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Transcervical Excision of a Giant Cervicomediastinal Cyst With Histopathological Features Compatible With a Thyroglossal Duct Cyst

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Abstract

Thyroglossal duct cysts (TGDCs) usually occur near the hyoid bone. Mediastinal extension is exceptional and can obscure the diagnosis. A 59-year-old man presented with hoarseness, dyspnea, and left vocal fold immobility. Computed tomography showed a water-density cyst with a maximum craniocaudal extent of 11 cm, inseparable from the left thyroid lobe, extending into the anterior mediastinum to the aortic arch and displacing the airway and great vessels. Fine-needle aspiration yielded clear, colorless fluid without a diagnostic cytological result, leading to a working diagnosis of parathyroid cyst. The lesion was removed intact through a cervical incision after careful identification and dissection of the left recurrent laryngeal nerve, with thoracic surgical backup. Histological examination showed an inflamed, sclerotic, largely denuded cyst wall associated with thyroid parenchyma. Focal cuboidal epithelium was documented in the histological images. The findings were considered compatible with a TGDC. Recovery was uneventful, with discharge on postoperative day 2. At follow-up in May 2025, the patient was well and had recovered left vocal fold function. Postoperative imaging was unavailable, so radiological absence of recurrence could not be established. Eight published mediastinal cases were reviewed, including one with papillary carcinoma. All four lesions associated with the thyroid gland or thyroid bed, including the present case, were removed transcervically. TGDC should be considered in the differential diagnosis of cervicomediastinal cysts, including lesions resembling parathyroid cysts. A cervical approach may permit intact removal of a large lesion reaching the aortic arch when anatomy is favorable and thoracic surgical backup is available.

Categories: Otolaryngology, Anatomy, Cardiac/Thoracic/Vascular Surgery
Keywords: case report, mediastinal cyst, parathyroid cyst, thyroglossal duct cyst, transcervical excision, vocal fold palsy

Introduction

Thyroglossal duct cysts (TGDCs) are the most common congenital neck anomalies, usually presenting as midline lesions near the hyoid bone [1]. They arise from remnants of the epithelial tract connecting the foramen cecum of the tongue to the developing thyroid gland during its descent [2]. Although commonly recognized in childhood, they may remain clinically silent until adulthood [3]. In a clinicopathological series of 685 cysts, the mean size was 2.6 cm and associated thyroid tissue was identified in 71% of cases [3]. Very large cervical cysts have been described, but are uncommon [4]. The standard operation for a cervical TGDC is the Sistrunk procedure, which removes the cyst, the central hyoid segment, and the residual tract [5].

TGDCs arising below the thyroid gland are rare [1,6]. Mediastinal lesions are particularly unusual and have been mistaken for thymic, bronchogenic, or lymphatic cysts, thyroid disease, and other mediastinal masses [1,7-13]. Their location complicates both diagnosis and the choice of surgical access.

We describe a giant cervicomediastinal cyst associated with the lower pole of the left thyroid lobe, with a maximum craniocaudal extent of 11 cm on CT, extending to the aortic arch and presenting with left vocal fold immobility. It was interpreted preoperatively as a parathyroid cyst and removed intact through a cervical incision. Histological findings were compatible with a TGDC. The report follows the clinical domains described in the CARE guidance [14] and includes a narrative comparison with published mediastinal cases.

Case Presentation

Patient information

A 59-year-old man presented in 2020 with hoarseness and shortness of breath beginning in February of that year. He reported no dysphagia or neck pain and had not noticed a neck swelling. His body weight was stable.

Clinical findings

Vital signs were within normal limits. Examination showed a slight, smooth fullness of the left lower neck without a discrete palpable mass. The laryngotracheal axis was displaced to the right. Flexible fiberoptic laryngoscopy showed left vocal fold immobility without an intrinsic laryngeal lesion, suggesting left recurrent laryngeal nerve (RLN) dysfunction.

Diagnostic assessment

Unenhanced and contrast-enhanced computed tomography (CT) of the neck and chest was performed in June 2020 and reported the following day. It showed a regular-walled, water-density cyst with a maximum craniocaudal extent of 11 cm (Figure *1*).

