Juvenile Nasal Angiofibroma on ^{68}Ga-DOTANOC PET/CT: Exploring Theranostic Avenues

Abstract

Somatostatin (SST) cell surface receptors (SSTRs) are expressed in many different malignant, benign, and neuroendocrine tumors. SSTRs are also expressed in the endothelium of human vessels during angiogenesis and not in the nonproliferating vessels. We present a case of 19-year-old boy with juvenile nasal angiofibroma (JNA), who underwent ^{68}Ga-DOTANOC PET/CT to explore SSTRs expression and theranostic potential. The scan revealed high uptake in the tumor, and in certain areas, the uptake was similar to that of the pituitary gland. Performance of DOTANOC PET/CT in JNA opens up new frontiers with respect to radiological staging, early recurrence identification, better delineation from postoperative scar tissue, possible preoperative treatment with SST analogs, and perhaps even radiopharmaceutical based-ligand therapy of inoperable/residual/recurrent JNAs in the future.

Keywords: *Angiofibroma, DOTANOC positron emission tomography computed tomography, juvenile nasopharyngeal angiofibroma*

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A 19-year-old boy with an extensive clinicoradiologically diagnosed juvenile nasal angiofibroma (JNA) underwent ^{68}Ga DOTANOC PET/CT scan to assess the somatostatin (SST) cell surface receptors (SSTRs) expression and to explore its theranostic potential. Only head-and-neck spot imaging was obtained to limit radiation exposure as the tumor is benign. The scan revealed heterogeneously increased tracer uptake in the soft tissue mass lesion, involving the right nasal cavity, the nasopharynx, and the ethmoid and sphenoid sinus (SUV_{max} 3.3). The lesion was extending into the right pterygopalatine and infratemporal fossa causing the characteristic anterior bowing of posterior wall of the maxilla ["Holman miller antral bowing sign," arrow in Figure 1d]. The uptake was intense in certain areas of the tumors, similar to the uptake of pituitary gland (SUV_{max} 3.6), concordant with the distribution of SSTRs. In addition, the intracranial extent of the tumor could be clearly demarcated as there was no uptake in the brain except for pituitary gland (axial, coronal, and sagittal PET [Figure 1a-c], CT [Figure 1d-f], and fused PET/CT images [Figure 1g-i], respectively). The patient underwent surgical excision and the histopathology confirmed JNA.

SST is a short peptide hormone with numerous autocrine, paracrine, and neurotransmitter regulatory functions.[1] SSTRs are expressed in many different malignant, benign, and neuroendocrine tumors. SSTRs are also expressed in the endothelium of human vessels during angiogenesis and not in the nonproliferating vessels.[2,3] Hence, SSTRs expression may be expected in juvenile nasopharyngeal angiofibroma (JNA), an uncommon locally aggressive benign fibrovascular neoplasm arising from the posterior part of the nasal cavity in adolescent males.[4,5] Gronkiewicz *et al*. described their findings in a group of 6 patients with juvenile nasal angiofibroma, in whom the ^{68}Ga-DOTATATE PET data were correlated with immunohistochemistry for SST receptors.[6] Performance of DOTANOC PET/CT in JNA opens up new frontiers with respect to radiological staging, early recurrence identification, better delineation from postoperative scar tissue, possible preoperative treatment with SST analogs, and perhaps even

How to cite this article: Sakthivel P, Thakar A, Prashanth A, Kumar R, Sharma SC, Kumar R. Juvenile nasal angiofibroma on ^{68}Ga-DOTANOC PET/CT: Exploring theranostic avenues. Indian J Nucl Med 2020;35:176-7.

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Received: 20-12-2019
Revised: 21-01-2020
Accepted: 31-01-2020
Published: 12-03-2020.

Access this article online

Website: www.ijnm.in

DOI: 10.4103/ijnm.IJNM_207_19

Quick Response Code:

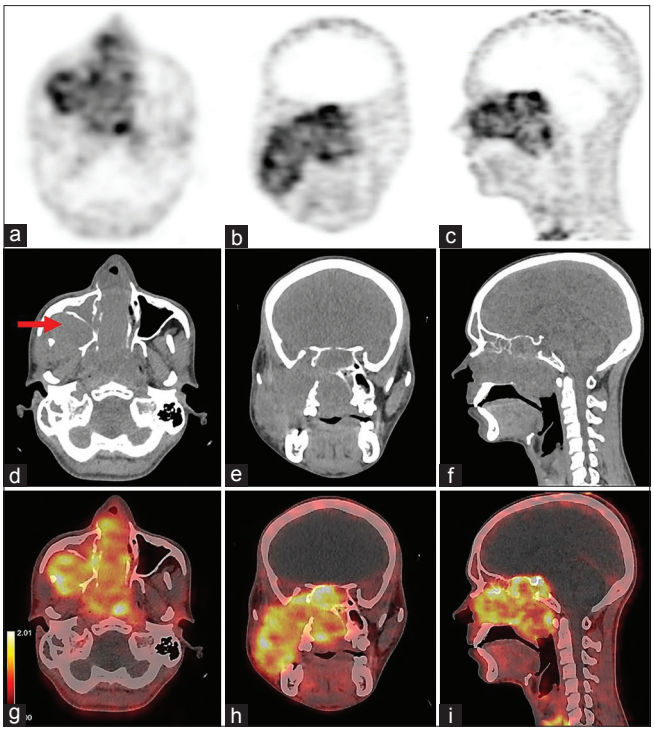

Figure 1: DOTANOC scan revealing heterogeneously increased tracer uptake in the tumor along with characteristic anterior bowing of posterior wall of the maxilla ("Holman miller antral bowing sign", arrow) (a). In addition, the intracranial extent of the tumor could be clearly demarcated as there was no uptake in the brain, except for pituitary gland – axial, coronal, and sagittal PET (a-c), CT (d-f), fused PET/CT images (g-i), respectively

peptide receptor-ligand therapy of inoperable/residual/recurrent JNAs in the future.

Informed consent

Informed consent was obtained from all individual participants included in the prospective clinical study (IECPG-432/27.06.2019), including the patient presented in this case report. A separate consent from the patient was obtained for publication of the case report.

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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