

## Risk factors in reoperative thyroid surgery for recurrent goitre. Our experience

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**SUMMARY:** Risk factors in reoperative thyroid surgery for recurrent goitre. Our experience.

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*Aim.* Reoperative thyroid surgery is an uncommon operation associated with a higher complication rate; we reviewed our series of patients on whom reoperative thyroid surgery was performed.

*Method.* 106 patients had a thyroid reoperation for recurrent multinodular goiter (93 patients), recurrent thyrotoxicosis (3) or suspected malignancy (10); bilateral completion thyroidectomy was performed in 68 cases, lobectomy in 36, removal of a mediastinal recurrence and of a pyramidal remnant in 1 patient respectively.

*Results.* Temporary hypoparathyroidism occurred in 41 patients (38.67%), definitive in 7 (6.6%), transient recurrent laryngeal nerve palsy in 5 (4.71%), permanent nerve palsy in 1 (0.94%); in 3 cases

(2.83%) surgical revision of haemostasis was necessary for postoperative haemorrhage. After monolateral surgery we had 13 cases of transient hypoparathyroidism (34.21%), 2 of definitive (5.26%) and 1 transient recurrent laryngeal nerve palsy (2.63%); after bilateral surgery we had 29 cases of transient hypoparathyroidism (42.64%), 5 of definitive (7.35%), 4 of transient recurrent laryngeal nerve palsy (5.88%), 1 of definitive (1.47%) and 3 of postoperative bleeding (4.41%).

*Conclusions.* Reoperative thyroid surgery is a technical challenge with a high incidence of complications. Scarring, edema and friability of the tissues together with distortion of the landmarks make reoperative surgery hazardous. A higher risk of complications is described when previous surgery has been performed on both sides. Total thyroidectomy should be considered the procedure of choice for benign multinodular goiter eliminating the potential of a reoperation. Whenever necessary, reoperative thyroidectomy may be performed safely with little morbidity in experienced hands.

KEY WORDS: Complications - Thyroidectomy - Recurrence.

## Introduction

The extension of resection for nodular benign thyroid diseases has varied over the years and it is still a matter of debate. Subtotal thyroidectomy has been the gold standard for many years because it was thought to be a safer procedure despite the risk of recurrent nodular goiter, which ranges from 3% to 43% (1-3). Suppressive L-thyroxin therapy has been used to reduce the rate of recurrence but with minimal efficiency (1, 4-9).

Reoperative thyroid surgery is uncommon and it can be indicated in case of recurrent uninodular or multinodular goiter, when there is compression or suspected

malignancy, and in some cases of recurrent thyrotoxicosis (7, 10).

Reoperative thyroid surgery is known to be associated with a higher complication rate because of scar tissue which makes it more difficult to avoid injury to the recurrent laryngeal nerve or the vascular pedicle of the parathyroid gland (11).

We reviewed our series of patients on whom reoperative thyroid surgery was performed.

## Patients and methods

From September 2002 to December 2010 2583 thyroid operations were performed at our institution. 106 patients (4.1%) had a thyroid reoperation for recurrent multinodular goiter (93 patients), recurrent thyrotoxicosis (3 patients) or suspected malignancy (10 patients). There were 98 women and 8 men. Two of the initial operations in these patients were performed by our team and 104 in other centers. All but one patients had undergone a single prior operation, one patient two prior operations. The median interval between the

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prior operation and the reoperation was 273 months (range 1 month-45 years). Preoperative thyroid ultrasound and indirect laryngoscopy was performed on all patients (12, 13).

Secondary thyroidectomy was performed using a standard operative technique, with the support of ultrasonic dissector (14). Dissection was begun laterally by mobilizing sternocleidomastoid muscles and dividing infra-hyoid muscles to avoid fibrous tissue around the thyroid remnant when the lobe had been partially removed during previous surgery.

If the lobe to be resected had not been disturbed at prior operation, we proceeded through infra-hyoid muscles to avoid fibrosis around the anterior face of the trachea. The first step was ligation of the superior thyroid vessels and special attention being paid to the superior parathyroid gland and the external branch of the superior laryngeal nerve. Then the recurrent laryngeal nerve was identified in the lower part of the neck and traced very carefully along its cervical course.

Intra-thoracic goiters extending into the superior mediastinum were removed by progressive traction through the collar incision. A median sternotomy was necessary in one patient with a large recurrent multinodular goiter with substernal extension.

The inferior parathyroid gland was preserved with its vessels when it was located far from thyroid lobe. Any parathyroid gland that could not be salvaged because of its anatomic location was minced and placed in a sternocleidomastoid muscle.

