REOPERATIVE SURGERY FOR BENIGN THYROID DISEASES

PIERO F. ALESINA, THOMAS ROLFS, MARTIN K. WALZ
Klinik für Chirurgie und Zentrum für Minimal Invasive Chirurgie, Kliniken Essen-Mitte, Akademisches Lehrkrankenhaus der Universität Duisburg – Essen

The aim of the study was to present a retrospective analysis of the experience with completion thyroïdectomy for benign thyroid disease in a referral centre.

Material and methods. Between October 1999 and December 2007, 2353 thyroid operations were performed for benign diseases. Of these, 113 patients (12 men, 101 women; age: 25-77 years) underwent a reoperation for recurrent goitre (n=107) or recurrent Grave’s disease (n=6). A bilateral resection was performed in 33 patients, a unilateral in 80 patients. The mean interval between the initial and the reoperative procedure was 14.5 years.

Results. The mean operative time was 78 minutes (range: 20–210) with 68 minutes for unilateral and 96 minutes for bilateral operations. Postoperative complications consisted of transient hypoparathyroidism in 6 patients (5.3%); no patient experienced a permanent hypoparathyroidism. A transient recurrent laryngeal nerve (RLN) palsy occurred in 6 cases (4.1% of „nerves at risk”) and a definitive bilateral RLN palsy was registered in a patient with a preoperative unilateral RLN palsy (0.9%). In 4 patients (3.5%) a postoperative bleeding required reoperation. No wound infection was observed. The mean postoperative hospital stay was 2.3 days. Final histology showed a thyroid cancer in 6 patients (5.3%).

Conclusion. In experienced hands, reoperative thyroid surgery can be performed safely and with limited morbidity.

Key words: thyroid surgery, thyroïdectomy, recurrence, results, complications, follow-up

Recurrent goitre represents a challenge for any endocrine surgeon because of the difficulties of reoperations. As from many author already reported (1-9) it is associated with an increased rate of recurrent laryngeal nerve (RLN) palsy and hypoparathyroidism. The major risk of complication occurs during dissection of scar tissue surrounding either the recurrent laryngeal nerve or the vascular pedicle of the parathyroid glands. The indications for reoperative surgery are a nodular recurrence after lobectomy or subtotal thyroïdectomy for benign thyroid disease or a completion thyroïdectomy when the final histology shows a well-differentiated thyroid carcinoma after a partial thyroïdectomy (10-13). A rare indication is also recurrent hyperthyroidism after a subtotal resection for a Grave’s disease.

This study was carried out in order to review the extent and type of complications that occur during secondary thyroïdectomy after prior surgery in the same area.

MATERIAL AND METHODS

Between November 1999 and December 2007, 2353 patients (1769 women, 584 men; mean age: 49±13 years; range: 11-90 years) were operated for benign thyroid diseases. In 113 patients (101 women, 12 men; mean age: 53±12 years; range: 25-77 years) were operated for locally recurrent thyroid diseases (study group), in 2240 patients (1668 women, 572 men; mean age: 49±14 years; range: 11-90 years) primary surgical procedures were performed (control group). Patients primarily operated for thyroid cancer were excluded. Characteristics of 2353 patients of both groups are illustrated in tab. 1.

Indications for redo thyroid operations were presence of a suspicious lesion on fine-needle
aspiration biopsy (n=23), hypofunctional nodule on thyroid scintigraphy (n=21), and thyroid nodule larger than 30 mm (n=59) probably with compressive symptoms (n=36). Moreover, recurrent hyperthyroidism was diagnosed in 10 cases, including 1 toxic adenoma, 3 toxic multinodular goitre, and 6 patients with Graves’ disease after unsuccessful radioiodine or medical therapy. The mean interval between the first and the second procedure was 14.5 years (range: 3-41 years). Three patients had two previous operations and one three. Patients were followed prospectively to evaluate short-term and long-term results.

Among 113 reoperations, 27 were total thyroidectomies, 6 subtotal thyroidectomies, 73 lobectomies, and 7 subtotal lobectomies or nodule resections. In the group of 2240 primary operations, 847 were total thyroidectomies, 544 were subtotal thyroidectomies, 796 were lobectomies, and 53 nodule resections. In all patients a direct laryngoscopy was performed before and after the operation. Blood samples for calcium were obtained postoperatively in case of symptoms. Symptomatic hypocalcaemia was defined as a Ca\(^{2+}\) less than 2 mmol/l with clinical manifestations such as tingling or numbness of the extremity or carpopedal spasm. Recurrent laryngeal nerve palsy was considered permanent if there was no recovery at 6 months after surgery. Hypoparathyroidism was considered permanent if the patient requires calcium or vitamin D supplement to maintain normal serum calcium level for 6 months or longer.

Statistical analysis

T-test and chi-square analysis were used to comparisons between groups and a p<0.05 was considered as statistically significant.

