

# Disease control of differentiated thyroid carcinomas by hemithyroidectomy

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## ABSTRACT

**Introduction:** Most differentiated thyroid carcinomas (DTC) are treated by total thyroidectomy in Hong Kong. This study investigates the outcome of tumour control in selected patients treated by hemithyroidectomy, which is beneficial in terms of having a lower operative morbidity.

**Methods:** This is a retrospective study of prospectively collected data from our cancer registry. Patients with pathologically proven differentiated thyroid carcinoma were stratified into risk groups according to the patients' age, tumour size, extrathyroid spread and distant metastasis. Low-risk patients were managed with hemithyroidectomy without postoperative radioactive iodine. Central compartment lymph node dissection was also carried out if the diagnosis was confirmed preoperatively. The oncological outcome and surgical morbidity were evaluated.

**Results:** A total of 236 patients with the diagnosis of DTC underwent a thyroidectomy at our institution during a 24-year period. 93 patients were initially treated by hemithyroidectomy. Subsequent evaluation was focused on this subgroup. The mean follow-up period was 63.3 +/- 55.1 months. The mean tumour diameter was 22.1 +/- 20.8 mm. The histopathologic diagnoses were papillary carcinoma (69 cases; 74.2 percent), follicular carcinoma (20 cases; 21.5 percent) and Hurthle cell carcinoma (four cases; 4.3 percent). 23 (24.7 percent) patients underwent hemithyroidectomy coupled with central compartment dissection. Pathologically proven lymph node metastasis was diagnosed in 12 (12.9 percent) patients. Transient vocal cord palsy occurred in six (6.5 percent) patients, while permanent vocal cord palsy occurred in two (2.2 percent). Local tumour recurrence arose in only one (1.1 percent) patient. No patient succumbed to the thyroid cancer.

**Conclusion:** Hemithyroidectomy coupled with

central compartment dissection in selected cases of DTC can achieve excellent tumour control with minimal surgical morbidity.

**Keywords:** central compartment, differentiated thyroid carcinoma, hemithyroidectomy

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## INTRODUCTION

While benign thyroid nodules are a frequently encountered clinical problem, thyroid malignancy is uncommon. Differentiated thyroid carcinoma (DTC) accounts for the majority of primary thyroid cancer. Worldwide, total thyroidectomy has evolved as the operation of choice for DTC. The advantages of this procedure include lower tumour recurrence, facilitating radioactive iodine (RAI) delivery and tumour surveillance by thyroglobulin assay.<sup>(1-4)</sup>

While the majority advocate the use of total thyroidectomy for DTC, there are also those who are against it. The prognosis of DTC is generally good, especially for young patients with early tumours. Hay et al<sup>(5)</sup> from the Mayo Clinic and Shaha et al<sup>(6)</sup> from the Memorial Sloan-Kettering Cancer Centre have reported a 20-year disease specific survival rate of 99% in low-risk patients. Owing to these excellent outcomes, the concept of treatment individualisation has been proposed. Total thyroidectomy is performed for aggressive tumours, while hemithyroidectomy is believed to be adequate in selected patients who have small tumours without extrathyroid spread or metastases.<sup>(7-9)</sup>

In Hong Kong, DTC is treated by total thyroidectomy almost routinely in most hospitals. In contrast, in our institution, we have adopted the concept of individualising treatment according to the clinical features. Based on our experience, this management policy simplifies the management plan with minimal surgical complications without compromising the oncological outcome.

## METHODS

Our patients were generally stratified in risk groups in accordance with Cady's proposal,<sup>(10)</sup> because of its simplicity and validity. High risk patients were those with distant metastasis, extrathyroid spread or a tumour size

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larger than 5 cm. This group of patients was managed with total thyroidectomy and postoperative adjuvant therapy. In contrast, other patients belonged to the low-risk group and were managed with hemithyroidectomy, except in instances where bilobar disease was diagnosed preoperatively or intraoperatively. Postoperative RAI was not administered. Likewise, aggressive histopathologic subtypes of papillary carcinoma (tall cell, columnar, diffuse sclerosing subtypes) and widely invasive follicular carcinoma were managed with total thyroidectomy followed by RAI therapy.

