

A review of surgical management of retrosternal goitre in a single tertiary care referral centre in Sri Lanka

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ABSTRACT

Introduction: Retrosternal goitres require surgical removal due to compressive symptoms as well as risk of malignancy. In a majority, the retrosternal part can be removed through the neck incision, while 5-10% requiring a sternotomy. An alternative to sternotomy is thoracoscopy, which is associated with reduced morbidity.

Methods: The surgical approach used to resect retrosternal goiters in our unit over a period of two years was evaluated.

Results: In fifty four patients out of sixty (90%) with retrosternal extension, resection was feasible from neck. Out of the remaining six, two had median sternotomy while four had thoracoscopy. The operating time, blood loss, post-operative analgesic requirement and hospital stay were less in the thoracoscopy group.

Conclusions: Majority of retrosternal goitres can be removed via neck. For those who require access in to chest, thoracoscopy is associated with reduced morbidity and hospital stay, when compared to median sternotomy.

Keywords: *Median sternotomy, retrosternal goitre, thoracoscopy.*

Introduction

Retrosternal goitres are cervical goitres with mediastinal extension through the thoracic inlet. Most show continuity with the cervical portion of the gland, although some have only a fibrous band connecting cervical and mediastinal thyroid tissue (1). Majority are long standing multinodular goitres. About 5-40% of all goitres are retrosternal (2). The criteria used to define retrosternal extension are variable and not constant, resulting in differences of reported incidence (3, 4). Many are asymptomatic but as they enlarge, they may cause compressive symptoms (3). Approximately 40% of patients who have retrosternal goitres present with compressive symptoms resulting from impingement on the airway, oesophagus, vessels and nerves (1, 5). The incidence of carcinoma in retrosternal goitres is reported as 8-22% (1, 2, 6, 7). These situations lead to surgical removal of the goitre.

The blood supply of the retrosternal goitres arises primarily from the inferior thyroid artery. Therefore ligation of vascular supply can be achieved in the neck and in a majority resection can be achieved through a cervical approach. About 5 - 15 % will need sternotomy or thoracotomy (4, 8-10). The extension to the posterior mediastinum, malignancy, mediastinally-sourced blood supply to the goitre, recurrences and adhesions to mediastinal vessels or compression on the superior vena cava may necessitate sternotomy or thoracotomy (1, 11, 12).

The decision to perform sternotomy should be considered carefully and discussed with the patient preoperatively because there is increased morbidity associated with sternotomy or thoracotomy. Patients requiring opening of the chest will have increased pain, respiratory complications

and dehiscence of sternotomy as disastrous outcomes (12, 13). In addition a large scar in the chest will be psychologically disturbing especially in the young.

For the patients who need opening of the chest, thoracoscopic excision is an alternative as thoracoscopy reduces the morbidity associated with open chest surgery (14).

In this study we reviewed the surgical technique of retrosternal goitres performed in our unit.

Methods

A retrospective analytical study was carried out on 391 patients presenting with goitre, from 1st of January 2018 to 1st of January 2020 in a single tertiary care referral centre. The patients who had retrosternal goitre were selected for the analysis. In the selected sample, cervical approach was the standard. When a cervical approach was not successful in removal of the goitre, intrathoracic extension through either sternotomy or thoracoscopy was used. With the establishment of the technique of thoracoscopy, sternotomy was not used. Thoracoscopic excision was done with patient in supine position. Ventilation was by standard single lumen tube with partial lung collapse obtained with insufflation of CO₂ at a pressure of 8 - 10 mmHg.

Surgery was performed with three ports. Approach was through the right side. The azygos vein, right brachiocephalic vein and superior vena cava were identified. Resection was done using bipolar diathermy and ultrasonic dissector. Resected gland was removed via the neck incision. Chest was drained with an intercostal tube.

Results

Of the 391 patients, 375(96%) were females and 16(4%) were males. The mean age was 47.43 years (Range: 14-77, mode 45). These values correspond with the unpublished data in the country (15).

