Arabia
[4]Residential at Armed Forces Hospital Southern Region, King Abdulaziz University, Abha, Saudi Arabia
[5]College of Medicine, University of Bisha, Bisha, Saudi Arabia
Email: *daliaqarnii@gmail.com

How to cite this paper: Kadasah, S.K., Al Helali, A., Aldhabaan, S.A., Alkenani, F.A., Alqarni, D., Alaklabi, M., Alsaluli, R., Alqawba, A., Alqarni, N. and Almnabhi, M. (2025) Acute Suppurative Thyroiditis in a Case with Atypical Third/Fourth Branchial Cleft Cyst: A Case Report. *International Journal of Otolaryngology and Head & Neck Surgery*, **14**, 129-136.
https://doi.org/10.4236/ijohns.2025.143015

Received: March 3, 2025
Accepted: May 12, 2025
Published: May 15, 2025

Abstract

A 37-year-old Saudi female patient presented with an unusual case of a third/fourth branchial cleft cyst and acute suppurative thyroiditis. She had been experiencing fever, dysphagia, and neck pain for 5 days, unrelieved by antibiotics. An initial CT scan showed a parapharyngeal abscess, which was further evaluated to reveal a collection mainly within the parapharyngeal and retropharyngeal spaces. Laryngoscopy indicated a large paraglottic collection causing vocal fold immobility. The surgical intervention involved intraoral drainage and cauterization of the identified branchial cleft sinus. Postoperative evaluation was completed, and the patient was discharged. All antibiotics were administered, resulting in excellent clinical improvement. It is important to consider branchial cleft anomalies as differential diagnoses for acute neck infections, and it is essential to involve multiple specialists in determining the diagnosis and treatment plan.

Keywords

Branchial Cleft Anomalies, Congenital Sinus, Neck Infections, Parapharyngeal Abscess, Suppurative Thyroiditis, Surgical Drainage

1. Introduction

Branchial cleft cysts (BCCs) are congenital abnormalities resulting from the in-

complete involution of branchial arches during embryological development [1]. These cysts, though uncommon, are notable for their variability in genesis and size. There are four types of BCCs, each related to one of the four branchial clefts [2]. Second-branchial cleft cysts are the most prevalent, comprising about 90% of BCCs, whereas third and fourth-branchial cleft cysts are rare, accounting for less than 5% of cases [3].

Benign neck masses, though rare, include branchial cleft cysts, typically originating from the third or fourth branchial cleft, with indistinguishable clinical features. These cysts can appear as lateral neck lumps, usually located behind the sternal halves of the left and right sternocleidomastoid muscles [4]. They are rare and often misdiagnosed or discovered accidentally during imaging for other unrelated diseases. They can range from simple nodal enlargement to severe acute infection, with symptoms such as pain, erythema, and systemic signs of infection [5].

Acute suppurative thyroiditis (AST) is an inflammatory illness affecting the thyroid gland and is rarely seen; its primary causes are bacterial infections [6]. This is mainly due to its relation to anatomical structures like the piriform sinus fistula that expose the thyroid gland to pathogens. AST may have clinical characteristics similar to other neck region diseases, complicating diagnostics. Fever, neck pain, dysphagia, and anterior neck swelling are definitive symptoms. The condition should be managed immediately to avoid complications such as stridor, respiratory distress, and other systemic manifestations [7].

In this study, we found a clear connection between third and fourth branchial cleft cysts and acute suppurative thyroiditis. These cysts are usually located near the thyroid gland, meaning that infection with such cysts can lead to an infection invading the thyroid tissues. Thus, the progression to AST can be described as a secondary disease developing from an infected or ruptured branchial cleft cyst [8]. However, such cases are rare, and the simultaneous presentation of these conditions complicates diagnosis and management.

To the author's knowledge, a combination of a third/fourth branchial cleft cyst with AST has not been reported in the literature. This review covers general and specific aspects of clinical manifestations and imaging characteristics that aid in diagnosis and management. We aim to highlight the diagnostic challenges and the need to include branchial cleft abnormalities in the differential diagnoses of acute neck infections, particularly those involving the thyroid. This underscores the importance of recognizing these atypical but potentially life-threatening disorders and the value of a multi-professional approach to treatment.

