

## Ectopic Parathyroid Adenoma Mimicking as a Neuroendocrine Tumor on Ga68- DOTANOC Positron Emission Tomography/Computed Tomography Imaging

### Abstract

Parathyroid adenoma sometimes present in ectopic location and may pose a difficulty in both diagnosis and localization. We report a case of a young lady suspected to have neuroendocrine tumor of the mediastinum demonstrating synaptophysin positivity on an initial core needle biopsy. Ga-68 DOTANOC positron emission tomography-computed tomography revealed a somatostatin receptor-expressing lesion in the anterior mediastinum with tracer avid multiple lytic bone lesions. On further biochemical and imaging workup with Tc-99 m SESTAMIBI, a diagnosis of ectopic parathyroid adenoma was made which was further confirmed with surgical excision.

**Keywords:** Ectopic parathyroid adenoma, Ga-68 DOTANOC positron emission tomography/computed tomography, neuroendocrine tumor, Tc-99 m SESTAMIBI

A 43-year-old hypertensive woman presented with history of breathlessness. Initial chest X-ray examination showed mediastinal widening. Noncontrast computed tomography (CT) of the chest showed an anterior mediastinal lesion with extension to the hilar region of the right lung. A core needle biopsy was obtained, and immunohistochemistry (IHC) showed synaptophysin positivity, suggesting a grade I neuroendocrine tumor. Subsequently, a Ga-68 DOTANOC positron emission tomography/CT (PET/CT) was performed for staging the disease, which showed increased tracer uptake in the mediastinal region (Maximum Intensity Projection (MIP) image; [Figure 1a] Trans-axial contrast-enhanced CT [Figure 1b] and fused PET/CT [Figure 1c] images showed a heterogeneously enhancing mass (~5.8 cmx 5.6 cm, with few areas of necrosis) in the anterior mediastinum and extending to the right parahilar region with a SUVmax 9.6. A few tracer avid lytic lesions were also noted in the bilateral iliac bones [Figure 1d and e, SUVmax 6.2] and scapula (SUVmax 4.6).

The patient was planned for surgical excision of the mass lesion and on preoperative workup, her biochemical investigations demonstrated hypercalcemia (Serum calcium

17.6 mg/dl). Further biochemical evaluation revealed elevated serum parathormone levels (PTH – 1295 pg/ml). A Tc-99 m SESTAMIBI scan was planned to detect the presence of any parathyroid adenoma. Dual time point Tc-99 m SESTAMIBI scan ([Figure 2a]-early image at 10 min postinjection [p. i.] and [Figure 2b] – delayed image 2 h p. i.) revealed the presence of a tracer avid mass lesion (white arrow) in the mediastinum, corresponding to the site of the lesion visualized on Ga-68 DOTANOC PET/CT. She underwent surgical excision of the anterior mediastinal mass. Postoperative histopathology findings confirmed a diagnosis of an ectopic parathyroid adenoma. Her serum PTH levels 1 week after surgery significantly reduced to 82 pg/ml. Ectopic parathyroid adenomas account for about 4%–10% of the pathology in patients with hyperparathyroidism.<sup>[1]</sup> They can be present anywhere from the base of the tongue to the mediastinum.<sup>[2]</sup> USG, 4D CT, and Tc-99 m Sestamibi scan are the first line investigations used to evaluate parathyroid adenomas.<sup>[3]</sup> Tc-99 m SESTAMIBI localizes to parathyroid adenomas because of the presence of high mitochondrial content in oxyphil cells.<sup>[4]</sup> The parathyroid adenomas are known to express Somatostatin Receptors (SSTRs)<sup>[5]</sup> and may also show positivity with synaptophysin on IHC,

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**How to cite this article:** Subramanian K, Krishnaraju VS, Kumar R, Bhadada S, Mittal BR. Ectopic parathyroid adenoma mimicking as a neuroendocrine tumor on Ga68- DOTANOC positron emission tomography/computed tomography imaging. Indian J Nucl Med 2021;36:447-8.

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Received: 06-05-2021  
Revised: 18-06-2021  
Accepted: 22-06-2021  
Published: 15-12-2021

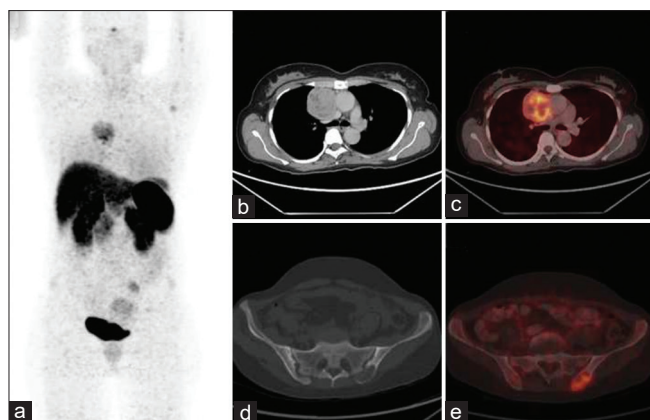
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Website: www.ijnm.in

DOI: 10.4103/ijnm.ijnm\_59\_21

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**Figure 1:** Maximum intensity projection image (a) of Ga-68 DOTANOC PET/CT demonstrate tracer uptake in the mediastinal region which on trans-axial contrast enhanced CT (b) and fused PET/CT (c) images localised to anterior mediastinal mass. Axial CT (d) and fused PET (e) demonstrated tracer avid lytic lesion in the iliac bone.

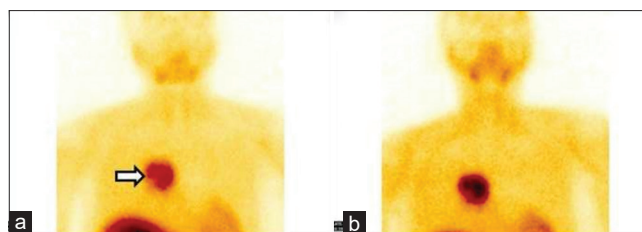
leading to a misinterpretation as a tumor of neuroendocrine origin.<sup>[6]</sup> Ga68-DOTANOC PET/CT has previously demonstrated detection of parathyroid adenomas at their native location due to the expression of SSTRs.<sup>[7]</sup> The present case highlights that parathyroid adenomas at the ectopic location may pose a diagnostic challenge because of the resemblance with neuroendocrine tumors with such SSTR targeted imaging agents.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.



**Figure 2:** Tc-99m SESTAMIBI scan early image at 10 minutes (a) and delayed image at 2 hrs (b) revealed tracer avidity in the mediastinal mass lesion (white arrow).

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