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SONOGRAPHIC FINDINGS OF ECTOPIC INTRATHYROIDAL THYMUS IN CHILDHOOD: OUR EXPERIENCE

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ABSTRACT

Intrathyroidal thymic tissue is a rare ultrasound finding and may be confused with a malignant thyroid nodule because of hyperechoic dots mimicking calcifications. We retrospectively evaluated thyroid ultrasound examinations of a paediatric population consisting of 205 children. Ten patients showed thyroid nodules with hyperechoic foci like those seen in thymic tissue. The knowledge and awareness of intrathyroidal ectopic thymus and its ultrasound features allows to avoid misdiagnosis of thyroid malignant nodules.

1. Introduction

Thyroid nodules are less common in children compared with adults and are seen in 0.2-2% (1). However, 20-73% of nodules found in children are malignant (2). Thus, it is essential a sonographic evaluation of all the nodules and the knowledge about the differential diagnoses.

One possible differential diagnosis that is being increasingly reported in the radiology literature is intrathyroidal ectopic thymus (IET) (3). IET is a rare embryological abnormality and, such as other embryological abnormality conditions, ultrasonography (US) evaluation plays a crucial role for the correct diagnostic work up (4). Typical US feature of IET is a hypoechoic nodule with hyperechoic dots which occasionally contains vascularization at color-Doppler (5-7). It may be confused with a malignant thyroid nodule because of hyperechoic dots mimicking calcifications (8). According to previous reports, ectopic thymus in the thyroid showed similar echogenicity to normal thymus.

Several cases of intrathyroidal thymic tissue mimicking a thyroid nodule have been reported (9). However, to our knowledge, literature data on larger studies are few.

2. Methods

We retrospectively reviewed US findings from all pediatric patients (M: 79, F: 126, aged 4 months-16 years, mean age: 7 years e 9 months) referred to our Radiology Department for any indication other than thyroid disease between December 2016 and September 2019 and underwent to thyroid US evaluation (n=205). Reasons for thyroid US were as follows: obesity (98), altered laboratory data (59), Diabetes mellitus type 1 (9) and IBD (14). US examinations were performed using a 4-13 MHz linear array transducer.

The authors declare that they have no conflict of interest. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, and its later amendments. This article does not contain any studies with human or animal subjects performed by any of the authors. Additional informed consent was obtained from all the patients for which identifying information is not included in this article.

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3. Results

In 146 patients (71%), no US thyroid abnormalities were detected. An US pattern of thyroiditis was found in 49 patients (23.9%). 10 children (4.9%) showed one or more thyroid nodules; one (0.51%) of them with a suspected pattern of possible thyroid malignancy had FNA that confirmed the diagnosis (figure 1-4). In the remaining 9 patients (4.39%) were detected lesions with an echo pattern resembling the mediastinal thymus (hypoechoic echo pattern with internal linear and punctate echogenic foci). The longest diameters ranged from 4x5mm to 15x6 mm (mean:8.4x4.8 mm). All lesions were well demarcated except one with irregular borders. The sonographic findings of multiple hyperechoic foci within the nodule were similar to those seen in thymic tissue. Many reported cases of intrathyroidal thymic tissue have presented as well-defined hypoechoic nodules with linear and dot-like echoes (6). Intrathyroidal thymic tissue may manifest contiguous with the mediastinal thymus. These sonographic findings are typical of intrathyroidal thymic tissue and can be used to confirm the diagnosis (3). None of the lesions showed altered vascularity on Doppler sonography or associated enlarged lymph nodes of the neck. All 9 patients had been re-evaluated with US in the follow-up phase (after one year) and there were no changes in diameters, echotexture, shape or border. In the patient showing the nodule with irregular borders was performed US-guided fine-needle aspiration biopsy (FNAB) which revealed Hassall's corpuscles with a background of small lymphocytes and confirmed the diagnosis of ectopic thymic tissue within the thyroid gland.

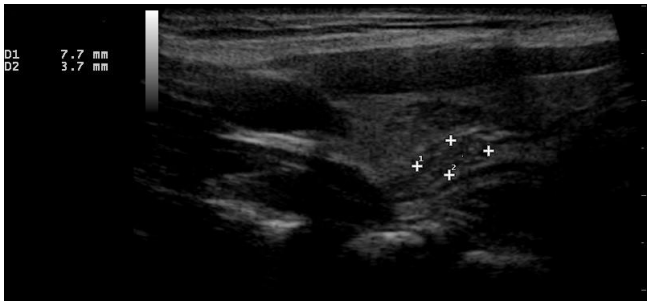

Figure 1. Left longitudinal B-mode ultrasound image of the neck. A hypoechoic heterogenous lesion with punctate echogenic foci and hyperechoic linear striation is seen within the mid-pole of the left thyroid lobe measuring 7.7x3.7mm.