2. Case Presentation

2.1. Patient Information

A 37-year-old Saudi female, previously healthy with no significant medical history, presented to the emergency room with a 5-day history of fever, sweating, dysphagia, and odynophagia. These symptoms had not improved despite initial antibiotic treatment.

2.2. Clinical Findings

Upon presentation, the patient was vitally stable and not in respiratory distress. However, she continued to experience moderate left-sided neck pain, which persisted despite conservative treatment with intravenous antibiotics. There was no change in her voice or shortness of breath.

2.3. Diagnostic Assessment

2.3.1. Initial Imaging

A CT scan of the neck with intravenous contrast revealed a paraglottic space collection measuring 2 × 1 cm. The findings suggested a left parapharyngeal abscess with no vascular infiltration. Multiple prominent neck lymph nodes were also noted (Figure 1).

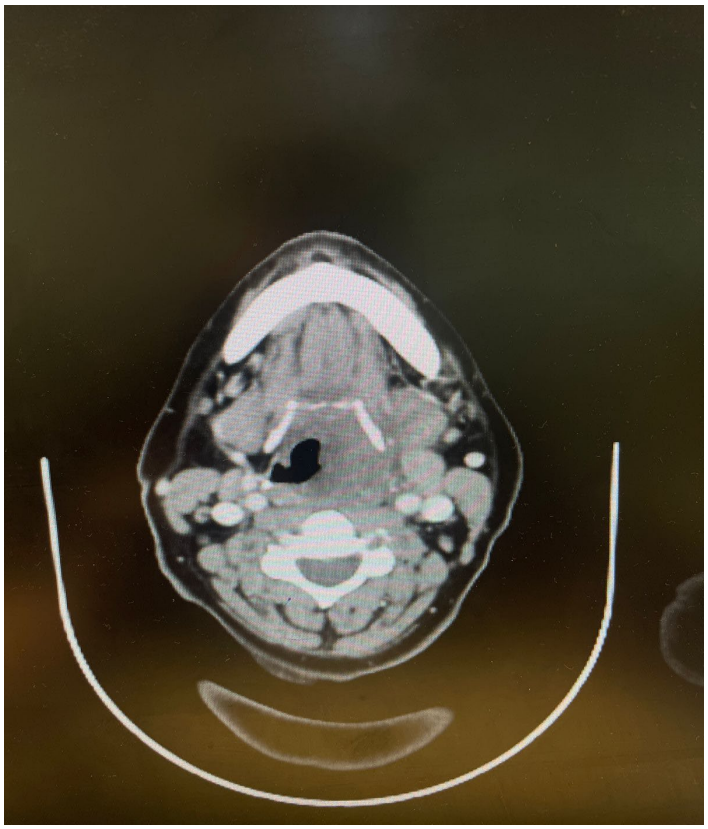

Figure 1. Initial CT scan shows a left parapharyngeal abscess.

2.3.2. Subsequent Imaging

A follow-up CT scan showed multiple hypoechoic collections in the left parapharyngeal, retropharyngeal, and left visceral spaces, extending superficially to form a large collection measuring 67 × 28 × 33 mm anterior to the left thyroid lobe. Additionally, there was diffuse subcutaneous fatty stranding, small hypodense nodules in both thyroid glands, multiple reactive cervical lymph nodes, a tracheal shift to the right side, and intact jugular veins and carotid sheath without bone destruction (Figure 2).