All the patients had pathologically proven papillary, follicular or Hurthle cell carcinomas. Ultrasonography of the neck was performed prior to surgery to examine the contralateral lobe for any significant bilobar abnormalities. The vocal cord was routinely assessed in patients with a preoperative diagnosis of thyroid cancer. Since 1997, the central compartment lymph node dissection was carried out as well due to the propensity of nodal metastasis,<sup>(11,12)</sup> if the diagnosis of papillary carcinoma was confirmed preoperatively by fine-needle aspiration cytology.<sup>(13)</sup>

Patients were followed up in the outpatient department three-monthly in the first year, six-monthly in the second year and yearly thereafter. Thyroxine suppression therapy was prescribed to most patients, except to those with microcarcinoma (tumour size < 1 cm)<sup>(14)</sup> or those who could not tolerate the medication. During follow-up, a clinical examination and neck ultrasonography were conducted to check for any disease relapse in the neck. Flexible laryngoscopy was also performed for patients who reported a voice change after the operation, to document any vocal cord palsy or its subsequent recovery.

The data was retrieved from our thyroid cancer registry, which is updated regularly. Patient charts were also studied when necessary. In the last few years, endoscopic-assisted thyroidectomy has been performed in a small number of patients, but these patients were not included for evaluation in this survey. The continuous variables were expressed as mean  $\pm$  standard deviation. The Kaplan-Meier estimation was used for survival analysis and the Statistical Package for the Social Sciences version 11.5 (SPSS Inc, Chicago, IL, USA) was used for statistical computation.

## RESULTS

A total of 236 patients with a diagnosis of DTC were surgically treated by traditional thyroidectomy at our institution from 1984 to February 2009. 93 patients were initially treated by hemithyroidectomy. The subsequent analysis focused on this group of patients.

**Table 1. Patient characteristics and treatment outcomes (n = 93).**

Characteristic	No. (%)
<b>Gender</b>	
Female	80 (86%)
Male	13 (14%)
Mean age $\pm$ SD (year)	48.7 $\pm$ 16.7
Tumour diameter $\pm$ SD (mm)	22 $\pm$ 20.7
Mean follow-up $\pm$ SD (month)	63.3 $\pm$ 55.1
<b>Histopathology</b>	
Papillary	69 (74.2%)
Follicular	20 (21.5%)
Hurthle cell	4 (4.3%)
<b>T-classification</b>	
T1	40 (43%)
T2	31 (33.3%)
T3	22 (23.7%)
<b>Operation</b>	
HT	70 (75.3%)
HT + CCD	23 (24.7%)
<b>Complication</b>	
Transient cord palsy	6 (6.5%)
Permanent cord palsy	2 (2.2%)
Haematoma	0
Hypoparathyroidism	0
Local relapse	1 (1.1%)
Died of thyroid cancer	0

HT: hemithyroidectomy; CCD: central compartment dissection

Female patients dominated in this series (86%). The mean age was 48.7  $\pm$  16.7 years. The mean follow-up period was 63.3  $\pm$  55.1 months. The mean tumour diameter was 22.1  $\pm$  20.8 mm.

The histopathologic diagnoses were papillary carcinoma (n = 69; 74.2%), follicular carcinoma (n = 20; 21.5%) and Hurthle cell carcinoma (n = 4; 4.3%). Of the 69 patients with papillary carcinoma, 21 (30.4%) had occult microcarcinoma. The T-classification according to the 2002 Tumour, Node, Metastasis (TNM) system was T1 (n = 40; 43.0%), T2 (n = 31; 33.3%) and T3 (n = 22; 23.7%). 70 (75.3%) patients underwent hemithyroidectomy, while 23 (24.7%) patients underwent hemithyroidectomy coupled with a central compartment dissection. Pathologically proven lymph node metastasis was diagnosed in 12 (52.2%) of these 23 patients who had undergone central compartment dissection.

