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ORIGINAL ARTICLE

Recurrent laryngeal nerve palsy and substernal goiter. An Italian multicenter study



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KEYWORDS

Recurrent laryngeal nerve palsy;
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Thyroid surgery

Summary The aim of this retrospective multicenter study was to verify whether the substernal goiter and the type of surgical access could be risk factors for recurrent laryngeal nerve palsy during total thyroidectomy. Between 1999–2008, 14,993 patients underwent total thyroidectomy. Patients were divided into three groups: group A (control; $n=14,200$, 94.7%), cervical goiters treated through collar incision; group B ($n=743$, 5.0%) substernal goiters treated by cervical approach; group C ($n=50$, 0.3%) in which a manubriectomy was performed. Transient and permanent unilateral palsy occurred significantly more frequently in B+C vs. A ($P \leq .001$) and in B vs. A ($P \leq .001$). Transient bilateral palsy was significantly more frequent in B+C vs. A ($P \leq .043$) and in C vs. A ($P \leq .016$). Permanent bilateral palsy was significantly more frequent in B+C vs. A ($P \leq .041$), and in B vs. A ($P \leq .037$). Extension of the goiter into the mediastinum was associated to increased risk of recurrent nerve palsy during total thyroidectomy.

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Introduction

Although the standardized capsular dissection technique is characterized by low morbidity and virtually no mortality in patients with cervical goiters [1–4], especially when performed in high-volume centers, there is still a relatively higher reported incidence of postoperative hypoparathyroidism and recurrent laryngeal nerve (RLN) palsy in cases of substernal goiter [5–7]. RLN palsy following total thyroidectomy (TT) is a serious complication, which not only has a large clinical impact, but also has a medicolegal one as it can lead to accusations of malpractice [4,8].

The definition of substernal goiter is not standardized [5,9,10]. Some studies considered only patients with an extension of > 50% of the thyroid gland beyond the thoracic inlet [11], while others included cases where any part of the gland extended below the thoracic inlet [5,9]. Therefore, due to the differences in defining criteria, the recorded incidence of substernal goiter varies from 3% to 20% of patients undergoing thyroidectomy [5–7,9–12]. The natural evolution of substernal goiter is progressive growth, causing impingement on surrounding anatomical structures, onset of compressive symptoms, and higher risk of malignancy. Therefore, TT, performed through a cervical or extracervical approach, is mandatory for the treatment of substernal goiter.

The aim of this study was to evaluate whether extension of a goiter into the mediastinum was a risk factor for RLN injury during TT performed using cervical or extracervical approaches.

Patients and methods

This study was a multicenter retrospective analysis performed on a population of patients that underwent TT. Between January 1999 and December 2008, patients who underwent TT in five Italian Departments of Surgery with high-volume of thyroidectomy (> 100 per year) were analyzed. Exclusion criteria were redo-surgery, concomitant primary hyperparathyroidism, anaplastic carcinoma, need for lymph node dissection, extensive surgery (i.e., laryngectomy plus thyroidectomy), subtotal and near total thyroidectomy, lobo-isthmectomy, minimally invasive video-assisted thyroidectomy (MIVAT), use of nerve monitoring systems, and patients lost during the follow-up.

After application of these exclusion criteria, 14,993 patients were included in the study. Only patients in whom > 50% of the gland was located below the clavicle were considered to have a substernal goiter. The diagnosis was always confirmed by a multidetector computed tomographic (CT) scan with multiplanar reformatting and volume-rendering reconstructions of the neck and chest (Fig. 1). All patients underwent a preoperative workup that included measurement of thyroid function and auto-antibodies, serum measurements of calcium, inorganic phosphorus, and magnesium, plain chest and neck radiography. An evaluation of preoperative vocal cord function was performed in all patients.

The study population was divided into three groups: group A (control; $n = 14,200$, 94.7%), including patients with cervical goiter treated by TT through a cervical collar incision (Fig. 2); group B ($n = 743$, 5.0%) with substernal goiter treated through a cervical incision (Fig. 3); group C ($n = 50$, 0.3%) in which TT was performed through a manubriotomy (Fig. 4). After written informed consent,

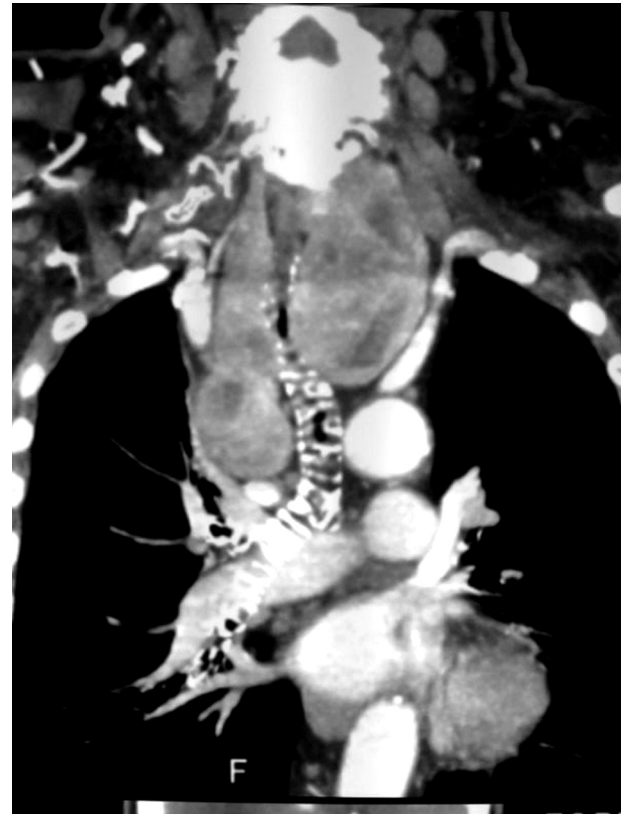


Figure 1. A multidetector computed tomography scan with multiplanar reformatting and volume-rendering reconstruction of the neck and chest shows an extension of the thyroid mass into the upper mediastinum.

patients underwent TT performed by highly experienced surgeons (> 100 thyroidectomies per year during the last 5 years), using a standardized capsular dissection technique. Hemostasis was achieved with individual vascular control and division of the thyroid vessels using conventional ligation or with the Harmonic scalpel (Harmonic Wave and

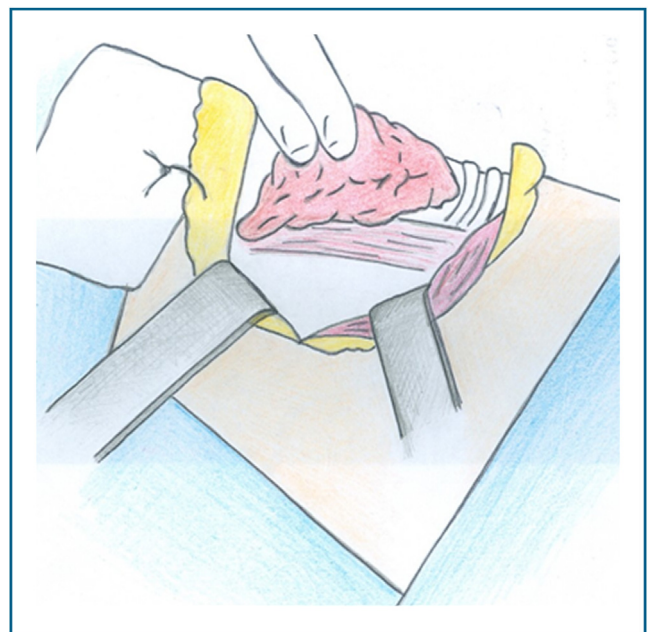


Figure 2. Total thyroidectomy performed for a cervical goiter: schematic drawing.

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