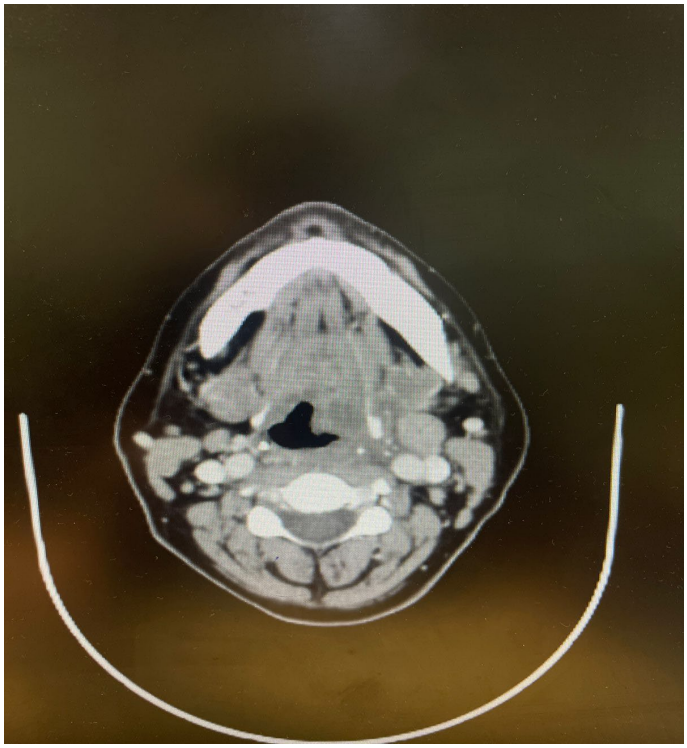

Figure 2. Follow-up CT scan shows the abscess progressing into a larger collection.

2.3.3. Laryngoscopic Examination

A fibroscopic laryngoscope revealed fullness in the left pyriform fossa, displacing the ventricle of Morgagni medially, which constitutes the medial wall of the paraglottic space. This fullness measures 8 cm in anteroposterior diameter and 5 cm in depth, resulting in limited vocal cord mobility and edema of the left arytenoid (**Figure 3**).

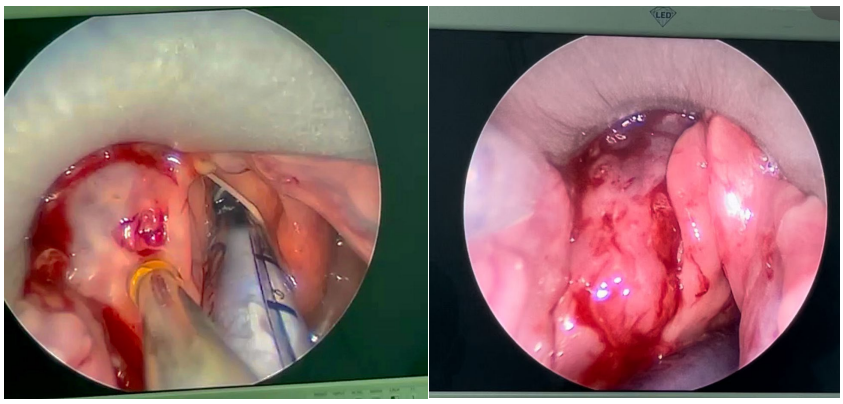

Figure 3. Laryngoscopy reveals fullness in the left pyriform fossa, displacing the ventricle of Morgagni medially and representing the medial wall of the paraglottic space.

2.4. Treatment and Surgical Intervention

Given the persistence of symptoms and findings from imaging and laryngoscopy, the patient underwent surgical drainage in the operating room. Using direct

laryngo-bronchoscopy, an intraoral approach was employed to drain the pus from the left pyriform sinus. The neck was swept, and the drainage tract was followed using cautery. To eliminate the drain, the Urology Instruments Bugbee Electrode Monopolar Flexible Needle Tip was used. A third/fourth branchial cleft sinus was identified and cauterized during the procedure.

2.5. Postoperative Course

Post-surgery, the patient completed a full course of antibiotics. She showed significant improvement in her symptoms and was discharged without complications. As the patient is under follow-up care at a different institution, postoperative images cannot be obtained.

3. Discussion

AST is a rare and severe infection of the thyroid gland but can occur due to congenital anomalies like branchial cleft cysts. This is seen in the case of a 37-year-old female who presented with fever, dysphagia, and odynophagia, which did not respond to initial antibiotic treatment, raising the diagnostic challenge of AST. The case study by Erwin *et al.* notes that individuals with branchial cleft anomalies are at a higher risk of recurrent neck infections [7].

AST in adults is rare, especially regarding BCC, which makes diagnosis more challenging. Based on existing data, most cases described are in children (92%), confirming the congenital origin of the disease [8]. Several studies found that congenital sinus tracts or recurrent cysts can lead to AST [9]. This supports the findings, illustrating that in managing adult patients with persistent neck infections, branchial cleft anomalies should be considered [10].

