

## Image

# An Ectopic Parathyroid Adenoma Mimicking a Carotid Body Paraganglioma

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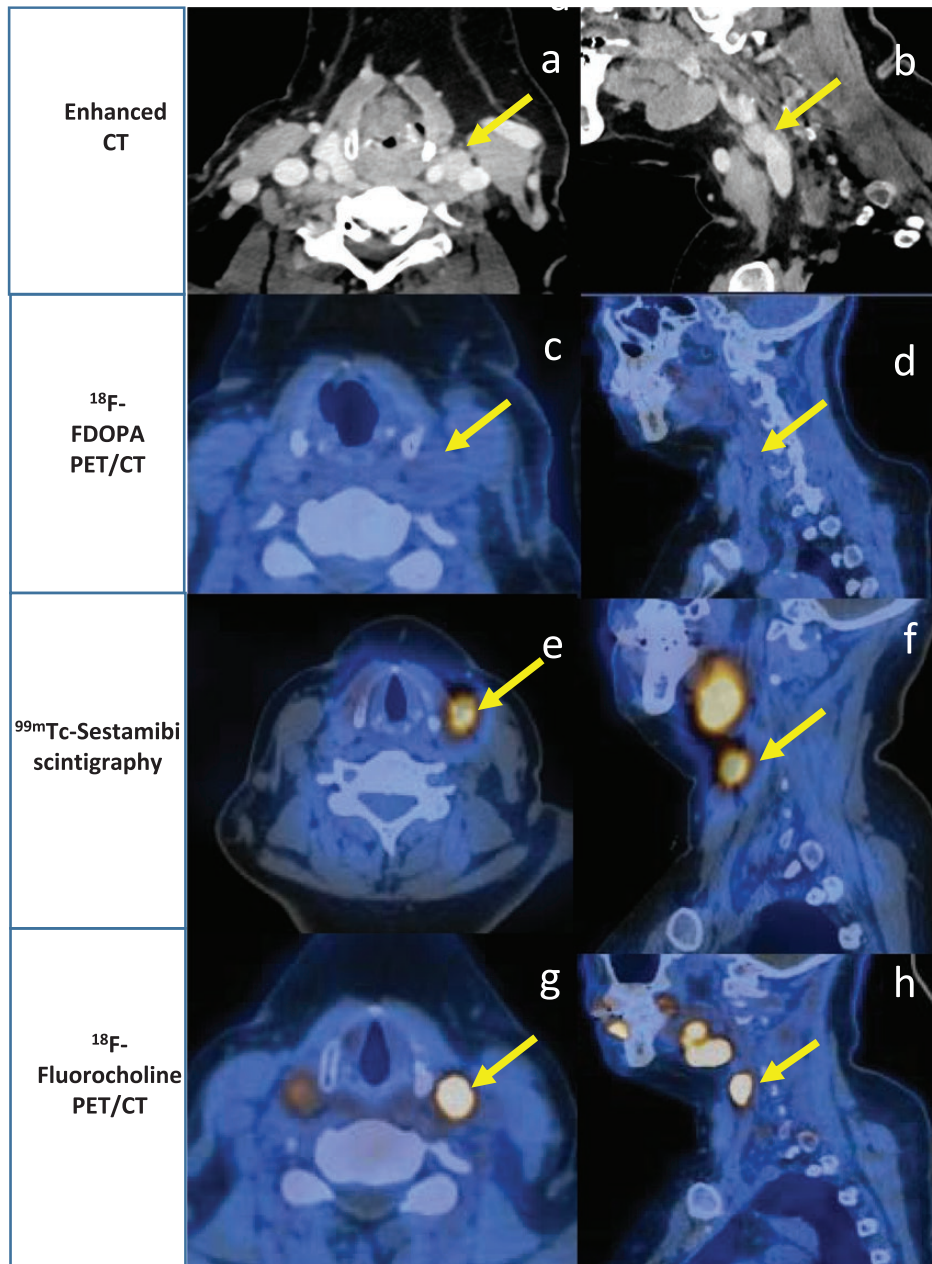
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A 56-year-old woman was investigated for a multinodular thyroid goiter. A neck ultrasound identified, in addition to the goiter, a highly vascularized hypoechoic solid lesion located between the carotid artery and the jugular vein (27 × 12 × 8 mm). A computed tomography (CT) scan confirmed a lesion medial to the carotid bifurcation with high postcontrast enhancement (Fig. 1A, 1B). A fine needle aspiration cytology showed clusters of cells with round to spindle nuclei and fine granular chromatin in a hemorrhagic background. These cytological characteristics suggest an epithelial tumor with neuroendocrine features, evocating a carotid body paraganglioma. Hormonal evaluation showed normal urine catecholamines level and <sup>18</sup>F-dihydroxyphenylalanine (<sup>18</sup>F-FDOPA) positron emission tomography (PET)/CT showed no significant uptake by carotid body lesion (Fig. 1C, 1D). Additional diagnostic workup revealed primary hyperparathyroidism with mild hypercalcemia at 2.70 mmol/L (normal 2.25–2.6), high ionized serum calcium at 1.44 mmol/L (normal 1.17–1.30), 24-hour hypercalciuria at 8.5 mmol/24 h and increased parathyroid hormone concentration at 7.03 pmol/L (normal 0.48–4.20). The

hyperparathyroidism was asymptomatic and patient had no kidney stones at renal echography or osteoporosis at bone densitometry. <sup>99m</sup>Tc-sestamibi scintigraphy showed high uptake by carotid body lesion (Fig. 1E, 1F), confirmed on <sup>18</sup>F-fluorocholine PET/CT (maximum standardized uptake value at 15) (Fig. 1G, 1H), suggesting a parathyroid origin. Following the recent guidelines of the American Association of Endocrine Surgeons, hypercalciuria led us to perform parathyroidectomy [1]. The carotid body lesion was resected and pathological analysis confirmed a parathyroid adenoma.

Ectopic parathyroid adenoma is exceptionally considered in the differential diagnosis of masses arising from the carotid body [2, 3]. This case illustrates the need for a systematic parathyroid hormone evaluation in front of any cervical lesion, to reserve fine needle aspiration cytology only in the presence of a tumor that remains undetermined. Carotid body tumors represent about 65% of head-and-neck paragangliomas and show high avidity for <sup>18</sup>F-FDOPA or gallium 68-labelled-somatostatin receptor analogues on PET/CT [4]. An ectopic parathyroid adenoma may mimic a carotid body tumor. <sup>18</sup>F-fluorocholine PET/CT had a high diagnostic accuracy in



**Figure 1.** Radiologic and nuclear medicine imaging of the ectopic parathyroid adenoma. (A) Axial, (B) sagittal enhanced CT scan showing a 27 × 12 × 8 mm lesion located between the carotid artery and the jugular vein. (C) Axial, (D) sagittal  $^{18}\text{F}$ -FDOPA PET/CT showing no uptake in the carotid body lesion. (E) Axial, (F) sagittal  $^{99\text{m}}\text{Tc}$ -sestamibi scintigraphy showing uptake in the carotid body lesion. (G) Axial, (H) sagittal  $^{18}\text{F}$ -fluorocholine PET/CT showing high uptake (maximum standardized uptake value at 15) in the carotid body lesion. CT, computed tomography; PET, positron emission tomography.

detection of ectopic parathyroid adenoma [5]. High uptake on  $^{18}\text{F}$ -fluorocholine PET/CT contrasting with no uptake on  $^{18}\text{F}$ -FDOPA PET/CT suggested the diagnosis of parathyroid adenoma, confirmed at pathological analysis.

### Additional Information

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**Data Availability:** All data generated or analyzed during this study are included in this published article or in the data repositories listed in References.

### References and Notes

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