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Original Article

# Management of Retrosternal Goitre: A Single Institute Experience

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## Abstract

When a portion of the mass of a goiter ≥50% extends into the mediastinum, it is called as retrosternal goiter (RSG), which is managed by surgical removal either by cervical approach alone or in combination with sternotomy. This is a retrospective analysis of our personal experience in the management of RSG, in terms of its demographics, clinical features, diagnostic considerations, and surgical approach defining, in particular, the cases requiring sternotomy. A total of 307 patients underwent thyroidectomy in the Department of General Surgery at ESIC Medical College and PGIMSR Model hospital, Rajajinagar, Bangalore over a period of 10 years (2011–2021), out of which seven cases had retrosternal extension. Five underwent surgical excision via cervical collar incision alone and two required a combined approach. Thus our experience states that though the management of RSG is technically demanding, a cervical approach is a feasible and safe option. Sternotomy should be reserved for a carefully selected set of patients.

**Key words:** Goitre, Mediastinum, Sternotomy, Thyroidectomy

## INTRODUCTION

Retrosternal goiter (RSG) was first described by Albrecht von Haller in 1749, as the extension of the thyroid tissue below the upper opening of the chest.[1] RSG is characterized by the presence of ≥50% portion of the goiter extending into the mediastinum[2,3] and is documented in 2–19% of all thyroidectomies.[4-6] It can either be "Primary" –arising from aberrant thyroid tissue ectopically located in the mediastinum supplied by mediastinal vessels and having no connection with the cervical thyroid tissue seen in <1% cases[7] or "Secondary"- a more common variety wherein there is extension or downward migration of thyroid tissue being supplied via branches of inferior thyroid artery. It can be retrosternal, substernal, intrathoracic, or mediastinal based on its location.

RSG are extremely slow growing with female preponderance and remain asymptomatic often detected incidentally on radiologic examination.[8] Diagnosis of RSG is most frequently made in the fifth or sixth decade of life. However, there can be sudden enlargement of RSG owing to hemorrhage, cystic degeneration, or rarely malignant change seen in 3–21% patients[9] - giving rise to symptoms often due to compressive effects on underlying structures like:

1. Airways - dyspnea, choking, inability to sleep comfortably.
2. Oesphagus- dysphagia and hoarseness
3. Vascular structures-SVC syndrome
4. Sympathetic chain-Horner's syndrome.

The diagnosis of RSG is based upon clinical history, physical examinations, and imaging findings on CT. Surgery is the mainstay of management but surrounded with controversies. A majority of surgeons suggest that all RSG should be operated,[4,5-16] however a small minority prefer surgery only in symptomatic/malignant RSG's.[17] This paper highlights our experience in managing the RSG.

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## MATERIALS AND METHODS

This is a retrospective study from 2011 to 2021 comprising 307 patients who underwent Thyroidectomy in the department of General Surgery at ESIC Medical College and PGIMSR Model hospital, Rajajinagar, Bangalore. RSG was

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noted in seven patients. The medical records of these patients were retrospectively studied. All patients had undergone; thyroid function tests, ultrasonography, chest X-ray, indirect laryngoscopy, fine-needle aspiration (FNA), and CT scan of the neck and chest and a few had been subjected to Thyroid scintigraphy and were managed by surgical excision. All the data obtained were analyzed in terms of its demographics, clinical features, diagnostic considerations, and surgical approach defining in particular the cases requiring sternotomy.

## RESULTS

A total of 307 thyroidectomies were performed in the Department of General Surgery at ESIC Medical College and PGIMSR Model hospital, Rajajinagar, Bangalore. RSG was noted in seven patients. The mean age at presentation was 50.8 years, Male: Female ratio was 4:3. Abnormal thyroid profile was seen in two patients. The most common mode of presentation was swelling in front of the neck followed by neck discomfort. Comorbidities were seen in two patients. All patients were surgically managed. Five underwent only Transcervical approach, whereas combined approach was used in two patients. Difficult anesthesia was encountered in 1 patient.

Mean hospital stay was 12 days. No major postoperative complications were seen. Final histopathology report was Colloid goiter in five patients. Malignant change was noted in 2 patients and there were managed accordingly. All patients received thyroid-stimulating hormone -suppressive treatment with the thyroid hormone post-operatively. No recurrences were noted in our study.

| **Consolidated results** | |
|---|---|
| Total thyroidectomies | 307 |
| RSG cases | 07 |
| Male: Female ratio | 4:3 |
| Median age at presentation | 50.8 |
| Presenting Complaint | |
| 1. Neck swelling | 7 |
| 2. Dyspnea | 2 |
| 3. Neck discomfort | 7 |
| 4. Hoarseness of voice | 1 |
| 5. Asymptomatic | None |
| Deranged thyroid profile | 2 (Hyperthyroid) |
| Characteristic CT finding | Heterogeneously enhancing mass arising from the thyroid lobes extending below the manubrium sterni |
| Anaesthetic considerations | 1 ( need for Fibro optics for intubation as trachea was near complete collapsed ) |
| Surgical procedure | |
| Cervical collar incision | 5 |
| Combined approach (with Sternotomy) | 2 |
| Mean duration of surgery | 3.07 h |
| Mean hospital stay | 12 days |
| Post op complications | Minor-2 |
| | Major-None |
| Final HPE | Colloid Goitre |
| Malignant changes | 2 |
| | 1. Papillary Carcinoma |
| | 2. Hurthle cell variant of Papillary carcinoma |

## DISCUSSION

As mentioned earlier the management of RSG has been a topic of debate. All patients who presented to us with thyroid swellings were clinically examined and the patients in whom lower border of the swelling was not palpable were considered to have retrosternal extension and were evaluated further [Figure 1]. Several factors favor the descent of the goitre into the mediastinum: Downward traction caused by normal swallowing, strong neck muscles, respiration creating negative intrathoracic pressure, and the pull of gravity on the goitre.[18] Although the epidemiology of the RSG varies according to the definition, the incidence, sex ratio, and mean age in our series are in-keeping with other reports.[19,20]

A classical chest X-ray finding of the RSG includes a mediastinal mass with tracheal deviation and compression, and visualization of the smooth or nodular outline of the tumor, however, all of our patients had only deviation of the trachea and no mediastinal mass noted on CXR [Figures 2 and 3]. Ultrasound suspected the retrosternal extension, however, did not provide detailed information about the RSG. CT scan [Figure 4] is the ideal and superior investigation as it provides a detailed anatomy of RSG and its relationship with the surrounding structures, and it was a source of major information in all our RSG patients. Nuclear imaging/Oesophagogram was not done in any of our patients, as it doesn't have any added advantage nor does it affect the course of management as described in few earlier studies.[21,22] FNAC of thyroid swelling was done in all patients however the FNAC of RSG was not

**Figure 1: Picture showing a huge thyroid swelling with inconspicuous lower border**

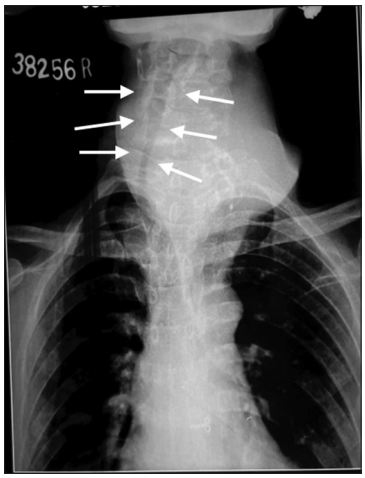



**Figure 2: Chest X-ray showing huge mass with tracheal compression and shift to right**

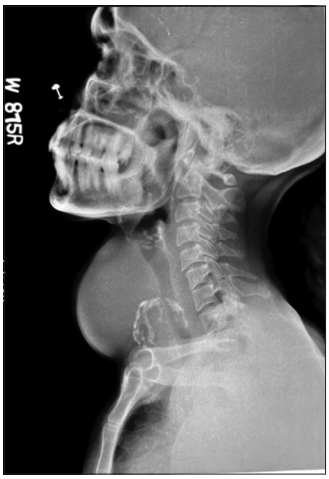



**Figure 3: Lateral view of neck X-ray showing the neck mass with intra glandular calcification**

**Figure 4: CT film of the neck and upper chest showing diffuse swelling of the thyroid gland and substernal goiter, which extends to left side of thorax. The goiter extended upto the right brachiocephalic vein with both trachea and esophagus shifted to right**

done, because it is technically difficult, may be dangerous to perform, and can miss the true pathology.[23,24] In our

