The Role of Thyroidectomy in Advanced Laryngeal and Pharyngolaryngeal Carcinoma

D. Dequanter · M. Shahla · P. Paulus ·
N. Vercruysse · Ph. Lothaire

Received: 15 March 2012 / Accepted: 21 March 2012 / Published online: 21 August 2012
© Association of Otolaryngologists of India 2012

Abstract Total thyroidectomy or hemithyroidectomy together with a total laryngectomy (TL) or pharyngo laryngectomy (TPL) for (pharyngo) laryngeal cancer often renders the patient hypothyroid and commits them to life-long thyroid hormone replacement. To determine the incidence of thyroid gland invasion (TG) in patients undergoing TL or TPL with total thyroidectomy (TThy) or lobectomy (HThy) for advanced laryngeal or hypo pharyngeal cancer and to assess predicative factors. Retrospective analysis of 35 patients from 2007 to 2010. Specimens were examined to determine the incidence of TG invasion and relevant predicative factors such as histological grade and subglottic extension. Pre-operative imaging was reviewed to assess for radiological evidence of TG invasion. TL and TThy was performed in 13 patients. TL and HThy was performed in four patients and TPL and TThy was performed in 18 patients. Surgery was performed for primary and recurrent cancer in 29 and six patients, respectively. Histological evidence of invasion of the TG was found in three patients. Relationship was found between TG invasion and subsite of primary carcinoma and the presence of subglottic extension. No relationship was found between TG invasion and patient's sex, stage of primary disease at surgery, degree of differentiation. In addition, no significant relationship was found between the presence of TG invasion and recurrent disease. Invasion of the TG in patients undergoing a TL or

TPL is a rare event and limits the need for a TThy in most cases.

Keywords Total thyroidectomy · Advanced pharyngolaryngeal cancer · Hypocalcemia

Introduction

In patients with (pharyngo) laryngeal invasive epidermoid carcinoma who are candidates for total (pharyngo) laryngectomy, it is recommended to resect en bloc at least half of the thyroid gland on the same side as the laryngeal or hypo pharyngeal tumor with the objective of decreasing local recurrence associated with thyroid infiltration. Nevertheless, in the histopathologic analysis of the specimen, a minority of thyroid glands show tumor infiltration. The fact that in these patients even partial thyroid resection is associated with hypothyroidism increased by postoperative radiotherapy is well known. The study was undertaken to determine the frequency of thyroid gland invasion in patients who have undergone total (pharyngo) laryngectomy due to (pharyngo) laryngeal cancer and its associated factors.

Methods

A retrospective case series was undertaken of 35 total (pharyngo) laryngectomies performed. We evaluated the histological results of glands resected en bloc with (pharyngo) laryngectomy in patients who underwent total (pharyngo) laryngectomy due to (pharyngo) laryngeal cancer. Tumor stage, subsite, anatomic characteristics and thyroid gland involvement were analyzed based on pathologic specimens. Pre- and post operative radiation therapy treatment and thyroid function were also noted.

D. Dequanter · M. Shahla · P. Paulus · N. Vercruysse ·
Ph. Lothaire
Department of Surgery, CHU Charleroi, 706 Rue de Gozée,
6110 Montigny le Tilleul, Belgium

D. Dequanter (✉)
Maandal 6, 1652 Alsemberg, Belgium
e-mail: didier.dequanter@pandora.be

Results

Thirty five patients were included. There were 29 men and six women. All the patients presented tumors that were clinically typified as T4. Six patients received preoperative radiotherapy and 29 patients received postoperative (chemo) radiotherapy, with pre- and postoperative rates of hypothyroidism of 38, 9 and 91 %. Among the 35 patients, three patients showed thyroid glandular infiltration due to epidermoid carcinoma in two cases, and thyroid carcinoma in one case. All these patients presented laryngeal tumors that were clinically typified as T4. All these tumors were transglottic and had a subglottic extension more than 1 cm. All the tumors demonstrated direct extension to the thyroid gland. Tumors invading the thyroid gland also invaded the cricothyroid membrane (100 % of the cases), anterior commissure (100 % of the cases), laryngeal ventricle (100 % of the cases) and thyroid cartilage (100 % of the cases). Moreover, evidence of radiological invasion of the thyroid gland was seen in all the patients. Recurrent lymph node metastasis was diagnosed in all cases. None of the hypo pharyngeal carcinoma patients had thyroid gland invasion. After a mean follow-up of 28 months, the rate of peristomal recurrence was not different comparing the group of patients with thyroid gland invasion with the group of patients without thyroid gland invasion.

