Inferior Thyroid Artery Precluding Fine Needle Aspiration Biopsy

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INTRODUCTION

Ultrasound guided fine needle aspiration biopsy (FNAB) is a safe and easy method to evaluate the nature of thyroid nodules with very high diagnostic accuracy (1). Complications after FNAB are unlikely to develop in experienced hands and development of a clinically important hematoma is extremely rare (2). Careful ultrasonographic examination and evaluation of the possible trace of needle via Doppler technique prior to FNAB, in order not to miss an important vascular structure on the way is advised (3). Thyroid gland is supplied by superior and inferior thyroid arteries. Superior thyroid artery is usually stable but inferior thyroid artery may show anatomical variations (4, 5).

Here we report a case with an unexpected observation of inferior thyroid artery within the thyroid parenchyma. To our knowledge, this is the first case with inferior thyroid artery embedded within the thyroid parenchyma, in literature.

Keywords: Fine needle aspiration biopsy, thyroid nodule, ultrasound.

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CASE REPORT

A fifty year old female patient consulted to the endocrinology department “to have her thyroid nodules checked”. Nodular goiter was diagnosed a year ago but she had not had an ultrasonography report with her. The nodules were not biopsied before. On physical examination; the right thyroid lobe was irregular on palpation and a nodule of 2 cm was palpable on the left lobe. Ultrasonography of the thyroid revealed a 19x12mm heterogenous

thyroid nodule in the inferior portion of the left lobe. A 10x9mm partially cystic isoechoic nodule was visible on the right side. A vascular structure of 2mm in diameter, lying centrally anterior to this nodule drove attention (Figure 1). This vessel was passing through the thyroid gland from lateral surface to medially, and was leaving branches within parenchyma. Doppler characteristics of the vessel supported that it was an artery, and its peak systolic velocity, and end-diastolic velocity were 56 cm/s and 26 cm/s respectively (Figure 2). Magnetic resonance angiography showed right common carotid artery was placed ventrally, right thyrocervical trunk was larger than left, and right inferior thyroidal artery originating from the thyrocervical trunk was entering the gland through the lateral surface of the central part and passing through the parenchyma medially towards the trachea (Figure 3).Fine needle aspiration biopsy is taken from the nodule on the left lobe but not from the nodule on the right, since this anatomical variation of the inferior thyroidal artery precluded approach to the nodule.

DISCUSSION

Inferior thyroid artery arises from the thyrocervical trunk although exceptional origins from vertebral, subclavian or common carotid arteries have been reported (4,5). Inferior thyroid artery descends on the posterior surface of the lateral lobe and gives two branches; anterior and posterior, before entering the thyroid (4) to supply mainly the inferior third of thyroid parenchyma (6). Inferior thyroid artery may be absent in about 2 to 6% of cases and may be replaced by ima artery (7).

Superior and inferior thyroid arteries form anastomoses along the posterior border of the thyroid and small arterioles and capillaries enter the thyroid parenchyma to form a network of blood supply (8). In our case, inferior thyroid artery itself was observed within thyroid

parenchyma. An artery of such caliber within the gland is an unexpected finding with important clinical aspects. It forms an absolute contraindication to FNAB since piercing the artery eventually would result in a hematoma. The prevalence of bleeding after thyroid surgery ranges from 0 to 6,5% (9). The anatomical variation reported in our case, may lead to life threatening intra or postoperative complications in case of thyroid surgery.

Carotid arteries are derived from the third aortic arch during embryological development. The right fourth aortic arch gives rise to the rise to the right subclavian artery, and seventh intersegmental branch of the aorta gives rise to the left subclavian artery. The thyrocervical arteries are derived from branches of cervical intersegmental arteries. While the aortic arches develop, thyroid gland which appeared during the third week of gestation begins its descent caudally from the floor of pharynx to the cervical region. Variations of blood supply to the thyroid are assumed to appear during this period (10).

In conclusion, anatomical variations of thyroid vessels should be carefully considered before any intervention to the thyroid. Surgeons, interventional radiologists and endocrinologists may encounter such variations during a procedure to the thyroid. Doppler evaluation prior to FNAB is advised to avoid unexpected complications of this safe and comfortable procedure.

Conflict of interest

The authors declare no conflict of interest.

