Bilateral multinodular goiter is the most common indications for surgery in endemic iodine-deficiency regions such as Bulgaria. Total thyroidectomy is currently the preferred treatment for thyroid cancer, for multinodular goiter. However many surgeons and endocrinologist still choose not to perform or recommend total thyroidectomy or lobectomy for bilateral or unilateral disease. We sought to assess whether the results support the hypothesis that total thyroidectomy is safe and can be considered as the optimal surgical approach for treating BMG in endemic region such as Bulgaria.

A total of 500 patients were included in this study. They underwent thyroid operation between 2004 and 2009. We excluded patients with thyroid cancer or suspicion of thyroid malignancy. We evaluated indications for total thyroidectomy, complication rates, local recurrence rate and long-term outcome after total thyroidectomy. All patients had bilateral goiter diagnosed with ultrasound (n = 500). The incidence of permanent bilateral recurrent laryngeal nerve palsy was 0% and that of permanent unilateral recurrent laryngeal nerve palsy and permanent hypocalcaemia occurred was 0.8 - 1.2%. Hemorrhage requiring repeat surgery occurred in 0.4-2% of patients. There was no wound infection, and postoperative mortality was 0%.

Total thyroidectomy is safe and is associated with a low incidence of disabilities. Total thyroidectomy has the advantages of immediate and permanent cure and no recurrences.

Keywords: Bilateral multinodular goiter, total thyroidectomy, subtotal thyroidectomy, endemic region

UDC: 616.441

Introduction

Bilateral multinodular goiter (BMNG) is the most common indications for surgery in endemic iodine-deficiency regions. Ever since Theodor Koher proposed surgery for goiter about a century ago there has been a debate about the best surgical resection for the disease. The method Koher used involved sparing enough thyroid tissue bilaterally to ensure euthyroid state. The main problem with this approach was that every patient needed different size of spared thyroid tissue to ensure euthyroid state. Furthermore the approach of subtotal bilateral thyroidectomy resulted in a recurrence varying from 13.4% to 60% according to the extent of resection.

In general about half of the patients who develop recurrence of benign goiter require surgical re-excision which carries a greatly increased risk of permanent complications. Now there is a changing trend amongst most of the endocrine surgeons towards performing total thyroidectomy for BMG (Barczynski, Konturek, Stopa, Cichon, Richter, and Nowak, 2011; Tezelman, Borucu, Senyurek, and Tunca, 2009). The aim of this study was to review our experience with total thyroidectomy as the treatment of choice for bilateral multi-nodular goiter in endemic region such as Bulgaria.
Patients and methods

This study was conducted in the endocrine surgery department, USHATE-Sofia. All patients who underwent total thyroidectomy between January 2004 and March 2009 were enrolled in this retrospective study. Patient with or with high probability for thyroid cancer, recurrent goiter and those presenting with solitary thyroid nodules were excluded from the series. By doing so the selected population for this study represents a select group with preoperative clinical diagnosis bilateral multinodular goiter (BMNG) who understood the need and agreed preoperatively to total thyroidectomy. Data was extracted regarding patients’ age, sex, indication for surgery, final histological diagnosis and complications. Every patient was evaluated with thyroid function tests - free thyroxin and thyroid stimulating hormone, TAT, MAT and ultrasonography to define the extent of the disease. Preoperatively every patient underwent laryngoscopic examination of the vocal cords and the serum calcium concentration test. After the operation every patient was asked if his or her voice was changed. If there was a positive answer or if the surgeon suspected postoperative vocal cord palsies during the postoperative period the patients underwent second postoperative laryngoscopic examination of the vocal cords.

Total thyroidectomy was performed by a standard technique of capsular dissection. Recurrent laryngeal nerves and parathyroid glands were routinely identified on both sides. The parathyroid glands with compromised blood supply were excised, diced and reimplanted in the sternocleidomastoid muscle. If there was no risk factors for bleeding the wounds were closed without suction drains. In the absence of any complication the patients were discharged on the third day.

Postoperative serum calcium levels were estimated twice for 24 hours after surgery. Calcium supplementation was given if serum calcium levels dropped below 2.0 mmol/l. If the patient could be weaned from calcium supplement within six months, hypoparathyroidism was considered transient. If there was laryngoscopic evidence of RLN recovery within six months of operation the RLN palsy was defined as transient. Oral thyroxin supplementation was started from the second day after the operation at a dose of 75-150 micrograms per day, according to body weight. Follow up was planed after a month, after tree months, after six months and after two years of discharge. The data analysis and interpretation was performed on SPSS 19.0 software package (SPSS Inc., Chicago, IL). The difference between groups was analyzed with chi square test and p < 0.05 was considered significant.

Results

The majority of patients enrolled in this series were women 447 (89.4%) and only 53 (10.6%) men with mean age of 44.8 years. The post-operative follow-up for every patient in this study was 3 years. Half of the patient underwent Subtotal thyroidectomy -250 patients with BMNG (group 1) and the other half total thyroidectomy-250 (Group 2) (Table 1).

