

OUTCOME OF TRANSCERVICAL THYROIDECTOMY FOR RETROSTERNAL GOITRE

HAYDER H. IBRAHIM, MBChB, FRCSEd\*

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**ABSTRACT**

**Background and objectives** The management of retrosternal goiter is a problem which has challenged surgeons. The development of multinodular retrosternal goiter is still common and knowledge of their treatment is important. The aim of this study was to analyze a series of patients who underwent surgery for retrosternal goitre, and explore the results of surgical treatment via transcervical approach in term of morbidity and mortality.

**Methods** A total of 50 patients out of 250 with retrosternal goiter who underwent thyroidectomy by the researcher in Mosul and Duhok from February 1995–December 2009 were included in the study.

**Results** Out of the total two-hundred fifty patients, fifty (20%) presented with retrosternal extension of goitre. The mean age of the patients with retrosternal extension were 40 years. Out of the fifty patients, females constituted 80%. The most common preoperative symptom was shortness of breath (74%). Twelve percent of patients were asymptomatic. Preoperative chest radiograph showed tracheal compression in 80% (by lateral view) and tracheal deviation in 20% of patients. The retrosternal goitre was resected via cervical approach in all patients. Postoperative complication rate was 20% which includes haematoma in 3 patients, wound infection in 2 patients, early hypoparathyroidism in 3 patients and temporary recurrent laryngeal nerve injury in 2 patients. There were no patients with permanent recurrent laryngeal nerve injury, permanent hypoparathyroidism or tracheomalacia. All of the patients for whom the surgery was done survived.

**Conclusion** Resection of thyroid gland through a cervical approach for retrosternal goitres is associated with low rate of morbidity and no mortality.

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**Key words:** Goitre, Retrosternal, Transcervical thyroidectomy, Complications

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The extension of thyroid gland into the mediastinum, known as retrosternal goitre, has received much attention. The origin of retrosternal goitre is believed to be resulted from extension of the cervical gland into the mediastinum, rather than from abnormal growth of a mediastinal-based gland. Evidence for this is that the neurovascular supply to nearly all retrosternal goitres is from a cervical rather than a thoracic source.<sup>1</sup> Inferior extension of the gland is facilitated by the anatomic constraints on the gland. Three additional factors affect the downward growth of the gland. They include downward traction of the swallowing,

negative intrathoracic pressure during respiration, and gravity.<sup>1</sup> In fact, 5-50% of patients can be asymptomatic on presentation.<sup>2-5</sup> With increased use of iodized salt, the overall incidence of multinodular goitre has dramatically declined. Nevertheless, it still remains a significant cause of morbidity and possibly of mortality<sup>6</sup>. Many authors have discussed this entity and proposed therapies from early reports by Kocher, Halasted, and Lahey to recent works.<sup>2,3,6,7</sup> The consensus is that retrosternal goitre is best managed surgically. Medical treatment by thyroid hormones can reduce the size of the gland by 20-30% and thus

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\* Lecturer in General Surgery, School of Medicine, Faculty of Medical Sciences, Duhok University, Kurdistan, Iraq. Email: hayder1950@yahoo.com

can reduce the symptoms. However, this is only temporary,<sup>8</sup> and so the cure can be achieved only by surgery.<sup>6</sup>

There are many approaches to surgery like cervical incision, sternotomy, thoracotomy, and combination approaches. Recent studies demonstrate that cervical approaches were adequate in 94--96%<sup>2,7</sup> of all cases while the remainder required sternotomy.<sup>9-11</sup> The reasons for carrying out surgery are the prevention of progressive airway obstruction, the prevention of acute airway compromise due to haemorrhage or cystic degeneration, the poor response to medical treatment, the inaccessibility to fine needle aspiration (FNA) and, therefore, the possibility of undiagnosed malignancy.<sup>2</sup>

In the current study, a series of patients with retrosternal goitres were analyzed for their clinical and pathological features, surgical treatment and outcomes.

The aims of this study, therefore, were to analyze a series of patients undergoing surgery for retrosternal goitre with emphasis on morbidity and mortality, and to establish a guideline for the treatment.