**Figure 5: Intraoperative picture showing transcervical approch**

**Figure 6: Intraoperative picture showing extraction of mass via Transcervical approach alone**

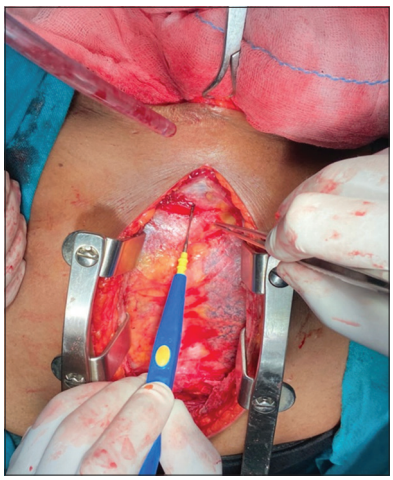
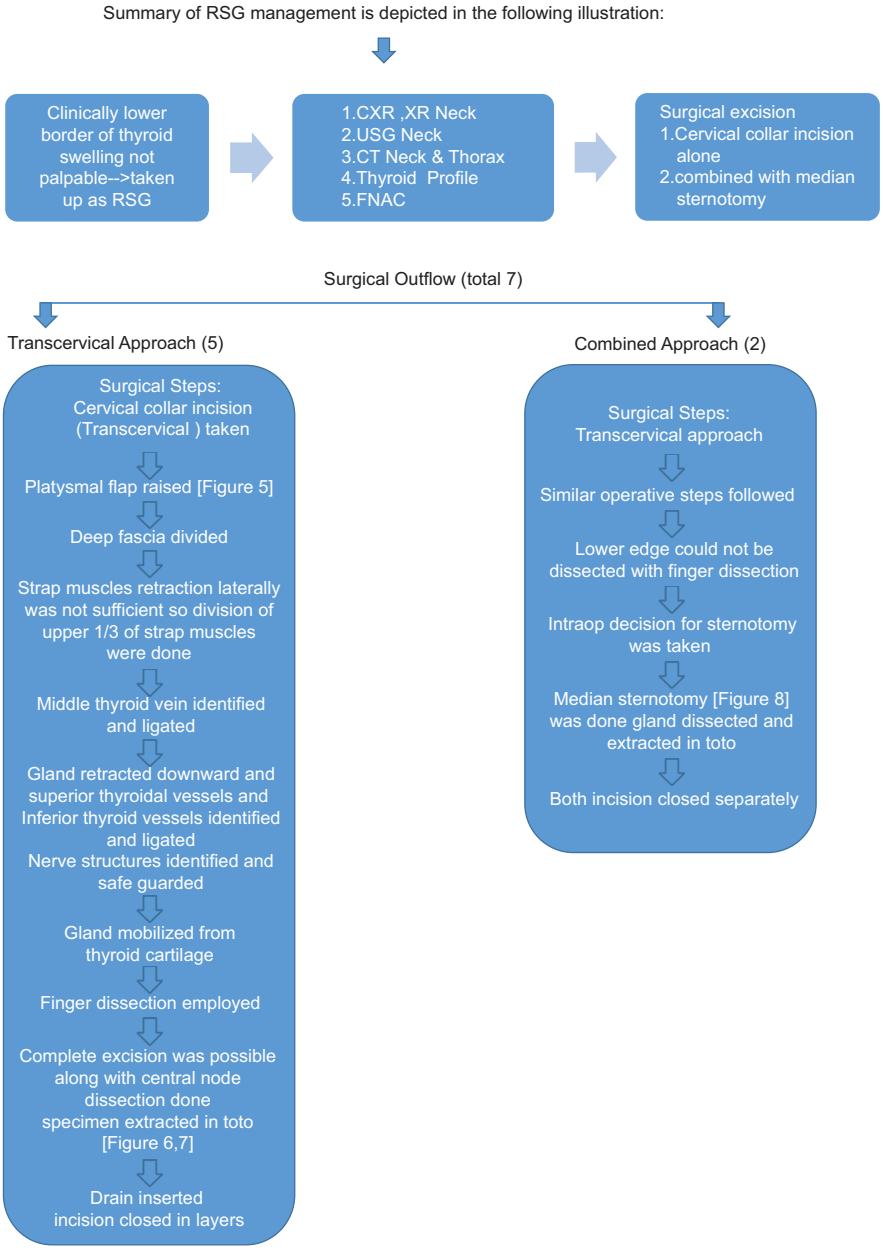


**Figure 7: Figure showing midline sternotomy**

series only two patients presented with toxic goiter. The reported incidence of hyperthyroidism in patients with RSG varies widely from 0 to 50%.[25] None of our patients with RSG was treated medically.



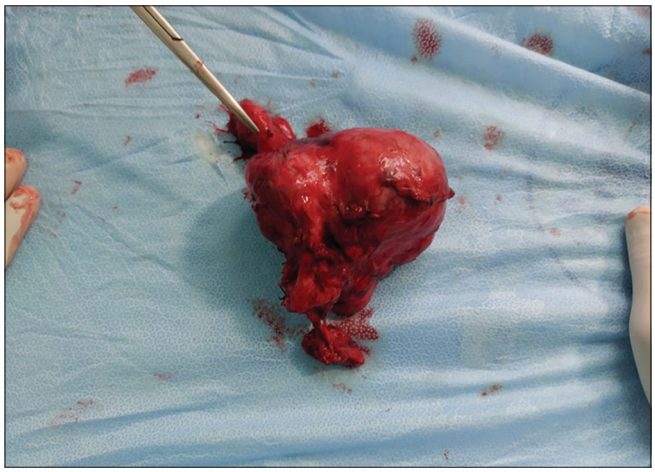



**Figure 8: Figure showing RSG extracted in toto**

## CONCLUSION

Most of the patients with retrosternal goiter can be managed with the Transcervical approach alone, but few selected cases require sternotomy. There are no fixed preoperative criteria or guidelines for sternotomy. Careful intraoperative finger dissection should be tried. In cases where the dissection is not possible or if the goiter is large enough or when a substernal goiter extends to either sides of the thorax and suspicious of malignancy in RSG or it has a larger diameter than the thoracic inlet or airway constriction is revealed, then sternotomy should be done which provides excellent exposure and can help reduce the risk of complications, such as a recurrent laryngeal nerve palsy and injuries to major blood vessels.