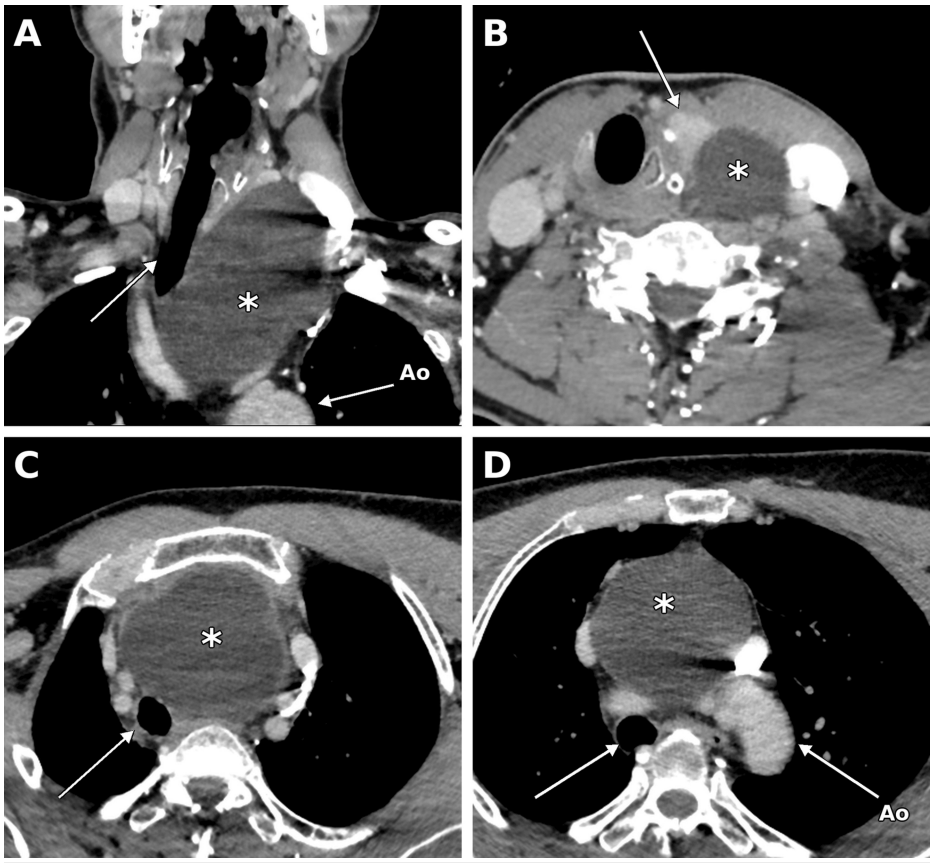


FIGURE 1: Preoperative contrast-enhanced computed tomography

(A) Oblique coronal reconstruction showing a large, homogeneous cyst of water density (asterisk) extending from the neck through the thoracic inlet into the mediastinum down to the aortic arch (Ao); the trachea (arrow) is displaced to the right and narrowed. (B) Axial image through the upper pole of the cyst (asterisk), which is inseparable from the enhancing left thyroid lobe (arrow); the trachea is displaced to the right. (C) Axial image at the level of the manubrium: the cyst (asterisk) fills the anterior mediastinum and compresses the trachea (arrow), which is displaced posteriorly and to the right. (D) Axial image at the level of the aortic arch (Ao), on which the lower pole of the cyst (asterisk) rests; the trachea (arrow) is displaced to the right.

The lesion was inseparable from the left thyroid lobe and extended retrosternally into the anterior mediastinum to the aortic arch. It displaced and compressed the brachiocephalic veins and was in contact with the origins of the supra-aortic vessels. The larynx and trachea were displaced to the right, with narrowing of the tracheal lumen. No focal glottic enhancement or enlarged cervical, hilar, or mediastinal lymph nodes were reported. Ultrasonography showed a hypoechoic cystic mass. Thyroid and parathyroid function were described as normal in the clinical account, although numerical results were unavailable in the documents reviewed. Ultrasound-guided fine-needle aspiration (FNA) yielded abundant clear, colorless fluid without a diagnostic cytological result. Measurements of parathyroid hormone (PTH) or thyroglobulin in the aspirate were not documented.

The ultrasonographic and aspiration findings were based on the contemporaneous clinical account. Original ultrasound images, images documenting the aspiration procedure, and cytological images were not available for inclusion.

The differential diagnosis included a thyroid cyst, parathyroid cyst, lymphangioma, and developmental cysts of thymic, branchial, or bronchogenic origin. The lower-neck location, mediastinal extension, and water-clear aspirate favored a non-functioning parathyroid cyst. Excision was indicated because of airway compression, vocal fold immobility, and the need to establish the nature of the lesion.

Therapeutic intervention

Surgery was performed under general anesthesia in August 2020. A thoracic surgeon was available, and blood products were prepared in case sternotomy became necessary. Through a Kocher collar incision, the lower pole of the left thyroid lobe and the upper border of the cyst were exposed. The left RLN was identified and carefully dissected free. Gentle blunt dissection directed caudally, combined with upward traction, separated the loose adhesions until the inferior pole was reached at the aortic arch. A finger placed around the lower border allowed the cyst to be delivered intact into the neck (Figure *2*).

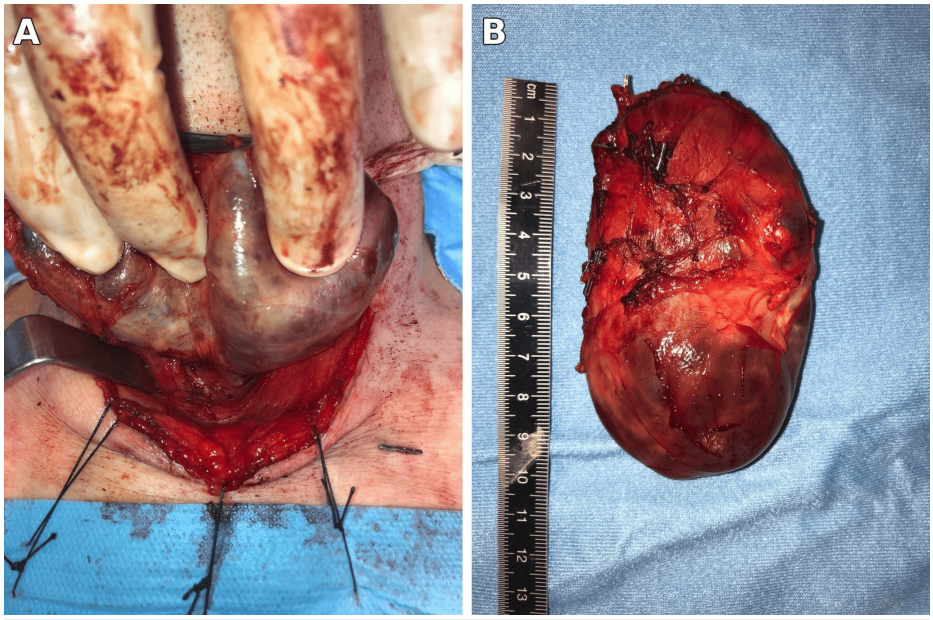


FIGURE 2: Intraoperative view and intact surgical specimen

(A) Intraoperative view through a cervical collar (Kocher) incision: the cyst is delivered from the superior mediastinum by upward traction combined with blunt digital dissection. (B) Intact surgical specimen laid flat beside a centimeter ruler. The lax walls and liquid content allowed the cyst to change shape with positioning; the photograph documents the specimen appearance rather than the maximum craniocaudal extent of 11 cm measured on CT.

A thin pedicle connecting it to the lower pole of the left thyroid lobe was divided. Exploration above the thyroid isthmus showed no residual tract or additional lesion; the hyoid bone was therefore preserved, and a Sistrunk procedure was not performed. After checking the anatomical integrity of the RLN and the absence of bleeding or chyle leakage, a suction drain was placed in the mediastinum, and the wound was closed in layers. The patient was observed for two hours in a sub-intensive care unit and then transferred to the ward.

Pathological findings

The specimen reached the pathology laboratory in August 2020, and the report was issued nine days later. The cyst had lax walls and a liquid content, allowing its shape and measured dimensions to vary with positioning, particularly when suspended or laid flat. The photograph shows the specimen laid flat beside a ruler (Figure *2B*). The pathology report described smooth internal walls and clear, straw-colored fluid released on opening. Its wall was predominantly denuded, inflamed, and sclerotic, in association with areas of thyroid parenchyma. The pathologist considered the findings compatible with a TGDC. The accompanying histological images, described by the pathologist, showed focal cuboidal epithelium, in places multilayered, and thyroid follicles adjacent to the cyst wall (Figure *3*).

