Case 3105

Medullary thyroid carcinoma: findings with color and power Doppler sonography
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Section: Head & neck imaging
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Imaging Technique: Ultrasound-Colour Doppler
Imaging Technique: Ultrasound-Power Doppler
Case Type: Clinical Cases
Authors: Reus M, Vázquez V, Abellán D, Morales D, Abellán JL
Patient: 38 years, female

Clinical History:

A 38-year-old woman presented with a node in the anterior part of the neck. A sonography revealed the existence of a single hypoechoic node with microcalcifications and irregular intranodular vascularization. FNAC demonstrated follicular proliferation.

Imaging Findings:

A 38-year-old female patient presented with a node in the anterior part of the neck and no other clinical symptoms. A physical examination revealed a single elastic non-adhesive node. The results of the laboratory tests that were related to the thyroid function were found to be normal. A sonography was performed using a Philips HDI 5000 (Royal Philips Electronic Eindhoven, The Netherlands) sonography unit equipped with a linear array multifrequency transducer of 7–15 MHz, which demonstrated a single solid node measuring 1.5 cm x 1 cm with irregular margins and a hypoechoic echostructure, without a surrounding echolucid halo with punctate bright echogenic foci in the inner part in the thyroid’s right lobe (Figs. 1a, b). A color Doppler and a power Doppler sonography revealed an intranodular hypervascularization with an irregular arrangement of blood vessels (Figs. 2a, 3a). No adenopathies were found. A fine-needle aspiration cytology (FNAC) demonstrated follicular proliferation. Taking into account the results of the sonography and cytology examinations, the basal plasma calcitonin level was measured, which showed an increased value of 90 pg/ml (normal value = 0–10 pg/ml). It was decided that a total thyroidectomy was required, with ganglionar dissection of the central neck area.

Discussion:

Medullary thyroid carcinoma (MTC) represents 3%–10% of thyroid cancers. It originates from the neoplastic transformation of the C cells or parafollicular cells of the thyroid gland. The neuroendocrine C cells secrete calcitonin. The occurrence of an MTC shows a peak of incidence in the middle age, and it can be classified as sporadic (70% of the cases) or as autosomal dominant inheritance, typical in early young age (children and teenagers), and presenting in a multicentric and/or bilateral form. The inherited variety can be divided into two types: (a) an isolated carcinoma (familial medullary thyroid carcinoma) or (b) associated with other multiple endocrine neoplasms, such as MEN IIA and IIB. Mutations in the RET protooncogen, located in the 10th chromosome, are responsible for the occurrence of a hereditary medullary carcinoma (MEN IIA, MEN IIB and familial medullary carcinoma). In these patients, the mutations of the RET protooncogen are studied, and if they are found to exist a first-line familial study is done. A prophylactic thyroidectomy is performed in patients in whom the mutation exists.
The MTC prognosis tends to be worse than the prognosis for papillary or follicular cancer. An MTC spreads lymphatically and haematically. The sonographic appearance of a medullary carcinoma, although non-specific, is as a hypoechoic node with microcalcifications (whose histology reveals calcified amyloid deposits), with irregular margins, intranodal hypervascularization and an irregular or chaotic arrangement of blood vessels, frequently associated with metastatic lymphadenopathies. As this tumor simulates any other histologic pattern of the thyroid carcinoma, the diagnosis through FNAC is difficult. Neoplastic neuroendocrine C cells retain the capacity of secreting calcitonin, the basal calcitonin plasma level being a tumoral marker. The treatment involves a total thyroidectomy with central neck region dissection in the cases where no metastatic adenopathies are present. Some authors recommend an initial laterocervical lymphadenectomy, due to the high prevalence of regional metastases such as the high risk of the occurrence of residual medullary carcinoma. Although the sonography findings are non-specific, our opinion is that sonography can be useful not only in the diagnosis of a medullary thyroid carcinoma in patients with thyroid nodes, but also in the early diagnosis, thus improving the long-term prognosis.

**Differential Diagnosis List:** Medullary thyroid carcinoma.

**Final Diagnosis:** Medullary thyroid carcinoma.

**References:**


**Figure 1**

**a**

Description: A transverse grey-scale sonography showing a nodule, which is hypoechoic with irregular margins in the right lobe of the thyroid (arrows) also seen are the carotid artery (C) and the trachea (T).

Origin:

**b**

Description: A transverse grey-scale sonography of the lower part of the nodule revealing two microcalcifications (arrows).

Origin:
**Figure 2**

*Description:* A longitudinal color Doppler scan showing hypervascularity of the nodule, with a typical chaotic arrangement. *Origin:*
Description: A longitudinal power Doppler scan revealing high hypervascularity with an irregular arrangement. Origin: