

Thyroid Toxic Adenoma in a Child: A Case Report

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Abstract

Thyroid nodules are rare in the pediatric age with a prevalence of around 2%. Their approach should include the assessment of thyroid function and a cervical ultrasound. Toxic adenoma presents as a hyperfunctioning autonomous nodule. We report the case of a 5-year-old child with autism spectrum disorder wherein the diagnosis of toxic adenoma was made after the investigation of a visible palpable cervical nodule. The thyroid function showed diminished thyroid stimulating hormone and increased free triiodothyronine and thyroxine levels. The cervical ultrasound revealed a hyperechogenic solid nodule in the thyroid right lobe, with a hypoechoic halo, which is compatible with an adenoma. The thyroid scintigraphy confirmed its hyperfunctioning nature. The therapeutic approach included a beta blocker and a thioamide, followed by surgical excision, with the normalization of the thyroid function.

Keywords: Adenoma; Child; Thyroid Neoplasms/diagnosis; Thyroid Neoplasms/therapy; Thyroid Nodule/etiology

Introduction

Thyroid nodules are highly prevalent in adulthood. However, in the pediatric age, their known prevalence is up to 2%.^{1,2} Due to a high incidence of thyroid cancer in children compared to adults, the approach to a thyroid nodule should be carried out with caution.³ In children with one or more thyroid nodules, their thyroid function should be assessed and a cervical ultrasound should be performed.⁴

Clinicians should suspect that they are facing a toxic adenoma in cases of hyperthyroidism associated with a palpable cervical nodule. Toxic adenoma is an autonomous, hyperfunctioning nodule, which

suppresses the secretion of thyroid stimulating hormone and shows increased radiopharmaceutical uptake in thyroid scintigraphy.⁵

Case Report

Female child, 5 years old, with healthy, non-consanguineous parents. She was born after a high risk pregnancy due to gestational diabetes, with a caesarean delivery at 37 weeks. Her weight and height were appropriate for gestational age and she did not need resuscitation maneuvers. The neonatal period was uneventful. She has macrocephaly, dysmorphic features, global developmental delay with motor stereotypies and no language, having been diagnosed with autism spectrum disorder at 3 years old. She is being followed in a neuropediatric clinic and has normal brain magnetic resonance and a comparative genomic hybridization (CGH) array. It is noteworthy that she had no previous head and neck irradiation and no personal or family history of thyroid disease. She was submitted to strabismus surgery. She was referred to the pediatric endocrinology clinic due to a cervical anterior mass noted by her parents at 4 years old without any other associated symptoms. Although her behavior made it difficult to carry out a complete physical examination, it was possible to palpate a nodule in the thyroid right lobe, mobile and of elastic consistency, not painful, as well as bilateral infracentimetric cervical ganglia. She was tachycardic (auscultatory method), although the patient's agitation stood out. Furthermore, no exophthalmos was observed. From the investigation, thyroid stimulating hormone < 0.005 μ UI/mL (0.70-5.97), free triiodothyronine (FT3) 9.91 ng/mL (2.41-5.5), and free thyroxine (FT4) 2.50 ng/dL (0.96-1.77) stood out. Antithyroid antibodies (thyroglobulin, thyroid peroxidase, and thyrotropin receptor antibodies) were negative. A cervical ultrasound was performed, showing a hyperechogenic solid nodule

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with 23 x 11 x 20 mm in the thyroid right lobe, with a hypoechoogenic halo, compatible with an adenoma (Fig. 1). It was decided to perform a fine-needle aspiration biopsy that revealed microfollicular structures, without nuclear atypia, and the results were concordant with the ultrasound findings. The patient then started treatment with atenolol 1.5 mg/kg/day.

A thyroid scintigraphy with technetium-99m-pertechnetate was performed, confirming the presence of a nodular formation with increased radiopharmaceutical uptake ("hot" nodule) in the right lobe of the thyroid, with a reduced uptake in the remaining gland, indicating a probably autonomous toxic nodule (Fig. 2). The product analysis confirmed a toxic nodule, with no signs of malignancy. After this, she started treatment with methimazole 0.5 mg/kg/day (once a day).

The normalization of the thyroid function was achieved and atenolol was discontinued. She was submitted to right hemithyroidectomy, which occurred without any complications and methimazole was suspended after the procedure. She maintains normal thyroid function now without medication and undergoes regular cervical ultrasound evaluation wherein the results have been normal.

