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Papillary Carcinoma Thyroid in a Nine-year-old Child: A Case Report

Seyed Ali Alamdaran[1], Rahim Vakili [2,3], *Somayyeh Hashemian [2,3], Asma Javid[4]

[1]Department of Radiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
[2]Department of Pediatric Endocrinology and Metabolism, Akbar Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
[3]Medical Genetic Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
[4]Department of Pediatric, Akbar Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

Abstract

Thyroid enlargement and nodules are very rare in children, but when they occur, the chance of malignancy among these nodules is very high. Thyroid carcinoma is rare in childhood, but in the last two decades, its incidence has increased two-fold. A painless nodule in the neck is the most common presentation of the disease. Dysphagia, hoarseness, cervical lymphadenopathy, weight loss, and fatigue are other presentations.

Surgical resection is the primary therapy for thyroid cancer. Levothyroxine and Iodine-131 (I131) are usually used as adjunctive therapy. This article presents the case of a 9-year-old girl who referred to our center with the chief complaint of a neck mass. Her symptoms had begun 6 months earlier.

Key Words: Child, Neck mass, Papillary carcinoma.

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Corresponding Author:

Somayyeh Hashemian (M.D), Department of Pediatric Endocrinology and Metabolism, Akbar Hospital, Mashhad, Iran.

E-mail: Hashemians951@mums.ac.ir

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1- INTRODUCTION

Thyroid cancer in children is a rare but treatable disease (1-3). Follicular cell-derived thyroid malignancies include follicular, papillary, and anaplastic cancers (4). Papillary carcinoma is the most common histological type associated with childhood thyroid cancer. From 1975 to 2012, the incidence of this disease increased from 4.8 to 14.9 per 100,000. It is more frequent in girls than in boys (5, 6). Radiation exposure of the thyroid during childhood, a family history of a thyroid cancer, occupational and environmental exposures are some risk factors for thyroid cancer (7). Thyroid cancer mainly presents as a thyroid nodule. Thyroid cancers in children perform differently compared to that of adults. Despite a higher incidence of lymph node and distant metastasis at presentation, the prognosis is better in younger patients (8). Notably, compared with the elderly, thyroid surgery in children is correlated with more complications.

2- CASE REPORTS

In August 2017, a 9-year-old girl with the chief complaint of feeling a mass in her neck referred to the Endocrinology Department of Imam Reza Hospital (Mashhad city, Iran). Her symptoms had begun 6 months earlier with a slow-growing, painless lump in the neck. The patient was also suffering from weight loss and trouble swallowing, but she had no chief complaint of hoarseness or other voice changes, trouble breathing, or chronic cough. Her past medical history was unremarkable. The patient's parents were cousins, and she had two healthy younger siblings. A thorough physical examination was performed and revealed a palpable nodule with ill-defined borders in the thyroid area. Cervical lymphadenopathy was detectable. For more consideration, neck ultrasonography (US) was done. Diffused microcalcification was observed in the bilateral thyroid parenchyma. A homogenous hypoechoic mass with ill-defined shape and border and 28 x 19 millimeters in size in the right lobe of the thyroid gland was reported. There were also multiple enlarged lymph nodes at left level IV. Level III nodes were enlarged on bilateral sides (**Figure.1**).

Ultrasonographically-guided fine-needle aspiration was done and follicular cells with a papillary pattern and macrofollicular cells with oval nuclei and fine chromatin which had nuclear molding and mild to moderate atypia were seen. Cellular findings were suspicious for malignancy. The patient was treated with a total thyroidectomy with central compartment clearance and bilateral selective neck dissection. Upon exploration, both lobes of the thyroid gland were diffusely enlarged. There were significantly enlarged lymph nodes in level VI and bilateral levels II and IV. Bilateral recurrent laryngeal nerves were identified and preserved.

The post-operative period was unremarkable, and treatment with calcium supplementation was initiated. The histopathology report showed diffuse papillary carcinoma thyroid involving the isthmus and both lobes of the thyroid gland with extensive calcifications. Extra capsular spread was noted. Eighteen lymph nodes were sampled, nine of which were metastatic with extra nodal spread. Other nodes only had reactive changes. She was started on suppressive doses of thyroxin. The laboratory data are shown in **Table.1**.