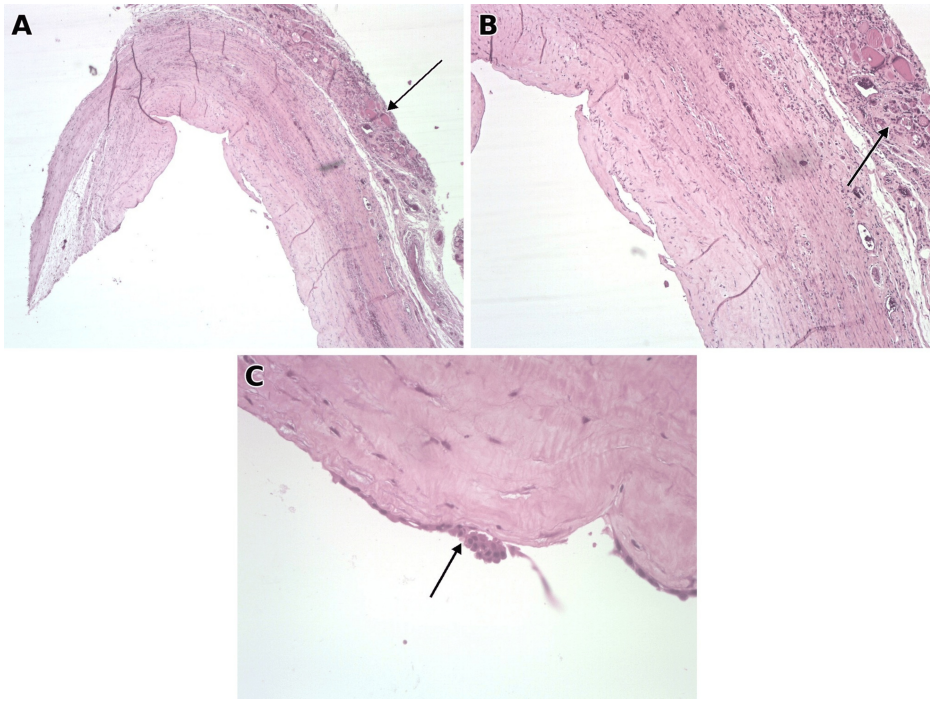


FIGURE 3: Histological findings

Hematoxylin and eosin staining. (A) Cyst wall associated with thyroid tissue, with extensive loss of the epithelial lining; thyroid follicles are indicated by the arrow. (B) Higher magnification of the cyst wall and adjacent thyroid follicles (arrow). (C) Focal cuboidal epithelium, in places multilayered, at the luminal surface (arrow). Original objective magnification: (A) ×2.5; (B) ×5; (C) ×20.

Follow-up and outcomes

The postoperative course was uneventful, and the patient was discharged on postoperative day 2. At follow-up in May 2025, approximately four years and nine months after surgery, the patient was well and had recovered left vocal fold function. Earlier correspondence indicated that he had declined further CT examinations. Postoperative imaging was unavailable, and radiological absence of recurrence could therefore not be established. The timeline is summarized in Table *1*.

Date/interval	Event
February 2020	Onset of hoarseness and shortness of breath
2020, before surgery	Clinical assessment: left lower-neck fullness, rightward airway deviation and left vocal fold immobility
June 2020	Neck and chest CT: water-density cyst with a maximum craniocaudal extent of 11 cm associated with the left thyroid lobe and extending to the aortic arch
Before surgery, date unavailable	Ultrasonography and FNA: clear, colorless fluid; non-diagnostic cytology
August 2020	Intact transcervical excision with thoracic surgical backup
Postoperative day 2	Discharge
August 2020	Pathology report: largely denuded cyst wall associated with thyroid parenchyma; findings compatible with TGDC
May 2025	Patient well; left vocal fold function recovered. Postoperative imaging unavailable.

TABLE 1: Timeline of the case

CT, computed tomography; FNA, fine-needle aspiration

Discussion

Comparison with published mediastinal cases

We summarized eight published reports of human TGDCs located within or extending into the mediastinum [1,7-13]. Cervical cysts without thoracic extension [6] and ectopic thyroid tissue without a thyroglossal cyst were excluded.

The eight published cases and the present case are summarized in Table *2*.