If the course of reoperation was uneventful, the patient was discharged from the hospital on postoperative day 2. We did not do routine laryngoscopy postoperatively in this series. Indirect laryngoscopy was repeated after reoperation in patients with dyspnea, hoarseness, or loss of voice quality. Serum calcium and phosphorus levels were measured daily while patients were hospitalized and weekly postoperatively until normalization.

Bilateral completion thyroidectomy was performed in 68 cases, in 3 cases associated with lymphadenectomy, in 3 associated with parathyroidectomy, with lobectomy in 36 cases, removal of a mediastinal recurrence in 1 case and removal of a pyramidal remnant in 1 case.

## Results

Histological examination revealed papillary cancer in 19 patients (3 microcarcinomas), follicular cancer in 1 and medullary cancer in 1. In 11 cases malignant neoplasm was unsuspected, in 10 cases preoperative suspect of cancer was confirmed.

Mean operative time was 140 minutes (range: 60-

260). All patients were submitted to a minimum follow-up of 6 months.

Temporary hypoparathyroidism occurred in 41 patients (38.67%) and definitive hypoparathyroidism in 7 patients (6.6%). In patients submitted to primary thyroidectomy the incidence was 23.2% (p=0.0002) and 2.4% (p=0.0171) respectively (Table 1).

Transient recurrent laryngeal nerve palsy occurred in 5 cases (4.71%) and permanent nerve palsy in 1 (0.94%). In primary thyroidectomies incidence was 0.9% (p=0.0009) and 0.3% (p=0.7591) respectively (Table 1).

In 3 cases (2.83%) surgical revision of haemostasis was necessary for postoperative haemorrhage. In all cases bleeding happened in the first 6 hours and we had intraoperative findings of diffuse haemorrhage without evidence of a major vessel bleeding. In primary thyroidectomies incidence was 1.3% (p=0.3613) (Table 1).

After one side surgery we had 13 cases of transient hypoparathyroidism (34.21%), 2 cases of definitive hypoparathyroidism (5.26%), 1 transient recurrent laryngeal nerve palsy (2.63%), no definitive recurrent laryngeal nerve palsy and no bleedings (Table 2).

After bilateral surgery we had 29 cases of transient hypoparathyroidism (42.64%), 5 cases of definitive hypoparathyroidism (7.35%), 4 cases of transient recurrent laryngeal nerve palsy (5.88%), 1 case of definitive recurrent laryngeal nerve palsy (1.47%) and 3 cases of postoperative bleeding (4.41%) (Table 2). Differences were not statistically significant.

## Discussion and conclusions

Reoperative thyroid surgery is a technical challenge with a high incidence of complications (11). Scarring, edema and friability of the tissues together with distortion of the landmarks make reoperative surgery hazardous (15). The complications are mainly related to the extent of the recurrent disease, the proximity of disease to the recurrent laryngeal nerve and the indications

TABLE 1 - COMPLICATIONS AFTER REOPERATIVE THYROID SURGERY COMPARED WITH PRIMARY THYROIDECTOMIES.

	Primary Thyroidectomies (n=2477)	Secondary Thyroidectomies (n=106)	p value	
Recurrent laryngeal nerve palsy				
• Transient	0.9% (22)	4.7% (5)	<b>p &lt; 0.01</b>	<b>0.0009</b>
• Permanent	0.3% (7)	0.9% (1)	p > 0.05	0.7591
Hypoparathyroidism				
• Transient	23.2% (574)	38.7% (41)	<b>p &lt; 0.01</b>	<b>0.0002</b>
• Permanent	2.4% (59)	6.6% (7)	<b>p &lt; 0.05</b>	<b>0.0171</b>
Postoperative hemorrhage	1.3% (32)	2.8% (3)	p > 0.05	0.3613

TABLE 2 - COMPLICATIONS AFTER REOPERATIVE THYROID SURGERY: BILATERAL VS. MONOLATERAL SURGERY.

	Monolateral Surgery (n=38)	Bilateral Surgery (n=68)	p value	
Recurrent laryngeal nerve palsy				
• Transient	2.63% (1)	5.88% (4)	p > 0.05	0.7678
• Permanent	0% (0)	1.47% (1)	p > 0.05	0.7727
Hypoparathyroidism				
• Transient	34.21% (13)	42.64% (29)	p > 0.05	0.4809
• Permanent	5.26% (2)	7.35% (5)	p > 0.05	0.9783
Postoperative hemorrhage	0% (0)	4.41% (3)	p > 0.05	0.4752

for which reoperative surgery is performed, along with scarring and fibrosis (11).