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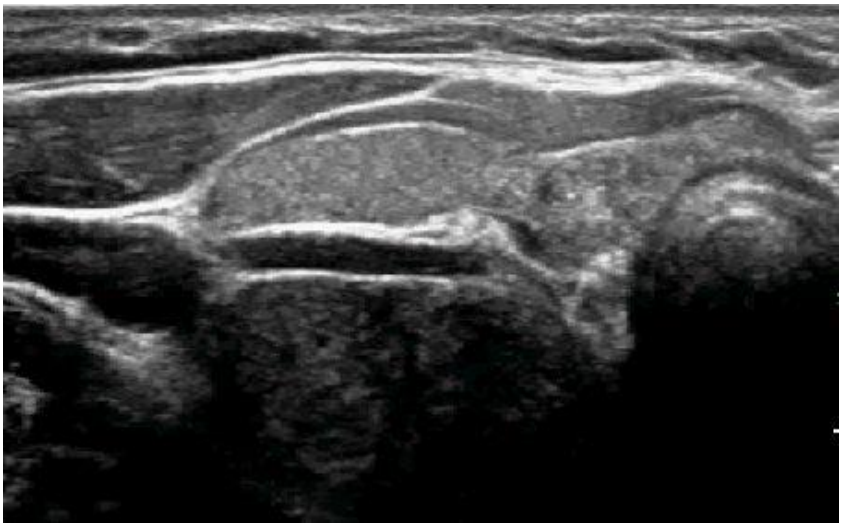

Figure 1: Ultrasonographic appearance of the vascular structure 2mm diameter (lying at the central part of the gland and passing from lateral surface to medially).

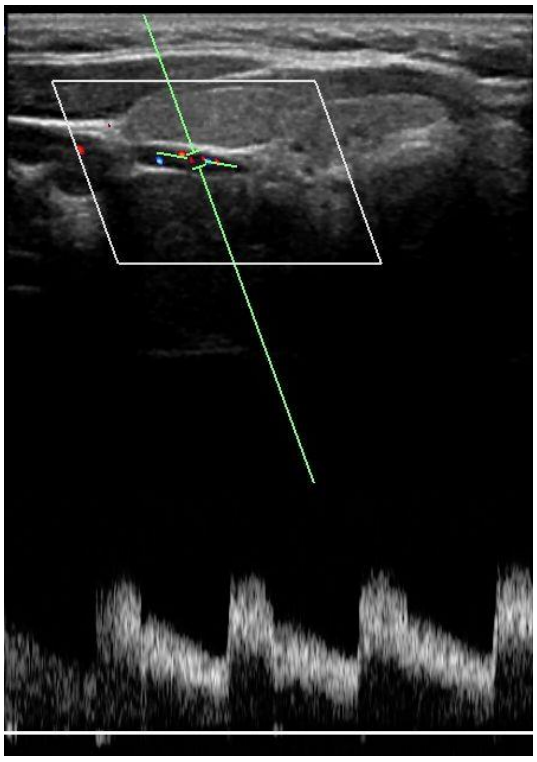

Figure 2: Spectral Doppler sonogram shows a peak systolic velocity of 56 cm/s and an end-diastolic velocity of 26 cm/s in the artery.

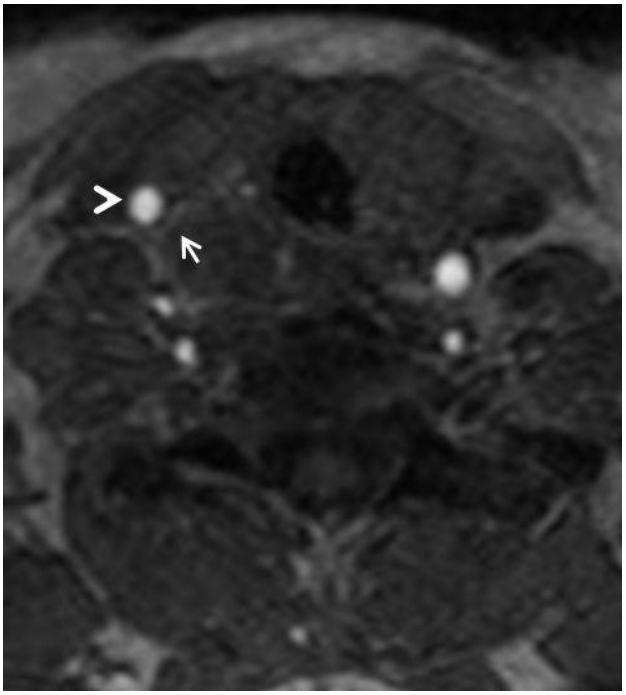

Figure 3: Magnetic resonance imaging shows right inferior thyroidal artery (arrow) originating from the thyrocervical trunk (arrowhead), passing through the thyroid parenchyma.