<p>| TABLE 1. PATIENTS` DISTRIBUTION AND POSTOPERATIVE OUTCOME IN GROUP 1 (SUBTOTAL THYROIDECTOMY) AND GROUP 2 (TOTAL THYROIDECTOMY) |
|--------------------------------------------------|------------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Group 1 BMNG</th>
<th>No</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 2 BMNG</td>
<td>250</td>
<td>72 (28.8%)</td>
</tr>
</tbody>
</table>

There was recurrence of thyroid disease as follows: BMNG was recorded in 72 (28.8%) patients in the group with subtotal thyroidectomy while there was no recurrence in the group with total thyroidectomy (p <0.01). There were 3 patients whose showed evidence
of malignancy in the group with subtotal thyroidectomy. Their age was 45, 51 and 56 years and histological diagnosis was classic variant of papillary microcarcinoma - 3mm, 5 mm and 5 mm. Based on that we accepted they had a low risk of recurrence and they were not reoperated.

Transient RLN palsy was recorded in 3 (1.2%) and 2 (0.8%) cases with BMNG. Permanent unilateral RLN palsy was noted in 2 (0.8%) and 1 (0.4%) cases with BMNG (Table 2). Permanent bilateral RLN palsy was not encountered in any patients in this study. There were no statistically significant differences (p value not significant) between the group with subtotal thyroidectomy and the group total thyroidectomy within the examined thyroid disease.

**TABLE 2. COMPLICATIONS OF TOTAL AND SUBTOTAL THYROIDECTOMY IN THE TREATMENT OF BENIGN MULTINODULAR GOITER**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage</td>
<td>5 (2%)</td>
<td>4 (1.6%)</td>
</tr>
<tr>
<td>Wound seroma</td>
<td>2 (0.8%)</td>
<td>1 (0.4%)</td>
</tr>
<tr>
<td>RLN PALSY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary</td>
<td>3 (1.2%)</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>Permanent</td>
<td>2 (0.8%)</td>
<td>1 (0.4%)</td>
</tr>
<tr>
<td>HYPOPARATHYROIDISM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary</td>
<td>5 (2%)</td>
<td>3 (1.2%)</td>
</tr>
<tr>
<td>Permanent</td>
<td>3 (1.2%)</td>
<td>2 (0.8%)</td>
</tr>
</tbody>
</table>

Permanent hypoparathyroidism occurred in 3 (1.2%) and 2 (0.8%) cases with BMNG. In our study we encountered temporary hypoparathyroidism in 5 (2%) and 3 (1.2%) cases with BMNG. Again we found no statistically significant differences (p value not significant) in the complication rates between the group with subtotal thyroidectomy and the group total thyroidectomy within the examined thyroid disease.

**Discussion**

Total thyroidectomy is a well-established surgical therapy for well-differentiated thyroid carcinoma. In some centers, it represents almost half of all thyroid operations carried out (Gough and Wilkinson, 2000; Khadra, Delbridge, Reeve, Poole and Crummer, 1992). It’s role in the treatment of benign thyroid disease is not completely established yet. There is increasing recognition that total thyroidectomy is appropriate for patients with benign thyroid disease when there is significant nodular disease involving both lobes (Bron and O’Brien, 2004). There is usually no normal tissue in patients with multinodular disease. Therefore, if a surgeon leaves abnormal thyroid tissue in a patient with bilateral multinodular disease, subsequent reoperation might be required (Tezelman, Borucu, Senyurek, and Tunca, 2009; Thomusch, Machens, Sekulla et al., 2000). The goal of surgical treatment should be to eliminate the disease with a low complication rate and to minimize the necessity for reoperation because the risk of complications in secondary (recurrent) operations is much higher than in primary operations. Menegaux et al. (Menegaux, Turpin, Dahman, Leenhardt et al., 1999) documented in 203 thyroid reoperations for benign thyroid disease that the permanent complication rate was higher in thyroid reoperations than in primary thyroid operations. One of the advantages of total thyroidectomy is to eliminate the potential of a more hazardous thyroid reoperation. Our data suggest that total thyroidectomy can be carried out with minimum morbidity among patients with BMNG, when surgery is indicated. In our study, permanent unilateral recurrent laryngeal nerve injury and permanent hypoparathyroidism occurred in only 1 (0.4%) BMNG and 2 (0.8%) BMNG. Although there was no statistically significant differences between the groups in the total thyroidectomy group the complications were fewer than the in the subtotal group. The reason for this might be the surgical technique,
Identification of laryngeal nerves during mobilization and dissection of thyroid lobes helped to prevent accidental injury and visualization of the 4 parathyroid glands and preservation of their blood supply minimized inadvertent damage to these structures. We documented that performance of total thyroidectomy instead of subtotal resection as the primary procedure significantly reduced the rate of recurrence of the thyroid disease. With experience in the surgical technique, total thyroidectomy has been recommended not only for the management of thyroid carcinoma, but also for BMNG, because total thyroidectomy is an appropriate approach to prevent recurrence (Reeve, Curtin, Fingleton et al., 1994; Thomusch, Sekulla, and Dralle, 2003; Zambudio, Rodriguez, Riquelme et al., 2004).

**Conclusion**

Our data support that total thyroidectomy is more a necessity than a valuable option, when surgery is indicated, for treating benign thyroid conditions such as multinodular goiter in endemic region such as Bulgaria. It has been shown that total thyroidectomy achieves immediate and permanent cure with no risk of disease recurrence or repeat surgeries. Long-term euthyroidism after total thyroidectomy is achieved easily with L-thyroxin supplementation, while cosmetic outcome is good with patient satisfaction and acceptance.

**References**


