

Case report

Surgical approach and technique in retrosternal goiter: Case report and review of the literature



Yin Rui Sheng, Ren Chong Xi*

Department of General Surgery, Cangzhou Clinical College of Integrated Traditional Chinese and Western Medicine of Hebei Medical University, Cangzhou 061000, China

HIGHLIGHTS

- Retrosternal goiter.
- A single neck incision.
- Less trauma and recovery quickly.

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ABSTRACT

Background: Retrosternal goiter is defined as a thyroid mass of which more than 50% is located below the thoracic inlet. The aim of this study is to assess the retrosternal goiter surgically approach through a neck incision and analyze the surgical technique.

Case presentation: The case reported by us used a single neck collar-shaped incision for huge retrosternal goiter with good outcome. The patient was surgically treated through a neck incision without the need for sternotomy or lateral thoracotomy. We did not observe definitive lesions in the inferior laryngeal nerve or definitive hypoparathyroidism.

Conclusions: Patients with retrosternal goiter can be safely treated surgically through a single neck incision, which is less trauma and recovery quickly.

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1. Introduction

Retrosternal goiter refers to the thyroid mass grows along dermal sternum from the neck to the substernal portion, descending below the thoracic inlet. Retrosternal, substernal, or intrathoracic, goiter was first described by Haller in 1749 [1]. The currently accepted definition of an retrosternal goiter is a thyroid gland with more than 50% of its mass located below the thoracic inlet [2]. It is characterized by slow progression and a longer course of illness. Surgery is the treatment of choice for retrosternal goiter. The literature has been reviewed to clarify the management of retrosternal goiters with regard to the various approaches, indications for extracervical incisions and their possible complications. Though retrosternal goiter extending beyond the aortic arch into the posterior mediastinum are better dealt with by either

sternotomy or lateral thoracotomy, most retrosternal goiters can be resected through a transcervical approach. In fact, the overall number of complications associated with those incisions is higher than that seen with the transcervical approach [3,4]. This report describes the use of transcervical approach and surgical technique with a good postoperative result.

2. Case report

A 32-year young woman was admitted to Cangzhou Clinical College of Integrated Traditional Chinese and Western Medicine of Hebei Medical University. The patient was referred to our institution with a 9-year history of left lobe thyroidectomy because of goiter. The retrosternal goiter was first recognized when further routine diagnostics were initiated due to a non-specific chest discomfort. The patient had reported fatigue and dyspnoea during physical stress, and had noticed a large mass on the front of the neck 1 year before the admission to our hospital. A chest X-ray was done in March of 2014, and showed a huge mass in the superior

* Corresponding author. Qian Tong Street No.17, Cangzhou City, Hebei Province, China.

E-mail address: rcxvip@outlook.com (R. Chong Xi).

mediastinum, which compressed and dislocated the trachea. She was found to have a huge retrosternal goiter. The ultrasound showed a large goiter: the right thyroid lobe with normoechoic and hypoechoic nodulus was measured at $45 \times 32 \times 55$ mm and extended beyond the sternum and absent left thyroid lobe. The isthmus of the thyroid gland was absent. The goiter considerably compressed the trachea in the mediastinum and displaced it to the left side [Fig. 1]. The proper evaluation of the size of the goiter was impossible because of retrosternal localization. The blood examination showed a slightly elevated level of the thyroid gland hormone FT3 6.8 pmol/L (2.8–7.1), a normal level of T4 101 nmol/L (66–181) and FT4 16 pmol/L (12–22) and a decreased level of thyroid stimulating hormone 0.25 μ U/ml (0.27–4.2). And we found no subclinical hyperthyroidism or hypothyroidism.

The patient was prepared and qualified for an operation in order to prevent the risk of any future illnesses or death resulting from acute airway obstruction. The approach was through a transcervical incision.

First, we made a standard collar incision (Kocher's) on the neck. The subtotal right lobe of the thyroid gland was excised after superior thyroid arteries and veins were ligated. Histopathologic examination reported a multinodular goiter. And then we had some problems with separating the lower thyroid artery, because of large goiter of the thyroid gland. Separation of the lower thyroid artery was difficult as there was not enough space between the right lobe of the thyroid gland and the sternum from the right side of the neck to the right side of mediastinum. Therefore, we slightly elevated the sternum. The goiter (mediastinal part of the right thyroid gland) extended into the thorax beyond the aortic arch and azygous vein. Next, the goiter situated in the mediastinum was resected. We had some difficulties with preparing the goiter and separating the goiter from the mediastinum, oesophagus and azygous vein. There was lot of adhesion against the trachea, oesophagus and azygous vein. Preparation and isolation of this large lobe were difficult because of the location of goiter and the presence of large blood

vessels adjacent to the goiter (superior vena cava, right brachiocephalic veins and brachiocephalic trunk). The key was to operate with your fingers close to the thyroid gland and enter capsule of the goiter with blunt dissection gently; the goiter was separated from the pleura and large blood vessels within the chest; and then it could be pulled from mediastinal up to the neck by using towel forceps or suture. Under normal circumstances the goiter was entirely possible to remove. During the operation, the laryngeal nerve and the parathyroid glands were identified and spared. And we did not find any additional vessels feeding the goiter. The length of the whole goiter was 14 cm [Fig. 2]. There were no complications after the operation and the patient was discharged from hospital in 1 week. Pathological evaluation revealed a typical goiter [Fig. 3]. The X-ray after the operation showed a correct image of thorax and mediastinum.

