



Management of a massive retrosternal goiter after prior thyroid surgery: a clinical case

Didiek D.T. Setyo, Iwan Sidharta✉

Airlangga University, Dr. Soetomo Regional General Hospital
47, Jl. Mayjen Prof. Dr. Moestopo, Surabaya, 60131, Indonesia

SECHENOV
MEDICAL JOURNAL
GRAPHICAL ABSTRACT



Management of a massive retrosternal goiter after prior thyroid surgery: a clinical case

Summary

Massive retrosternal adenomatous goiter after prior thyroid surgery caused severe airway compression and dysphagia, and was safely treated by thyroidectomy via a combined transcervical approach and median sternotomy.



Diagnosis

Symptoms

progressive anterior neck mass
palpitations dysphagia
retrosternal pressure cough

Computed tomography

large goiter
11 × 10 × 7 cm
mediastinal extension
tracheal compression



Workup

fine-needle aspiration biopsy –
adenomatous goiter
ultrasonography – TI-RADS 1
thyroid function – normal FT4
with low TSH

Treatment

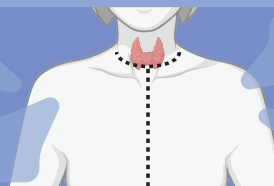
Transcervical collar incision + sternotomy

Airway risk + inferior mediastinal
extension → sternotomy

Recurrent laryngeal nerve
identification and preservation

Parathyroid
preservation

Cervical + retrosternal drains



Outcomes

Early postoperative outcome

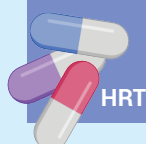
- Airway stable; symptoms relieved
- No hoarseness / vocal changes
- No dysphagia
- Normocalcemia

Hospital course

Day 1: Levothyroxine initiated,
transferred to ward
Day 4: Drains removed
Day 5: Discharged

Follow-up plan

- Monthly TSH monitoring
- Clinical review every 6 months



Setyo D.D.T., Sidharta I. Management of a massive retrosternal goiter after prior thyroid surgery: a clinical case. Sechenov Medical Journal. 2025; 16(4): 41–48. <https://doi.org/10.47093/2218-7332.2025.16.4.41-48>

8 minutes
to read



FT4 – free thyroxine, TI-RADS – Thyroid Imaging Reporting and Data System, TSH – thyroid-stimulating hormone

Abstract

Adenomatous goiter is a common benign thyroid condition that can become surgically challenging when it extends into the mediastinum, including in patients with a history of partial thyroid surgery. Retrosternal goiter is often diagnosed at a late stage, and its management is frequently complex due to distorted mediastinal anatomy.

Case report. A 58-year-old woman with a history of left isthmolobectomy performed in 2006 presented with a rapidly enlarging right-sided neck mass accompanied by dysphagia. Although the cervical findings initially suggested right thyroid lobe involvement, contrast-enhanced computed tomography revealed a massive retrosternal goiter originating from residual left thyroid tissue. The lesion extended retrosternally into the anterior mediastinum, resulting in significant tracheal narrowing, displacement of the esophagus, and close anatomical relationships with major mediastinal vessels. Management was undertaken by a multidisciplinary team, and the patient underwent complete thyroidectomy using a combined transcervical approach and median sternotomy, achieving complete resection of the retrosternal component.

© Setyo D.D.T., Sidharta I., 2025

Discussion. This case highlights delayed retrosternal progression of adenomatous goiter after partial thyroid surgery. Cross-sectional imaging guided surgical planning, and median sternotomy enabled safe complete resection, underscoring the importance of long-term follow-up and multidisciplinary management.

Keywords: adenomatous goiter; thyroidectomy; sternotomy; recurrent case

MeSH terms:

CASE REPORTS

GOITER, SUBSTERNAL – DIAGNOSIS

GOITER, SUBSTERNAL – DIAGNOSTIC IMAGING

GOITER, SUBSTERNAL – SURGERY

RECURRENCE

THYROIDECTOMY – METHODS

For citation: Setyo D.D.T., Sidharta I. Management of a massive retrosternal goiter after prior thyroid surgery: a clinical case. Sechenov Medical Journal. 2025; 16(4): 41–48. <https://doi.org/10.47093/2218-7332.2025.16.4.41-48>

CONTACT INFORMATION:

Iwan Sidharta, Associate Professor, Department of Head and Neck Surgery, Faculty of Medicine, Airlangga University, Dr. Soetomo Regional General Hospital.

Address: 47, Jl. Mayjen Prof. Dr. Moestopo, Surabaya, 60131, Indonesia

E-mail: iwansidh@yahoo.com

Compliance with ethical standards. Consent statement. The patient consented to the publication of the article “Management of a massive retrosternal goiter after prior thyroid surgery: a clinical case” in the “Sechenov Medical Journal”.

Conflict of interest. The authors declare that there is no conflict of interests.

Financing. The study was not sponsored (own resources).