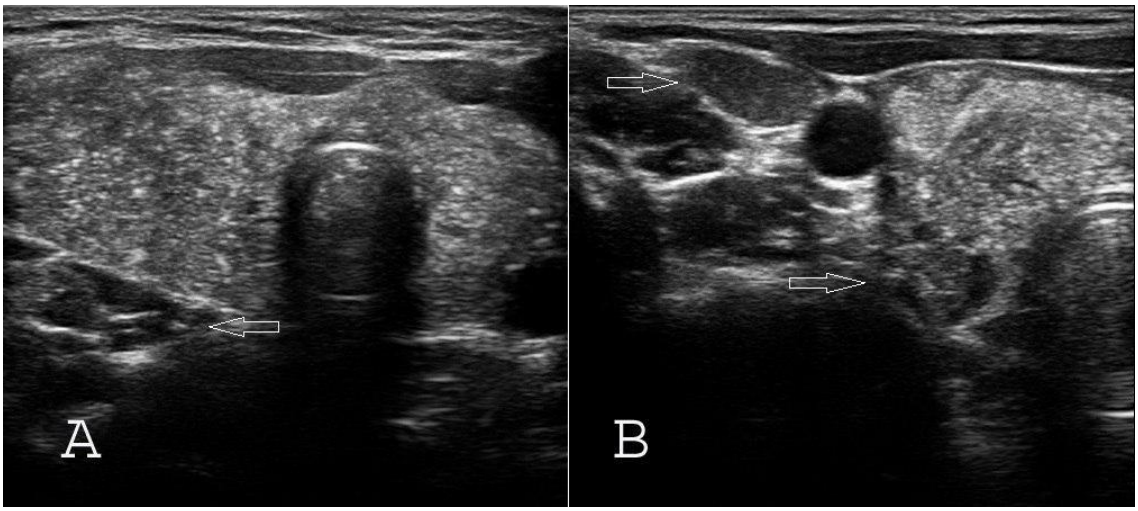

Fig.1: Gray-scale transvaginal ultrasonographic view of thyroid gland (12 MHZ linear probe). **A**: The bilobed view of thyroid gland shows hypoechoic bulky right lobe with diffuse mild heterogeneous and micro-calcification and a lymphadenopathy (Arrow) having micro-calcification and cystic change in behind of right lobe. **B**: The transverse view of right lobe of thyroid and level 4 of neck shows thyroid heterogeneity and micro-calcification two lymphadenopathy(Arrows) in behind of right lobe in level 6 and lateral of carotid artery in level 4.

Table-1: The patient laboratory information

Characteristics	Value	Characteristics	Value
Total thyroxine	2.4 micg/dl(6.4-13.3 micg/dl)	TPO antibody	1 IU/ml (<20 IU/ml)
TSH	>50.0 micIU/ml(0.3-4.84 micIU/ml)	Potassium	3.5 meq/l (3.5 -5 meq/l)
Calcium	9.2 mg/dl (3.1-6 mg/dl)	Sodium	135 meq/l (135-145 meq/l)
Phosphorus	5.2 mg/dl (4-80 mg/dl)	CBC	Normal

TSH: Thyroid-stimulating hormone; CBC: Cell blood count; TPO: thyroid peroxidase antibody.

3- DISCUSSION

Thyroid cancer among children is an infrequent disease, although there is a recent tendency towards an increased prevalence. It is still uncommon among children aged less than 10 years (8). Hogan et al. studied 1753 pediatric patients with thyroid cancer, and only 5% were less than 10 years of age (1). The most common histological subtype of thyroid cancers in childhood is papillary carcinoma. Tata Memorial Hospital reported that differentiated thyroid cancer among children contributes to 3% of all differentiated thyroid cancer (1, 10). The prevalence of thyroid cancer is greater in girls than in boys. Hogan et al. reported its prevalence as 4 times higher in girls. In a study by Devendra et al., girls outnumbered boys 2.3 to 1 with ratios of 1.5:1 in the pre-pubertal age group and 3:1 in the 13-17 years age group (1). In Fassina et al.'s study, 76.8% patients had papillary carcinoma, 16% had follicular carcinoma, 3.6% had medullary carcinoma, and 3.6% had lymphoma (11).

The biological behavior of thyroid cancer is more aggressive in children compared with adults. It often presents with lymph node or with distant metastasis. Devendra et al. showed that 56% of patients presented with cervical lymphadenopathy, and 19.2% of them had pulmonary metastasis. The prevalence of pulmonary metastasis was notably higher in those with lymph node involvement at presentation. In a study by Luiz Paulo et al., 61% of pediatric patients had lymph node metastases, whereas 24% of them presented with cervical lymphadenopathy without thyroid enlargement. In a study by Zimmerman et al., the incidence of distant metastasis in children was reported as 6.9% compared to 2.1% in adults (10, 12).

The presence of lymph node metastasis at presentation and its impact on recurrence rates and survival are not clear. Analysis from Memorial Sloan Kettering reported that the presence of cervical lymph nodes had no impact on survival or recurrence in young patients. Hogan et al. showed that the presence of distant metastasis is associated with a worse outcome compared to regional metastasis. The current patient had lymph node metastasis upon presentation. Cervical lymph nodes were palpable on both sides of the neck. In the final histopathological examination, eleven lymph nodes had metastatic disease; however, the patient did not have any distant metastases (1, 13).

The treatment of differentiated thyroid cancer, according to ATA guidelines, is by total thyroidectomy followed by I131 ablation. Suppressive dose of thyroxin and follow-up by thyroglobulin estimation, iodine diagnostic scanning, and ultrasonography are necessary (14, 15). A total thyroidectomy and bilateral neck dissection was done for our patient. She was then started on thyroxin post-operatively, and after thyroxin was stopped, radioiodine ablation was done. Total thyroidectomy has more complications in children than in adults. Transient or permanent hypocalcemia, recurrent laryngeal nerve paralysis, and post-operative bleeding and hematoma are some of its complications (12, 15). Whereas the presentation of thyroid cancer in pediatric patients is more aggressive, the prognosis is excellent. Poor prognostic factors are male gender, distant metastasis, and non-papillary tumor (16). A mean overall survival of 30.5 years (and longer in females) was reported by Hogan et al. (1). McGregor et al. showed a 100% 25-year survival for 56 patients (17).

4- CONCLUSION

Although the prevalence of thyroid cancer among the pediatric population is generally low, novel trends indicate its increase. In spite of the aggressive presentation (lymph nodal disease, distant Santhosh metastases), prognosis seems to be great. Total thyroidectomy along with dissection of involved neck nodes followed by I131 ablation is the recommended treatment. TSH suppression with thyroxin, serial thyroglobulin assessment, and radioiodine scanning are regular and necessary follow-up procedures.

5- CONFLICT OF INTEREST: None.

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