No.	Author, year (country)	Age/sex	Presentation	Location and extent	Size (cm)	Preoperative diagnosis/FNA	Surgical approach	Histology	Follow-up
1	Kaczmarski et al., 2001 (Poland) [7]	NR	NR (mimicked a mediastinal tumor)	Mediastinum (details NR)	NR	Mediastinal tumor	Simple cystectomy (access NR)	TGDC	No recurrence at 2 years
2	Baysungur et al., 2002 (Turkey) [8]	40/F	Progressive dyspnea, worse when supine; enlarging right cervical masses; subtotal thyroidectomy 4 years earlier	Multiple right cervical cysts (0.2-2 cm) and an anterior mediastinal cyst	7 (mediastinal cyst, partly calcified)	Cervicomediastinal cystic hygroma; FNA negative	Right cervical incision + partial upper sternotomy	Papillary carcinoma arising in TGDC; adjuvant radioiodine	No disease on MRI at 3 months
3	Chon et al., 2007 (South Korea) [1]	40/F	Neck mass found at routine examination; mild dysphagia	Inferior pole of left thyroid lobe → superior anterior mediastinum to aortic arch; stalk beneath thyroid	5 × 6	Thymic mass	Transcervical	TGDC: respiratory and squamous lining; thyroid tissue in wall	No recurrence on neck US at 22 months
4	López García et al., 2011 (Spain) [9]	46/M	Anterior neck mass for 25 years; intermittent dysphonia (normal vocal fold mobility)	Isthmus and inferior pole of left lobe (prethyroid) → anterior mediastinum below the manubrial border	6.2 × 2.5 × 3.6 (US); 5 × 3.5 (CT); ~10 × 5 (intraoperative)	FNA: squamous cells (malignancy suspected)	Cervical; simple excision	TGDC: squamous lining	Annual clinical and US surveillance (duration NR)
5	Granato et al., 2011 (UK) [10]	65/F	Found on CT performed for vocal fold palsy	Isolated anterosuperior mediastinum, behind the manubrium; no cervical component	3.5	Thymoma could not be excluded	Transcervical with manubrial elevation	TGDC: pseudostratified columnar lining; lymphoid follicles; thyroid follicles	Uneventful; voice unchanged (duration NR)
6	Alavi and Asadi Gharabaghi, 2015 (Iran) [11]	55/M	Dry cough; vague retrosternal pain	Isolated right middle mediastinum; no neck abnormality	7 × 7	Bronchogenic cyst (intraoperative)	Right thoracotomy	TGDC: thyroid follicles; flat epithelial lining	Uneventful (duration NR)
7	Rao et al., 2024 (India) [12]	Late 30s/M	Retrosternal discomfort; cough	Superior mediastinum near left brachiocephalic vein; small cervical extension right of midline	4.3 × 1.5 (CT)	Exophytic thyroid nodule or thymic cyst; no FNA	Median sternotomy	TGDC: pseudostratified columnar lining; thyroid follicles; lymphocytic infiltrate	No recurrence (duration NR)
8	Kovács et al., 2026 (Hungary) [13]	55/F	Progressive dysphagia, cervical pressure, exertional dyspnea; near-total thyroidectomy (2021)	Left thyroid bed → superior mediastinum to aortic arch; tracheal deviation	7.6 (CT); 5 × 4 × 3.2 (specimen)	Recurrent thyroid disease or cystic malignancy; FNA: squamous cells with atypia	Redo Kocher incision with thoracic surgical assistance	TGDC: squamous and cuboidal/columnar lining; thyroid follicles	Discharged on POD 3 (follow-up NR)
9	Present case (Italy)	59/M	Hoarseness; dyspnea; left vocal fold palsy	Inseparable from lower pole of left thyroid lobe (thin pedicle) → retrosternal space and anterior mediastinum to aortic arch	11 maximum craniocaudal extent (CT)	Parathyroid cyst; FNA: clear, colorless fluid, non-diagnostic	Transcervical (Kocher incision); thoracic surgeon on standby	Compatible with TGDC: inflamed, sclerotic, largely denuded wall; focal cuboidal lining; associated thyroid parenchyma. Calretinin performed, result unavailable.	Uneventful early recovery; discharge on POD 2. Well with recovered left vocal fold function in May 2025. Postoperative imaging unavailable.

TABLE 2: Published cases of thyroglossal duct cyst located in or extending into the mediastinum, including the present case

Data for case 1 are limited to the English abstract of the Polish article.

CT, computed tomography; F, female; FNA, fine-needle aspiration; M, male; MRI, magnetic resonance imaging; NR, not reported; POD, postoperative day; TGDC, thyroglossal duct cyst; US, ultrasonography

Among cases with reported demographic data, ages ranged from the late 30s to 65 years; there were four

women and four men, including our patient. Demographic data were unavailable for one report [1,7-13]. Presentations included dyspnea, cough, dysphagia, and voice changes. Four lesions were associated with the thyroid gland or thyroid bed [1,9,13]. At 11 cm craniocaudally on CT, our cyst exceeded the maximum dimensions reported for the other cases included in this comparison, although imaging and specimen measurements were not uniform.