Transient vocal cord palsy occurred in six (6.5%) patients, while permanent vocal cord palsy occurred in two (2.2%) patients. No patient developed hypoparathyroidism after the initial hemithyroidectomy. In this series, no patient developed neck haematoma. Local tumour recurrence at the contralateral lobe was diagnosed in only one (1.1%) patient, who was treated with completion total thyroidectomy. No patient was found to have distant metastasis, and no patient succumbed to thyroid cancer.

Since there was no thyroid cancer mortality in this cohort, the Kaplan-Meier disease-specific survival curve was not plotted. During the follow-up period, nine (9.7%) patients died of diseases unrelated to thyroid cancer. The overall mean survival time was  $209.8 \pm 24.2$  (median 197) months.

## DISCUSSION

The optimal form of treatment for low-risk DTC is contentious. Despite our relatively small sample size, this study demonstrates the effectiveness of conservative surgery in selected cases of DTC. A relatively short follow-up time is another limitation of this survey. However, other large-scale studies with protracted surveillance have also failed to show any survival benefit in spite of the modern trend toward aggressive management protocol for papillary thyroid carcinoma.<sup>(15,16)</sup> In contrast to these reports, the oncological outcome improved by bilobar thyroid resection plus postoperative RAI therapy has been described as well.<sup>(17,18)</sup> The reason for this discrepancy in treatment results is dubious but could be the result of a heterogenous case mix, different surgical policies and a variable period of follow-up. Nevertheless, the modern trend is moving toward more aggressive therapy (both surgical and oncological) for DTC, as reflected in some treatment guidelines.<sup>(19)</sup>

Apart from the issue of a debatable marginal survival benefit, more local tumour recurrence is another criticism that has been levelled against hemithyroidectomy for DTC.<sup>(20-22)</sup> However, a respectable low relapse rate of < 5% has been reported by Sandars and Cady,<sup>(23)</sup> as well as by Shaha et al.<sup>(24)</sup> An excellent prognosis and zero local relapse have also been described for minimally invasive or low-risk follicular carcinoma.<sup>(25-28)</sup> Our 1% local relapse rate compares favourably with those of other studies. Such a low recurrence rate can be attributed to our recent policy on central compartment lymph node dissection,<sup>(10,11)</sup> if the diagnosis of papillary carcinoma is made preoperatively or intraoperatively. In order to avoid contralateral recurrent laryngeal nerve and parathyroid injury, only the ipsilateral and pretracheal lymph nodes are removed if the tumour is well lateralised. This is supported by the rare incidence of positive nodal metastasis on the opposite paratracheal region.<sup>(29)</sup> In addition, preoperative ultrasonography is valuable in that it excludes any significant abnormalities on the opposite thyroid lobe.

RAI therapy is one of the reasons to advocate for total thyroidectomy for DTC. However, the role played by RAI therapy in low-risk DTC remains to be defined. The risk of RAI must be balanced out with its benefits.

A meta-analysis conducted by Sawka et al<sup>(30)</sup> failed to provide convincing evidence that RAI improves either survival or the overall tumour recurrence rate. One local study has demonstrated the advantage of enhanced locoregional control by RAI.<sup>(31)</sup> Remarkably, central compartment dissection was not performed in most of the patients in that cohort. RAI might just have compensated for the insufficiencies of the initial surgery and thus resulted in better locoregional control. We envisage that if central compartment lymph nodes are removed surgically, the value of RAI in this respect should be less significant. The results of our study suggest this, as reflected by the rarity of local relapse among our patients. A systematic review by White et al<sup>(32)</sup> also supported the role of central lymph node dissection. In our institution, after hemithyroidectomy and level VI dissection, low risk patients are spared RAI therapy. This averts the discomfort of thyroxine withdrawal and the side effects of RAI administration. It also has the potential to lower the treatment costs.

In conclusion, based on our experiences, hemithyroidectomy coupled with central compartment dissection in selected cases of DTC can achieve excellent tumour control. This simple treatment protocol reduces surgical complications and patients can be spared from undergoing RAI therapy.

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