

Incidence of Cancer in Nodular Goitres

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Abstract

Introduction: Nodular goitres occur commonly in the population and this paper aims to determine the incidence of thyroid cancer found in these goitres. **Materials and Methods:** This is a retrospective, consecutive analysis of the histology of 268 nodular goitres that had been operated on, from 2002 to 2004, in a single tertiary hospital in Singapore. **Results:** Fifty-seven goitres (21.2%) with multiple nodules were found to contain a malignancy. Forty-four thyroid cancers (77%) were of the papillary type. The mean age of presentation for benign nodular goitres was 47.9 years. The mean age of presentation for malignant thyroid tumours was 49.25 years. **Conclusion:** The incidence of cancer is significant in nodular goitres and these malignant tumours are usually of the papillary type.

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Key words: Goitres, Malignancy, Thyroid

Introduction

The incidence of malignancy in multinodular goitres have been found to vary from 4% to 17%.¹ The incidence of malignancy in solitary nodules is not significantly higher.² These studies alluded to the fact that the risk of malignancy in both multinodular goitres and solitary thyroid nodules is not negligible. Therefore, both conditions should be carefully evaluated to detect any underlying malignant foci, which may require further surgical intervention. This study aims to examine the incidence of cancer in the resected specimens of nodular goitres in a Singapore hospital.

Materials and Methods

A retrospective study was carried out on the 268 patients who had been operated on for nodular goitres from 2002 to 2004. These patients had been referred to our centre for nodular goitres that had been picked up on clinical examination as well as on ultrasound of the thyroid. One hundred and fifty goitres (56%) were multinodular clinically. The remaining 118 goitres had a palpable dominant nodule and smaller nodules, the latter of which were only detected on ultrasound or other imaging modalities. Patients with Grave's disease and metastatic lymphadenopathy with no palpable goitres were excluded from the study. None of these patients had a history of irradiation to the thyroid.

These patients underwent a thyroid hormone assay and

most of them had a fine-needle aspiration of the thyroid done. The patients were offered surgery based on suspicious findings from the clinical assessment, diagnostic work-up, compressive symptoms and cosmesis. Subsequently, all the patients underwent hemithyroidectomy, subtotal thyroidectomy or total thyroidectomy, based on the preoperative and intraoperative findings. All resected specimens were sent for histology.

Bivariate analysis of categorical data was performed using Chi-square test in version 11 of SPSS. $P < 0.05$ was taken as statistically significant.

Results

The above patients had undergone thyroid surgery between the years 2002 and 2004. Fifty-seven nodular goitres (21.2%) contained a malignant focus.

The mean age of patients with nodular goitres was 48.1 years [standard deviation (SD), 15.05]. Patients with benign goitres had a mean age of 47.9 years (SD, 14.87). The malignant goitres occurred in an older age group, with a mean age of 49.25 years (SD, 15.66). Two hundred and twelve patients (79.1%) with nodular goitres were female.

All the patients had been referred to our tertiary hospital for palpable nodules in their thyroid gland. The median of the duration of these lumps in the thyroid was 96 days. Eighteen patients (6.7%) complained of painful nodules, 16 (6.0%) patients noted hoarseness of voice and another

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16 (6.0%) gave a history of dysphagia. Eighty patients (29.9%) requested for surgical excision of the goitre for cosmetic reasons.

Ultrasonography of the thyroid was performed for 236 patients. The mean number of nodules detected was 2.0 (SD, 1.6). The mean size of benign thyroid nodules was 3.3 (SD, 1.8) cm while that of the malignant nodules was 3.0 (SD, 1.7) cm. Twenty-eight thyroid cancers (49.1%) displayed areas of complex and heterogenous echogenicity (Table 1). Twelve (21%) of the thyroid cancers contain microcalcifications as compared to 22 (10.4%) of the benign nodules ($P = 0.000$). 42.1% of the malignant nodules had irregular margins while 35.2% of the benign goitres were not well-circumscribed ($P = 0.000$).

Fine-needle aspirate cytology was performed for 218 patients. 29.5% of the nodular goitres yielded no conclusive results as the aspirates contained only colloid materials or blood (Table 2).

The patients were offered surgery based on suspicious findings during the diagnostic work-up, equivocal results from the various investigations, compressive symptoms and cosmesis. Of the thyroid surgeries conducted, 176 operations (74%) were hemithyroidectomy, 65 (23%) were total thyroidectomy and 8 (3%) were subtotal thyroidectomy.

Forty-four thyroid cancers (77%) were papillary thyroid carcinomas. There were 5 follicular carcinomas, 5 medullary carcinomas and 3 lymphomas. Microcarcinomas were found in 13 (4.9%) nodular goitres.

