

## Ga-68 DOTATATE Positron Emission Tomography/Computed Tomography in a Rare Case of Esthesioneuroblastoma

### Abstract

We describe the Ga-68 DOTATATE positron emission tomography/computed tomography (PET/CT) findings of a 51-year-old man, operated for right esthesioneuroblastoma. Postoperative Ga-68 DOTATATE PET/CT revealed focal uptake anterior to sphenoid ostium on the right paramedian side, suspicious for residual disease. Magnetic resonance imaging showed an enhancing lesion in posterosuperior nasal cavity on the right side extending into the right sphenoid sinus. He underwent re-surgery and adjuvant chemoradiotherapy. The histopathology revealed residual olfactory neuroblastoma. The follow-up Ga-68 DOTATATE PET/CT was negative. This case emphasizes the role of Ga-68 DOTATATE PET/CT in the management, especially in residual or recurrent disease and potential radiotheranostics for these rare tumors.

**Keywords:** *Esthesioneuroblastoma, Ga-68 DOTATATE positron emission tomography/computed tomography, olfactory neuroblastoma, somatostatin receptor imaging, tumor response*

A 51-year-old man presented with symptoms of nasal blockage and nasal discharge for 1 month. Computed tomography (CT) scan showed a 3.1 cm × 2.5 cm × 1.4 cm sized lesion in the posterior nasal cavity on the right side with extension into sphenoid on the right side with no intracranial extension. He underwent endoscopic excision and was diagnosed to have olfactory neuroblastoma (Hyam's Grade 2). Olfactory neuroblastoma or esthesioneuroblastoma is a rare malignant neoplasm of the nasal cavity and of the paranasal sinus. In treating patients with advanced olfactory neuroblastoma, the combination of craniofacial resection with radiotherapy and/or chemotherapy has significantly improved the survival rate. However, locoregional recurrence and distant metastasis frequently occur, irrespective of the aggressiveness of therapy.<sup>[1]</sup> Imaging plays a very important role in staging and management of olfactory neuroblastoma, and long-term follow-up is necessary because of the extended interval for recurrent disease.<sup>[2,3]</sup> The frequent expression of SSTR2A provides a rationale for radioreceptor diagnosis and therapy with SST analogs in esthesioneuroblastoma.<sup>[4]</sup> The patient

was referred for postoperative evaluation with Ga-68 DOTATATE positron emission tomography (PET)/CT. It [Figure 1a-c] revealed focal uptake just anterior to sphenoid ostium on the right paramedian side, maximum standard uptake value 8.40 with no obvious morphologic lesion, suspicious of residual disease. Magnetic resonance imaging [Figure 2a-c] showed an irregular lesion epicenter at posterosuperior nasal cavity extending to the right sphenoid sinus, which appeared hyperintense on fluid-attenuated inversion recovery and T2 and showed enhancement on postcontrast T1 sequences. He underwent revision nasal endoscopic surgery. Postoperative histopathology [Figure 2d] report was suggestive of olfactory neuroblastoma Grade II. He received adjuvant radiotherapy to face and upper neck with concurrent carboplatin. Follow up Ga-68 DOTATATE PET/CT [Figure 1d-f] after 3 months did not show any abnormal tracer uptake suggestive of resolution of disease. This case emphasizes the role of Ga-68 DOTATATE PET/CT in the management of this rare tumor, especially in residual or recurrent disease where the morphology may have been disturbed due to prior surgery or radiation therapy. Ga-68 DOTATATE PET/CT might be especially useful in regions

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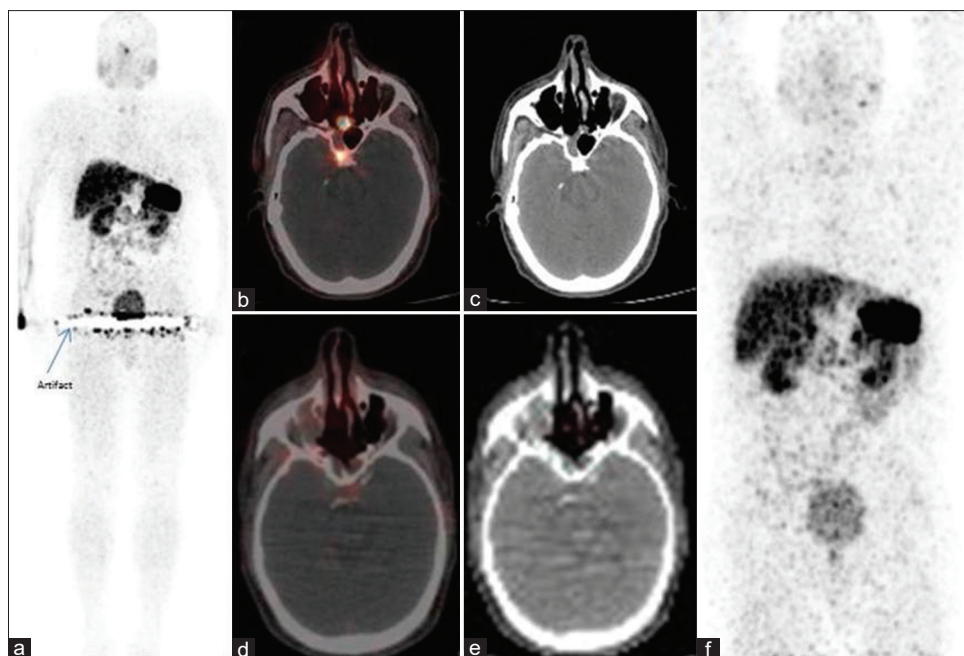


