International Journal of Surgery 12 (2014) S57–S62

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Central neck dissection in papillary thyroid carcinoma: Results of a retrospective study

F. Tartaglia [a, *], S. Blasi [a], A. Giuliani [b], M. Sgueglia [a], L. Tromba [a], S. Carbotta [a], G. Carbotta [a], G. Tortorelli [a]

[a] Department of Surgical Sciences, "Sapienza" University of Rome, Rome, Italy
[b] Istituto Superiore di Sanità, Rome, Italy

ARTICLE INFO

Article history:
Received 23 March 2014
Accepted 3 May 2014
Available online 23 May 2014

Keywords:
Papillary thyroid carcinoma
Central neck dissection
Total thyroidectomy

ABSTRACT

Aims of the study: The aim of this retrospective study was to appraise the impact of central neck dissection (CND) when treating papillary thyroid carcinoma (PTC) and identifying predictors of tumour recurrence by analysing the results and complications related to this surgical procedure.
Materials and methods: The study examined the histories of 347 patients with PTC, divided into two groups: group A including 284 patients who underwent total thyroidectomy (TT) only; group B including 63 patients who underwent TT and CND and possible lateral neck dissection (LND).
Results: The patients in the B group were younger than those in the A group (an average of 44.5 vs. 48.6; $p = 0.03$) and their tumours were larger (1.91 cm vs 1.27 cm, $p = 0.001$). Multifocality, extra-capsular extensions of the neoplastic mass and high cell histological variant were more prevalent in the B group. The incidence of permanent hyperparathyroidism was higher in group B than in group A (25.4% vs 9.5%, $p = 0.0006$). Recurrence of disease and the numbers requiring reoperation were also higher in group B: (24.1% in group B vs 6.6 in group A, $p < 0.0001$). Patients classified as clinically N0 at their first operation and who were most probably clinically N1, totalled 6.6%.
Conclusions: Our data show that only extra-capsular extension may be considered a predictor of recurrence. The findings of our study support the idea of carrying out "therapeutic" CND only in cases of preoperative or macroscopic intraoperative clinical evidence of lymph-node involvement.

1. Introduction

Papillary thyroid carcinoma (PTC) accounts for about 80% of all thyroid cancers and is the sixth most common cancer with an increased incidence in the case of females [1]. PTC presents a high incidence of lymph-node metastases, particularly in the central compartment (level VI). The presence of clinically evident lymph-node metastases in the central compartment requires, besides total thyroidectomy (TT), also central neck dissection (CND). CND carried out (clinically or availing of radiology) to remove apparent metastatic lymph-nodes in the central compartment (cN1a) is called "therapeutic central neck dissection" while central lymphadenectomy performed in the absence of suspected lymph-node metastases (cN0) is defined "prophylactic" or "elective" [2]. In the presence of cN1a carcinomas, almost all agree in associating therapeutic CND and TT, whereas in the case of cN0, and, therefore, for "prophylactic" CND the issue is quite controversial. Many factors should be considered when deciding whether and when to perform prophylactic CND: the T of the tumour, gender, age, histological subtype, the involvement of the capsule and so on. Personal conviction is supported by rates of reoperation due to recurrence, survival over time, laboratory index trends. Unfortunately, there isn't any decisive contribution to the discussion due to the lack of randomized prospective trials and the explanations of this lack have been explained quite thoroughly in a recent article regarding this issue [3]. Therefore, we wish to make a contribution by expounding our convictions starting from our personal experience. The purpose of this retrospective study was, therefore, to assess the impact of the CND in the treatment of PTC's by identifying factors predicting tumour recurrence and analysing the oncological results and complications related to the surgical procedure.

* Corresponding author. Largo Pannonia 48, 00183 Rome, Italy.
E-mail address: francesco.tartaglia@uniroma1.it (F. Tartaglia).

http://dx.doi.org/10.1016/j.ijsu.2014.05.053
1743-9191/

2. Materials and methods

This retrospective study was carried out by examining the case histories of patients who underwent thyroid surgery in the years between 2000 and 2010 at the Department of Surgical Sciences of "Sapienza" University of Rome. We included all patients with histological–pathological PTC diagnoses. We excluded from the study all patients who had undergone surgery for benign thyroid disease, surgery for non-papillary thyroid carcinomas, previous radiation therapy of the neck, simultaneous surgery for hyperparathyroidism, completion thyroidectomy. The patients were divided into two groups. The first group (group A) included all patients with clinically negative lymph nodes (cN0) who underwent TT. The second group (group B) included all patients who underwent TT and CND and/or lateral neck dissection (LND) with preoperative or intraoperative clinical evidence of lymph-node metastases both in the central and lateral cervical compartments (cN1a and cN1b). Preoperative assessment was carried out by clinical examination, ultrasound exam of the neck, fine needle aspiration, measurements of serum calcium, phosphorus, PTHi, Tg, anti-Tg antibodies. The motility of the vocal cords was assessed by preoperative and postoperative indirect or fibre optics laryngoscopy. Temporary recurrent laryngeal nerve dysfunction was defined as decreased or absent vocal cord mobility resolving within 6 months of surgery. Permanent recurrent nerve paralysis was defined as vocal cord dysfunction persisting beyond 6 months after initial surgery. Temporary hypocalcaemia was defined as a decrease in serum calcium levels of <8.0 mg/dl. Definitive hypoparathyroidism was defined as the presence of intact PTH values of <10 pg/ml persisting one year after surgery. Phosphorus concentrations were evaluated only after ruling out any concomitant causes of hyper-or hypophosphatemia that might invalidate the assessment [4]. All patients were subjected to whole-body scintigraphy after surgery and/or radioiodine ablation therapy according to the ATA guidelines of 2009. All the patients data gathered over the years were entered into a database. The data included the demographic characteristics of the patients, the histological–pathological features of their primary tumours and lymph nodes and postoperative complications The follow up of all the patients was carried out by monitoring serum thyroglobulin, anti-thyroglobulin antibodies, serum calcium, phosphorus and iPTH, annual neck ultrasonography, total body scintigraphy. Data regarding the number of reoperations were also collected and these were classified according to the lymph node compartment removed: central (level VI), lateral (levels I–IV), both (levels I–VI). Recurrence of neoplastic disease was defined as the presence of neoplastic disease 6 months after the first surgical operation.

