Thyroid Papillary Carcinoma in Paediatric and Adolescent Patients: Evaluation of Surgical Treatment in a Single Centre

KÇ Özçelik1, Ġ Zqhn2, O Karaköse1, H Pülat1
S Turanlı2

ABSTRACT

**Aim:** Thyroid cancers are the most commonly determined cancers in the paediatric age group. Although the rates of lymph node and distant metastasis are greater at the time of diagnosis in comparison with adult thyroid cancers, with the appropriate treatment protocols, the prognosis is excellent. In this paper we present the clinical characteristics of thyroid papillary carcinoma determined in children and adolescents in our clinic, the surgical techniques applied and the clinical results evaluated in the light of the relevant literature.

**Patients and Method:** A retrospective evaluation was made of the patient records of 12 patients in the paediatric and adolescent age group from a total of 250 who underwent surgery for a diagnosis of thyroid papillary carcinoma at Ankara Oncology Training and Research Hospital between 2000 and 2007.

**Results:** The incidence of thyroid and papillary carcinoma in childhood and adolescence was determined as 4.8%. The patients were all female with a mean age of 17.9 years (range, 11-21 years). At the time of diagnosis, lymph node metastasis was determined in 7 cases (58.3%) and lung metastasis in 4 (33.3%). Total thyroidectomy was performed on all patients and for those with lymph node metastasis, a modified radical neck dissection was also applied. Postoperatively, all patients were administered radioactive iodine therapy followed by levothyroxin therapy. During the mean follow-up period of 123 months, apart from in persistent patients, recurrence was not determined in any other patients.

**Conclusion:** As thyroid papillary carcinoma in childhood and adolescence is characterised by lymph node and distant metastasis, even if the tumour is limited to the thyroid, because of frequent recurrence after treatment, total thyroidectomy and where necessary, modified neck dissection, are recommended for all patients rather than more conservative treatment protocols.

**Keywords:** Adolescent, carcinoma, papillary, thyroid.

From: 1Suleyman Demirel University Medical Faculty, Department of Surgical Oncology, Isparta, Turkey, 2Ankara Oncology Education and Research Hospital, Department of General Surgery, Ankara, Turkey.

Correspondence: Dr O Karaköse, Suleyman Demirel University Medical Faculty, Department of Surgical Oncology, 32260, Isparta, Turkey. Fax: +90 2462112830, e-mail: oktaykarakose@gmail.com

West Indian Med J DOI: 10.7727/wimj.2015.413
INTRODUCTION

Although differentiated thyroid cancer is rarely seen in the thyroid gland in childhood and adolescence, thyroid cancers are one of the most commonly encountered malignancies in the paediatric age group (1). The incidence of differentiated thyroid cancer in childhood and adolescence is between 2.6% and 1.9% of all patients (2, 3). Just as in adults, papillary carcinoma is seen most frequently (2, 4). In this age group, although lymph node and metastasis are often determined, prognosis is excellent with appropriate treatment protocols. Despite good prognosis, because of recurrences which develop following surgical intervention, repeated surgical procedures are necessary and this increases morbidity associated with complications. In the paediatric and adolescent age group, prognostic factors (gender, complete tumour resection, multicentricity, tumor size, distant metastasis) have been determined similar to adults and the most significant prognostic factor, which has been determined in several studies is lymph node involvement (5, 6). If it is considered that lymph node metastasis has been determined in literature at rates of 40–80%, aggressive surgical procedures are at the forefront of treatment in this age group.

The aim this study was to present the clinical characteristics, surgical techniques applied and clinical results of patients with thyroid papillary carcinoma determined in childhood and adolescence together with an evaluation of literature.

PATIENTS AND METHOD

A retrospective examination was made of the records of 12 patients aged below 21 years from a total of 250 who underwent surgery for thyroid papillary carcinoma at Ankara Oncology Training and Research Hospital between 2000 and 2007.
Patient data were recorded as age, gender, lymph node and distant organ metastasis at the time of diagnosis, surgical method, tumour histopathological characteristics, TNM stage, postoperative complications and adjuvant treatment protocols. The histopathological characteristics of the tumour include size, extra-thyroid invasion, multicentricity, and lymph node involvement with vascular and capsular invasion. Tumour staging was applied according to the 7-stage TNM grading system issued by the American Joint Committee on Cancer.

In patients where cervical lymph node metastasis was suspected clinically or from imaging, a fine needle biopsy was taken from the lymph node. In cases where cervical lymph node metastasis was determined, total thyroidectomy together with modified radical neck dissection was applied in the same session. Radioactive iodine (RI) treatment was started 6 weeks postoperatively in accordance with the American Thyroid Association (ATA) guidelines. After RI therapy, all patients were followed up with thyroid stimulating hormone (TSH) suppression therapy with levothyroxin, again in accordance with ATA guidelines (7). Thyroid function and thyroglobulin tests were applied at regular 3-month intervals throughout the follow-up period and thyroid and neck ultrasonography was applied at 6-month intervals. When necessary, other imaging methods (cervical tomography, positron emission tomography and whole body bone scintigraphy) were applied. Apart from the lesions determined at the time of diagnosis, local involvement and distant organ involvement emerging after the first 6 months were accepted as progression, and lesions and distant organ involvement persisting from the time of diagnosis were accepted as persistent disease.
RESULTS

The study comprised 12 female patients aged below 21 years diagnosed with thyroid papillary cancer. The mean age at diagnosis was 17.9 years (range, 11-21 years). At the time of diagnosis, 7 (58.3%) patients had lymph node metastasis and 4 (33.3%) had lung metastasis. Both lung and lymph node metastasis were determined together in 3 patients. Total thyroidectomy was applied to 5 patients and total thyroidectomy together with modified radical neck dissection to 7 patients with a median of 22 lymph nodes removed (min 16, max 45), of which median 6 (min 2, max 22) were determined as metastatic lymph nodes.