RESULTS

There was no mortality in the study group, while 1 female patient in the control group died from heart failure due to a thyrotoxic crisis one day after emergency thyroidectomy. Postoperative complications of secondary thyroidectomy consisted of unilateral RLN palsy in 6 patients (5.3%), and 1 bilateral RNL palsy necessitating tracheostomy for airway control in a patient with a preoperative unilateral RLN palsy. Five of 6 unilateral nerve palsy were re-

<table>
<thead>
<tr>
<th></th>
<th>Secondary thyroidectomy (n=113)</th>
<th>Primary thyroidectomy (n=2240)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female/male (sex ratio)</td>
<td>101/12 (8.4)</td>
<td>1668/572 (2.9)</td>
</tr>
<tr>
<td>Mean age±SD (years)</td>
<td>53±12</td>
<td>49±14</td>
</tr>
<tr>
<td>Wole wieloguzkowe / multinodular goitre</td>
<td>103 (91%)</td>
<td>1729 (77%)</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>1 (1.1%)</td>
<td>54 (2.5%)</td>
</tr>
<tr>
<td>Toxic adenoma</td>
<td>3 (2.6%)</td>
<td>101 (4.5%)</td>
</tr>
<tr>
<td>Toxic multinodular goitre Graves’ disease</td>
<td>6 (5.3%)</td>
<td>356 (16%)</td>
</tr>
<tr>
<td>Associated primary hyperparathyroidism</td>
<td>3 (2.6%)</td>
<td>64 (2.8%)</td>
</tr>
<tr>
<td>Preoperative recurrent laryngeal nerve palsy</td>
<td>2 (1.7%)</td>
<td>3 (0.1%)</td>
</tr>
</tbody>
</table>
versible; the patient requiring tracheostomy had a definitive RLN palsy and died 4 years later for reasons not related to the thyroid operation. A transient recurrent laryngeal nerve palsy was registered in 38 patients (1.7%) after the primary operation (p<0.05); we observed 32 unilateral and 6 bilateral palsy on 3643 “nerves at risk” (1.2%). No patients required tracheostomy. A transient hypoparathyroidism developed in six patients (5.3%) after second surgery. No definitive hypoparathyroidism was observed. The rate of transient hypocalcaemia in 1403 patients who underwent primary bilateral surgery was 6.5% (92 cases). The incidence of transient hypocalcaemia was found to be equivalent (6.5 vs 5.3%) in both groups. Other complications include postoperative bleeding requiring operative revision in 4 (3.5%) and 42 cases (1.8%) (p<0.05), respectively after redo and first thyroidectomy. Moreover, 8 (0.3%) wound infections were observed in the primary surgery group and none after recurrent surgery. The complications are summarized in tab. 2.

The mean overall operative time was 78±37 minutes (range: 20-210 min) and 78±35 minutes (range: 15-220 min) for secondary and primary surgery [p=ns], respectively. Table 3 compares the operative time for unilateral and bilateral surgery in primary and secondary surgery. Final histology showed a thyroid carcinoma in 6 cases (5.3%) in the reoperation group and in 66 patients after primary surgery (2.9%) (p<0.05). The mean postoperative hospital stay was 2.3±0.8 days (range 2-6 days) for the study group and 2.2±0.9 days (range: 1-8 days) the control group (p=ns). After a mean follow-up of 3.5±2.2 years (range: 1-8 years) no patient required another thyroid surgery.

DISCUSSION

Secondary thyroidectomy is not a common operation and there are only few published reports of large series (tab. 4). Moreover, almost all of them include completion thyroidectomy after lobectomy and unexpected histology showing differentiated thyroid carcinoma and contralateral recurrent goiter after previous hemithyroidectomy. It is questionable if those si-
tations should be compared to a reoperation for recurrent goiter. In most cases the second procedure consists on a contralateral lobectomy in an operative field not explored during the first operation and therefore without any local scar. To our knowledge no study in the past differentiated the complication rate according to this important difference. Aim of our study was to analyze the complications after surgery in an already operated field.

As reported by Beahrs and Vandertoll (14) in 1963 on 548 secondary thyroidectomies performed, the major problems of this procedure are the higher incidence of recurrent laryngeal nerve damage and permanent hypoparathyroidism. This was confirmed also in this study where we observed an incidence of 6.2% of RNL palsy (almost four times higher as after primary resection), although all out of one recovered within six months. Of particular concern is the finding of a high incidence of vocal cord palsy following the initial procedure, many of which had been unsuspected. In our series one patient with a preoperative palsy needed postoperatively a tracheostomy with a consequent prolonged hospital stay.

For this reason we strongly recommend a routine preoperative investigation of the vocal cord function. This procedure is standard in our unit for any patient scheduled for a thyroid operation. In order to minimize the risk of RLN palsy we suggest some tips summarized as follow: 1) try to avoid an extensive dissection of the dorsal aspect of the thyroid before visualizing the nerve, 2) when the nerve is identified avoid unnecessary preparation caudally because the presence of scar tissue can result in an excessive trauma and try to complete the dissection of the lower pole be meticulous adherent to the gland capsule, 3) this strategy could also prevent damage to the inferior parathyroid glands, 4) the practice of leaving a small amount of thyroid tissue in the region of the ligament of Berry, as already suggested by Thomas (15) should be endorsed in order to minimize the risk of injury in this critical area, 5) we strongly suggest the use of intraoperative neuromonitoring (ioNM) for any secondary thyroidectomy. Moreover, we believe ioNM cannot take the place of routine nerve identification. Its routine use can facilitate in same case the operation, although we could not demonstrate in the study population a reduction in the operative time with 94–39 (range: 35-180 min) and without 73–35 (range: 15-210 min) ioNM.