Received: 02.10.2025

Accepted: 28.11.2025

Date of publication: 30.12.2025

УДК 616.441-006.6-089.87

Стратегия лечения массивного ретростерального зоба после ранее перенесенной операции на щитовидной железе: клинический случай

Д.Д.Т. Сетьо, И. Сидхарта✉

Университет Айрлангга, Региональная больница общего профиля имени доктора Сутомо
ул. Мейджен проф. д-ра Мустопо, д. 47, г. Сурабая, 60131, Индонезия

Аннотация

Аденоматозный зоб является распространенным доброкачественным заболеванием щитовидной железы, которое может представлять значительные хирургические трудности при распространении в средостение, в том числе у пациентов с анамнезом частичной тиреоидэктомии. Ретростеральный зоб часто выявляется на поздних стадиях, а его лечение нередко осложняется измененной анатомией шеи и средостения.

Клинический случай. Пациентка 58 лет с анамнезом удаления левой доли щитовидной железы и перешейка, выполненной в 2006 году, обратилась по поводу быстро увеличивающегося правостороннего образования шеи, сопровождающегося дисфагией. Клинические данные указывали на вовлечение правой доли щитовидной железы, вместе с тем по данным компьютерной томографии с контрастированием выявлен массивный ретростеральный зоб, исходящий из остаточной ткани левой доли. Образование распространялось ретростерально в переднее средостение, вызывая выраженное сужение трахеи, смещение пищевода, и находилось вблизи магистральных сосудов средостения. Мультидисциплинарной командой пациентке была выполнена тотальная тиреоидэктомия с использованием комбинированного шейного доступа и медианной стернотомии, что позволило добиться полного удаления ретростерального компонента.

© Сетьо Д.Д.Т., Сидхарта И., 2025

Обсуждение. Представленный клинический случай демонстрирует отсроченное ретростеральное распространение аденоматозного зоба после частичной тиреоидэктомии. Методы лучевой диагностики сыграли ключевую роль в планировании хирургического вмешательства, а медианная стернотомия обеспечила безопасное и радикальное удаление образования, что подчеркивает необходимость длительного наблюдения и мультидисциплинарного подхода к ведению таких пациентов.

Ключевые слова: аденоматозный зоб; тиреоидэктомия; стернотомия; рецидивирующий случай

MeSH terms:

ОПИСАНИЕ СЛУЧАЕВ

ЗОБ ЗАГРУДИННЫЙ – ДИАГНОСТИКА

ЗОБ ЗАГРУДИННЫЙ – ДИАГНОСТИЧЕСКОЕ ИЗОБРАЖЕНИЕ

ЗОБ ЗАГРУДИННЫЙ – ХИРУРГИЯ

РЕЦИДИВ

ТИРЕОИДЭКТОМИЯ – МЕТОДЫ

Для цитирования: Сетьо Д.Д.Т., Сидхарта И. Стратегия лечения массивного ретростерального зоба после ранее перенесенной операции на щитовидной железе: клинический случай. Сеченовский вестник. 2025; 16(4): 41–48. <https://doi.org/10.47093/2218-7332.2025.16.4.41-48>

КОНТАКТНАЯ ИНФОРМАЦИЯ:

Сидхарта Иван, доцент кафедры хирургии головы и шеи медицинского факультета университета Айрлангга региональной больницы общего профиля им. доктора Сутомо

Адресс: ул. Мейджен проф. д-ра Мустопо, д. 47, г. Сурабая, 60131, Индонезия

E-mail: iwansidh@yahoo.com

Соблюдение этических норм. Заявление о согласии. Пациент дал согласие на публикацию представленной статьи «Стратегия лечения массивного ретростерального зоба после ранее перенесенной операции на щитовидной железе: клинический случай» в журнале «Сеченовский вестник».

Конфликт интересов. Авторы заявляют об отсутствии конфликта интересов.

Финансирование. Исследование не имело спонсорской поддержки (собственные ресурсы).

Получена: 02.10.2025

Принята: 28.11.2025

Дата печати: 30.12.2025

Abbreviations:

CT – computed tomography

RSG – retrosternal goiter

TSH – thyroid-stimulating hormone

HIGHLIGHTS	КЛЮЧЕВЫЕ ПОЛОЖЕНИЯ
A retrosternal goiter can remain asymptomatic until the late stages, when the mediastinal extension becomes life-threatening by compressing the airway, compromising the vascular system and causing dysphagia.	Ретростеральный зоб может длительное время оставаться бессимптомным; на поздних стадиях его медиастинальное распространение становится жизнеугрожающим вследствие компрессии дыхательных путей, сосудистых структур и пищевода.
Contrast-enhanced computed tomography is essential for assessing mediastinal extent and preoperative planning in substernal goiter.	Компьютерная томография с контрастированием – ключевой метод для оценки медиастинального распространения и предоперационного планирования при ретростеральном зобе.
Safe management of retrosternal goiter depends on meticulous surgical technique, preservation of vital structures, and coordinated multidisciplinary planning.	Безопасное хирургическое лечение ретростерального зоба основано на тщательной хирургической технике, сохранении жизненно важных анатомических структур и скоординированной междисциплинарной работе.
Use of standardized classification systems, such as the Mukhtar et al. metric, improves decision-making regarding the need for sternotomy in retrosternal goiter.	Использование стандартизированных классификационных систем, таких как метрическая классификация Mukhtar и соавт., способствует более обоснованному принятию решений о необходимости стернотомии при ретростеральном зобе.

