



Surgery of Retrosternal Thyroid: Evaluation of 36 Cases

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ABSTRACT

Objective: Retrosternal thyroid is the presence of thyroid tissue in the mediastinum either by enlarging of the cervical or by an ectopic mediastinal thyroid. Surgery for a retrosternal thyroid has technical differences than conventional cervical thyroid surgery and has a higher risk of complications. This paper aims to analyze the cases with retrosternal thyroid and to evaluate the outcomes of the surgery.

Materials and Methods: Retrospective analysis in terms of age, sex, clinical course, thyroid hormone levels, parathormone (PTH) levels, diagnostic methods, and fine needle aspiration cytology (FNAC) results and complications of 36 cases that underwent surgery was performed.

Results: In addition to routine evaluation for thyroid pathology, computerized tomography was used for each patient. Thirty-four surgeries were completed with a cervical incision, one with a sternotomy and one with a thoracotomy. Four patients (11.1%) experienced temporary postoperative hypocalcemia, and one patient had a transient vocal cord immobility. Neither permanent hypocalcemia nor vocal cord paralysis was present in any of the patients postoperatively.

Conclusion: Planning surgery as early as possible is suggested to avoid compression symptoms and possible malignancy. Cervical approach is mostly enough for the majority of patients; however, in case of a need of an additional (transthoracic) approach, multidisciplinary planning with thoracic surgeons is proposed. The risk of complications in experienced centers is parallel to cervical thyroidectomy.

Keywords: Mediastinal neoplasms, thyroid, surgery

Cite this article as:

Vural A, Gülmez E, Demir ÖF, Kökoğlu K, Yüce İ, Çağlı S. Surgery of Retrosternal Thyroid: Evaluation of 36 Cases. Erciyes Med J 2019; 41(3): 261-4.

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Submitted
20.03.2019

Accepted
20.05.2019

Available Online Date
16.08.2019

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INTRODUCTION

Retrosternal thyroid (RT), which was first described by Haller in 1749, is the presence of thyroid tissue in the mediastinum either by enlarging of the cervical thyroid or by an ectopic mediastinal thyroid, the latter being extremely rare (1, 2). Various descriptions of RT are present, the most accepted being “the appearance of more than 50% of the thyroid tissue in the mediastinum” (1, 2). Surgery for RTs is the only treatment option; however, it carries a higher risk of complications than surgeries for a cervical thyroid (2, 3). This paper aims to analyze the cases with RT and to evaluate the outcomes of the surgery for RTs at a single institution.

MATERIALS and METHODS

A retrospective analysis of 36 cases, which were operated for RT between 2012 and 2018 in a single tertiary institution, was performed. The patients were evaluated in terms of age, sex, clinical course, thyroid hormone levels, parathormone (PTH) levels, diagnostic methods, and fine needle aspiration cytology (FNAC) results. The surgical procedures were evaluated according to the method performed. Pre- and postoperative vocal cord movements and preoperative and postoperative first-hour PTH levels were evaluated in terms of morbidity.

RESULTS

Ten (27.7%) patients were male, and male to female ratio was 1/2.6. The mean age was 56.3 years (Table 1). The most common symptom was neck mass that was present in 30.5% of the patients. Thirty-eight percent of the patients were symptom-free (Table 2). The thyroid function tests revealed that 30 patients (83.3%) were euthyroid and 6 (16.6%) were hyperthyroid. The latter were operated after reaching the euthyroid levels after appropriate medical treatment. One patient had elevated PTH levels in the preoperative measures, and further evaluation with scintigraphy and USG revealed an adenoma that was also removed in the same surgical session with thyroidectomy. Two of the patients had concurrent paragangliomas (i.e., glomus caroticum) with thyroid pathologies; both underwent excision of the paragangliomas in the same surgical session.

Table 1. The distribution of patients according to ages at the time of surgery

Ages	n	%	Cumulative %
31–40	5	13.8	13.8
41–50	8	22.2	36.1
51–60	7	19.4	55.5
61–70	11	30.5	86.1
71–80	5	13.8	100
Total	36	100	100

Table 2. The distribution of patients according to major symptoms at initial admission

Symptom	n	%	Cumulative %
None	14	38.8	38.8
Mass in the neck	11	30.5	69.4
Shortness of breath	6	16.3	86.1
Difficulty in swallowing	3	8.3	94.4
Cough	2	5.5	100
Total	36	100	100