Confirming the challenging of this procedure, postoperative bleeding requiring operative revision was observed significantly more often after reoperation than after first surgery. On the other hand we could not demonstrate an increased incidence of postoperative hypocalcaemia (5.3 vs 6.5%). The absence of permanent hypoparathyroidism after reoperative surgery can be attributed to an operative technique directed to preserving the vascular pedicle of the parathyroid glands following strictly a capsular dissection.

The routine use of a total or near-total thyroidectomy is advocated by many authors as the preferred options for multinodular goiter because eliminate the risk of recurrence (16-19). As reported in many studies (2, 22, 23), young age at initial surgery is the main risk factor for recurrence. All these authors reported a mean age of less than 40 years for patients who developed a recurrence. These could perhaps represent a standard indication for total thyroidectomy in patients with multinodular goiter.

### Table 4. Redo thyroidectomy and complications: published studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>n</th>
<th>Transient hypocalcaemia n</th>
<th>Permanent hypocalcaemia n</th>
<th>Transient recurrent laryngeal nerve palsy n</th>
<th>Permanent recurrent laryngeal nerve palsy n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reeve (8)</td>
<td>1988</td>
<td>408</td>
<td>30 (7,3%)</td>
<td>12 (2,9%)</td>
<td>6 (1,4%)</td>
<td>brak danych / no data</td>
</tr>
<tr>
<td>Levin (2)</td>
<td>1992</td>
<td>114</td>
<td>4 (3,5%)</td>
<td>0 (0%)</td>
<td>1 (0,8%)</td>
<td>1 (0,8%)</td>
</tr>
<tr>
<td>Chao (1)</td>
<td>1997</td>
<td>115</td>
<td>6 (5,2%)</td>
<td>2 (1,7%)</td>
<td>3 (2,6%)</td>
<td>2 (1,7%)</td>
</tr>
<tr>
<td>Peix (9)</td>
<td>1997</td>
<td>47</td>
<td>7 (14,8%)</td>
<td>0 (0%)</td>
<td>2 (4,2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Maheieff (6)</td>
<td>1998</td>
<td>117</td>
<td>12,9%</td>
<td>4,6%</td>
<td>2,5%</td>
<td>1,7%</td>
</tr>
<tr>
<td>Wilson (7)</td>
<td>1998</td>
<td>32</td>
<td>3 (9,3%)</td>
<td>0 (0%)</td>
<td>2 (6,2%)</td>
<td>1 (3,1%)</td>
</tr>
<tr>
<td>Müller (5)</td>
<td>2001</td>
<td>949</td>
<td>23 (2%)</td>
<td>5 (0,5%)</td>
<td>46 (5%)</td>
<td>33 (3%)</td>
</tr>
<tr>
<td>Gibelin (23)</td>
<td>2004</td>
<td>122</td>
<td>1 (0,8%)</td>
<td>0 (0%)</td>
<td>7 (5,7%)</td>
<td>1 (0,8%)</td>
</tr>
<tr>
<td>Lefevre (12)</td>
<td>2007</td>
<td>685</td>
<td>34 (5%)</td>
<td>17 (2,5%)</td>
<td>8 (1,2%)</td>
<td>10 (1,5%)</td>
</tr>
<tr>
<td>This study</td>
<td>2008</td>
<td>113</td>
<td>6 (5,3%)</td>
<td>0 (0%)</td>
<td>6 (5,3%)</td>
<td>1 (0,9%)</td>
</tr>
</tbody>
</table>
dular bilateral disease. Instead of the “dogma of total thyroidectomy”, Berghout (20) noted otherwise that two accepted risk factors for recurrence as family history and bilateral disease were not statistically significant. The mean cause of recurrence is inadequate initial surgery and that is why reliable preoperative staging is essential. Ultrasonography is an operator-dependent examination; an experienced sonographer can highlight micronodules that must be treated at initial surgery to avoid an early recurrence. Moreover, when performing a lobectomy exploration of the contralateral lobe should be avoided. The morbidity of a completion thyroidectomy can be minimized when the contralateral lobe has not been explored by palpation (21). Subtotal resection should be performed only on one side to minimize the risk of recurrence; if the nodule on the side planned for a subtotal resection is situated on the lower pole it could be possible to resects it avoiding nerve isolation (avoid scar in this area for a possible secondary surgery); when the RLN is identified the subtotal resection should be limited to the upper thyroid pole not leaving remnant close to the nerve.

**CONCLUSION**

This study documents that the risk of temporary RLN palsy and postoperative bleeding is increased in recurrent thyroid surgery demonstrating the need of a careful selection of patients for this procedure.

**REFERENCES**


Received: 14.07.2008 r.
Adress correspondence: Henricistrasse 92, D-45136 Essen, Germany