Statistical analyses were carried out using SAS 6.1 software. The quantitative variables were expressed as ±SD averages and qualitative variables as proportions and percentages. The Student's *t*-test and the Mann–Whitney *U*-test were used to compare quantitative variables, respectively, with or without normal distribution. The chi-square test was used to investigate differences between qualitative variables. The value of $p < 0.05$ was considered significant. The analysis of variance was performed to determine whether gender, age ≥45, high cell variant, multifocality, extra-capsular extension, hyperfunction, tumour size ≥1 cm and chronic thyroiditis may be considered predictors of tumour recurrence.

3. Results

Three hundred and forty-seven patients fulfilled the study's inclusion criteria. Group A included 284 patients, who underwent TT only. Group B included 63 patients who underwent both TT and CND and in some cases LND too. A summary of the demographic and clinical characteristics of the two groups is provided in Table 1.

The patients in group B were younger on average than those in group A (average age of 44.5 vs. 48.6, $p = 0.03$). The gender distribution rate was similar for both groups. Two hundred and eight subjects underwent preoperative cytology (Table 2). The sizes of the tumours were greater in group B compared to group A (1.91 cm vs. 1.27 cm, $p = 0.001$). Multifocality and extra-capsular extension of the tumour occurred significantly more frequently in group B. The higher frequency of extra-capsular extension and larger tumour size in the group B was proved by the greater frequency of cases rated pT3, and pT4 in group B (respectively 17.2% vs 34.9% and 5.6% vs 19%, $p < 0.0001$) (Table 3). Lymphocytic thyroiditis was apparently more frequent in group A than in group B (21.9% vs 12.7%), but again the statistical significance was low ($p = 0.09$). A summary of histological variants distribution between the two groups are provided in Table 4. The most frequent and classical histological variant was practically the same in both groups and was, therefore, statistically insignificant: 60.5% in group A vs 60.3% in group B ($p = 0.97$). A high cell variant rate was prevalent in group B: 7.9% vs. 2.46% ($p = 0.03$). The follicular variant was slightly more frequent in group A (23.9% vs 15.9%) and was statistically significant ($p = 0.16$).

A summary of the postoperative complications for both groups is provided in Table 5. Bleeding requiring reoperation occurred only in group A and in 5 patients only (1.76%). In the case of the entire sample, transient recurrent lesion occurred in 4.9% instances and proved definitive in 2.6% cases. The average values for serum calcium and phosphorus during the first and second days and one year after surgery, as well as the mean values for iPTH one year after surgery are provided in Table 6. Occurrence of transient hypocalcaemia does not differ significantly between group A and group B (10.9% vs. 12.7%, respectively, $p = 0.6$) although the mean values for serum calcium during the first and second postoperative days are lower for group B (8.1 mg/dl vs 7.8 mg/dl, $p = 0.007$). All the patients in our sample had normal preoperative phosphorus levels, which mean that any early and late postoperative changes could reasonably be considered as side-effects of surgery. No statistically significant results emerged from the data analysed, with the exception of the one-year phosphorus concentrations in the symptomatic patients. The cumulative incidence of definitive hypoparathyroidism in the entire sample was 12.4%, but revealed a higher prevalence in group B than in group A (25.4% vs 9.5%, $p = 0.0006$). The average values for iPTH a year after surgery were lower in group B than in group A (24.08 pg/ml vs 33.3 pg/ml, $p < 0.0001$). The presence of parathyroid during final histological examinations was shown to be more frequent in group B than in group A (19.7% vs. 14.7%, $p = 0.18$). In the B group the parathyroid was never replanted, in group A at least one parathyroid gland was replanted (in 12 cases). The average values for thyroglobulin and

Table 1
Demographic data.

Variables	Group A ($N = 284$)	Group B ($N = 63$)	Odds ratio B/A	*P* value
Age (in years)	48.6 ± 13.7	44.5 ± 15.4	_	0.03
Male %	59 (20.8)	16 (25.4)	0.8	0.4
Female %	225 (79.2)	47 (74.6)	1	
Tumour Size (mm)	1.27 ± 1.4	1.9 ± 1.16	_	0.001
Tumour multifocality %	69 (24.3)	29 (46.0)	1.9	0.0005
Extra-thyroidal extension %	52 (18.3)	35 (55.6)	3.0	0.0001
Hyperthyroidism %	18 (6.3)	1 (1.6)	0.2	0.13
Hashimoto thyroiditis %	62 (21.9%)	8 (12.7%)	0.6	0.09

N = numbers of subjects. Age and tumour size are expressed as means ± standard deviations.