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INTERESTING IMAGE

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^{68}Gallium-Arginine-Glycine-Aspartic Acid and ^{18}F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography in Chondroblastic Osteosarcoma of the Skull

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Abstract We report the case of a 32 year-old male with Chondroblastic Osteosarcoma of the skull, which was imaged with both ^{18}[F]fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) and ^{68}Gallium-arginine-glycine-aspartic acid (^{68}Ga-RGD) PET/CT. The ^{18}F-FDG PET/CT did not demonstrate the tumour, whereas the ^{68}Ga-RGD PET/CT clearly depicted a left-sided frontal tumour. ^{68}Ga-RGD PET/CT may be a clinically useful imaging modality for early detection of recurrent osteosarcoma, considering the limitations of ^{18}F-FDG PET in a setting of low glycolytic activity.

Keywords Chondroblastic Osteosarcoma · ^{18}F-FDG · ^{68}Ga-RGD · PET/CT

Abbreviations

PET/CT	Positron emission tomography/computed tomography
^{68}Ga-RGD	^{68}Gallium-arginine-glycine-aspartic acid
^{18}F-FDG	^{18}[F]fluorodeoxyglucose

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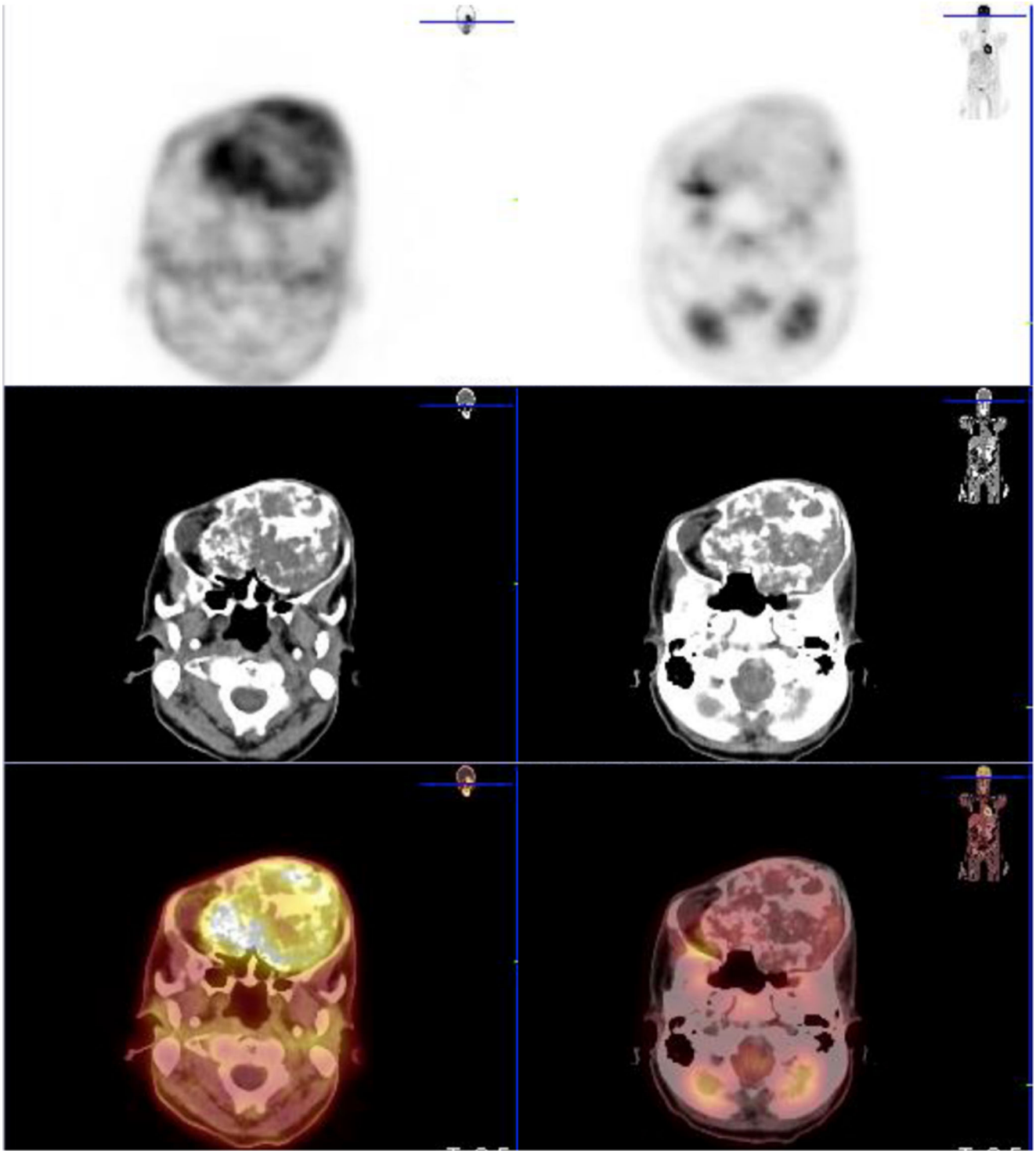