In the histopathological examination, the tumour was observed to have made capsular invasion at the rate of 41.7% and vascular invasion at 16.7%. While multicentricity was determined in 5 (41.7%) patients, it was noticeable that there was lymph node metastasis in 4 and lung metastasis in 3 at the time of diagnosis. Tumour size was determined as T3 in 41.7%, T1 in 33.3%, T2 in 11.7% and T4 in 8.3%. Lymph node metastasis alone was determined in 2, lymph node and lung metastasis together in 2 of the 5 T3 patients and in 1 of the T4 patients. Although statistical analysis could not be made because of the low number of patients, it was noticeable that with an increase in tumour size, so there was an increase in the rates of lymph node and lung metastasis.

In the postoperative period, temporary hypocalcemia was determined in the 3 patients to whom total thyroidectomy with neck dissection was applied and no other complications were encountered which could have developed associated with thyroid surgery. At postoperative mean 6.5 weeks, the first RI treatment was initiated. TSH suppression therapy with levothyroxin was administered in the follow-up period. Within the mean follow-up period of 123 months, apart from persistent patients, recurrence was not determined in other patients.
DISCUSSION

The current study was consistent with literature in that the incidence of thyroid papillary carcinoma was determined as 4.8% in childhood and adolescence from all the age groups (2, 3). Cervical region lymph node metastasis was investigated with imaging methods preoperatively in all patients and fine needle biopsies were taken with cytology from suspicious lymph nodes. In several studies, lymph node metastasis in this age group has been reported at rates between 40–80% and in the patients of the current study, lymph node metastasis was determined at 58.3% at the time of diagnosis (8, 9). Distant organ metastasis has been reported by several authors at the rate of up to 20% in the lungs and at less than 5% in bone, and in the patients of the current study, lung involvement was observed in a third and no bone metastasis was determined (10, 11). However, even though the lymph and distant organ involvement rates are high in the current study, the 10-year survival rate was 100%, which is consistent with literature (1, 8).

Just as in all age groups, thyroid papillary carcinoma in childhood and adolescence has an excellent prognosis with the appropriate treatment protocols. Although primary treatment of the disease is surgery, no consensus has been reached on surgical procedure. Several researchers have shown the optimal treatment to be total thyroidectomy followed by RI therapy and TSH suppression (2–4, 6, 12, 13). In contrast, some researchers recommend conservative treatment in cases of non-advanced disease and have reported that extended thyroid resection is not related to disease outcome (14–16). The Society of Surgical Oncology recommend lobectomy in T1M0N0 patients limited to the thyroid (17), whereas for tumours with the same characteristics, total or near total thyroidectomy is recommended by the American Thyroid Association and the American Association of Clinical Endocrinologist (18). In addition, all three associations recommend total thyroidectomy in cases of
multicentricity, local or surrounding tissue invasion or lymph node or distant organ metastasis.

Those recommending conservative treatment have reported that there is a lower risk of the development of complications associated with lobectomy with thyroid surgery, the recurrence rate is less than 5% and more than half of these patients could be cured with surgery (19, 20). However, in a study by Koloğlu et al, it was reported that because of recurrence after lobectomy, there was a high complication rate in re-operations (13). One of the disadvantages of lobectomy is that in the postoperative follow-up of patients, serum thyroglobulin can not be monitored. In patients to whom thyroid ablation has been applied, serum thyroglobulin level has high sensitivity in indicating recurrence and distant metastasis. Another disadvantage is that radioactive iodine (I–131) which is used in scanning or the treatment of residual thyroid tissue, distant metastasis and recurrence, can not be applied to these patients (1). To increase the efficacy of RI therapy in these patients where distant metastasis develops, especially in the lungs, excision of the residual thyroid tissue is necessary and this increases the risk of complications. In contrast to all of these, the most important advantage of total thyroidectomy is that the risk is removed of recurrence which could develop in the contralateral thyroid tissue or microscopic tumour foci in the contralateral thyroid tissue not determined at the time of diagnosis. Kebebew et al showed that in up to 85% of papillary thyroid carcinoma, microscopic tumour foci could be determined in the contralateral thyroid lobe (20). In line with this information, total thyroidectomy was applied to all the patients in the current study including two T1M0N0 patients. Although the number of patients was not sufficient for statistical analysis and the follow-up period was short, no postoperative distant metastasis or recurrence was determined in any patient who underwent total thyroidectomy and neck dissection because of lymph node metastasis.
CONCLUSION

Papillary thyroid carcinoma is seen rarely in childhood and adolescence but compared to adults, higher rates of local recurrence and distant metastasis are encountered. Rather than conservative treatment in these patients who have an excellent prognosis with the appropriate treatment, total thyroidectomy can be recommended to both increase the efficacy of postoperative RI therapy and to avoid recurrences which could develop in the contralateral lobe, and when there is lymph node metastasis, modified radical neck dissection can be added to the total thyroidectomy.
REFERENCES


