

Childhood Papillary Thyroid Carcinoma: A Case Report

Alma Al Mansour¹ , Hayder Makki Hamadi¹ , Mahmoud Elshafey Mohamed¹,
Maryam Alkhatry^{2*} 

¹Alqassemi Hospital, Emirates Health Services, Sharjah, UAE

²Ibrahim Bin Hamad Obaidulla Hospital, Ras Al Khaimah, UAE

Email: alma_almansour@outlook.com, haidermakki@hotmail.com,
dr.mahmoud.shafey@gmail.com, *dr.maryam.alkhatry@gmail.com

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Abstract

Background: Thyroid cancer is a rare disease yet the most common endocrine malignancy in pediatrics. Unlike adult patients, children with thyroid nodules typically don't complain of pain, soreness, or difficulty swallowing. Additionally, using the recommended therapy for adults to treat paediatrics is not appropriate. There is an unmet need for updated unique guidelines for the management of papillary thyroid carcinoma (PTC) in paediatrics and adolescents. **Case Report:** A 12-year-old girl had an atypical presentation of metastatic PTC in lymph nodes. She was treated initially with hemi-thyroidectomy, followed by total thyroidectomy. A multidisciplinary team followed her up till successful results were found. **Conclusion:** Due to the difference in pathophysiology between thyroid tumors in children and adults, a unique approach to PTC management is to be implemented. Further trials are required for a better understanding of risk factors, the likelihood of recurrence, and the long-term side effects of the chosen management plan.

Keywords

Papillary Thyroid Carcinoma, Childhood, Thyroidectomy, Case Report

1. Introduction

Thyroid cancer is a rare disease yet the most common endocrine malignancy in the pediatric age group, with a higher prevalence amongst females than males and an overall good prognosis [1] [2].

The etiology of thyroid cancer and the risk factors that indeed increase its incidence are still for debate, and many points are obscure. However, it is becoming increasingly evident in most literature that exposure of children to ionizing

radiation has a considerably higher risk of developing thyroid cancer [3]. In comparison to thyroid neoplasms in adults like epithelial-derived differentiated thyroid cancer (DTC), which includes papillary and follicular thyroid cancer, those exhibiting in the pediatric population differ in pathophysiology, clinical presentation, staging, and long-term outcomes [1]. Despite having more extensive PTC, pediatric patients have similar postoperative recurrence rates to adults, often accompanied by distant metastases and a lower mortality rate from PTC [4].

Furthermore, unlike adult thyroid nodule patients, children's patients usually don't complain of pain, tenderness, or swallowing difficulties. The neck masses are typically asymptomatic and discovered accidentally. However, 70% of patients present with extensive regional nodal involvement, and 10% - 20% of patients have distant metastasis, usually to the lung [5] [6].

For children, who may be more vulnerable to the deadly side effects of aggressive treatment than from thyroid cancer itself, recommended therapy for adults may not be appropriate. This highlights the need for tailored guidelines for children and adolescents with thyroid tumors [7].

Here, we are presenting the diagnostic and therapeutic process of a 12-year-old female patient who presented atypically with metastatic PTC to lymph nodes to point out the challenge that might arise in the initial management of pediatric PTC, which presents atypically.

2. Case Report

A 12-year-old Filipino female a known case of asthma controlled by salbutamol and ipratropium bromide nebulizers presented to the Emergency Department of Ibrahim Bin Hamad Obaidulla Hospital with a history of sudden onset palpitations and shortness of breath. A few days earlier, she had an upper respiratory tract infection for which she was prescribed clarithromycin.

The patient had a history of neck swelling, palpitations, and abdominal pain that lasted for almost a year; these acute symptoms started simultaneously. An abdominal ultrasound was done, and the result was unremarkable. The family history is unknown, but the surgical history was positive for adenotonsillectomy.

Upon arrival, she was vitally stable: heartrate (HR) 66 bpm, blood pressure (BP) 117/57 mmHg, respiratory rate (RR) 18 bpm, temperature 36.3°C, and SpO₂ 100% on room air. A thorough physical examination revealed a marked neck swelling that moved with deglutition. The thyroid examination illustrated a mildly tender nodule that was felt on the right lobe, measuring around 3 × 2 cm, mobile, not attached to skin underlying muscle, nor extended retrosternal. Laboratory findings of thyroid function tests were within the normal range.

Ultrasound (**Figure 1**) showed heterogeneous solid focal lesions measuring 36 × 27 × 20 mm in the right thyroid lobe. No demonstrable vascularity was seen. The left lobe and the isthmus had no significant changes. The echogenicity was homogenous for both lobes. Bilateral deep cervical adenopathy was also found.

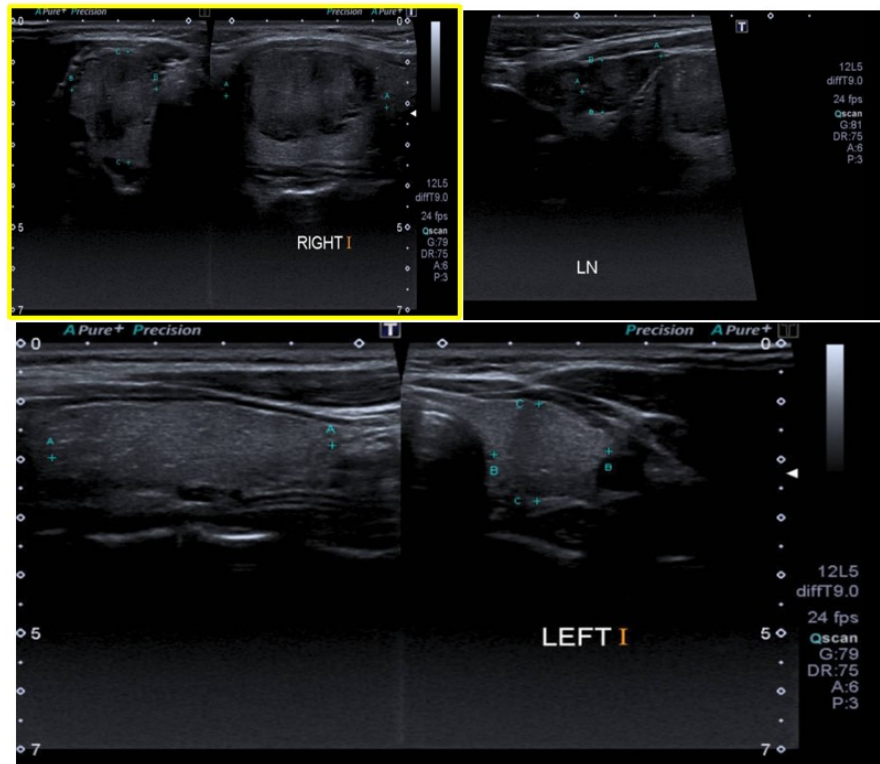


Figure 1. Ultrasonographic view of the thyroid gland.

An interdisciplinary team approach was implemented to treat and follow up on the case. The patient underwent fine-needle aspiration (FNA); bloody smears, sheets of follicular cells with slight pleomorphism, and small follicle formation were seen. Cellular findings were suspicious for follicular neoplasia and recommended for excision biopsy. The patient underwent a hemithyroidectomy procedure for treatment.

Further evaluation was done using soft tissue neck contrast CT (**Figure 2**). Right thyroid lobe hemithyroidectomy with areas of residual stippled calcification at the site of the right thyroid lobe was reported. Post-contrast CT showed multifocal heterogeneous intense lymph node enhancement in the right paratracheal region below and inferior to the right residual thyroid lobe. Bilateral enlargement of jugular lymph nodes with right-sided intense enhancing pattern in the (lower jugular and lower posterior triangle) Iva, V with areas of breakdown and necrosis. Bilateral enlargement of upper jugular anterior and posterior lymph nodes measuring 15 mm and the intra parotid nodes. Right-sided pretracheal enlargement of the mediastinal node.

Three weeks after the initial surgery, she underwent right total thyroidectomy and isthmusectomy with neck lymph node dissection and frozen section. The intraoperative fresh frozen section suggested a picture of follicular adenoma. However, after a complete pathological study, results showed PTC with a follicular variant.

Histopathological examination from the left lobe revealed sporadic invasive

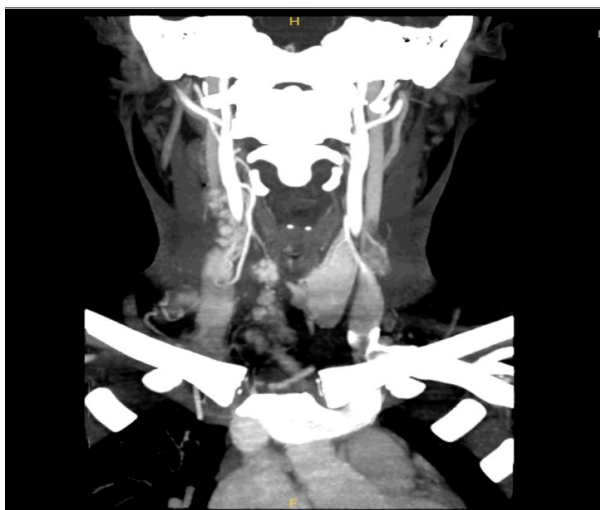


Figure 2. Soft tissue neck contrast CT.

malignant follicles and focal intravascular invasion associated with fascia from the right side: 6 metastatic lymph nodes: 6/7, and right block dissection showed three metastatic lymph nodes: 3/14. In comparison, left block dissection showed eight metastatic lymph nodes: 8/13.

