18F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Findings of Osteoblastoma of Rib – A Rare Benign Tumor with Unusual Site and Uncommon Age

Abstract

Osteoblastoma accounts for approximately 1% of all primary bone tumors. We report F18-fluorodeoxyglucose positron emission tomography/computed tomography (F18-FDG PET/CT) findings of an osteoblastoma in the rib of a 20-month-old girl child, who had fever with pain in the right shoulder for 4 months. This lesion was initially judged as a malignant bone tumor but a biopsy revealed it to be an osteoblastoma. The age of patient and predominant site of disease involvement contributes to uniqueness of our case. In our case, F18-FDG PET/CT has facilitated biopsy planning and ruled out other sites of disease involvement.

Keywords: *Child, F18-fluorodeoxyglucose positron emission tomography/computed tomography, osteoblastoma, rib*

Shantanu S. Pande, Venkata Rama Mohan Gollamudi[1], Shashikant Patne, Mukta Ramadwar[2], Nilendu purandare[3]

Departments of Nuclear Medicine and Pathology, Homi Bhabha Cancer Hospital and Mahamana Pandit Madanmohan Malaviya Cancer Centre, BHU Campus, Varanasi, Uttar Pradesh, Departments of [1]Pediatric Oncology, [2]Pathology and [3]Radiology, Tata Memorial Hospital, Mumbai, Maharashtra, India

A 20-month-old girl child presented with a history of fever and pain in the right shoulder region for 4 months as narrated by the parents. No neurological deficits and no other relevant clinical findings were detected. After initial evaluation at another institution, the child was referred to our center. Axial T1 [Figure 1a] and T2 [Figure 1b] magnetic resonance images taken at our institution revealed an expansile lytic lesion in the right fourth rib posteriorly (arrow) with compression of the spine at this level. It appeared hypointense on the T1 and T2 images and showed heterogeneous postcontrast enhancement [Figure 1c]. The overall findings were suggestive of a malignant bony lesion (Ewing's sarcoma, osteosarcoma, or metastasis from a neuroblastoma). Rest of medical examination was noncontributory.

Whole body 18F-fluorodeoxyglucose positron emission tomography/noncontrast computed tomography (18F-FDG PET) was acquired for the initial evaluation. The maximum intensity projection image [Figure 2a] revealed a solitary FDG-avid lesion in thoracic region (arrow). The CT images [Figure 2, axial-b, coronal-c, sagittal-d and bone window-e] showed an expansile lytic lesion centered in the right fourth rib posteriorly, extending to pedicle, transverse process, and body of adjacent vertebra (arrow), measures 4.3 cm × 6.8 cm × 3.4 cm in (TV × AP × CC) dimensions. The lesion shows intraspinal and posterior mediastinum extension. The corresponding fused 18F-FDG PET/CT [Figure 2f] revealed a FDG-avid (SUVmax-5.98) rib lesion (arrow). Histopathological examination [Figure 2g] revealed foci of the osteoid rimmed by a single layer of osteoblasts. Proliferation of osteoblasts was observed with scattered multinucleate giant cells. On immunohistochemistry, cells were positive for SATB2 [Figure 2h] and negative for AE1/AE3 [Figure 2i]. The features of the lesion were consistent with osteoblastoma. Osteoblastoma is a rare benign tumor that accounts for 1% of all primary bone tumors[1] and generally occurs in adolescents and young adults, although age can range from 6 months to 75 years.[2] The most common sites are the vertebral column, long bone, followed by the feet, skull, and clavicle. The ribs are involved in <5% of patients.[3] Osteoblastomas can be locally aggressive; however, they do not metastasize. Several benign tumors and bony lesions can have

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Address for correspondence:
Dr. Shantanu S. Pande, Department of Nuclear Medicine, Homi Bhabha Cancer Hospital and Mahamana Pandit Madanmohan Malaviya Cancer Centre, Sundar Bagiya, BHU Campus, Varanasi - 221 005, Uttar Pradesh, India.
E-mail: quantnucmed@gmail.com

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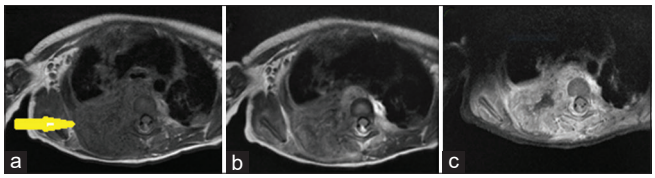

Figure 1: Magnetic resonance images of thorax of 20-month-old child are described. Axial T1 (a) and T2 (b) images revealed hypointense expansile lytic lesion in the right fourth rib (arrow) as described in text. It showed heterogeneous post-contrast enhancement (c)

marked FDG uptake, for example, fibrous dysplasia, giant cell tumor,[4,5] chondroblastomas, chondromyxoid fibromas, and nonossifying fibromas.[6-10] Cases of rib osteoblastomas have been reported on CT scans, but no case of an FDG-avid osteoblastoma centered on rib was found. FDG avid aggressive bony lesions should be interpreted cautiously and clinicopathological correlation is suggested before coming to conclusion. In our case, the lesion was inoperable and the child was planned for radiofrequency ablation.

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Conflicts of interest

There are no conflicts of interest.

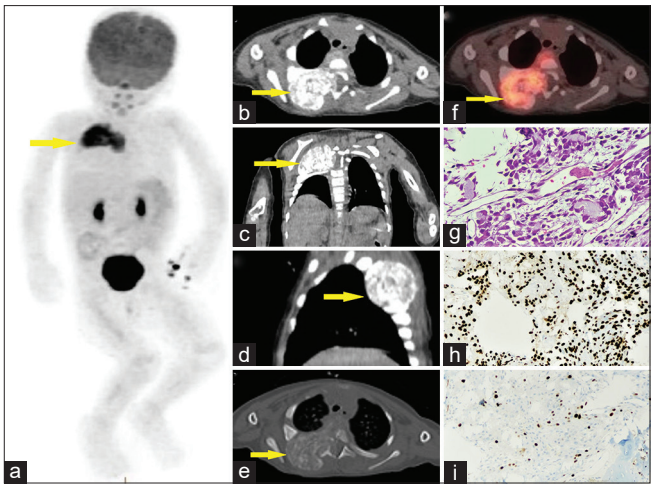

Figure 2: 18F-fluorodeoxyglucose positron emission tomography/noncontrast computed tomography, Histopathology and immunohistochemistry images of rib lesion are described. The maximum intensity projection image (a) revealed a solitary fluorodeoxyglucose-avid lesion in thoracic region (arrow). The computed tomography images (axial - b, coronal - c, sagittal - d and bone window - e) showed an expansile lytic lesion centered in the right fourth rib as described (arrow). The corresponding fused 18F-fluorodeoxyglucose positron emission tomography/computed tomography showed fluorodeoxyglucose avid rib lesion (f). Findings of histopathology (Figure - 2g) are described. On immunohistochemistry, On immunohistochemistry, cells were positive for SATB2 [Figure 2h] and negative for AE1/AE3 [Figure 2i]

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