## METHODS

The study included fifty patients with retrosternal goiter out of two hundred and fifty (20%) operated on for goiter by the researcher from February 1995–December 2009 in Duhok and Mosul General Hospitals. A special form was designed for each patient included age, gender, clinical presentation, investigations, histopathology, and post-operative complications. A patient was defined to have retrosternal goitre when a major portion of the thyroid gland was found within the mediastinal compartment either radiologically (chest radiograph) or at the time of operation. A complete head and neck examination was performed in each patient. All patients had thyroid mass. Thyroid function test and chest x-ray were performed for all cases preoperatively. Indirect mirror laryngeal examination was performed for all patients before operation,

and showed four patients (8%) with preexisting paresis of the vocal cords those who presented with hoarseness of voice. Ultrasound has a relatively small role in evaluating the retrosternal goiter as it is not very effective in the retrosternal position so it was not used in this study. All patients with retrosternal goitres were approached through a cervical incision. The operative procedure for removal of retrosternal goiter included mobilization of the upper pole of the gland first with ligation of superior and middle vascular pedicles. Using a blunt finger dissection technique, the gland was gently elevated out of the mediastinum and the inferior thyroid artery and veins were ligated and identifying or at least feeling the recurrent laryngeal nerve. In all cases, the vascular supply to the retrosternal gland was from the cervical rather than the thoracic origin. After removal of the gland, the wound was closed after a suction drain was left in place. Tracheostomy was not required in any of these cases.

## RESULTS

Of the two-hundred fifty patients for whom thyroidectomy performed, retrosternal goitre was diagnosed in fifty patients (20%). The mean age of this group was 40 years (range 25- 65), with female: male ratio of 4:1. The symptoms and signs at presentation are outlined in table 1.

All patients had thyroidectomy via a cervical incision approach. A sternotomy or thoracotomy approach was never utilized. The operative findings, as shown in table 2, were both lobes goitre in 40 patients (80%), left side retrosternal in 7 patients (14%), and right side retrosternal extension in 3 patients (6%). Tracheal deviation was seen in 10 patients (20%) and tracheal compression was encountered in 40 patients (80%). Oesophageal compression was noticed in two patients (4%) as well as lymph node enlargement in two patients (4%).

## OUTCOME OF TRANSCERVICAL THYROIDECTOMY FOR RETROSTERNAL GOITRE

**Table 1. Symptoms and signs at presentation in patients with retrosternal goitre who underwent thyroidectomy at Duhok and Mosul General Hospitals from February 1995 to December 2009 (n=50)**

Symptoms	No. (%)
Asymptomatic	6 (12)
Lump in the neck	50 (100)
Pressure effect	
Dyspnea	38 (76)
Dysphagia	2 (4)
Hoarseness	4 (8)
Euthyroid	48 (96)
Hyperthyroid	2 (4)
Hypothyroid	0 (0)

**Table 2. Operative findings in patients with retrosternal goitre who underwent thyroidectomy at Duhok and Mosul General Hospitals from February 1995 to December 2009 (n=50)**

Findings	No. (%)
Bilateral retrosternal goitre	40 (80)
Right retrosternal goitre	3 (6)
Left retrosternal goitre	7 (14)
Tracheal compression	40 (80)
Tracheal deviation	10 (10)
Oesophageal compression	2 (4)
Lymph node enlargement in malignant goitre	2 (4)

Histopathological findings are presented in table 3. Malignancy was detected in 3 patients (6%). All others were benign.

**Table 3. Histopathological findings in patients with retrosternal goitre who underwent thyroidectomy at Duhok and Mosul General Hospitals from February 1995 to December 2009 (n=50)**

Histopathology	No. (%)
Non-toxic multinodular goiter	42 (84)
Toxic multinodular goitre	2 (2)
Hashimoto's thyroiditis	3(6)
Malignancy - Papillary carcinoma	3(6)

Table 4 shows postoperative complications that the patients encountered. Overall, complication occurred in 10 patients (20%). None of the patients had permanent recurrent laryngeal nerve injury, permanent hypoparathyroidism, or tracheomalacia. In addition, none of the patients died from the surgery.

**Table 4. Complications of surgery in patients with retrosternal goitre who underwent thyroidectomy at Duhok and Mosul General Hospitals from February 1995 to December 2009 (n=50)**

Complications	No. (%)
Haematoma	3 (6)
Infection	2 (4)
Temporary recurrent laryngeal nerve injury	2 (4)
Early hypoparathyroidism	3 (6)
Permenant Hypoparathyroidism	0 (0)
Tracheomalacia	0 (0)
Permanent recurrent laryngeal nerve injury	0 (0)

## DISCUSSION

Several definitions of retrosternal goitre have been previously published, which are, at least, partly responsible for the wide difference in the reported incidence.<sup>5, 12</sup> An incidence of retrosternal extension of 15.3% out of all thyroidectomies was observed.<sup>13</sup> Another author chose to define the condition if 50% or more of the goitre is located in the chest, and this resulted in an incidence of only 2.6%.<sup>5</sup> We had chosen to diagnose retrosternal extension when there was any intrathoracic component of the goitre seen with the neck extended at operation. The position of the neck in extension, as is common practice in thyroid surgery, had been included for accuracy in the definition. It has been shown that only very minimal cephalad movement of the thyroid occurs, conferring little perceivable advantage for the surgeon.<sup>14</sup>

In this study, the retrosternal goitre presented most commonly in the fourth

decade of life with a female: male ratio of 4:1. In all patients, goitre was located in superior part of the anterior mediastinum and none of the patients had posterior mediastinal goitre.