Imaging also plays an important role in diagnosing AST, as demonstrated by the contrast-enhanced CT scan report showing a large abscess in the parapharyngeal and retropharyngeal spaces. In this context, Bin Saeedan *et al.* substantiate the use of CT scans for detecting abscess formations and clearly differentiating them from other neck masses or nodules within the thyroid gland [11]. Similarly, Bagchi *et al.* emphasized how imaging can help describe the degree of infection in a patient and determine whether surgical intervention is necessary [12].

The clinical signs and symptoms of AST can mimic other forms of thyroiditis, but the acute features of the disease, such as severe pain over the involved area, fever, and dysphagia, may be specific to the condition. In this regard, Lafontaine *et al.* found that timely evaluation and intervention are crucial to avert critical consequences such as airway occlusion [13]. While the patient might experience symptoms due to other health disorders such as Hashimoto's thyroiditis or Graves' disease, these conditions most commonly have gradual symptoms and lack the acute suppuration characteristic of AST.

If there is a large abscess formation or ineffective treatment through medication, surgery becomes inevitable. Sanker *et al.* have argued about the need to establish surgical drainage in extensive abscessing in AST, noting that intraoral ap-

proaches to drainage help overcome many associated complications and provide early relief to patients [14]. This case illustrates that using intraoral drainage was the correct approach; it alleviated the patient's symptoms and decreased the possibility of complications.

Branchial cleft anomalies, particularly those developing from the third and fourth branches, are less common than first and second-branchial cleft cysts; however, any infection can be fatal. Mishra *et al.* reported that these anatomical abnormalities could manifest as chronic neck infections and evolve into more severe forms of suppurative infection, such as AST if left untreated [15]. This case underscores the need for a comprehensive assessment of patients with recurrent neck infections to avoid missing congenital abnormalities.

Fiberoptic laryngoscopy provided further information on the severity of the infection and its effect on airway tissue, including prominent abscess formation and vocal cord paralysis observed during the assessment. It emphasizes using laryngoscopy as a crucial investigation in the decision to perform surgery. Detailed inspection of the airway structures aids in strategizing how the surgery will be conducted and in avoiding an airway catastrophe.

For AST, surgical interventions are followed by necessary antibiotic treatment and constant observation for complete healing. The study by Breen *et al.* and Chen *et al.* also shows that postoperative antibiotics are needed to avoid disease relapses and facilitate healing [16]. This case shows that a conscious focus on postoperative care and a watchful discharge plan facilitated substantial recovery from these symptoms and contributing conditions.

Several reports highlight the necessity of identifying and treating branchial cleft sinuses during surgery to prevent recurrent infections. Similarly, Liu *et al.* noted that complete elimination and sealing of the sinus tract is essential after drainage to minimize the chances of recurrence and subsequent suppurative complications [17]. The next step in eradicating the disease was finding and sealing the route of the third/fourth branchial cleft sinus tract.

Further directions involve educating clinicians on the possible link between congenital anomalies and adult neck infections, increasing the use of multifaceted imaging as a diagnostic tool, and initiating support for surgery and medical intervention as the cornerstone of treatment. More longitudinal studies may be useful in comparing the postoperative prognosis of patients with AST due to branchial cleft disorders to better understand the optimal postoperative treatments for such cases.

4. Conclusion

The case of the 37-year-old female patient, whose symptoms did not improve after the first antibiotic administration and who was found to have a branchial cleft sinus, highlights the necessity of proper imaging and endoscopy when dealing with neck infections. It also underscores the importance of surgical intervention in managing the infection and preventing potentially life-threatening conditions.

This case demonstrates the need for a high level of suspicion for congenital anomalies, such as branchial cleft cysts, in adults presenting with neck abscesses and thyroiditis. Appropriate management is crucial to achieving the best outcomes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] McCormack, S.M. and Nicewicz, M.J. (2022) Complications and Diagnosis of Branchial Cleft Cysts: A Case Report. *Cureus*, **14**, e32667. https://doi.org/10.7759/cureus.32667

[2] Mittal, M.K., Malik, A., Sureka, B. and Thukral, B.B. (2012) Cystic Masses of Neck: A Pictorial Review. *Indian Journal of Radiology and Imaging*, **22**, 334-343. https://doi.org/10.4103/0971-3026.111488

[3] Alshihmani, S.H.A. (2023) A Second Branchial Cleft Cyst, a Case Report. *International Journal of Surgery Case Reports*, **108**, Article 108429. https://doi.org/10.1016/j.ijscr.2023.108429

[4] Allen, S.B., Jamal, Z. and Goldman, J. (2024) Branchial Cleft Cysts. StatPearls Publishing.