Fig. 1 This 32 year old male underwent both ^{18}F-FDG and ^{68}Ga-RGD PET/CT for suspected recurrence following complaints of new-onset bone pain. He had completed chemotherapy and radiotherapy following surgical excision of the left frontal bone tumour which confirmed Chondroblastic Osteosarcoma. ^{18}F-FDG images on the right demonstrate no uptake in the left sided skull lesion whereas ^{68}Ga-RGD images are discordant with ^{18}F-FDG findings. Noninvasive PET imaging of integrin αvβ3 with ^{68}Gallium-arginine-glycine-aspartic acid (^{68}Ga-RGD) has become an important tool for tumour diagnosis and treatment monitoring in both preclinical and clinical studies [1, 2]. Both, integrin αvβ3 expression and glucose metabolism were believed to correlate with tumour aggressiveness and progression despite their completely different pharmacodynamic mechanisms [3, 4]. Recently, other studies have demonstrated that ^{18}[F]fluorodeoxyglucose (^{18}F-FDG) uptake is independent of angiogenesis and that there is no correlation between ^{18}F-FDG uptake and angiogenesis [5, 6]. No studies have been done with ^{68}Ga-RGD for osteosarcoma or for Chondroblastic Osteosarcoma

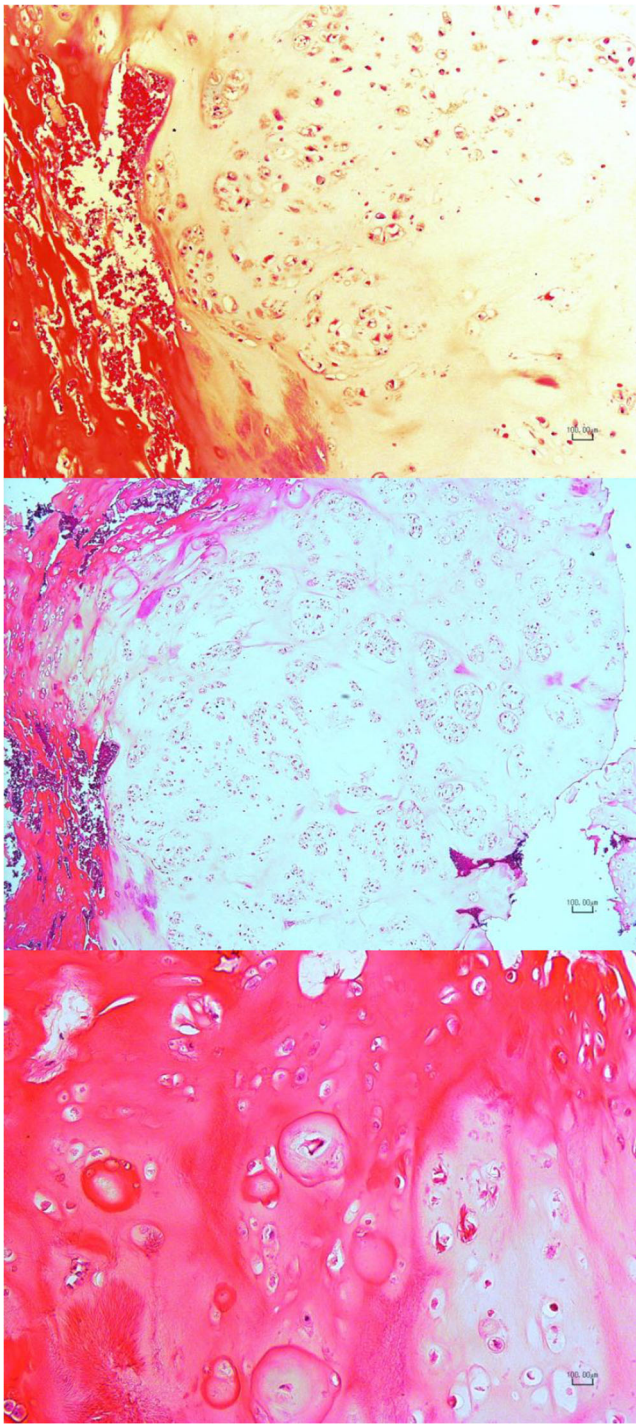

Fig. 2 Histology of the left frontal bone lesion demonstrated atypical chondroid areas with pleomorphic and atypical binucleate cells; large hyperchromatic nuclei are demonstrated. Although it has been established that ^{18}F-FDG PET has a very high sensitivity in detecting primary osteosarcoma lesions [5, 7, 8], it is not considered a diagnostic tool to prove the presence of osteosarcoma. Since no correlation between ^{18}F-FDG uptake and angiogenesis was found in this case, ^{68}Ga-RGD could be considered as an alternative diagnostic tool in osteosarcomas with low ^{18}F-FDG avidity

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Compliance with Ethical Standards

Conflict of Interest Akintunde Orunmuyi, Moshe Modiselle, Thabo Lengana, Thomas Ebenhan, Mariza Vorster, and Mike Sathekge, declare that they have no conflict of interest.

Ethical Statement This study was approved by the University of Pretoria's Research Ethics committee and has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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