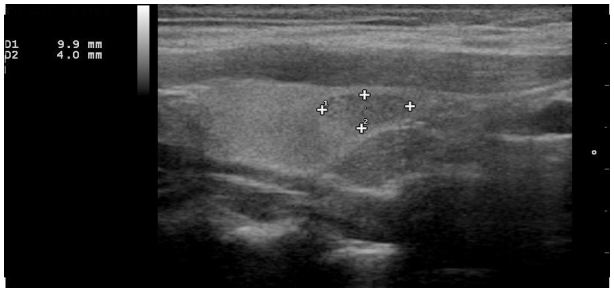

Figure 2. Right longitudinal B-mode ultrasound image of the neck. A hypoechoic heterogenous and well-demarcated lesion with punctate echogenic foci is seen at the right thyroid inferior pole, measuring 9.9x4.0mm.

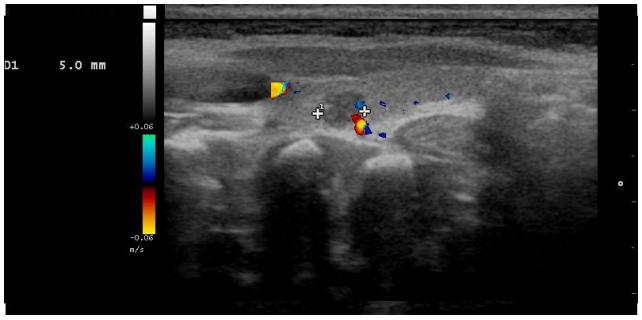

Figure 3. Right longitudinal color-Doppler ultrasound image of the neck. A hypoechoic heterogenous and well-demarcated lesion with punctate echogenic foci and peripheral vascularity is seen at the upper pole of the right thyroid (maximum diameter: 5mm).

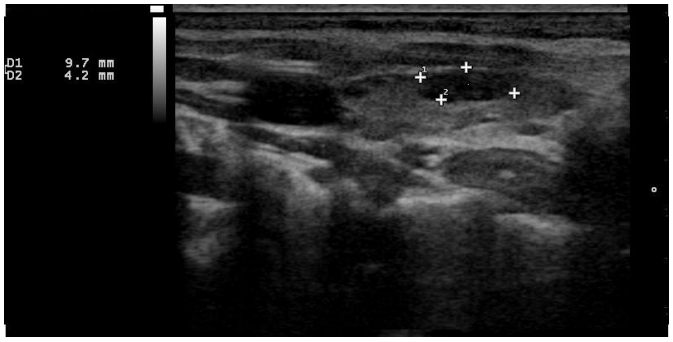

Figure 4. Left longitudinal B-mode ultrasound image of the neck. A well-defined hypoechoic nodule with linear and dot-like echoes hypoechoic is seen at the mid-pole of the left thyroid lobe measuring 9.7x4.2mm.

4. Discussion and conclusions

The thymus is embryologically derived from ventral sacculation of the third pharyngeal pouch and minor portions of the fourth pharyngeal pouch in the sixth week of gestation. The bilateral primordial of the thymus starts midline fusion in the eighth week to form the bilobed thymus, which descends into the superior mediastinum (10). The descent of the thymus and thyroid are closely related because of the proximity of the thyroid diverticulum to the 3rd branchial pouch. During the migration, thymic remnants can be left along the path, which can result in ectopic and accessory thymic tissue in various locations. During the migration, thymic remnants can be left along the path, which can result in ectopic and accessory thymic tissue in various locations.

Examples of this include cervical extension of the thymus, cervical thymus, thymic cyst, cervical thymoma, and ectopic thymus (7). Ectopic thymic tissue may manifest as a neck mass or an incidentally detected mass. Ectopic intrathyroidal thymus remnants can be explained by their close relationship during their embryologic development (10). In children, intrathyroidal thymic tissue should be considered in the differential diagnosis for thyroid nodules.

In our study, we evaluated 205 patients, in which we found 10 (4.9%) cases consistent with intrathyroidal ectopic thymus.

The found incidence was slightly higher than reported by the literature but is still in accordance with some of the more recent literature (11). This value could be due to more widespread use of US evaluation and to a greater awareness of this condition (12).

In conclusion, intrathyroidal thymic tissue is a rare condition and may be confused with a malignant thyroid nodule because of hyperechoic dots mimicking calcifications. In children, intrathyroidal thymic tissue should always be considered in the differential diagnosis for thyroid nodules. US findings of ectopic thymus are similar to those of the thymus. If US features are inconclusive, further evaluation is needed with a biopsy procedure for a definitive diagnosis. Therefore, the knowledge and awareness of this condition and its ultrasound features allows to avoid misdiagnosis of thyroid malignant nodules and useless surgery and/or invasive diagnostic procedures.

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