

Short article

False positive ⁶⁸Ga-DOTA-NOC: role for endoscopic ultrasound assessment



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ABSTRACT

We present two patients with a clinically suspected neuroendocrine tumor who underwent ⁶⁸Ga-DOTA-NOC PET/CT where a high tracer uptake in the uncinate process was observed. Repeated endoscopic ultrasound was negative for a neuroendocrine tumor. ⁶⁸Ga-DOTA peptide techniques have emerged as more sensitive and specific tests than Octreoscan[®]. Nevertheless, physiological uptake of the uncinate process remains a “false” positive source and should be considered when managing patients with clinically suspected neuroendocrine tumors. Endoscopic ultrasound is a useful technique in this setting given its high diagnostic accuracy for pancreatic nodules as small as 2 mm.

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Falsos positivos em estudos ⁶⁸Ga-DOTA-NOC: papel da ecoendoscopia

RESUMO

Os autores apresentam 2 doentes com suspeita clínica de tumor neuroendócrino. No decurso da investigação realizaram PET/TC com ⁶⁸Ga-DOTA-NOC que revelou captação aumentada no processo uncinado. Ecoendoscopias seriadas não identificaram qualquer lesão pancreática. As técnicas de medicina nuclear com utilização de péptidos ⁶⁸Ga-DOTA têm emergido como exames mais sensíveis e específicos que o tradicional Octreoscan[®]. Contudo, a hiper captação fisiológica do processo uncinado mantém-se uma fonte de “falsos” positivos que deve ser considerada na abordagem de doentes com suspeita clínica de tumor neuroendócrino. A ecoendoscopia é uma técnica útil neste contexto dada a elevada acuidade no diagnóstico de nódulos pancreáticos, permitindo observar lesões a partir de 2 mm.

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Palavras-chave:

Tumor neuroendócrino pancreático

⁶⁸GaDOTA-NOC PET/CT

Ecoendoscopia

We present two patients with a clinically suspected neuroendocrine tumor (NET) who underwent ⁶⁸Ga-DOTA-NOC and endoscopic ultrasound (EUS).

The first case refers to a 49-year-old woman who presented with Cushingoid features for two years, namely easy bruising, proximal myopathy, hyperpigmentation, new-onset hypertension, weight gain, depression and emotional lability. Laboratory

evaluation revealed ACTH dependent hypercortisolism (urinary free cortisol 227 µg/24 h – R 20–90; ACTH 91.1 – R <50 pg/mL). CRH test, high dexamethasone suppression test and CRH stimulated bilateral inferior petrosal sinus sampling supported an ectopic source of ACTH. Brain MRI revealed a normal pituitary gland. Metyrapone (up to 1.75 g/day) and ketoconazole (up to 800 mg/day) were started, but 9 months later the patient was submitted to a bilateral adrenalectomy due to intolerance to medical therapy and worsening of medical comorbidities. In the diagnostic workup a ⁶⁸Ga-DOTA-NOC PET/CT was performed and revealed a high tracer uptake (maximum SUV (standardized uptake value)

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Fig. 1. ^{68}Ga -DOTA-NOC PET/CT: (a) PET positive uptake in the uncinate process, maximum SUV 17.35; (b) anatomical location in CT scan; (c) composed PET/CT image.

17.35) in the uncinate process (Fig. 1a–c). The EUS examination (UCT 10–140 AL5; Olympus) only depicted a 6 mm well-defined cyst in the pancreatic head (Fig. 2). Despite the benign characteristics of the cyst a fine needle aspiration was taken with a 25G needle to rule out an atypical NET. Cell block cytology was consistent with a simple cyst. The patient repeated EUS one year later and aside from the pancreatic cyst no other abnormalities were seen. Five years post-adrenalectomy a pituitary macroadenoma was depicted on brain MRI. Transsphenoidal surgery was performed and pathologic examination revealed an ACTH-staining tumor. Serum ACTH dramatically decreased after surgery (31 pg/mL).

In the second case a 38-year-old man presented with aqueous chronic diarrhea, arthralgia and episodic palpitations for 1 year. Clinical suspicious of a NET led to biochemical work-up and functional imaging (Octreoscan[®]). Levels of 24 h urinary 5-HIAA, serum chromogranin A and neuron-specific enolase were normal. Octreoscan[®] revealed a moderate-high tracer uptake in the upper abdomen. Subsequently, a ^{68}Ga -DOTA-NOC PET/CT showed a high uptake (maximum SUV 21.7) in the uncinate process. The

patient underwent two EUS examinations, requested by the attending physician 8 months apart, and no pancreatic abnormality was identified. On follow-up the patient was diagnosed with an anxiety disorder and the symptoms improved after commencing psychiatric therapy.

NETs are rare and heterogeneous tumors that arise most frequently in the gastrointestinal tract and bronchopulmonary system. Evaluation of NET of unknown origin includes a thorough family history, tumor markers, chest, abdomen and pelvis CT or MRI and nuclear imaging techniques.¹ Currently, ^{68}Ga -DOTA peptides techniques are replacing Octreoscan[®] as the standard nuclear imaging technique to assess NET.² Pancreatic head uptake of ^{68}Ga -DOTA peptides is common in PET/CT. Although most patients present low uptake in the pancreatic head, a high focal uptake in the uncinate process, mimicking a malignant tumor, can be physiological, with maximum reported SUV up to 28.7.^{3,4}

The presented cases stress the importance of carefully interpreting nuclear imaging positive findings in the uncinate pancreatic process where, even with a more sensible and specific method such as ^{68}Ga -DOTA-NOC PET/CT, physiological high uptake can occur and is responsible for “false” positive results. Also, after a positive nuclear imaging test, EUS is a reliable technique to diagnose or rule out a pancreatic NET given its high diagnostic accuracy even for pancreatic lesions as small as 2–3 mm.⁵

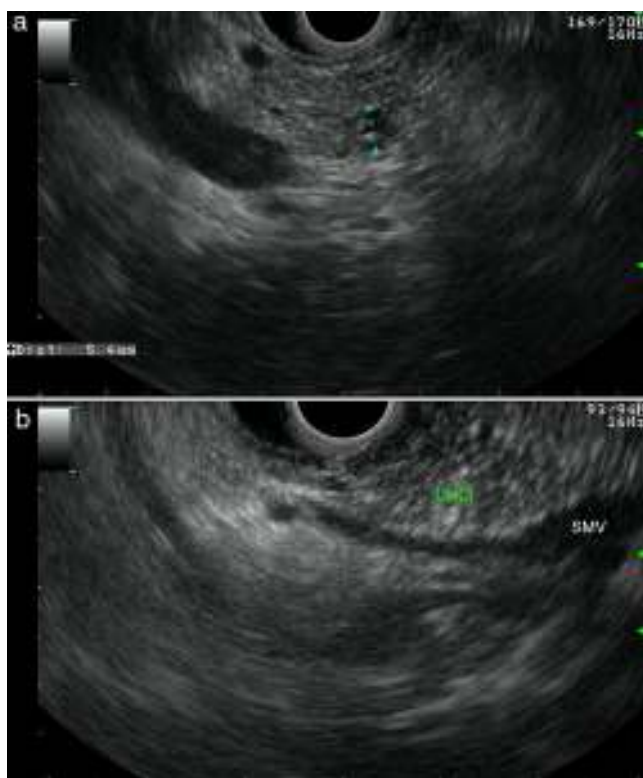


Fig. 2. Linear endoscopic ultrasound: (a) 6 mm pancreatic head cyst; (b) normal uncinate process (UNC) underlined by the superior mesenteric vein (SMV) as seen through D2.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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Conflicts of interest

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