Retrosternal goiter (RSG), also referred to as substernal or intrathoracic goiter, remains a rare but clinically significant condition, often emerging many years after prior thyroid surgery. Its extension into the mediastinum can lead to airway compression, dysphagia, and cardiovascular compromise, creating both diagnostic and operative challenges [1]. Residual thyroid tissue after hemithyroidectomy or incomplete resection can progressively enlarge, representing a major cause of goiter recurrence [2]. Such recurrence typically manifests many years after the initial surgery, often presenting with progressive compressive symptoms and mediastinal extension, as in the present case.

Advances in cross-sectional imaging have improved the ability to determine the extent of retrosternal involvement and predict surgical risks. Computed tomography (CT) is particularly valuable in delineating mediastinal spread and airway narrowing, allowing surgeons to plan operative strategy with greater accuracy [3, 4]. Such imaging data are critical because RSGs have been shown to be associated with perioperative morbidity compared with purely cervical counterparts, reinforcing the importance of meticulous preparation and multidisciplinary planning [3, 5].

Thyroidectomy is the treatment of choice for RSG [6]. In parallel with these technical developments, operative excellence has become central in modern endocrine surgery. Classification systems provide structured guidance in complex cases, and the recently proposed metric classification by Mukhtar H. et al. [7] offers standardized criteria for determining the necessity for sternotomy. This framework not only enhances surgical safety but also supports reproducibility and staff training in high-risk thyroid surgery. This report describes a case of bilateral recurrent adenomatous RSG, presenting nearly two decades after isthmolobectomy, successfully managed with combined thyroidectomy and sternotomy.

CASE REPORT

The patient, a 53-year-old woman, presented with a right-sided neck mass and dysphagia. She first noted bilateral thyroid nodules in 2000 and underwent a left isthmolobectomy in 2006 because of enlargement of the left lobe, while the right-sided nodules were small and asymptomatic; histopathological data from the initial surgery were unavailable. The right-sided nodules remained stable and asymptomatic for many years and therefore did not initially require surgical treatment.

Following the initial surgery, the patient was placed on levothyroxine replacement therapy at a dose of 100 µg/day, with a target thyroid-stimulating hormone (TSH) level of 1–2 mIU/L. She remained asymptomatic until 2009, when gradual enlargement of the right thyroid

lobe was noted. However, no clinical or imaging follow-up was performed between 2009 and early 2025, as the patient remained asymptomatic and did not seek further evaluation until the right-sided neck mass began to enlarge.

By February 2025, the neck mass had shown progressive enlargement, and dysphagia had developed and worsened, requiring liquid intake to facilitate swallowing; this was accompanied by retrosternal discomfort described as a sensation of chest pressure, intermittent pain, and palpitations, while excessive sweating and voice changes were denied.

On examination, the patient was in good general condition and hemodynamically stable, with normal body mass index, no respiratory distress, no significant cardiovascular, pulmonary or metabolic comorbidities, and no overt hyperthyroidism, so she was considered suitable for major surgery including possible sternotomy. Physical examination revealed a large right-sided cervical mass that moved with deglutition. The overlying skin was unremarkable. On palpation, the mass measured approximately 6×3×3 cm, firm-elastic in consistency, with a smooth surface, well-defined margins, and mobile over the underlying structures. The lower pole was not palpable. The lesion was non-tender, and no cervical lymphadenopathy was detected.

Laboratory examination revealed suppressed TSH levels (0.215 mIU/L; reference range 0.4–4.0 mIU/L) with normal free thyroxine (FT4) concentrations (1.23 ng/dL; reference range 0.8–1.8 ng/dL), consistent with subclinical hyperthyroidism.

Neck ultrasonography on February 18, 2025 demonstrated bilateral purely anechoic cystic nodules – benign, cystic type, with smooth margins, absent internal vascularity, and no suspicious cervical lymphadenopathy. The findings were consistent with benign cystic lesions and classified as American College of Radiology Thyroid Imaging Reporting and Data System (ACR TI-RADS) category 1¹ (Figs. 1A, B) [8].

Fine-needle aspiration biopsy of the cervical mass confirmed adenomatous goiter. A bone survey revealed no lytic or blastic lesions, thereby excluding metastatic bone disease. Thyroid scintigraphy was not performed. Contrast-enhanced CT scan of the cervicothoracic region performed on July 25, 2025 demonstrated a large retrosternal thyroid mass measuring approximately 11×10×7 cm, predominantly solid with areas of necrosis and coarse calcification.