Sixty patients (15.3%) had retrosternal extension confirmed by ultrasound scans and 15 patients were evaluated further with contrast enhanced CT (CECT) neck and chest. In 54 patients (90% of patients with retrosternal goitres), it was possible to deliver the retrosternal part through the cervical incision alone. In the remaining 6 patients (10%), median sternotomy was performed in 2 patients and thoracoscopy was done in 4 patients. The reason for sternotomy and thoracoscopy was the inability to deliver the retrosternal extension through the neck. There were no conversions to sternotomy or thoracotomy in the thoracoscopy group. Table 1 summarizes the mean duration and the mean blood loss between the two procedures.

Two patients who had sternotomy were ventilated overnight and managed in intensive care unit for two days. Their intercostal tubes were removed on day four and five. They required narcotic analgesics for three days. Patients who underwent thoracoscopy were extubated at the end of surgery and observed in intensive care unit overnight. They were started on oral feeding on the same day and did not require narcotic analgesics and managed with diclofenac sodium suppositories and oral analgesics. Their intercostal tubes were removed by the fourth postoperative day.

All the patients with a cervical incision alone were discharged within 3 days post-operatively. The two patients who underwent sternotomy were discharged on day 8 and day 10. Four patients who had thoracoscopic mobilization were discharged by 5th postoperative day.

Table 1: Comparison of the two procedures with regards to duration of procedure and mean blood loss

Type of procedure	Mean duration of surgery (minutes)	Mean blood loss(ml)
Total thyroidectomy via cervical root and median sternotomy	280	750
Total thyroidectomy via cervical root and thoracoscopy	210	<100

Seven patients out of sixty (11.6%) had differentiated cancer of them. Five patients had micropapillary carcinoma and two had follicular carcinoma.

Discussion

The incidence of retrosternal goitre reported in the literature varies and is about 5-40%. The variation in reported rates is founded on variability of definition of retrosternal extension. Some define it as any extension to the substernal area while others take it only when more than 50% of the goitre extends into the chest (12). In our series, the incidence of retrosternal goitre was 15.3%.

What matters more is whether the thyroidectomy can be completed through the neck or direct transthoracic access to the chest is required. This is because in the latter situation, appropriate surgical expertise needs to be planned.

Preoperative CECT will provide necessary information regarding the need for transthoracic access. Goitres extending beyond the arch of thoracic aorta have a high potential for transthoracic access. In our series, retrosternal goitres above the aortic arch were removed transcervically as well as a few going just beyond the aortic arch. All requiring transthoracic approaches were going beyond the aortic arch.

The reported incidence requiring transthoracic approach is about 5-15 % (4, 8-10, 12, 16). In our series it was 10%.

For patients requiring a transthoracic approach there are three possible access techniques. By open surgery it may be done by lateral thoracotomy or median sternotomy (17). The latter is associated with more operative morbidity but has better control of major intrathoracic vessels. The other alternative is by thoracoscopy where the postoperative morbidity is reduced.

Out of the six patients undergoing transthoracic surgery in our unit two were done via median sternotomy. Following the establishment of thoracoscopic surgery in our department, four patients had surgery via thoracoscopy. The access to chest was from the right side as all the retrosternal extension was predominantly on the right. This is

reported in literature and explained by the aortic arch with branches limiting progress on the left side (12). The resected goitre was removed through the cervical incision.

The mean operative time was less in the minimal access group as well as less reduced blood loss similar to published data (14, 18). Conversion to open surgery was not required in any of the patients. All patients who underwent median sternotomy were electively ventilated for one day while those who had thoracoscopy were extubated postoperatively. The analgesic requirement was less in them as well as having the early removal of intercostal tube and early discharge.

The reported incidence of malignancy in multinodular goitre is 8-22% (2, 6, 7, 19-21). Our data too fall within the given range.

Conclusions

According to the findings of our study, the majority of retrosternal goitres reported to our unit were safely resected through cervical incision alone. For the rest, combination of thoracoscopy has given a better advantage than sternotomy by reducing operative time, blood loss during the procedure, requirement of analgesics, postoperative morbidity and hospital stay; though they are too small for a statistical comparison.

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