Primitive Neuroectodermal Tumor of Nasal Cavity on ^{18}F-Fluorodeoxyglucose Positron Emission Tomography-Computed Tomography

Abstract

Primitive neuroectodermal tumor is a malignant small round cell tumor of presumed neural crest origin, usually affecting the bony structures of the nasal cavity and its clinical and radiological features may be confused with those of infection and malignancy. I report a case with primitive neuroectodermal tumor of the nasal cavity showing increased tracer uptake on ^{18}F-fluorodeoxyglucose positron emission tomography-computed tomography mimicking an another primary malignancy in a 17-year-old boy.

Keywords: *Fluorodeoxyglucose, nasal cavity, neuroectodermal tumor, positron emission tomography-computed tomography*

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Introduction

Primitive neuroectodermal tumor is a malignant small round cell tumor of presumed neural crest origin, usually affecting the bony structures of the nasal cavity and its clinical and radiological features may be confused with those of infection and malignancy. I report a case with primitive neuroectodermal tumor of the nasal cavity showing increased tracer uptake on ^{18}F-fluorodeoxyglucose positron emission tomography-computed tomography mimicking an another primary malignancy in a 17-year-old boy.

Case Report

A 17-year-old boy was diagnosed for primitive neuroectodermal tumor (PNET) of the right nasal cavity. He had complaints of the right eyeball deviation and nasal obstruction of the right nasal area 2 weeks ago. A ^{18}F-fluorodeoxyglucose positron emission tomography-computed tomography (^{18}F-FDG PET/CT) [Figure 1a and b] for staging showed increased tracer uptake containing calcification and eccentric hypermetabolic foci arising from the right nasal cavity with extension into the right orbit with wall destruction (maximum standardized uptake value [SUVmax]: 7.3), which suggested an aggressive malignancy. The reformatted contrast-enhanced perineural spread CT [Figure 1c] and the coronal contrast-enhanced T2-weighted [Figure 1d and e] images revealed an about 3.2 cm × 2.6 cm × 3.3 cm sized T2 heterogeneously high, T1 intermediate signal intensity, heterogeneously enhancing mass with right nasal cavity and right medial orbital areas appeared to be a olfactory neuroblastoma, inverted papilloma, and meningioma. Since the imaging studies demonstrate the malignant nature of this lesion on FDG PET/CT imaging, an excisional biopsy of the lesion was performed. The histology showed proliferation of noncohesive cellular proliferation of atypical round cells with eccentric pleomorphic nuclei and large amount of dense eosinophilic or glassy cytoplasm. In addition, immunohistochemistry disclosed positive for vimentin and CD99 only, which suggested PNET.

Discussion

PNET is one of the tumors in Ewing's sarcoma family of tumors, which also includes Ewing's sarcoma. The common primary sites are chest wall, abdominal cavity, or pelvis, and affected age groups are adolescence and young adult. Patients with PNET typically present with localized pain or swelling of a few weeks or months duration.[1,2] Radiologically,

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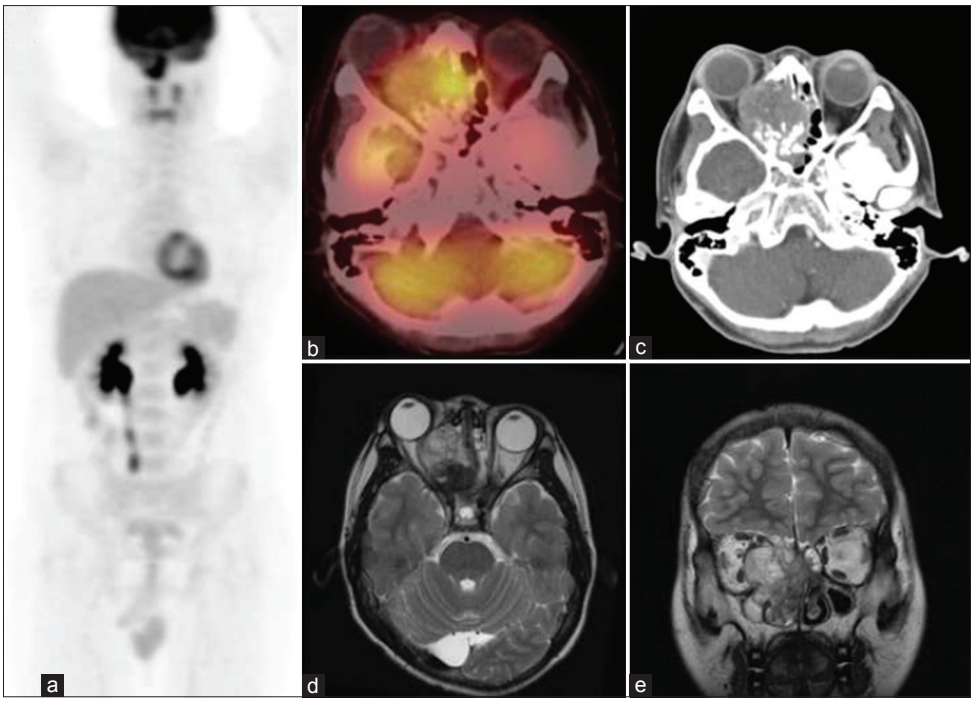

Figure 1: A ^{18}F-fluorodeoxyglucose positron emission tomography-computed tomography (a and b) for staging showed increased tracer uptake containing calcification and eccentric hypermetabolic foci arising from the right nasal cavity with extension into the right orbit with wall destruction (maximum standardized uptake value: 7.3), which suggested an aggressive malignancy. The reformatted contrast-enhanced perineural spread computed tomography (c) and the coronal contrast-enhanced T2-weighted (d and e) images revealed an about 3.2 cm × 2.6 cm × 3.3 cm sized T2 heterogeneously high, T1 intermediate intensity, heterogeneously enhancing mass with right nasal cavity and right medial orbital areas

aggressive destructive lesions that must be considered in the differential diagnosis, olfactory neuroblastoma, rhabdomyosarcoma, lymphoma, Ewing's sarcoma, small cell osteogenic sarcoma, and active inflammatory lesions.[3] Histologically, PNET is composed of tumors that were predominantly poorly differentiated or undifferentiated but usually showed areas of glial (astrocytic, ependymal, or rarely oligodendroglial), Homer-Wright rosette, and/or neuroblastic differentiation and its histological features may be confused with those of infection and variety of neoplasm. Local excision with chemotherapy or radiotherapy is the recommended treatment.[4]

^{18}F-FDG PET/CT experiences in imaging PNET at chest wall, upper extremity, stomach, and spinal cord were reported.[5-7]

I think that the heterogeneous FDG uptake on ^{18}F-FDG PET/CT can be a characteristic finding of PNET. This finding can be explained by aggressiveness and early spread pattern of tumor, heterogeneous composition of hemorrhage, necrosis, calcification, and/or solid portions in PNET.

In conclusion, I reported a case of rare PNET that could result in false-positive interpretation by exhibiting ^{18}F-FDG activity with a SUVmax similar to sarcoma, lymphoma, and/or neuroblastoma at pretreatment evaluation of nasal cavity malignancy. ^{18}F-FDG PET/CT could be a useful tool to evaluate an aggressiveness and/or heterogeneity of nasal cavity PNET and to early detection of regional or distant metastasis in initial staging.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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