## REFERENCES


1. Haller A. Disputatones Anatomica Selectae. Gottingen: Vendenhoceck; 1749. p. 96.
2. DeSouza FM, Smith PE. Retrosternal goiter. J Otolaryngol 1983;12:393-6.
3. Katlic MR, Wang CA, Grillo HC. Substernal goiter. Ann Thorac Surg 1985;39:391-9.
4. Allo MD, Thompson NW. Rationale for the operative management of substernal goiters. Surgery 1983;94:969-77.
5. Hsu B, Reeve TS, Guinea AL, Robinson B, Delbridge L. Recurrent substernal nodular goiter: Incidence and management. Surgery 1996;120:1072-5.
6. Netterville JL, Coleman SC, Smith JC, Smith MM, Day TA, Burkey BB. Management of substernal goiter. Laryngoscope 1998;108:1611-7.
7. Wu MH, Chen KY, Liaw KY, Huang TS, Lee PH. Primary intrathoracic goiter. J Formos Med Assoc 2006;105:160-3.
8. Shen WT, Kepebew E, Duh QY, Clark OH. Predictors of airway complications after thyroidectomy for substernal goiter. Arch Surg 2004;139:656-60.
9. Nervi M, Iacconi P, Spinelli C, Janni A, Miccoli P. Thyroid carcinoma is intrathoracic goiter. Langenbecks Arch Surg 1998;383:337-9.
10. Torre G, Borgonovo G, Amato A, Arezzo A, Ansaldo G, de Negri A, *et al*. Surgical management of substernal goiter: Analysis of 237 patients. Am Surg 1995;61:826-31.
11. Rodríguez JM, Hernandez Q, Piñero A, Ortiz S, Soria T, Ramirez P, *et al*. Substernal goiter: Clinical experience of 72 cases. Ann Otol Rhinol Laryngol 1999;108:501-4.
12. Erbil Y, Bozbora A, Barbaros U, Ozarmağan S, Azezli A, Molvalilar S. Surgical management of substernal goiters: Clinical experience of 170 cases. Surg Today 2004;34:732-6.
13. Chauhan A, Serpell JW. Thyroidectomy is safe and effective for retrosternal goiter. ANZ J Surg 2006;76:238-42.
14. Hashmi SM, Premachandra DJ, Bennett AM, Parry W. Management of retrosternal goiters: Results of early surgical intervention to prevent airway morbidity, and a review of the English literature. J Laryngol Otol 2006;120:644-9.
15. Pieracci FM, Fahey TJ 3rd. Substernal thyroidectomy is associated with increased morbidity and mortality as compared with conventional cervical thyroidectomy. J Am Coll Surg 2007;205:1-7.
16. Hardy RG, Bliss RD, Lennard TJ. Retrosternal Goiter: The case for operation in all patients. Ann R Coll Surg Engl 2009;91:8-9.
17. Balasubramanian SP, Harrison BJ. Asymptomatic retrosternal goiter-a case for primum non nocere? Ann R Coll Surg Engl 2009;91:10-1.
18. Sianesi M, Del Rio P, Arcuri MF, Soliani P, Rusca M. Cervicomediastinal goiter. Chir Ital 2002;54:15-8.
19. Maruotti RA, Zannini P, Viani MP. Surgical treatment of substernal goiters. Int Surg 1991;76:12-7.
20. Katlic MR, Grillo HC, Wang C. Substernal goiter (analysis of 80 patients from Massachusetts general hospital). Am J Surg 1985;149:283-7.
21. Porzio S, Marocco M, Oddi A, Lombardi V, Porzio O, Calvelli C, *et al*. Endothoracic goiter: Anatomoclinical and therapeutic consideration. Chir Ital 2001;53:453-60.
22. Alfonso A, Christoudias G, Amaruddin Q. Tracheal or esophageal compression due to benign thyroid disease. Am J Surg 1981;142:350-4.
23. Armour RH. Retrosternal goiter. Br J Surg 2000;87:519.
24. Singh B, Lucente FE, Sahara AR. Substernal goiter: A clinical review. Am J Otolaryngol 1994;15:409-16.
25. Madjar S, Weisberg D. Retrosternal goiter. Chest 1995;60:207-12.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