Discussion

In patients with (pharyngo) laryngeal invasive epidermoid carcinoma who are candidates for total (pharyngo) laryngectomy, it is recommended to resect en bloc at least half of the thyroid gland on the same side as the (pharyngo) laryngeal tumour with the objective of decreasing local recurrence associated with thyroid infiltration. Nevertheless, in the histopathologic analysis of the specimen, a minority of thyroid glands show tumour infiltration; the fact is that, in these patients even with partial thyroid resection, the rate of hypothyroidism, increased by post operative radiotherapy, is high [1].

Our study was undertaken to determine the frequency of thyroid gland invasion in patients who have undergone total (pharyngo) laryngectomy due to (pharyngo) laryngeal cancer and its associated factors. In our retrospective study, three of the 35 patients showed thyroid gland infiltration. All the laryngeal tumors were clinically typified T4. All the tumors were transglottic and showed subglottic invasion.

Gallegos et al. [1] included 92 patients in their study; 11 patients (12 %) showed glandular infiltration due to epidermoid carcinoma. All the tumors were clinically typified T3 and T4 (8/11 tumors were transglottic and only three tumors (27 %) showed subglottic invasion. During follow-

up (5 year mean), 17/92 patients showed peristomal recurrence (18 %); only three tumors (3 %) showed thyroid gland invasion. In our study, after a mean follow-up of 28 months, the rate of peristomal recurrence was not different comparing the group of patients with thyroid gland invasion with the group of patients without thyroid gland invasion.

Moreover, in their study, the best predictor of thyroid gland invasion was the evidence of extra laryngeal cancer extension.

After metaanalysis, Mendelson [2] found, that thyroid gland invasion was present in 8 % of the laryngectomy specimens. The principal method of invasion of the thyroid gland was by direct extra laryngeal extension. Subglottic extension >10 mm (OR 7.22(2.05–25.46); $p = 0.002$), transglottic tumors (OR 3.232 (1.16–9.00); $p = 0.025$), and subglottic subsite (OR 5.66 (1.34–23.87); $p = 0.018$) were all significantly associated with thyroid gland invasion. Cartilaginous invasion by laryngeal or hypo pharyngeal tumour was not a significant predictor of thyroid gland invasion ($p > 0.05$).

Based on their results, Biel and colleagues advocated ipsilateral or total thyroidectomy for palpably suspicious thyroid glands seen intraoperatively, subglottic tumors, glottis tumors with more than 1 cm of subglottic extension, T4 endolaryngeal tumors with transcricoid invasion, and T4 pyriform sinus tumors [3].

In our study, all the patients had T4 (pharyngo) laryngeal tumors and underwent ipsilateral or total thyroidectomy. Only three of the 35 patients (1 %) showed thyroid invasion (by epidermoid carcinoma in two cases and thyroid carcinoma in one case).

In their prospective study, in fifty patients who underwent total laryngectomy (TL) with either ipsilateral hemithyroidectomy or total thyroidectomy, Gurunatnan et al. [4] showed a 2 % incidence of thyroid gland invasion. The presence of subglottic extension of more than 2 cm, cartilage invasion, and perithyroidal soft tissue involvement were considered as indicators for sacrificing the whole thyroid gland during surgery [4]. In our study, following these indicators we estimated correctly the thyroid invasion in all our patients with advanced (pharyngo) laryngeal cancers.

In their study, Brennan and Dadas confirmed that routine thyroid gland removal during (pharyngo) laryngectomy is not indicated for the majority of (pharyngo) laryngeal cancers that do not meet the aforementioned criteria [5, 6].

In our study, none of the hypo pharyngeal carcinoma patients had thyroid gland invasion.

Nevertheless, Ceylan et al. [7] recommend total thyroidectomy in advanced hypo pharyngeal tumors.

In their study, none of the laryngeal carcinoma patients had thyroid gland invasion whereas eight (57 %) hypo pharyngeal carcinoma patients had thyroid gland invasion

but there were only three cases (21 %) with thyroid cartilage invasion.

Other studies [8–11] recommend thyroidectomy during (pharyngo) laryngectomy in advanced hypopharyngeal tumors but also in laryngeal carcinoma cases with subglottic extension.