The compressive symptoms documented in this series are likely to be secondary to the pressure from an expanding thyroid mass. Because of the bony confines of the thoracic inlet and the limited space of the upper mediastinum, the thyroid compresses the trachea much more readily and causes luminal compromise with a smaller mass, when compared with a cervical goitre.<sup>15</sup>

In the current study, clinically and radiological (chest radiograph, barium swallow) evident tracheal compression and deviation was present in 80% and 20%, respectively, whereas esophageal compression was noted in only 4%. This suggests that compression from a mediastinal mass tends to affect the trachea before affecting the esophagus. Three of the patients with preoperative hoarseness of voice improved after operation.

Three patients in this series had recurrent retrosternal goitre. These patients had undergone a prior lobectomy or subtotal resection of the thyroid. These data suggest that not only retrosternal goitre does arise in the face of longstanding cervical goitre, but also any resection less than total allows for the possibility of retrosternal recurrence. This does not suggest that total resection should be performed in the setting of primary cervical disease. However, in the case of retrosternal goitre, we feel that a total resection will prevent the need for future mediastinal dissection.

As in prior series of retrosternal goitre, malignancy is an uncommon but a significant threat. The risk of malignancy in retrosternal goitre is between 6% and 21%.<sup>2,3,7</sup> Our series was similar, as 6% of patients demonstrated malignancy (papillary carcinoma) on pathologic evaluation. Patients with lymph nodes

enlargement pre-operatively had malignant goiter confirmed by histopathology.

The retrosternal goitre in all patients was approached via a cervical incision.

Many series in the 1950s through 1970s recognized the potential need for opening the mediastinum. Various recommendations existed for a combination of cervical incision with anterior thoracotomy, partial sternotomy or full sternotomy.<sup>16</sup>

More recent series<sup>2,3, 6,7</sup> advocate the routine use of the cervical incision, with sternotomy reserved for the 2% to 6% of cases with atypical anatomy, dense adhesions from prior surgery, or inability to deliver the gland into the neck.<sup>9, 11</sup> In our series, sternotomy was never required.

We routinely perform thyroidectomy for retrosternal goiter. In 80% of the patients, a subtotal or near total thyroidectomy was performed, while in the remaining, a hemithyroidectomy was utilized.

Our complication rate of 20% which is similar to what is noticed in other series.<sup>7,14,17,18</sup> There were three cases with haematoma; in two of them, it was superficial to the investing layer of deep cervical fascia, and in one patient it was deep to the fascia which was explored. Wound infection was noted in two patients. Three cases presented postoperatively with early hypoparathyroidism, and two patients with temporary recurrent laryngeal nerve injury. No patient was presented with permanent hypoparathyroidism or recurrent laryngeal nerve injury. Despite tracheal compression by goitres, there was no tracheomalacia noted in this series.

Indeed, for a condition that is potentially more difficult than standard cervical thyroidectomy, our morbidity rate is low and mortality is found to be zero which is similar to other report.<sup>15</sup> Also, transcervical approach for retrosternal goitre is almost always a safe operation with a relatively low incidence of serious complications.<sup>19</sup>

Conclusion we approached all retrosternal goitre by a cervical incision, and despite the large size and extensive involvement in the mediastinum, there were no major complications related to the thyroidectomy and there was no mortality. We routinely perform thyroidectomy for the reasons of malignant and recurrence potential. While the risk of tracheomalacia is known, it was not encountered in this series.

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## پوخته

## خوندنی نارمنج نشته رگه ریا په ریزادا پشت ده پی سنگی (نه خوش بوون و مرنی فه) بریكا فه کرنا هه فکی پا

**پیشه کی و نارمانج:** چاره سه ریا په ریزادا پشت ده پی سنگی ناسته نگه که کو به ره نگاریا نشته رکارا دبیت. دیار بوونا په ریزادا پشت ده پی سنگی یا پرگری هیشتا یا مشه یه و زانینا چاره سه ریا وان یا گرنگه. نارمانجا فی فه کولینی نهو بو کو شروفه کرنا چهند نه خوشا بیت کو نشته رگه ریا په ریزادا پشت ده پی سنگی بو هاتیه کرن بیته نه نامدان و زانینا نهجا میت چاره سه ریا نشته رگه ری ژلاتی (نه خوش بوون و مرنی فه) بریكا فه کرنا هه فکی پا.