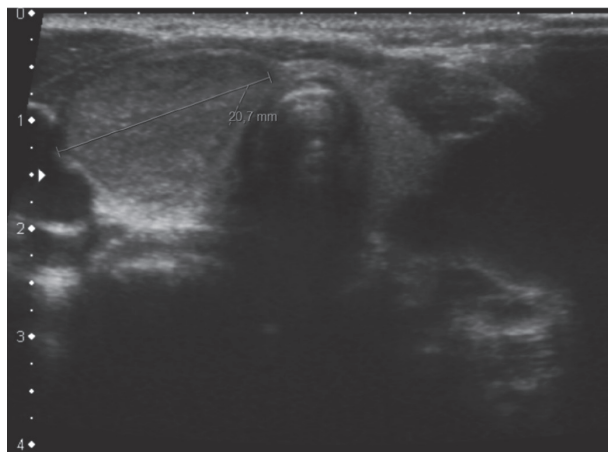


Figure 1. Cervical ultrasound: hyperechogenic solid nodule with 23 x 11 x 20 mm at the thyroid right lobe, with a hypoechoogenic halo.



Figure 2. Thyroid scintigraphy: nodular formation with increased radiopharmaceutical uptake in the thyroid right lobe, with a reduced uptake in the remaining gland.

Discussion

Thyroid nodules are rare in pediatrics, but the risk of malignancy is not negligible. Authors point out the importance of an integrated approach when it comes to hyperthyroidism associated with a palpable cervical nodule, which includes the assessment of the thyroid function, ultrasound, and scintigraphy, the latter to confirm the presence of a hyperfunctioning nodule.

One of the obstacles to the diagnosis of toxic adenoma in this child was the fact that she had autism spectrum disorder. This is a neurodevelopmental disorder characterized by impairment in social communication, behavior function, and language development. Therefore, it was almost impossible to value the symptoms of hyperthyroidism, namely tremor, tachycardia, hypertension, and even some weight loss due to difficulty in performing the physical examination and in inquiring about any complaints.

Regarding treatment in cases of toxic adenoma, the recommendations are not consensual, and the literature is scarce. Treatment options consist in relieving hyperthyroidism symptoms with beta blockers and decreasing the production of thyroid hormone with radioiodine ablation or surgery. Sometimes, thioamide therapy is used to avoid radioiodine and surgery or before this procedure. Beta blockers are used after the diagnosis of hyperthyroidism to ameliorate symptoms like tachycardia and hypertension and can be stopped when the thyroid function returns to normal. The most frequently used is atenolol, which has a beta-1 selective action. To decrease thyroid hormone synthesis, the permanent treatments are surgery and radioiodine. In addition, thioamides (from which methimazole is an example) are sometimes used for hyperthyroidism (although without remission) until definitive treatment is performed.⁵⁻⁷

This case places an emphasis on the importance of the ultrasound and scintigraphy since clinical observation and thyroid palpation were hampered. It also highlights the role of the fine-needle aspiration biopsy to exclude a neoplasia, and ultimately the surgical procedure to remove the nodule.

WHAT THIS CASE REPORT ADDS

- The authors emphasize that the approach to a thyroid nodule should be carried out with caution since it can represent a serious condition.
- In cases of hyperthyroidism associated with a palpable cervical nodule, a toxic adenoma should be suspected.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

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Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

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Adenoma Tóxico da Tireoide numa Criança: Um Caso Clínico**Resumo**

Os nódulos da tireoide são raros em idade pediátrica, com uma prevalência de cerca de 2%. A sua abordagem deve incluir a avaliação da função tireoideia e a realização de ecografia cervical. O adenoma tóxico apresenta-se como um nódulo hiperfuncionante autónomo. Descrevemos o caso de uma criança de 5 anos com perturbação do espectro do autismo, na qual o diagnóstico de adenoma tóxico foi feito no contexto da investigação de nódulo cervical. A função tireoideia mostrou diminuição dos valores da hormona estimuladora da tireoide e aumento dos valores de

triiodotironina e tiroxina livres. A ecografia cervical revelou um nódulo hiperecogénico no lobo direito da tireoide, com um halo hipoecogénico, compatível com adenoma. A cintigrafia tireoideia mostrou tratar-se de um nódulo hiperfuncionante. A abordagem terapêutica incluiu um beta bloqueador e uma tiamida, seguidos de intervenção cirúrgica, com normalização da função tireoideia.

Palavras-chave: Adenoma; Criança; Neoplasias da Tireoide/diagnóstico; Neoplasias da Tireoide/tratamento; Nódulo da Tireoide/etiologia