Clinical note

Fluorodeoxyglucose positron emission tomography/computed tomography (FDG PET/CT) for the detection of skeletal muscle and skin metastases in uterine leiomyosarcoma: A case report

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Abstract

We report the clinical value of FDG PET/CT imaging in a 57-year-old woman who was diagnosed with uterine leiomyosarcoma 6 years ago. In a staging procedure, whole body FDG PET/CT discloses the presence of both local recurrence and remote metastases at widespread muscularcutaneous sites, liver and femur. With its advantage of scanning the whole body in a single procedure, we propose the use of PET/CT imaging for the evaluation of patients with uterine leiomyosarcomas, a tumor with a propensity for widespread hematogenous spread to unusual sites.

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Tomografía por emisión de positrones con fluorodeoxiglucosa/tomografía computerizada (FDG PET/TC) para la detección de metástasis muscular-esqueléticas y cutáneas en el leiomiosarcoma uterino: informe de un caso

Resumen

Presentamos el valor clínico de la FDG PET/TC en una mujer de 57 años de edad diagnosticada de leiomiosarcoma uterino hace 6 años. En un estudio de estadificación, la FDG PET/TC descubrió la presencia tanto de recidiva local como de metástasis a distancia en localizaciones muscularcutáneas, hígado y fémur. Por la ventaja de obtener imágenes del cuerpo completo, proponemos el uso de la PET/TC en la evaluación de pacientes con leiomiosarcoma uterino, un tumor con tendencia a la diseminación hematogénea hacia localizaciones poco habituales.

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Introduction

Uterine leiomyosarcomas are rare tumors with a reported overall prevalence of 0.30–0.64/100,000 and comprise 1% of all uterine malignancies and 25–36% of all uterine sarcomas. Despite treatment, local recurrences and distant metastases are common, leading to a 5-year survival of 50–70% in stage 1 and 0–20% in later stages of the disease. Hematogenous spread to various organs has previously been reported.1,4

Magnetic resonance imaging (MRI) is frequently used and sometimes combined with CT and bone scintigraphy to stage and follow up patients with uterine leiomyosarcomas.5 FDG PET has also been reported to be useful for the diagnosis and follow-up of this disease.6 Whole body imaging in a single session with FDG PET/CT may disclose metastases in unusual locations that fall outside of standard imaging planes with other imaging modalities.

Here we report a case with uterine leiomyosarcoma in whom FDG PET/CT was detected wide spread muscular and cutaneous metastases in association with liver and bone involvement.

Case report

A 57-year-old woman underwent hysterectomy followed by pelvic radiotherapy and chemotherapy for uterine leiomyosarcoma 6 years ago. Upon detection of multiple nodular masses at the scalp region, which were biopsy-proven to be leiomyosarcoma metastases, she received local radiotherapy 3 years ago. Two years later, multiple metastatic nodules were detected in both lungs and were treated with chemo and radiotherapy again. Finally, the patient was referred to our department for restaging by the use of PET-CT imaging.

FDG PET-CT disclosed pathologically increased FDG uptake at pelvic soft tissue, consistent with local recurrence (Fig. 1). Multiple cutaneous and subcutaneous lesions which were widely spread throughout the whole body but were mostly concentrated at the scalp and anterior abdominal wall appeared to be hypodense at CT images and had FDG uptake of varying intensities on PET imaging.
Fig. 1. PET/CT images of the pelvis and the femoral region. Note the increased FDG uptake at the pelvic soft tissue lesions on CT, consistent with pelvic local recurrence and also the increased FDG uptake at the left femur suggestive of bone metastasis.

(SUV max: 1.2–2.9). Increased pathological FDG uptake (SUV max: 5.3) was evident on multiple muscular lesions of varying sizes (the largest being 8 cm in diameter) at the axial skeleton and the extremities (Fig. 2). In addition, a hepatic lesion that looked hypodense on CT images and thus was consistent with metastasis, disclosed pathologically increased FDG uptake. On the other hand, there was no pathological FDG uptake on the multiple parenchymal nodules that was evident on CT images of the lungs, a finding regarded as response to therapy. Lastly, there was evidence of increased metabolic activity consistent with metastasis at the left femoral shaft (Fig. 1).

With the PET CT diagnoses of local recurrence, liver, bone and multiple cutaneous and muscular metastases, the patient received palliative radiotherapy for the cutaneous and muscular lesions that were large enough to cause symptoms. Chemotherapy was also started.

Fig. 2. Fusion PET/CT slices and MIP image disclosing multiple muscular and subcutaneous metastases with varying sizes and intensities of FDG uptake.
Discussion

Uterine leiomyosarcomas are tumors of myometrial smooth muscle origin. Hematogenous spread is common and recurrences appear at extrapelvic sites 80% of the time. Metastases may be seen even years after total hysterectomy. Lungs are the most frequent site of metastasis followed by the liver; brain, thyroid, heart, breast, bone, kidney and skeletal muscle metastases have also been reported.\(^1,4\) Prognosis is closely related with the level of spread; 5-year survival drops from 53% at stage I to 8% at stages II–IV.\(^7\) MRI is useful for staging by evaluating both the local regional lymph nodes and the degree of spread through the myometrium. Recently, the use of PET CT has been proposed for diagnosis, detection of recurrences and post-therapy surveillance in this disease.\(^8,9,10\) In a study that compared conventional methods (CT, MRI or ultrasonography) with PET/CT for the detection of recurrences, PET/CT was reported to be more sensitive (85.7% vs. 57.4%) and specific (100% vs. 87.5%).\(^8\) The utilization of PET or PET/CT at post therapy follow-up influenced the patient management in one-third of 36 patients with uterine leiomyosarcoma.\(^9\)

FDG PET/CT allows whole body imaging in one session and thus provides an opportunity to detect hematogenous metastases at unusual sites that fall outside the classical imaging areas of CT and MRI. In addition to evaluation of local recurrences, PET/CT gives information about the involvement of skin, skeletal muscle, brain, liver, intraabdominal organs and the skeletal system in a one-stage procedure, leading to precise staging and restaging and thus to appropriate therapy.

In this case report whole body imaging with FDG PET/CT lead to the detection of local recurrence in association with correct localization of both muscular and cutaneous lesions in a patient with uterine leiomyosarcoma and widespread cutaneous and muscular metastases. In addition, the technique allowed the detection of therapy response in previously treated lung metastases and the diagnosis of new metastatic foci in the liver and the femur, an unusual site that falls outside conventional scanning areas.

Metastases at cutaneous and muscular sites disclosed varying intensities of FDG uptake and it should be kept in mind that metastases of this kind may be associated with low levels of FDG uptake.

In conclusion, unexpected metastatic foci should be considered in the evaluation of a patient with uterine leiomyosarcoma, a disease with an aggressive clinical course due to its propensity for widespread hematogenous spread. With the potential of whole body imaging in a single session, we propose the use of PET/CT for the staging and follow-up of this disease.

References