The lesion originated from the left thyroid lobe and extended retrosternally into the anterior mediastinum, causing severe tracheal narrowing and posterior and lateral displacement of the esophagus. It was in close relation to major mediastinal vessels, including the aortic arch, common carotid, subclavian artery, and

¹ American College of Radiology. Thyroid Imaging Reporting and Data System. <https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Reporting-and-Data-Systems/TI-RADS> (access date: 25.09.2025).

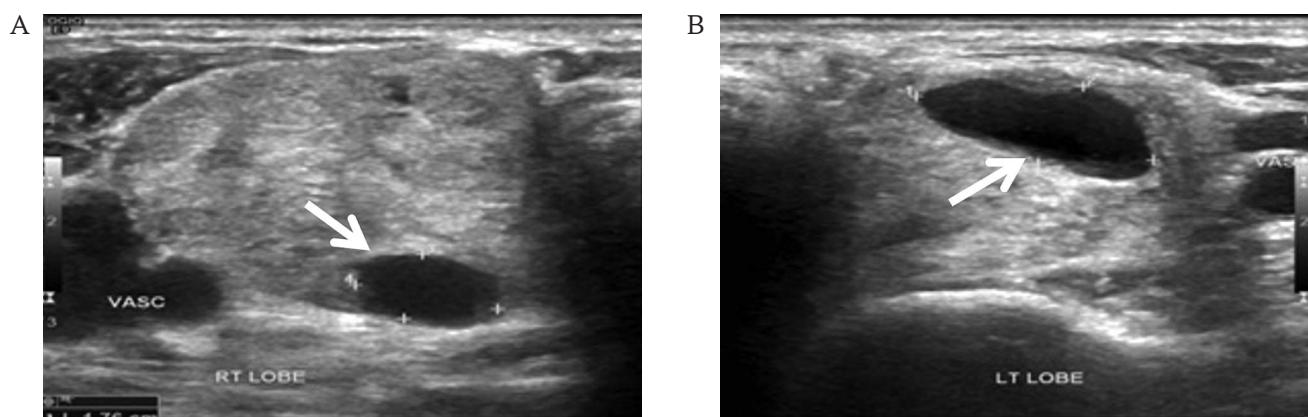


FIG. 1. Neck ultrasonography of a 58-year-old female patient with massive retrosternal goiter.

A. Transverse ultrasound image of the right thyroid lobe showing a purely anechoic cystic nodule (arrow) with smooth margins and absent internal vascularity
 B. Longitudinal ultrasound image of the left thyroid lobe demonstrating a similar benign-appearing cystic nodule (arrow) with smooth margins and no evidence of cervical lymphadenopathy