Figure 1: Ga 68 DOTATATE positron emission tomography/computed tomography maximum intensity projection image (a) and fused axial image (b) and computed tomography (c) images showing focal radiotracer uptake just anterior to sphenoid ostium on the right paramedian side, maximum standard uptake value 8.40 with no obvious morphologic lesion suspicious of residual disease. Postsurgery and adjuvant radiotherapy Maximum intensity projection image (f) and fused axial image (d) and computed tomography (e) images showing no abnormal tracer accumulation.

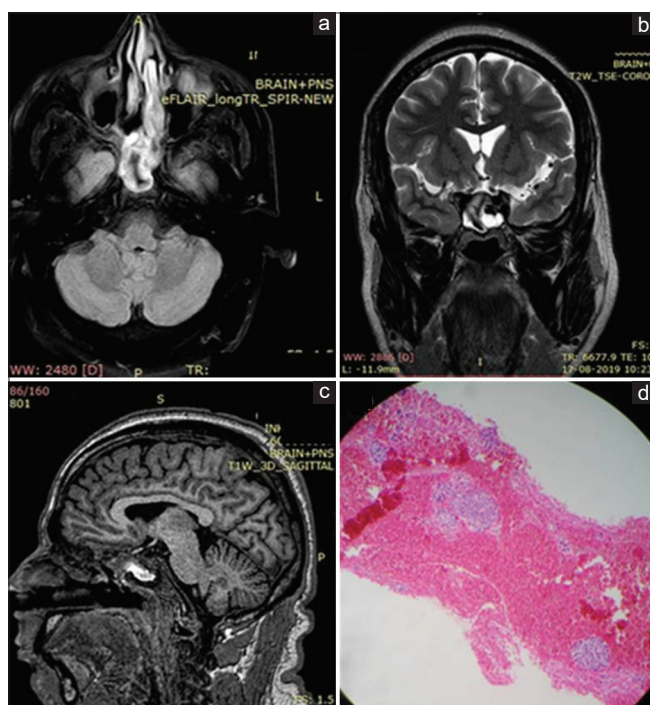


Figure 2: Magnetic resonance imaging showing irregular lesion epicenter at posterosuperior nasal cavity extending into right sphenoid sinus which appears hyperintense on fluid-attenuated inversion recovery (a) and T2 (b) and showing enhancement on postcontrast T1 (c) sequences. Photomicrograph (d) showing small round blue cell tumor in a fibrillary background with occasional mitosis (H and E, x40). Features are suggestive of olfactory neuroblastoma Grade II

with difficult tumor visualization resulting from high background, such as brain tissue in 18F fluorodeoxyglucose PET/CT. Somatostatin receptor imaging in patients

with esthesioneuroblastoma may facilitate the potential application of radiotheranostic agents for the treatment of this aggressive subtype of tumors.<sup>[5]</sup>

There are very few reports describing Ga-68-DOTA-peptides PET/CT findings in esthesioneuroblastoma.<sup>[6]</sup> This eventually opens the avenues for theranostics using Lu-177 DOTATATE in patients with unresectable locally extensive or metastatic esthesioneuroblastoma which is beginning to be explored.<sup>[7]</sup>

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

#### References

1. Kondo N, Takahashi H, Nii Y, Nagao J. Olfactory neuroblastoma: 15 years of experience. *Anticancer Res* 2012;32:1697-703.
2. Dublin AB, Bobinski M. Imaging characteristics of olfactory neuroblastoma (esthesioneuroblastoma). *J Neurol Surg B Skull Base* 2016;77:1-5.

3. Loy AH, Reibel JF, Read PW, Thomas CY, Newman SA, Jane JA, *et al.* Esthesioneuroblastoma: Continued follow-up of a single institution's experience. *Arch Otolaryngol Head Neck Surg* 2006;132:134-8.
4. Czapiewski P, Kunc M, Gorczyński A, Haybaeck J, Okoń K, Reszec J, *et al.* Frequent expression of somatostatin receptor 2a in olfactory neuroblastomas: A new and distinctive feature. *Hum Pathol* 2018;79:144-50.
5. Dadgar H, Norouzbeigi N, Ahmadzadehfar H, Assadi M 68Ga-DOTATATE and 18F-FDG PET/CT for the management of esthesioneuroblastoma of the sphenoclival region. *Clin Nucl Med* 2020;45:e363-4.
6. Tripathy S, Kumar R, Kakkar A, Kumar R, Sharma P, Shamim SA, *et al.* Esthesioneuroblastoma on 68Ga DOTANOC PET/CT. *Clin Nucl Med* 2019;44:e486-8.
7. Sabongi JG, Gonçalves MC, Alves CD, Alves J, Scapulatempo-Neto C, Moriguchi SM, *et al.* Lutetium 177-DOTA-TATE therapy for esthesioneuroblastoma: A case report. *Exp Ther Med* 2016;12:3078-82.