TGDC was seldom recognized preoperatively. Alternative diagnoses included thymic, thyroid, bronchogenic, and lymphatic lesions [1,7-13]; our lesion was considered a parathyroid cyst. FNA did not establish TGDC in the four cases in which it was reported, and squamous cells raised concern for malignancy in two [9,13]. All four thyroid-associated lesions, including ours, were removed cervically [1,9,13]. Other approaches included manubrial elevation, partial or median sternotomy, and thoracotomy [8,10-12]. One published lesion contained papillary carcinoma [8]. Follow-up was often short or unspecified.

Diagnostic and surgical implications

The principal finding is intact transcervical removal of an 11 cm cyst extending to the aortic arch. Its capsule, cervical continuity, and loose adhesions permitted upward delivery despite its size. These observations support consideration of cervical access in selected patients, with preparation for wider exposure; they do not establish a general size threshold or superiority over thoracic approaches.

The thyroid gland develops at the foramen cecum of the tongue and descends into the neck, leaving a normally involuting thyroglossal tract [2]. Mediastinal TGDCs may arise from downward enlargement of a lower cervical or intrathyroidal remnant [1,9,15], or unusually deep embryological migration [10,11]. The pedicle at the left thyroid pole was consistent with the former mechanism but did not prove the origin.

Compression or stretching of the left RLN was plausible given the cyst's relationship to the airway and aortic arch and the need to dissect the nerve free. Recovery of vocal fold function by May 2025 was consistent with reversible dysfunction, although its precise cause and recovery time could not be established. Vocal fold palsy was considered incidental in another mediastinal case [10]; recovery after decompression is also described in benign thyroid disease [16].

The differential diagnosis includes thyroid, parathyroid, thymic, bronchogenic, mesothelial, and lymphatic cysts and other cystic mediastinal masses [17]. CT defines surgical relationships but is not specific for TGDC [10,12]. A non-functioning parathyroid cyst was a reasonable initial possibility because of the location and water-clear aspirate. Cyst-fluid PTH can assist this distinction [18], but biochemical measurements in our aspirate were undocumented.

The pathological findings favored, but did not conclusively establish, TGDC. Extensive denudation limited assessment of the lining. Associated thyroid tissue occurs commonly in TGDC [3], and cuboidal or flattened lining has been reported in mediastinal cases [10,13]. In our patient, residual cuboidal epithelium, adjacent thyroid parenchyma, and the operative pedicle supported the pathologist's qualified interpretation. Calretinin can assess mesothelial differentiation [19], but its unavailable result could not exclude a mesothelial cyst. Further pathological review would strengthen diagnostic certainty.

Surgical access should reflect inferior extension, vascular relationships, cervical continuity, and anticipated adhesions. Experience with substernal goiter also identifies deep extension as a factor in sternotomy requirements [20]. In this case, the cyst reached but did not descend below the aortic arch; RLN protection and thoracic backup were essential precautions. Excision relieved compression and provided tissue for characterization, including assessment for malignancy [8,10,11].

The Sistrunk procedure remains standard for conventional cervical TGDC [3,5]. It was not performed because no tract was found above the thyroid isthmus. This anatomy-based decision does not establish equivalence to Sistrunk excision. Long-term surveillance remains relevant [1], and favorable clinical recovery cannot establish absence of recurrence without imaging.

The main limitations were a qualified histopathological diagnosis and unavailable postoperative imaging. In May 2025, the patient was well with recovered left vocal fold function; radiological recurrence status remained unknown. Numerical laboratory results, cyst-fluid biochemistry, and original ultrasound and aspiration-related images were unavailable. The lax, fluid-filled cyst changed shape with positioning, so its CT extent and apparent specimen dimensions were not directly interchangeable. The literature comparison involved few heterogeneous reports with incomplete data and possible publication and selection bias.

Conclusions

TGDC should be considered among cystic lesions of the lower neck and superior mediastinum. In this case, histopathological findings were compatible with TGDC, and an 11 cm cyst reaching the aortic arch was removed intact through a cervical incision with thoracic backup. The patient was well with recovered left vocal fold function in May 2025. Diagnostic certainty remained qualified, and postoperative imaging was

unavailable to assess recurrence.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Pietro Salvatori, Roberto Briatore

Critical review of the manuscript for important intellectual content: Pietro Salvatori, Roberto Briatore, Vincenzo Landolfo

Acquisition, analysis, or interpretation of data: Vincenzo Landolfo

Disclosures

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