**ریکین فه کولینی:** ریکوردیت (50) پینجی نه خوشا هاتنه شروفه کرن بیت کو نشته رگه ریا هه لاندنا په ریزادی بو هاتیه کرن ژ شواتا 1995 – کانینا ئیک 2009 ی.

**نه نجام:** ژ کوبی (250) دووسه د و پینجی نه خوشا، پینجی ژ وان (20%) دیار بوون کو په ریزادا پشت ده پی سنگی ل خو یا دک ساخه تیت فان نه خوشا دیار بوون کو ژیی و دچل سالیی دا بوو، (80%) ژ توخمی می بوون و (20%) ژ توخمی نیر بوون. 20% ژ نیشانیت هه ره مشه لنک فان نه خوشا بهری نشته رکاری بو بیته کرن بیته نکی بوو (74%)، و 12% ژ وان نه خوشیا چ نیشان لنک دیار نه بوون. تیرریژا سنگی یا بهری نشته رکاری دیارکر کو گفاشتنا کرکری لنک 80% ولادانا کرکری لنک 20% یا دیار بوو. په ریزادا پشت ده پی سنگی هاته هالاندن دریکا هه فکی پا لنک هه می نه خوشا. ریژا ئالوزیت پشتی نشته رگه ری 20% بوون کو نه وژیک بریتی بوون ژ گومتکلیت خنیی لجه م (3) نه خوشا و هه ودان لجه م (2) نه خوشا، دیار بوونا زی (hypoparathyroidism) لنک (3) نه خوشا و (2) نه خوشا ئیفلینج بوونا بهروه ختا ده ماریت دهنگی لجه م په یدابوو. نه خوشا ئیفلینج بوونا ده ماریت دهنگی یا هه رده می نه بوو و هه رووسا چ ژوان تووشی (hypoparathyroidism). هه رده می نه بوون ته نک بوون و پیتی بوونا بووریا بای دیارنه بوو و چ نه خوشا ژیی خو ژ ده ست نه دا.

**دهر نه نجام:** برین و هه لاندنا په ریزادی دریکا هه فکی پا ژبو په ریزادا پشت ده پی سنگی یا هه فبه نده لگه ل کیماسیا نه خوش بوونی و یا بی باره ژمرنی.

## الخلاصة

## دراسة نتائج عمليات استئصال تضخم الغدة الدرقية خلف عظم القص من خلال الرقبة

**خلفية واهداف البحث:** المرضى المصابين بتضخم الغدة الدرقية خلف عظم القص (الدراق) تعتبر من المشاكل الجراحية من ناحية الطريقة الجراحية للعلاج وهي حالة طبية غير قليلة. إن الهدف من هذه الدراسة هو تحليل مجموعة من المرضى الذين أجريت لهم عمليات استئصال الغدة الدرقية الممتدة خلف عظم القص ودراسة نتائج العمليات (المضاعفات والوفيات) من خلال فتح الرقبة أي دون اللجوء إلى فتح عظم القص.

**طرق البحث:** تم دراسة عمليات استئصال الغدة الدرقية للفترة من شباط 1995 ولغاية كانون الأول 2009 للحالات الذين لديهم تضخم الغدة (الدراق) خلف عظم القص.

**النتائج:** من مجموع مئتي وخمسون مريض، خمسون منهم (20%) لديهم تضخم الغدة الدرقية خلف عظم القص. خواص المرضى تشمل معدل العمر 4 سنة، 40 (80%) نساء 10 رجال (20%). أكثر الأعراض شيوعا هي ضيق التنفس 37 مريض (74%)، و 6 مرضى (12%) بدون أعراض انضغاطية. أشعة الصدر قبل العملية أخذت لكافة المرضى وتبين مايلي: الضغط على ألرغامي (القصبة الهوائية) في 40 مريض (80%)، انحراف ألرغامي في 10 مرضى (20%). جميع الحالات المرضية تم استئصال الغدة من الرقبة وبدون فتح عظم القص. كانت نسبة المضاعفات بعد العملية 20% (10 مريض) والتي تشمل تجمع دموي في 3، التهاب الجرح في 2، فشل مبكر وقتي في الطريقة 3، وإصابة جزئية في العصب الراجع للحنجرة 2 من المرض. لا يوجد مريض في حالة إصابة دائمية في العصب الراجع للحنجرة أو هبوط دائمي في الغدة المجاورة للدرقية (الدريقة) كما لأتوجد حالات تلين ألرغامي أو حالات وفيات في هذه الدراسة.

**الاستنتاج:** استئصال الغدة الدرقية من خلال فتح الرقبة بدون فتح عظم القص لمرضى تضخم الغدة الدرقية (الدراق) ذات الامتداد خلف عظم القص تعتبر عملية آمنة مع مضاعفات قليلة وبدون وفيات.