Discussion

Thyroid cancer is the ninth most common cancer in the female population of Singapore. Thyroid nodules are present in 4% to 7% of the population by neck palpation (the incidence increases with increasing age) and 30% to 50% by ultrasonography.³⁻⁵ It has been believed that fewer than 5% of these nodules are malignant and require surgical treatment, and that extensive evaluation or surgical excision is not practical.² However, Stoffer et al⁶ reported that 13% of the glands resected in thyroid operations for any reason contained carcinoma.

The most sensitive clinical indicator of malignancy in goitres is that of a painless, hard lump (57.6% of thyroid cancer present in this way). It was also noted that 50.5% of solitary nodules felt on palpation are actually part of multinodular goitres. This is similar to the pick-up rates of thyroid nodules as illustrated by Brander et al.⁷ The palpation of thyroid nodules can be hampered further by the presence of a short and thick neck and the location of nodules deep within the thyroid gland. Jarlov et al⁸ noted that the experience of a physician contributes significantly to the palpation of thyroid nodules and that there is less inter-observer among examiners who had more experience than

Table 1. Sonographic Characteristics of Thyroid Cancers

Ultrasound findings	No. of thyroid cancers	%
Complex and heterogenous	28	49.1
Hypo-echoic	17	29.8
Hyper-echoic	6	10.5
Iso-echoic	4	7.0
An-echoic	2	3.5

Table 2. Results of FNAC

FNAC results	No. of goitres	%
Benign	95	35.4
Malignant	42	15.7
Inconclusive	79	29.5

FNAC: fine-needle aspirate cytology

among those with different levels of training. Even with experience and careful techniques, physicians may fail to detect many nodules smaller than 1 cm in diameter.⁹

High-frequency, real-time ultrasonography is the most sensitive tool in outlining thyroid nodules. It can also detect lymph node metastasis, differentiate extrathyroidal tissues and be used to conduct ultrasonographic guided biopsy. The important sonographic findings suggestive of malignancy in thyroid nodules are microcalcifications (which are present in 22% of thyroid cancers), irregular margins of the nodules, complex echogenicity and smaller nodules. The mean size of malignant nodules is 3.0 cm. It is postulated that the thyroid cancers would have manifested with more overt signs and symptoms of local invasion or metastasis by the time they reach a significant size.

Fine-needle aspirate cytology is a fast, accurate and inexpensive test to obtain cellular samples. A series of reviews have reaffirmed its importance in the assessment of thyroid nodules.¹⁰⁻¹⁵ When a comparison of the results for fine-needle aspirate cytology and the final histology was made, the former had a sensitivity of 80.6% and a specificity of 87.1%. The false negative rate was only 7%. These results alluded to the indispensable nature of fine-needle aspirate cytology as an investigative tool.

The results of the final histology showed that 57 (21.2%) nodular goitres contained malignant foci. Forty-four of these malignant tumours were papillary carcinoma, 5 were follicular carcinoma, 5 were medullary carcinoma and 3 were lymphomas. Seven thyroid cancers were multifocal in nature, 6 of which were papillary carcinomas. Microcarcinomas were found in 13 (4.9%) nodular goitres. These carcinomas were smaller than 1 cm in size and were mostly of the papillary type (11 goitres). These microcarcinomas

had not been picked up during the physical examination or in the imaging studies. They were discovered only upon biopsy of the specimen. The incidence of microcarcinomas was comparable to the 6% of the 1020 autopsies conducted by Lang et al.¹⁶ All the medullary carcinomas had silent mutations of the RET oncogene and would not lead to Multiple Endocrine Neoplasia (MEN) syndrome.

Our figures are in line with the findings of Stoffer et al⁶ and Pelizzo et al.¹⁷ The prevalence of carcinoma in nodular goitres is indeed significant. However, Sokal¹⁸ suggest that the incidence of carcinoma in non-toxic thyroid nodules is low and patients can be followed up safely for up to 15 years. We postulate that the selection of the patients played a significant role in the disparity of the figures. These patients had been referred to our hospital tertiary centre by physicians who were concerned about the presentation of nodular goitres. Therefore, the incidence of thyroid cancers seen at the tertiary centres would be higher than that in the general population. However, these are the very patients whom we see in the clinics and it would be prudent to keep the high incidence of thyroid cancer in mind during the assessment of nodular goitres.

In conclusion, the incidence of thyroid cancer in nodular goitres, which present at tertiary centres, are significant. Ultrasonography and fine-needle aspirate cytology are indispensable tools in the assessment of these goitres.

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