



# A case of mediastinal goiter treated surgically using a clavicle-lifting technique



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## ABSTRACT

**INTRODUCTION:** Mediastinal goiter is a benign disease, which is defined as a goiter with the greater portion of its mass lying below the thoracic inlet. It is controversial whether the cervical approach is the best approach for all mediastinal goiter surgeries.

**CASE PRESENTATION:** A 71-year-old woman presented with respiratory discomfort during exertion. Computed tomography (CT) revealed a mediastinal goiter extending to the arch of the aorta. Surgical resection was performed using a clavicle-lifting technique. The excised specimen was 13 × 10 × 5 cm in size and weighed 220 g. The pathological diagnosis was nodular goiter.

**DISCUSSION:** The clavicle-lifting technique is a simple and safe technique that involves lifting the clavicles with a pediatric extension retractor (Kent Retractor Set, Takasago Medical Industry, Tokyo, Japan). This is a good choice for surgery on upper mediastinal lesions such as mediastinal goiters as it obviates the need for a median sternotomy.

**CONCLUSION:** Although further study is necessary, it appears that a transcervical approach using the clavicle-lifting technique may be an acceptable treatment for mediastinal goiters that extend to the aortic arch.

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## 1. Introduction

Mediastinal goiter is a benign disease, which is defined as a goiter with the greater portion of its mass lying below the thoracic inlet [1]. Usually, such goiters can be resected via a cervical approach. It remains unknown whether this approach can be applied for the cases that would normally be approached via a median sternotomy or lateral thoracotomy. Mediastinal goiters extending beyond the aortic arch have been reported to be good candidates for extracervical incision [2]. Herein, we report a case of a mediastinal goiter extending to the aortic arch that we treated with a transcervical approach using the clavicle-lifting technique.

## 2. Case presentation

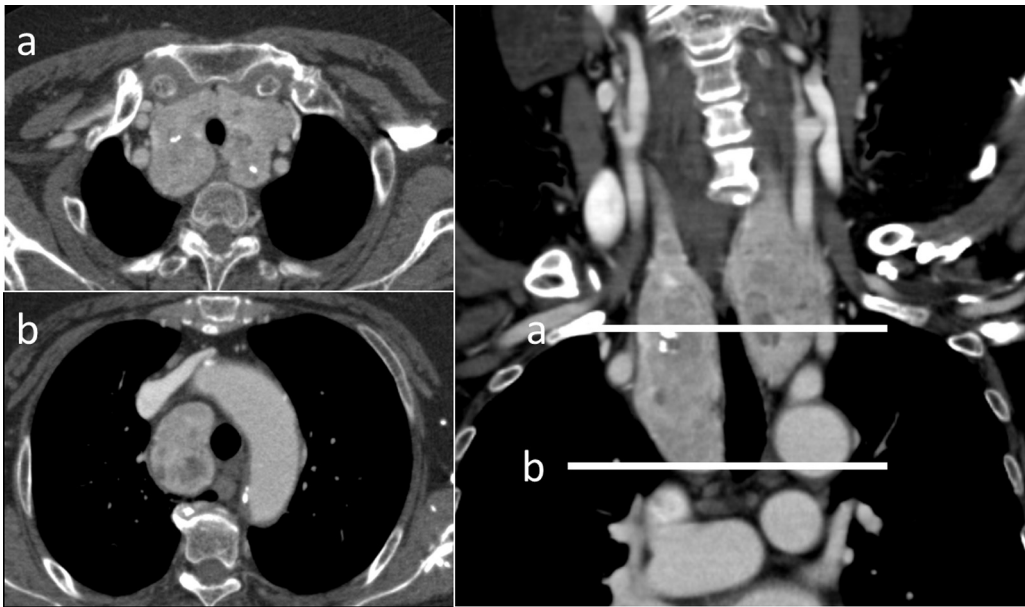
A 71-year-old woman presented at our department with shortness of breath. All the hormonal assays were normal; TSH 0.20  $\mu$ IU/ml, FT3 2.97 pg/ml, FT4 1.00 ng/ml, TG 0.98 ng/ml, AbTG 12 IU/ml, AbTPO 6.2 IU/ml, Calcitonin < 0.50. An ultrasound showed that a hypoechoic mass with internal heterogeneity spread bilat-