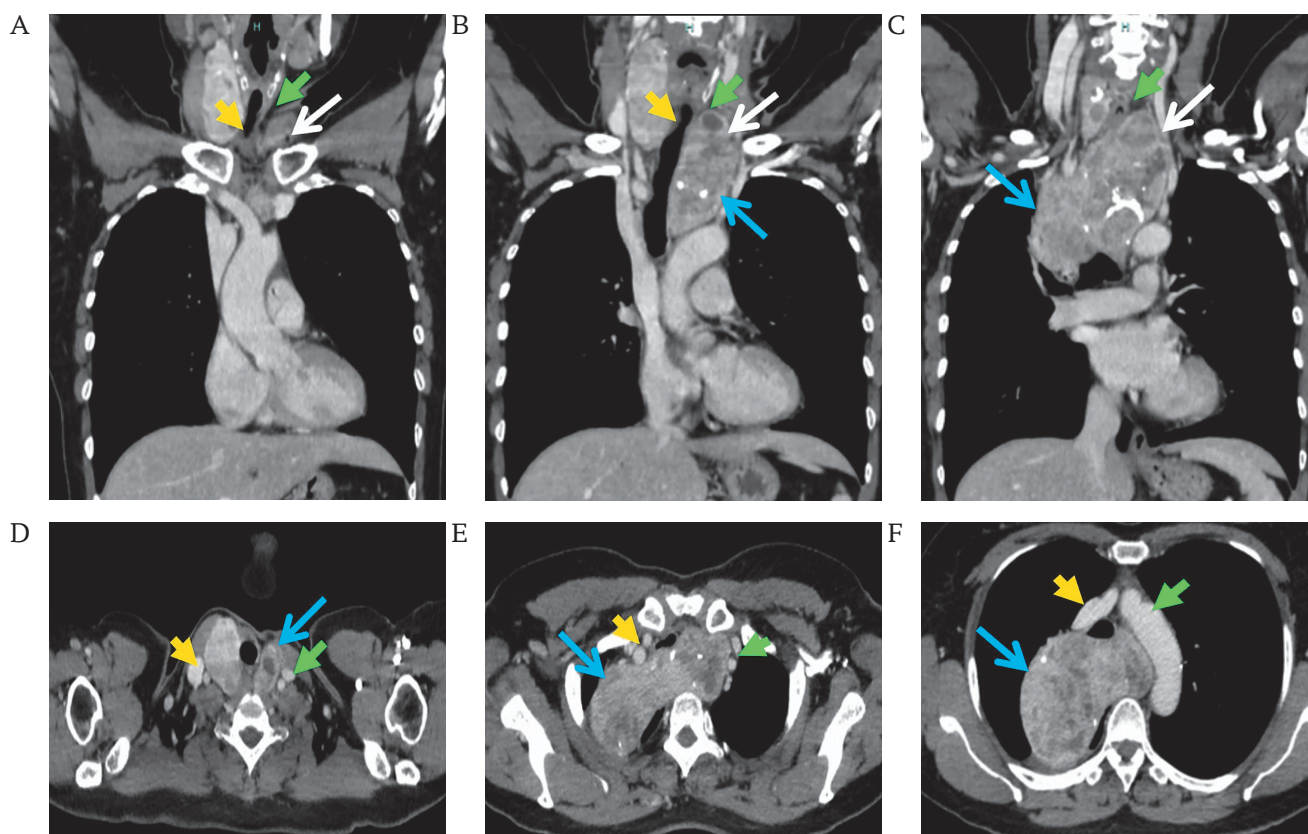


FIG. 2. Contrast-enhanced computed tomography of the cervicothoracic region in a 58-year-old female patient with massive retrosternal goiter.

A–C. Coronal sections: enlarged left thyroid lobe (white arrow) and large retrosternal thyroid mass (blue arrow) compressing the trachea (yellow arrowhead) and displacing the esophagus (green arrowhead).

D–F. Axial sections: inferior extension of the mass (blue arrow) into the anterior mediastinum with close anatomical relationship to the aorta arch and the branches (yellow arrowhead) (green arrowhead).

brachiocephalic trunk, while the margins with these structures remained preserved. Additional findings included minimal right pleural effusion, multiple hepatic cysts, and left-sided nephrolithiasis (Figs. 2A–F).

Preoperative planning was conducted through a multidisciplinary team discussion involving head and neck surgery, anesthesiology, radiology, and pathology. The team reviewed contrast-enhanced CT

findings demonstrating severe tracheal narrowing and mediastinal extension, ultrasound results confirming bilateral benign cystic nodules, and fine-needle aspiration biopsy indicating adenomatous goiter. Based on these evaluations, the team agreed that a combined transcervical approach with median sternotomy was necessary to achieve complete resection and ensure airway safety.

The clinical diagnosis was recurrent bilateral retrosternal adenomatous goiter with concomitant subclinical hyperthyroidism in a patient with a history of left isthmolobectomy.

On July 31, 2025, a complete thyroidectomy with sternotomy was performed under general anesthesia with endotracheal intubation. The operative sequence included a cervical collar incision followed by right lobectomy with preservation of the recurrent laryngeal nerve and parathyroid glands; the isthmus was absent.

Dissection then proceeded to the deeply located left lobe, during which the left recurrent laryngeal nerve was identified and protected, although the left parathyroid glands were not visualized. The inferior retrosternal extension of goiter necessitated median sternotomy to expose the lower trachea, esophagus, and aortic arch, enabling downward traction and blunt dissection, while the contralateral mediastinal extension was released using finger dissection.

Intraoperatively, the left thyroid gland remnant was found extending into the anterior mediastinum, compressing the trachea and displacing the esophagus. Careful dissection allowed for complete removal of the goiter mass, and after excision of the retrosternal component the final surgical field demonstrated the exposed trachea and preserved mediastinal structures (Figs. 3A–D).

The goiter mass was successfully removed, despite the dense adhesions to the posterior thoracic wall