The patient stayed in the ICU for one night. Three days later, she was stable and discharged on calcium carbonate (100 mg, q6hr) and sodium aescinate (20 mg, q12hr). During the follow-up period, a few months later, her thyroglobulin dropped from 239 ug/L on admission to less than 0.2 ug/L.

3. Discussion

Papillary thyroid carcinoma is the most common type of thyroid cancer in children, accounting for about 90% of cases. It is also the leading cause of endocrine cancer in children, comprising 6% of all cases [8]. This condition mostly affects adolescent females, and the female-to-male ratio is equal or slightly reversed in children under ten [9]. The risk factors for PTC include genetic predisposition, history of thyroid disease, family history, and radiation exposure. However, PTC can occur in patients without identifiable risk factors [10].

About 70% of pediatric patients present with an asymptomatic neck mass and normal thyroid hormone levels; thus, they seek medical advice at different stages of disease progression. Early diagnosis requires a comprehensive evaluation, including radiological, microbiological, and histopathological assessments, to ensure accuracy [11]. Our patient presented with atypical features. She did not have any risk factors for thyroid cancer. Hence, a clinical diagnosis of thyroid malignancy was entertained accidentally. A neck nodule with no symptoms was found on the right lobe, so a routine evaluation for thyroid disease was conducted. Thyroid function tests, including thyroid stimulating hormone (TSH) and thyroxine (T4) levels, were not helpful in this case as they usually appear normal. A neck ultrasound was done, showing signs of possible cancer, followed by a con-

firmatory FNA cytology for the nodules. The FNA finding is the initial basis for our case diagnosis despite its low positive predictive value in children [11] [12]. A biopsy was then performed to confirm the diagnosis. Physicians should have a significant level of suspicion for malignancy in children with asymptomatic neck mass [11].

A cooperative approach is recommended to achieve long-term PTC survival. The management of PTC requires careful planning, beginning with preoperative staging and selecting the most effective treatment strategy for the patient. These concepts were adopted in the multidisciplinary management and follow-up of our case.

According to the most recent American Thyroid Association (ATA) children's guidelines in 2015, total thyroidectomy, followed by radioactive iodine (RAI) ablation, is recommended for intermediate- and high-risk groups due to an increased risk of multifocal involvement. Radioactive iodine ablation seeks to enhance the surgical management's response rate. Moreover, the combination of RAI therapy and TSH suppression significantly improves the complete response rate (47.32%) and partial response rate (38.39%). Withholding RAI for low-risk pediatric patients does not have a negative impact on remission rates [13] [14].

The indications for adjuvant postoperative iodine-131 (I-131) therapy are debated, especially for pediatric PTC patients without lymph nodes or distant metastases. It has not been cleared beyond a doubt whether RAI will improve survival and/or reduce recurrence rates in these patients. For patients with extra-thyroidal invasion or locoregional metastasis, lymph node dissection is advised to lower the probability of recurrence and improve the effectiveness of RAI therapy [13] [15]. Patients with PTC require routine follow-up, monitoring of thyroglobulin levels, and diagnostic testing. I-131 whole-body scans should be done annually [16].

This comes in line with our case, which is treated initially with hemithyroidectomy, followed by total thyroidectomy, and then monitored by a multidisciplinary team for several months. Thyroglobulin level showed a dramatic drop indicating successful results of PTC management.

4. Conclusion

Pediatric DTC behaves differently than adult DTC and, for this reason, should be treated exclusively. Long-term follow-up studies of pediatric DTC cohorts are necessary to increase our current knowledge of the clinical behavior of pediatric DTC, risk factors for recurrence, and late effects of the administered treatments. Prospective multicenter trials should be performed, preferably across borders, to enable the inclusion of sufficient patient numbers to generate new data.

Informed Consent

The patient has provided informed consent.

Ethical clearance

Exemption from the Ethical approval has been obtained. MOHAP REC reference NO: MOHAP/DXB-REC/No. 83/2022, dated 06/10/2022.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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