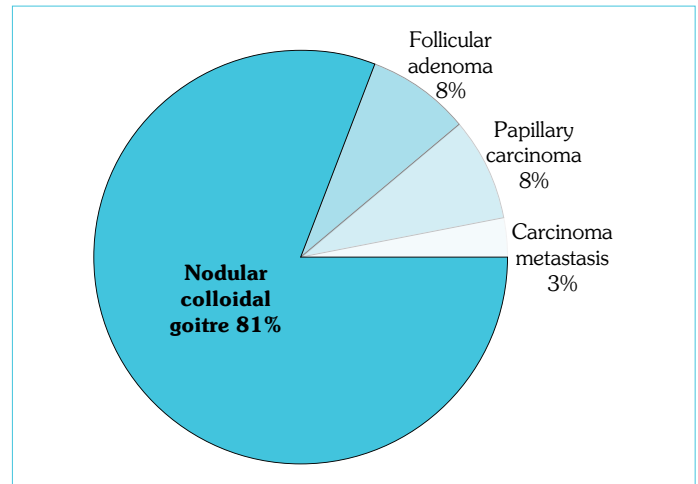
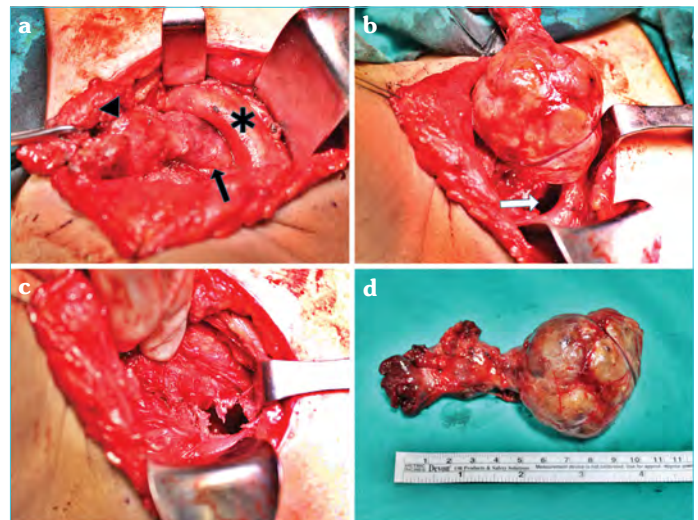
The most common pathology was nodular colloid goiter (NCG), which was present in 29 (81%) of the patients. Three (8%) of them had follicular adenoma, three (8%) had papillary microcarcinoma, and one (3%) had a metastasis of a renal cell carcinoma.

The FNAC was performed on 18 patients of which 14 (77.7%) had benign lesions, 2 (11.1%) hürthle cell lesions, and 2 (11.1%) non-diagnostic cytology. Of the ones who had hürthle cell lesions in FNAC, one had NCG and the other follicular adenoma in the final pathological evaluation. The ones with a non-diagnostic cytology had also NCG (Fig. 1).

All patients except two underwent thyroidectomy with a cervical incision (Fig. 2). A partial sternotomy was performed in a case with an anterior mediastinal thyroid and a right sided thoracotomy in the other with a posterior mediastinal thyroid. Four patients (11.1%) experienced temporary postoperative hypocalcemia. One patient had a transient unilateral postoperative recurrent laryngeal nerve paresis. Neither permanent hypocalcemia nor vocal cord paralysis was present in any of the patients postoperatively.

DISCUSSION

RT, either primary or secondary, consists 3%–21% of mediastinal masses (4). Primary retrosternal goiters develop from ectopic thyroid tissues in the mediastinum and consists of 1% of the retrosternal goiters (5). Secondary RTs develop by inferior growth of a cervical thyroid (6). A “forgotten goiter” can also be seen in 2%–16% of RT cases, which is the recurrence of an unnoticed lesion after previous cervical thyroidectomy (7). RT is described to be seen more frequent in the fifth to sixth decades of life and particularly in females. The female/male rate of this study was 2.6:1; and 50% of the patients were between 50 and 70 years old (6).

**Figure 1.** Graph showing the final diagnosis of the specimens**Figure 2.** a–d Intraoperative pictures showing the removal of a thyroid mass descending to the mediastinum (a–c). Note the hourglass-shaped growth pattern of the tumor with a thin neck at the thoracic inlet (d). (The asterisk indicates the clavicle, the arrow indicates the superior of the retrosternal portion of the lesion, the triangle indicates the cervical thyroid, and the white arrow points the mediastinum after the removal of the mass)

The clinical course and symptomatology vary according to the size, position, extension, and histology of the lesion; and symptoms are mainly related to compression of the trachea, esophagus, or vascular structures (8, 9). Patients without symptoms were also reported as 16%–50% in the literature (10). While tracheal compression may cause dyspnea and/or chronic coughing, a vascular compression may result in neurological symptoms (8). The obstruction of the trachea might even cause an airway obstruction requiring emergency intervention. In this series, 38.8% of the patients were asymptomatic, and the diagnosis was set either in routine controls or coincidentally.