eral lobe and lower pole of the right lobe was not well defined. An enhanced CT scan showed that there was a large mediastinal goiter extending to the aortic arch, which was the primary cause of her dyspnea (Fig. 1). There were no findings that indicated a malignant tumor. Because this huge goiter extended to the aortic arch and impinged upon the trachea, we decided to perform a total thyroidectomy. Aspiration cytology was difficult because the patient's neck was short and her subcutaneous fat was thick. Moreover, it was thought that aspiration cytology would aggravate her symptoms. Accordingly, we did not perform pre-surgical cytology.

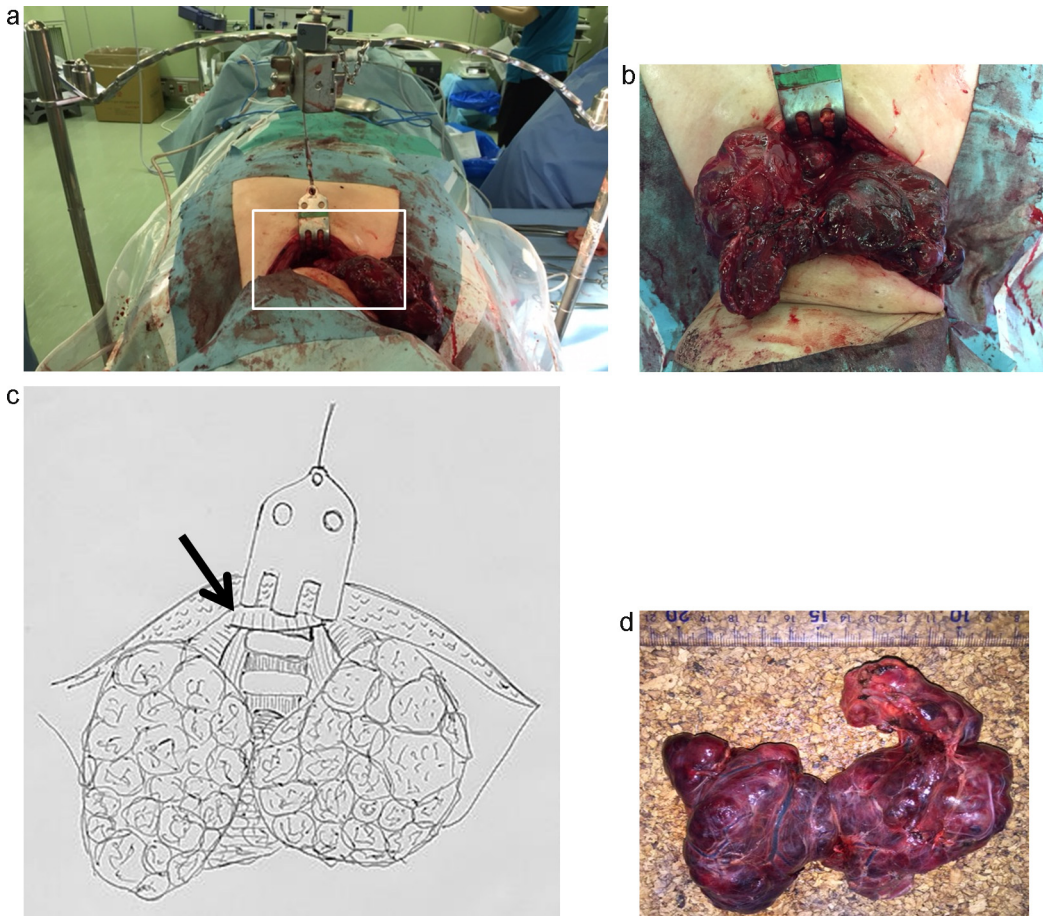
We decided to perform a total thyroidectomy to relieve her symptoms (Fig. 2a). We chose a cervical approach. There were many neovascular vessels around the thyroid. The left lobe was handled easily by the usual operative technique. But the inferior pole of the right lobe was located under the clavicles and extended to the aortic arch. By lifting the clavicles with a pediatric extension retractor (Kent Retractor Set, Takasago Medical Industry, Tokyo, Japan), the operative field was enlarged to allow better access. The aortic arch was clearly visible and the thyroid was resected safely (Fig. 2b). Both superior thyroid arteries were ligated distally preserving the external branch of the superior laryngeal nerves. The parathyroid glands and both recurrent laryngeal nerves were identified and preserved. Operative time was 168 min. Blood loss was 415 ml. The excised specimen was 13 × 10 × 5 cm in size and weighed 220 g (Fig. 2c). Pathological examination revealed nodular hyperplasia. She was discharged from our hospital 4 days after the operation without