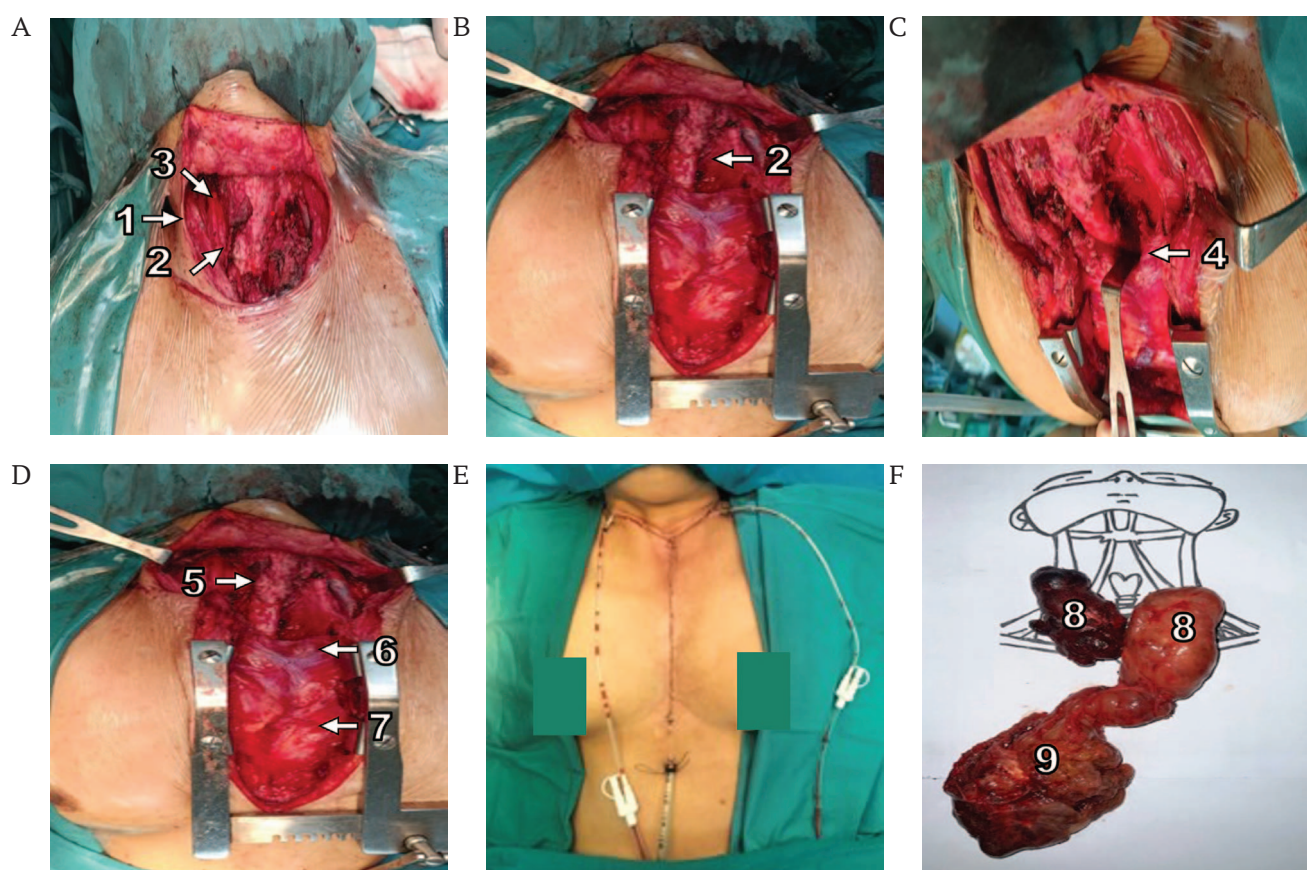


FIG. 3. Complete thyroidectomy with sternotomy in a 58-year-old female patient with massive retrosternal goiter
 A. Right thyroid lobectomy (1) with preservation of the recurrent laryngeal nerve (2) and parathyroid glands (3); the isthmus was absent.
 B. Dissection of the deeply located left thyroid lobe; the left recurrent laryngeal nerve was identified and protected (2), while the parathyroid glands were not visualized.
 C. Retrosternal component (4) mobilized with downward traction and blunt dissection, including contralateral release using finger dissection.
 D. Tumor bed following complete resection of the retrosternal thyroid component, showing the exposed trachea (5) and preserved mediastinal structures such as aortic arch (6), and Heart (7) after median sternotomy.
 E. Final wound closure with placement of cervical and retrosternal drains
 F. Gross specimen showing the resected bilateral thyroid gland (8) with massive retrosternal extension (9).

which added technical difficulty. The excised specimen confirmed bilateral retrosternal adenomatous goiter (Fig. 3E). Recurrent laryngeal nerve preservation was performed anatomically, as intraoperative neuromonitoring was unavailable. Parathyroid glands were carefully identified and preserved *in situ* with their vascular supply whenever possible. Auto-transplantation into the sternocleidomastoid muscle was performed only in cases of devascularization. Fiberoptic laryngoscopy was used at the end of surgery to confirm vocal fold mobility. Hemostasis was secured, drains were placed in the cervical and substernal regions, and the sternum was closed with wire (Fig. 3F).

Postoperative care included routine monitoring for bleeding, pain, airway stability, recurrent or superior laryngeal nerve injury symptoms, and early signs of hypocalcemia. Levothyroxine replacement therapy was initiated on the first postoperative day at a dose of 100 mcg/day, with a target TSH level of 1–2 mIU/L. During hospitalization, the patient remained stable, with stepwise transfer from the intensive care to the general ward, and drains were removed on the fourth day. Patient was discharged on the fifth postoperative day without dysphagia, hoarseness, or hypocalcemia. After discharge, the planned follow-up consisted of monthly TSH monitoring and clinical evaluations every six months.