The diagnostic workup of patients with RT has not yet been standardized. In addition to routine evaluation of a patient with a thyroid pathology, in the diagnosis algorithm of RTs, the first step is

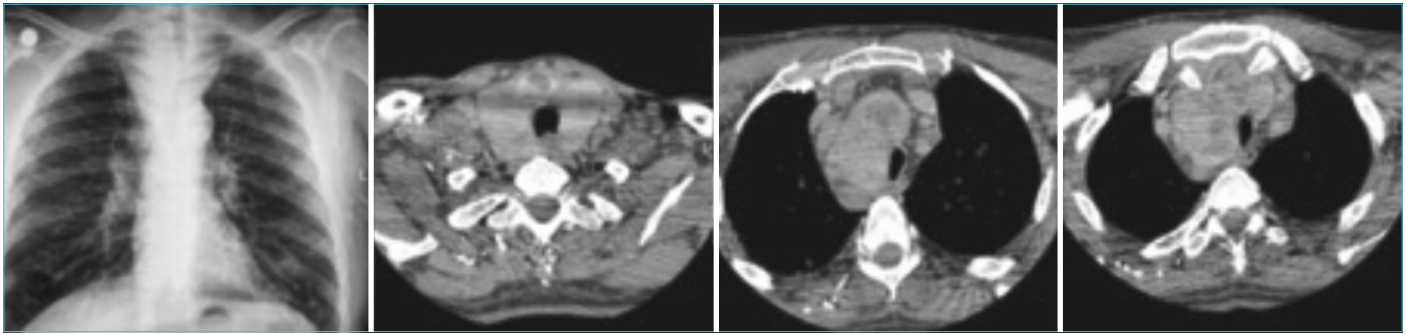


Figure 3. Radiographical images of a retrosternal thyroid compressing the trachea

physical examination. While thyroid ultrasonography is the gold standard for the diagnosis of cervical thyroids, it has limited effectiveness in the lesions of the thorax (11). Performing an FNAC from a lesion in the retrosternal area can also be challenging; and because of frequently observed large nodule size, false negative results is not unexpected (12). In case of a goiter with retrosternal extension, a negative FNAC from a cervical nodule does not obviously rule out a possible malignancy in the retrosternal nodule, thus the indication for surgery in such cases is more likely. The expected rate of malignancy in an RT varies from 3% to 22% (13, 14). Malignancy was observed in four cases in this study, three (8.3%) of which were papillary microcarcinoma and one (2.7%) was renal cell carcinoma metastasis.

The computerized tomography (CT) is not a routine method of diagnosis and evaluation in thyroid pathologies. However in case of an RT, it is helpful and is required for demonstrating the relation with trachea, esophagus, major vascular structures, main bronchi, lungs and pericardium as well as the extension (Fig. 3) (15, 16). It also identifies potential signs of a malignant condition such as irregular margins, heterogeneous features, and the presence of microcalcification (3). The usage of iodine-containing contrast materials in CT might cause a delay in RAI in patients planned with postoperative treatment, which is an issue that must be kept in mind (12).

Although as abovementioned, the majority of the retrosternal goiters are asymptomatic, early surgical intervention is suggested to avoid possible fore coming symptoms of compression as well as the risk of malignancy (17). Because of anatomical and physiological divergences, the surgical treatment plan for RT is not wholly same with the one used for cervical goiter. Anatomically, the shape of the gland is mostly like an hourglass, larger in the mediastinal portion than the thoracic inlet. That unusual appearance might cause variations of the position of the recurrent laryngeal nerve and the parathyroid glands. The arterial supply of an RT is from the neck, although it is situated in mediastinum and venous congestion due to compromised drainage may cause unexpected bleedings. Despite these technical challenges, transcervical approach alone should be enough in most of the cases even in case of posterior mediastinal localized lesions (14, 18). The surgeon should dissect the interclavicular ligament, reach the correct plane, and gradually bring the intrathoracic part by gentle pulling through the thoracic inlet. In case of a primary mediastinal goiter, uncontrolled bleeding and an inferior border that cannot be reached, additional incision (i.e., sternotomy) might be applied in a multidisciplinary approach the thoracic surgical team (19).