[5] Pimpalkhute, K.M., Parikh, P. and Jha, R. (2021) A Rare Case of Parotid Swelling Presenting as Branchial Cleft Cyst. *Indian Journal of Otolaryngology and Head & Neck Surgery*, **74**, 5747-5752. https://doi.org/10.1007/s12070-020-02353-3

[6] Falhammar, H., Wallin, G. and Calissendorff, J. (2019) Acute Suppurative Thyroiditis with Thyroid Abscess in Adults: Clinical Presentation, Treatment and Outcomes. *BMC Endocrine Disorders*, **19**, Article No. 130. https://doi.org/10.1186/s12902-019-0458-0

[7] Erwin, D.Z., Lesko, D. and Ferrell, J.K. (2022) Recurrent Neck Mass: A Case Report. *Cureus*, **14**, e22098. https://doi.org/10.7759/cureus.22098

[8] Touihmi, S., Rkain, I., Mehdaoui, A., El boussaadni, Y. and Oulmaati, A. (2021) Acute Suppurative Thyroiditis with Abscess. *Journal of Pediatric Surgery Case Reports*, **65**, Article 101757. https://doi.org/10.1016/j.epsc.2020.101757

[9] Câmara, B., Andrade, C., Forno, A., Lopes, M. and Pilar, C. (2024) Acute Suppurative Thyroiditis in Childhood: An Atypical Presentation. *Cureus*, **16**, e55275. https://doi.org/10.7759/cureus.55275

[10] Goff, C.J., Allred, C. and Glade, R.S. (2012) Current Management of Congenital Branchial Cleft Cysts, Sinuses, and Fistulae. *Current Opinion in Otolaryngology & Head and Neck Surgery*, **20**, 533-539. https://doi.org/10.1097/moo.0b013e32835873fb

[11] Bin Saeedan, M., Aljohani, I.M., Khushaim, A.O., Bukhari, S.Q. and Elnaas, S.T. (2016) Thyroid Computed Tomography Imaging: Pictorial Review of Variable Pathologies. *Insights into Imaging*, **7**, 601-617. https://doi.org/10.1007/s13244-016-0506-5

[12] Bagchi, A., Hira, P., Mittal, K., Priyamvara, A. and Dey, A.K. (2018) Branchial Cleft Cysts: A Pictorial Review. *Polish Journal of Radiology*, **83**, 204-209. https://doi.org/10.5114/pjr.2018.76278

[13] Lafontaine, N., Learoyd, D., Farrell, S. and Wong, R. (2021) Suppurative Thyroiditis: Systematic Review and Clinical Guidance. *Clinical Endocrinology*, **95**, 253-264. https://doi.org/10.1111/cen.14440

[14] Sanker, V., Mohamed, A. and Jadhav, C. (2022) Acute Suppurative Thyroiditis (AST) with Thyroid Abscess: A Rare and Potentially Fatal Neck Infection. *Cureus*, **14**, e29062. https://doi.org/10.7759/cureus.29062

[15] Mishra, A., Zohaib, M., Farooq, N.M., Jah, S.M.H.M., Amjad, M.M. and Hussain, A. (2021) A Rare and Challenging Case of Neck Infection—Thyroid Abscess. *Cureus*, **13**, e15527. https://doi.org/10.7759/cureus.15527

[16] Norman, G., Dumville, J.C., Mohapatra, D.P., Owens, G.L. and Crosbie, E.J. (2016) Antibiotics and Antiseptics for Surgical Wounds Healing by Secondary Intention. *Cochrane Database of Systematic Reviews*, No. 3, CD011712 https://doi.org/10.1002/14651858.CD011712.pub2

[17] Liu, H., Cheng, A., Ward, B.B., Wang, C., Han, Z. and Feng, Z. (2020) Clinical Manifestations, Diagnosis, and Management of First Branchial Cleft Fistula/Sinus: A Case Series and Literature Review. *Journal of Oral and Maxillofacial Surgery*, **78**, 749-761. https://doi.org/10.1016/j.joms.2019.12.017