DISCUSSION

RSG presents unique diagnostic and operative challenges due to mediastinal extension, tracheal compression, and close relation to great vessels, resulting in higher perioperative morbidity compared with purely cervical goiter [2, 3]. Although this case of adenomatous goiter in a patient with a history of left isthmolobectomy was initially described as a recurrence, the absence of imaging or operative records from the patient's first surgery in 2006 makes it impossible to exclude a pre-existing retrosternal component. Therefore, the present clinical case may more accurately represent a progression of longstanding multinodular goiter with retrosternal extension rather than a true recurrence. This distinction has been clarified in order to align terminology with the underlying clinical uncertainty. A recent international multicenter evaluation confirmed higher rates of transient hypoparathyroidism and surgical complications in RSG patients, underscoring the need for meticulous preparation and high-level surgical expertise [3].

Compared with the transcervical approach, sternotomy carries higher risks of bleeding, wound complications, and transient hypocalcemia [3, 9, 10]. In the present case, these risks were mitigated through multidisciplinary planning, optimized anesthetic and airway preparedness, careful anatomical preservation of the recurrent laryngeal nerves, protection and selective auto-transplantation of the parathyroid glands, and meticulous hemostasis. All of

this also ensured an uncomplicated postoperative course. This multidisciplinary planning involved coordinated assessment by head and neck surgery, anesthesiology, radiology, and pathology, ensuring consensus on airway preparedness, the need for sternotomy, and the safest operative trajectory. Cross-sectional imaging is indispensable in modern RSG management. Contrast-enhanced CT provides an accurate assessment of cranio-caudal extent, tracheal narrowing, and anatomical relationships with mediastinal structures, which are essential for airway and surgical planning [4]. Recent series report tracheal deviation in ~60% and compression in ~40% of large RSG, with postoperative hypocalcemia and airway-related events not infrequent, highlighting the tight coupling between imaging severity and perioperative risk [10]. In this case, CT demonstrated significant airway narrowing and mediastinal spread, making sternotomy the most reliable and safe approach for complete resection.

Newer classification frameworks, such as the metric system proposed by Mukhtar H. et al. [7], provide standardized criteria for determining the need for sternotomy. The metric classification showed that Grade I (<3 cm) rarely required sternotomy, whereas most Grade III (>6 cm) did. Applied to this case, the extent and airway compromise met criteria favoring sternotomy, improving team alignment and reproducibility of decisions.

Not all RSG demand sternotomy; many are resectable transcervically, and complication profiles vary with gland size, previous thyroid surgery, and tracheal deviation. A 2019–2023 cohort study found transient hypocalcemia as the most common complication; however, malignancy and larger glands were independently associated with surgical outcomes, reinforcing the role of individualized risk stratification beyond access planning [9]. Comparative series similarly show that RSG patients represent a different risk phenotype than cervical goiter patients [3].

Surgical excellence, including meticulous dissection, preservation of the recurrent laryngeal nerves and parathyroid glands, effective hemostasis, and coordinated multidisciplinary airway planning, remains essential for optimizing outcomes in patients with RSG, particularly in cases with severe tracheal compression [3, 9, 10]. Although most RSG are benign multinodular or adenomatous lesions, several reports suggest that their oncologic risk profile differs from that of cervical multinodular goiters [6, 11]. Therefore, total thyroidectomy remains the treatment of choice for symptomatic or compressive RSG, ensuring both oncologic safety and long-term airway relief. Hybrid approaches, such as transcervical combined with video-assisted thoracoscopic surgery (VATS), may reduce chest wall morbidity in selected patients; however, sternotomy remains indispensable for massive mediastinal disease or when adhesions to vascular structures are extensive [12].

CONCLUSION

The atypical recurrence of a RSG almost two decades after partial thyroidectomy highlights the unpredictability of the long-term course of thyroid disease. Contrast-enhanced CT and metric-based classifications are essential to determine mediastinal

extension and the need for sternotomy with total thyroidectomy in cases of compressive goiter. The importance of long-term follow-up of RSG patients, structured preoperative planning and multidisciplinary teamwork in cases of goiter extension beyond the sternum, remains undeniable.

AUTHOR CONTRIBUTIONS

Iwan Sidharta was the attending physician responsible for the patient and served as the primary surgeon. Didiek D.T. Setyo acted as the first assistant during the procedure, and also collected research data, analyzed the literature, and contributed to the development of the scientific concept. All authors approved the final version of the publication.

ВКЛАД АВТОРОВ

И. Сидхарта был лечащим врачом пациента и выполнял функции основного оперирующего хирурга. Д.Д.Т. Сетьо выступал первым ассистентом во время операции, а также осуществлял сбор исследовательских данных, анализ литературы и внес вклад в разработку научной концепции. Все авторы одобрили окончательную версию публикации.