The risk varies according to the initial surgical resection: unilateral lobectomy versus bilateral subtotal lobectomy (16). A higher risk of complications is described when previous surgery has been performed on both sides (10). The risk of complications increased with the number of reoperations (7). In particular, a higher risk of hematomas in reoperative surgery is reported in literature (17). Our experience shows a higher risk of complications for bilateral surgery, particularly for postoperative bleedings, but differences were not statistically significant.

One of the most feared complications of repeated thyroid surgery is the recurrent laryngeal nerve injury (18). The risk of a recurrent laryngeal nerve palsy is said to be eight times higher after operation for relapses than after the primary operation (19). The incidence of temporary and permanent palsy of recurrent laryngeal nerve may be as high as 20% in recurrent goiters (15). Reoperative thyroid surgery had more frequent recurrent laryngeal nerve injuries, both temporary (0-22%) and permanent (0-13%) (7, 20). Hyperthyroidism and not exposing the nerve during operation were predisposing factors (10, 19). In our experience transient recurrent laryngeal nerve palsy was five times higher than for primary operations and difference was highly significant. Permanent palsy was also higher for secondary surgery but the difference was not statistically significant.

Another feared complication of repeated thyroid surgery is permanent hypoparathyroidism which can be a very disabling complication (18). A very high risk of hypoparathyroidism was noticed in literature for reoperative thyroid surgery: it has been reported that the incidence of transient hypoparathyroidism was 0% to 25% and of definitive hypoparathyroidism from 0% to 22% (7, 8, 18, 20, 21). The exact position of parathyroid glands may be obscured by scar tissue from the previous operative procedure (18). In our experience the incidence of transient and definitive hypoparathyroidism was very high (38.67% and 6.6%) compared with primary thy-

roidectomies and the difference was statistically significant, particularly for transitory hypoparathyroidism.

The mortality after repeat operations is 0.61%, which is three times more than during initial operation (19). We had no mortality in our experience.

In repeat surgery for recurrences the lateral approach is popular as it avoids the infiltration by connective tissue of Kocher's approach (7, 10, 22) and allows identification of the nerves in a previously un-dissected area (23). Rather than reopening the median raphe, the straps are retracted medially and a plane anterior to the sternocleidomastoid muscle is entered (7). The recurrent laryngeal nerve should be always identified, usually in the lower neck, then followed along its cervical course (7, 24). However, no significant difference in the rate of palsy between the lateral and medial approach was reported. A tendency for a slightly higher rate of palsy using the lateral approach was reported in one study (7). A possible explanation is that the lateral approach avoids the connective tissue ventrally, but dorsally it cannot be avoided by either approach where the nerve is at risk; moreover, surgeons usually have less experience using the lateral approach and hence the surgical field and anatomy may be less familiar (7).

Intraoperative neuromonitoring can be useful in reoperative thyroid surgery especially when the anatomic situation diverges from the normal. In fact, intraoperative neuromonitoring may reduce the morbidity of reoperative thyroid surgery (15). In our opinion intraoperative neuromonitoring may be particularly useful for reoperative thyroid surgery, making the detection of the nerve in the scar tissue easier. Unfortunately our experience in neuromonitoring is short and it's not possible to obtain statistically significant results.

Finally total thyroidectomy is the most effective operation for preventing recurrence of benign nodular goiters (7). In addition to disease recurrence, numerous studies have demonstrated that a significant proportion of patients who have surgery for multinodular goiter harbour occult malignancy. Removing all thyroid tissue eliminates the risk of developing recurrent disease and thy-

roid carcinoma in the remnant tissue (3). In our experience histological examination revealed malignancy in 21 patients (19.81%); in 11 cases (10.37%) malignant neoplasm was unsuspected, in 10 cases preoperative suspect of cancer was confirmed.

In medullary cancer molecular genetic techniques such as study of RET mutation can be very useful in the diagnosis and in the management of the operation (25).

In conclusion, reoperative thyroid procedures have a higher rate of complications because of scarring and

loss of normal tissue planes. For this reason every effort should be made to avoid them by performing definitive initial treatment; thus total thyroidectomy should be considered the procedure of choice for benign multinodular goiter eliminating the potential of a reoperation. Careful evaluation of the patient's risk factors, physical examination, and the fine needle aspiration cytology is crucial for selecting those could most benefit from the reoperation. Whenever it is necessary, reoperative thyroidectomy may be performed safely with little morbidity in experienced hands.

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