Case Report

Recurrent giant cell tumor of foot detected by F18-FDG PET/CT

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ABSTRACT

Detection of recurrence of tumors with conventional imaging like computed tomography (CT) and magnetic resonance imaging (MRI) can be difficult because of distorted anatomy and implants *in situ*. Fluorine-18 fluorodeoxyglucose positron emission tomography/computed tomography (F-18 FDG PET/CT has been shown to be very useful in detection of recurrent tumors with higher accuracy than conventional imaging method. Giant cell tumors of foot though rare have high recurrence potential after initial curative treatment. However, currently there is no literature addressing the role of F-18 FDG PET/CT in evaluation of these tumors. We report a case of post excisional recurrent giant cell tumor of foot diagnosed on F-18 FDG PET/CT. In addition, to detection of recurrence F-18 FDG PET/CT also aided in accurate management of the patient.

Keywords: F-18 FDG, giant cell tumor, PET/CT, recurrence

INTRODUCTION

Giant cell tumors of foot are uncommon and have been reported to have an incidence of less than 4% of all the locations[1] and typically have a varied natural history ranging from entirely benign to highly malignant behavior with distant metastases.[2,3] Surgery offers the best chance of cure in patients with localized disease. However, after curative local treatment giant cell tumors (GCTs) of foot and have high incidence of recurrence ranging from 10 to 47%.[3,4] Detection of recurrence with conventional imaging like CT and magnetic resonance imaging (MRI) can be difficult because of distorted anatomy and implants *in situ* following surgery. Functional imaging has a definite role in detection of recurrence in such cases. Here, we report a case of recurrent GCT of foot detected on F18-FDG PET/CT.

CASE REPORT

A 48-year-old female patient diagnosed to have GCT of right foot was subjected to excision, curettage and arthrodesis of ankle joint. Six months post-surgery she presented with increasing pain in right foot and recurrence was suspected. MRI could not be carried out due to surgical implant *in situ*. Total body F-18 FDG PET/CT acquired 60 min after intravenous injection of 10.2 mCi of F18-FDG was performed for detection of recurrence. Diagnostic quality CT images were acquired as part of the study. It showed intense uptake of FDG in soft-tissues in right hind foot along the anterior and medial surface of the right ankle joint. FDG uptake was also seen to involve the inferior surface of talus, cuboid, lateral and intermediate cuneiform, navicular, talus and calcaneum bones of the foot [Figure 1]. However, exact soft-tissue delineation was not possible due to surgical implant *in situ* leading to artefacts on CT. Later patient underwent biopsy from the suspected area, which confirmed recurrence. Patient was subsequently subjected to below knee amputation due to involvement of talar bone. Histopathologically the amputated specimen showed giant cell tumor of intermediate grade with involvement of inferior surface of talus, cuboid, lateral and intermediate cuneiform bones, navicular, and calcaneum correlating exactly with the F18-FDG PET/CT findings.

DISCUSSION

Foot and ankle giant cell tumors have increased rate of local recurrence. Early and accurate detection of recurrence is important to decide upon accurate management. Conventional imaging modalities are known to be of limited utility in detecting recurrence due to distortion of anatomy post-surgery and

Access this article online

Quick Response Code:

Website: www.ijnm.in

DOI: 10.4103/0972-3919.115402

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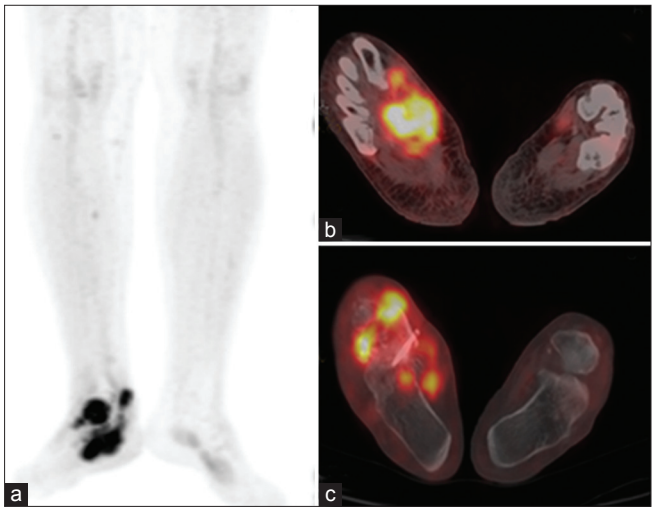