REFERENCES / ЛИТЕРАТУРА

1. Yankov G., Alexieva M., Mekov E.V. Residual retrosternal goiter and thymolipoma after cervical thyroid resection. *Cureus*. 2024 Oct; 16(10): e71627. <https://doi.org/10.7759/cureus.71627>. PMID: 39553011
2. Gurrado A., Prete F.P., Di Meo G., et al. Retrosternal, forgotten, and recurrent goiter. In: Testini M., Gurrado A., editors. *Thyroid Surgery. Updates in Surgery*. Cham: Springer; 2024. P. 39–46. https://doi.org/10.1007/978-3-031-31146-8_5
3. Cappellacci F., Canu G.L., Rossi L., et al. Differences in surgical outcomes between cervical goiter and retrosternal goiter: an international, multicentric evaluation. *Front Surg*. 2024 Feb; 11: 1341683. <https://doi.org/10.3389/fsurg.2024.1341683>. PMID: 38379818
4. Akinci O., Aygan S., Inci E., et al. Computed tomography findings affecting the decision of sternotomy in substernal goiter. *Sisli Etfal Hastan Tip Bul*. 2023 Sep; 57(3): 305–311. <https://doi.org/10.14744/SEMB.2023.25307>. PMID: 37900343
5. Sahbaz A., Aksakal N., Ozcinar B., et al. The “forgotten” goiter after total thyroidectomy. *Int J Surg Case Rep*. 2013; 4(3): 269–271. <https://doi.org/10.1016/j.ijscr.2012.11.014>. Epub 2012 Dec 7. PMID: 23336990
6. Prete F.P., De Luca G.M., Sgaramella L.I., et al. Prevalence and clinical risk factors of thyroid cancer in retrosternal goiter: a retrospective comparative study with cervical multinodular goiter. *J Clin Med*. 2025 Jan; 14(2): 489. <https://doi.org/10.3390/jcm14020489>. PMID: 39860494
7. Mukhtar H., Zahid H., Khan I.M., et al. A new metric classification system for surgical management of retrosternal goitres. *J Coll Physicians Surg Pak*. 2025 Jun; 35(6): 708–711. <https://doi.org/10.29271/jcpsp.2025.06.708>. PMID: 40491102
8. Tessler F.N., Middleton W.D., Grant E.G., et al. ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White Paper of the ACR TI-RADS Committee. *J Am Coll Radiol*. 2017 May; 14(5): 587–595. <https://doi.org/10.1016/j.jacr.2017.01.046>. Epub 2017 Apr 2. PMID: 28372962
9. Obadiel Y.A., Al-Shehari M., Algmaly Y., et al. Surgical Management and Predictors of Postoperative Complications of Retrosternal Goiters: A Retrospective Study. *Cureus*. 2024 Mar; 16(3): e56573. <https://doi.org/10.7759/cureus.56573>. PMID: 38646310
10. Sridhar K., Mohiyuddin S.A., A S., et al. Outcomes of total thyroidectomy in large goiters with retrosternal extension and tracheal compression: a multivariate analysis. *Cureus*. 2024 Nov; 16(11): e73921. <https://doi.org/10.7759/cureus.73921>. PMID: 39697941
11. Chen Q., Su A., Zou X., et al. Clinicopathologic characteristics and outcomes of massive multinodular goiter: a retrospective cohort study. *Front Endocrinol*. 2022 May; 13: 850235. <https://doi.org/10.3389/fendo.2022.850235>. PMID: 35685217
12. Al Jadeedi S., Usama M., Al Harthi H., et al. A hybrid surgical approach for retrosternal goiter: surgical experience at a tertiary thoracic and endocrine surgery center. *J Endocr Surg*. 2025 Sep; 25(3): 89–100. <https://doi.org/10.16956/jes.2025.25.3.89>

INFORMATION ABOUT THE AUTHORS / ИНФОРМАЦИЯ ОБ АВТОРАХ

Didiek D.T. Setyo, surgical intern, Department of Head and Neck Surgery, Faculty of Medicine, Airlangga University, Dr. Soetomo Regional General Hospital.
ORCID: <https://orcid.org/0009-0001-7821-4012>

Iwan Sidharta✉, Associate Professor, Department of Head and Neck Surgery, Faculty of Medicine, Airlangga University, Dr. Soetomo Regional General Hospital.
ORCID: <https://orcid.org/0009-0009-7108-6052>

Сетьо Дидик Дармади Три, врач-интерн хирургического профиля кафедры хирургии головы и шеи медицинского факультета Университета Айрлангга Региональной больницы общего профиля им. доктора Сутомо.
ORCID: <https://orcid.org/0009-0001-7821-4012>

Сидхарта Иван✉, доцент кафедры хирургии головы и шеи медицинского факультета Университета Айрлангга Региональной больницы общего профиля им. доктора Сутомо.
ORCID: <https://orcid.org/0009-0009-7108-6052>

✉ Corresponding author / Автор, ответственный за переписку