3. Discussion

Surgery is the treatment of choice for retrosternal goiter with or without clinical symptoms. The procedure can be performed through a single neck incision in most cases. Employment of systematic technique minimizes the need for sternotomy, even in patients with significant intrathoracic component, and keeps severe complication rates at levels comparable to those of conventional thyroidectomy [5]. The case reported by us used a single neck collar-shaped incision for huge retrosternal goiter (performed total resection) with good outcome (less trauma and quicker recovery). The literature is consistent in stating that most substernal goiter cases may be resected through one neck incision. The need for sternotomy or thoracotomy ranges between 0% and 13% [6], while some authors claim such rate to be as high as 50% one author reported rates of 29% [7]. Arici C et al. believed that the cervical collar incision is nearly always adequate, with few exceptions [8]. Agha A et al. support that a transverse collar incision should be the standard approach for most patients [2]. In reality, patients with retrosternal goiter can and should be safely treated through the neck approach with good outcome, while sternotomy or thoracotomy should be



Fig. 1. Preoperative chest x-ray. Enlargement of the upper and middle mediastinum, mild tracheal deviation to the left, and tracheal stenosis, at the level of the aortic arch. The chest X-ray showing deviated trachea and enlarged upper mediastinum due to retrosternal goiter.



Fig. 2. The maximum length of the right lobe (total specimen) was 14 cm.

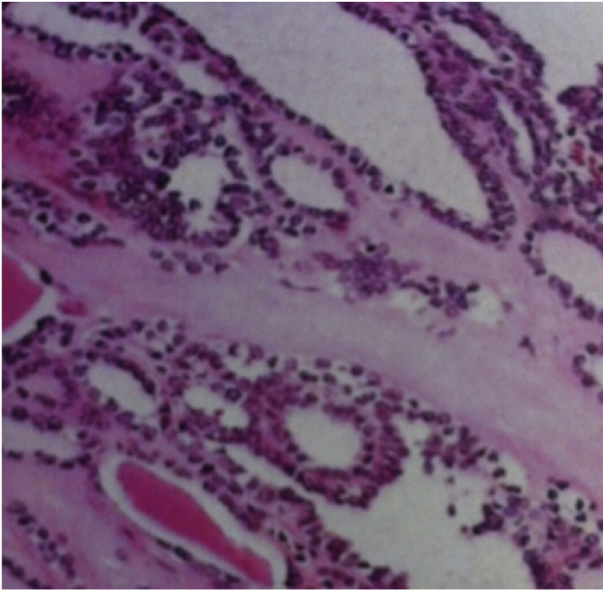


Fig. 3. Histopathological examination showed a goiter.

reserved for selected cases.

Though retrosternal goiters are classified as either primary or secondary, the primary goiter is an exceptional finding and this group represents approximately 1% of retrosternal goiter. The vast majority of retrosternal goiter are secondary, which originate from the downward extension of the gland along the planes of the cervical and mediastinal fascia [9]. The blood supply arises principally from the inferior thyroid arteries and most of the venous return is through the inferior thyroid veins. The surgical strategy for treating retrosternal goiter is somewhat different from the one used for the goiter due to anatomic and physiologic dissimilarities. It make retrosternal thyroidectomy technically challenging. The surgery is technically demanding, with greater associated chances of injury to native structures [4]. Once the following situations appear, sternotomy or lateral thoracotomy should take into account. 1)retrosternal goiter is too large to be removed through thoracic inlet; 2) the retrosternal goiter blood supply originates in the chest. 3)retrosternal goiter growing into the mediastinum causes anatomic variations in the location of the recurrent laryngeal nerve and the parathyroid glands; 4)Venous congestion due to compromised drainage may cause severe bleeding. Based on this, we consent with Machado et al. [3]in that most retrosternal goiters can be resected through a transcervical approach, but those extending beyond the aortic arch into the posterior mediastinum are better dealt with by sternotomy or lateral thoracotomy.

4. Conclusions

Surgery is the treatment of choice for retrosternal goiter with or

without clinical symptoms. Surgical removal of the goiter is always indicated and should be performed as soon as possible. The procedure can be performed through a single neck incision in most cases patients with retrosternal goiter can be safely treated surgically through a single neck incision, which is less trauma and recovery quickly.

Ethical approval

Approval of the study was obtained from the Institutional Review Board.

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Author contribution

Yin Rui Sheng has made substantial contributions to conception and design; Ren Chong Xi has been involved in drafting the manuscript and revising it critically for important intellectual content.

Conflicts of interest

The authors declare that they have no competing interests.

Guarantor

Yin ruisheng; Ren chongxi.

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