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**Fig. 1.** An enhanced CT scan revealed a large mediastinal goiter extending beyond the aortic arch, which was likely the cause of the patient's dyspnea.



**Fig. 2.** (a: photograph of the operative field) Pediatric extension retractors (Kent Retractor Set, Takasago Medical Industry, Tokyo, Japan) have two posts, a bridging arch, a reel and a trammel shape retractor. (b: an enlarged view of Fig. 2a) We placed the trammel shape retractor under the breastbone. Pulling up the clavicles, the operative field was enlarged. (c: schema of Fig. 2b) The aortic arch was clearly visible (arrow), and the thyroid was resected safely. (d) The excised specimen was 13 × 10 × 5 cm in size and weighed 220 g.

any complications. At present, after 9 months of surgery, the patient is alive without hypoparathyroidism and thyroid function is well controlled with levothyroxine 75  $\mu$ g.

### 3. Discussion

Mediastinal goiter is a benign disease, which is defined as a goiter with the greater portion of the mass lying below the thoracic inlet [1]. It remains a matter of controversy whether these goiters can be resected via a cervical approach or whether they are better approached via a median sternotomy or lateral thoracotomy. Mediastinal goiters extending to the aortic arch, like the present case, have been reported to be good candidates for an extracervical approach [2]. It has been reported that a thyroidectomy should be performed for all mediastinal goiters because of the risk of airway obstruction, potential malignancy, tracheomalacia and invasion into adjacent structures [3,4].

Surgery to treat a mediastinal goiter can be performed via a transcervical approach, a lateral thoracotomy or a sternotomy. In most cases, the goiter can be resected via a cervical approach. However, between 2% and 29% of all mediastinal goiters require an extracervical incision [3–6]. However, there is disagreement about whether a cervical approach is best choice for a lesion causing tracheal or vascular compression. There is also disagreement about whether a cervical approach is indicated in cases of suspected malignancy, extremely large mediastinal goiters (>10 cm), recurrent goiters, cases of primary ectopic tumors with intrathoracic blood supply, and cases in which the goiter reaches the aortic arch and/or invades into adjacent structures [1–8].

We previously reported that the clavicle-lifting technique is useful for dissecting the lymph nodes in the neck and for upper mediastinal lesions in esophageal cancer [9]. It is a simple and safe technique that involves lifting the clavicles with a pediatric extension retractor. The clavicle-lifting technique was very useful in the present case as it allowed us to resect the lesion without performing a median sternotomy.

### 4. Conclusion

Although further study is necessary, the present case shows that a transcervical approach using the clavicle-lifting technique is a suitable technique for resecting mediastinal goiters that extend to the aortic arch.

### Conflict of interests

The authors declare no conflict of interests for this article.

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None.

### Ethical approval

Written informed consent was obtained from the patients for publication of these case reports and accompanying images.

### Consent

This patient was properly informed and gave consent for her clinical information to be included in an Elsevier publication.

### Author contribution

Eisaku Ito performed the surgery, wrote the manuscript and is responsible for the information.

Hironori Ohdaira reviewed critically the manuscript.

Jungo Yasuda performed the surgery.

Masashi Yoshida reviewed critically the manuscript.

Yutaka Suzuki reviewed critically the manuscript and performed the surgery.

### Guarantor

Eisaku Ito and Yutaka Suzuki are the guarantor of this paper.

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