In this study, thoracotomy or sternotomy was required in addition to the cervical approach in two patients. Simo et al. (3) revealed that iceberg-shaped glands and lesions extending beyond the aortic arc most likely require extracervical approach. They also concluded that the indications for extracervical approaches may be categorized depending on risks, based on CT, and the experience of the surgical team. The rate of extracervical approaches range from 0% to 1.7% in the literature (3, 20). Thoracotomy would be the choice of approach in large goiters with a posterior mediastinal appearance; while in cases with an anterior mediastinal mass, partial sternotomy would be done (21). Depending on the tumor extension and localization, transclavicular or anterior minimal thoracotomy can also be performed, while manubriotomy, partial sternotomy, full sternotomy, lateral, and posterolateral thoracotomies are still options that surgeons may use (22, 23). Nowadays, video-assisted thoracoscopic thyroidectomy is also presented in the literature to be safely and comfortably applicable (24).

All of the natural risks of complications for thyroid surgery are obviously present for retrosternal goiters, the rate appearing as higher as a consequence of more extended surgery (6, 25, 26). Posterior mediastinal extension of RTs can displace the NLR anteriorly and hence elevate the risk of injury (14). In the current series, temporary hypocalcemia was observed in four cases and transient recurrent laryngeal nerve paresis in one case. No other pre- or postoperative complications were seen, and all of the patients were discharged within an average of 3.2 days (range: 2–6 days) after surgery.

CONCLUSION

Based on our experience and the literature, in case of an RT, even if diagnosed incidentally, we recommend planning surgery as early as possible to avoid compression symptoms and possible malignancy. CT is crucial in preoperative evaluation of patients. Cervical approach is mostly enough for the majority of patients; however, in case of a need of an additional (transthoracic) approach, joint planning of the case with thoracic surgeons can be suggested. The risk of complications in experienced centers is parallel to cervical thyroid cases.

Ethics Committee Approval: Erciyes University Clinical Research Ethics Committee, Approval date: 08.05.19, Number: 2019/300.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – AV, İY, SÇ; Design – AV, İY, SÇ; Supervision – AV, İY, SÇ; Data Collection and/or Processing – AV, EG, KK; Analysis and/or Interpretation – AV, EG, KK; Literature Search – AV, EG; Critical Reviews – KK, İY, SÇ.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Ng YL, Mann V, Rahbaran S, Lewsey J, Gulabivala K. Outcome of primary root canal treatment: systematic review of the literature – Part 2. Influence of clinical factors. *Int Endod J* 2008; 41(1): 6–31.
2. Obinata K, Satoh T, Towfik AM, Nakamura M. An investigation of accidental ingestion during dental procedures. *J Oral Sci* 2011; 53(4): 495–500. [\[CrossRef\]](#)
3. Susini G, Pommel L, Camps J. Accidental ingestion and aspiration of root canal instruments and other dental foreign bodies in a French population. *Int Endod J* 2007; 40(8): 585–9. [\[CrossRef\]](#)
4. Grossman LI. Prevention in endodontic practice. *J Am Dent Assoc* 1971; 82(2): 395–6. [\[CrossRef\]](#)
5. Kuo SC, Chen YL. Accidental swallowing of an endodontic file. *Int Endod J* 2008; 41(7): 617–22. [\[CrossRef\]](#)
6. Webb WA. Management of foreign bodies of the upper gastrointestinal tract. *Gastroenterology* 1988; 94(1): 204–16. [\[CrossRef\]](#)
7. Hou R, Zhou H, Hu K, Ding Y, Yang X, Xu G, et al. Thorough documentation of the accidental aspiration and ingestion of foreign objects during dental procedure is necessary: review and analysis of 617 cases. *Head Face Med* 2016; 12(1):23. [\[CrossRef\]](#)
8. Rosenberg RC. Hazards of Endodontics without the Rubber Dam; Report of Three Cases. *Ann Dent* 1965; 24: 29–32.
9. Bhatnagar S, Das UM, Chandan GD, Prashanth ST, Gowda L, Shigaon N. Foreign body ingestion in dental practice. *J Indian Soc Pedod Prev Dent* 2011; 29(4): 336–8. [\[CrossRef\]](#)
10. Wu Y, Borde M, Heissmeyer V, Feuerer M, Lapan AD, Stroud JC, et al. FOXP3 controls regulatory T cell function through cooperation with NFAT. *Cell* 2006; 126(2): 375–87. [\[CrossRef\]](#)
11. Lambrianidis T, Beltes P. Accidental swallowing of endodontic instruments. *Endod Dent Traumatol* 1996; 12(6): 301–4. [\[CrossRef\]](#)
12. Almuthhin M, Aljahdali A, Alzahrani M, Alhusain B, Algamdi Y. Accidental ingestion of the endodontic instrument: a case report. *European Journal of Medical Case Reports* 2017; 1(3): 148–51. [\[CrossRef\]](#)