Finally, in their study, Sparano et al. [12] found that tumoral involvement of the thyroid gland appeared to be a very important negative prognostic factor.

However, while the prognosis of patients with thyroid gland invasion was worse than that of patients with no invasion, the difference was not statistically significant in the study published by Croce [13].

In contrary, in their study, thyroid gland invasion is described as a very negative prognostic factor [14]. In their study, Gilbert noted that the survival in this group of patients was poor, with 18 patients dying of their diseases within 3 years [15].

In our study, the three laryngeal cancer patients with thyroid invasion died of their disease within 1 year.

At conclusion, we recommend routine hemithyroidectomy and isthmectomy during TL only in cases with subglottic extensions more than 1 cm or thyroid cartilage invasion. In the other cases, assessment of thyroid gland will determine whether thyroidectomy should be performed.

References

- Gallegos-Hernandez JF, Minauro-Munoz G, Hernandez-Hernandez DM, Flores-Carranza A, Hernandez-Sanjuan M, Resendiz-Colosia JA (2005) Thyroidectomy associated with laryngectomy in laryngeal cancer treatment. Is it routinely necessary? *Cir Cir* 73:3–6
- Mendelson AA, Al-Khatib TA, Julien M, Payne RJ, Black MJ, Hier MP (2009) Thyroid gland management in total laryngectomy: meta-analysis and surgical recommendations. *Otolaryngol Head Neck Surg* 140:298–305
- Biel MA, Maisel RH (1985) Indications for performing hemithyroidectomy for tumors requiring total laryngectomy. *Am J Surg* 150:435–439
- Gurunatnan RK, Panda NK, Das A, Karupplan S (2008) Thyroid gland in caerfc inoma of the larynx and hypopharynx: analysis of factors indicating thyroidectomy. *J Otolaryngol Head Neck Surg* 37:435–439
- Brennan JA, Meyers AD, Jafek BW (1991) The intraoperative management of the thyroid gland during laryngectomy. *Laryngoscope* 101:929–934
- Dadas B, Uslu B, Cakir B, Ozdogan HC, Calis AB, Turgut S (2001) Intraoperative management of the thyroid gland in laryngeal cancer surgery. *J Otolaryngol* 30:179–183
- Ceylan A, Köybasioglu A, Yilmaz M, Uslu S, Asal K, Inakl E (2004) Thyroid gland invasion in advanced laryngeal and hypopharyngeal carcinoma. *Kulak Burun Bogaz Ihtis Derg* 13(1-2): 9–14
- Faganz JJ, Kaye PV (1997) Management of the thyroid gland with laryngectomy for cT3 glottic carcinomas. *Clin Otolaryngol Allied Sci* 22:7–12
- Yuen AP, Wei WI, Lam KH, Ho CM (1995) Thyroidectomy during laryngectomy for advanced laryngeal carcinoma—whole organ section study with long—term functional evaluation. *Clin Otolaryngol Allied Sci* 20:145–149
- Al-Khatib T, Mendelson AA, Kost K, Zeiotouni A, Black M, Payne R, Hier M (2009) Routine thyroidectomy in total laryngectomy: is it really indicated? *J Otolaryngol Head Neck Surg* 38: 564–567
- Elliot MS, Odell EW, Tysome JR, Connor SE, Siddiqui A, Jeannon JP, Simo R (2010) Role of thyroidectomy in advanced laryngeal and pharyngolaryngeal carcinoma. *Otolaryngol Head Neck Surg* 142:851–855
- Sparano A, Chernok R, Laccourreye O, Weinstien G, Feldman M (2005) Predictors of thyroid gland invasion in glottis squamous cell carcinoma. *Laryngoscope* 115:1247–1250
- Croce A, Moretti A, Bianchedi M, Boccia MM, de Vincentiis M (1991) Thyroid glands and carcinoma of the hypopharyngeal-laryngeal region. *G Chir* 12:489–492
- Kim JW, Han GS, Byun SS, Lee DY, Cho BH, Kim YM (2008) Management of thyroid gland invasion in laryngopharyngeal cancer. *Auris Nasus Larynx* 35:209–212
- Gilbert RW, Cullen RJ, van Nostrand AW, Bryce DP, Harwood AR (1986) Prognostic significance of thyroid gland involvement in laryngeal carcinoma. *Arch Otolaryngol Head Neck Surg* 112: 856–859