Figure 1: Fluorine-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (a) maximum intensity projection image of lower limbs showing intense tracer uptake in right hindfoot around the ankle joint. FDG uptake is seen to extend into the lower one third of the leg on medial side (b) transaxial images through the feet show intense FDG uptake in soft tissue mass in right foot (c) transaxial images showing intense FDG uptake in lower surface of talus

also by the presence of metallic implants in many tumors. Functional imaging modalities have a definite role in such situations. One study by Shimizu *et al.* highlighted the better performance of functional imaging with Gallium scintigraphy over anatomical imaging modalities in prediction of recurrence.[5] F-18 FDG uptake in GCTs has been described and GCTs are known to be highly F-18 FDG avid.[6] Few case reports have demonstrated the utility of FDG PET in evaluation of multi-centric GCTs.[7] However, to best of our knowledge there is no literature addressing the utility of F-18 FDG PET-CT in detection of recurrent GCTs of foot. Advantages of F-18 FDG PET over gallium scintigraphy include superior resolution and better images. Fusion with CT has always helped in improving the accuracy of interpretation of functional imaging in the foot.[8] Stand-alone CT might have limitations in accurately detecting the recurrence but in conjunction with F-18 FDG PET it definitely helps in accurate localization of uptake to specific bone, which may have implications in appropriate management. Detection of involvement of talus is important in case of foot as it favors an amputation against conservative approach limiting to excision of tumor.[5] In our case, involvement of talus was also noted and was one of the factor favoring amputation.

CONCLUSION

Giant cell tumors of foot though rare can recur early post-treatment. Combined anatomical and functional information obtained from CT and F-18 FDG PET in one investigation – FDG PET/CT aids in accurate detection of recurrence and thereby directing appropriate management of recurrent giant cell tumors. We also propose that F-18 FDG PET/CT can be used as primary modality in evaluating the patients with suspicion of recurrent GCT of foot.

REFERENCES

1. O'Keefe RJ, O'Donnell RJ, Temple HT, Scully SP, Mankin HJ. Giant cell tumor of bone in the foot and ankle. Foot Ankle Int 1995;16:617-23.
2. Biscaglia R, Bacchini P, Bertoni F. Giant cell tumor of the bones of the hand and foot. Cancer 2000;88:2022-32.
3. Kamath S, Jane M, Reid R. Giant cell tumor around the foot and ankle. Foot Ankle Surg 2006;12:99-102.
4. Yip KM, Leung PC, Kumta SM. Giant cell tumor of bone. Clin Orthop Relat Res 1996;323:60-4.
5. Shimizu T, Uehara T, Akahane T, Isobe K, Arai H. Recurrence potential of diffuse-type giant cell tumor in the foot: Radiologic and pathologic features. Foot Ankle Int 2005;26:474-8.
6. Strauss LG, Dimitrakopoulou-Strauss A, Koczan D, Bernd L, Haberkorn U, Ewerbeck V, *et al.* 18F-FDG kinetics and gene expression in giant cell tumors. J Nucl Med 2004;45:1528-35.
7. McKinney AM, Reichert P, Short J, Dhurairaj T, SantaCruz K, McKinney Z, *et al.* Metachronous, multicentric giant cell tumor of the sphenoid bone with histologic, CT, MR imaging, and positron-emission tomography/CT correlation. AJNR Am J Neuroradiol 2006;27:2199-201.
8. Mohan HK, Gnanasegaran G, Vijayanathan S, Fogelman I. SPECT/CT in imaging foot and ankle pathology-the demise of other coregistration techniques. Semin Nucl Med 2010;40:41-51.

How to cite this article: Manohar K, Mittal BR, Bhattacharya A, Sen R. Recurrent giant cell tumor of foot detected by F18-FDG PET/CT. Indian J Nucl Med 2012;27:262-3.

Source of Support: Nil. **Conflict of Interest:** None declared.