Clinical note

Spinal epidural metastasis from Ewing’s sarcoma on PET/CT: A case report


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A B S T R A C T

Early diagnosis of metastatic spinal disease is important because functional outcome depends on neurological condition at the time of diagnosis. Epidural metastasis to the spine from Ewing’s sarcoma is very uncommon. Despite the fact that epidural involvement has been described in a few cases of primary extraskeletal Ewing’s sarcoma, it is considerably rare. Metastatic epidural involvement secondary to Ewing’s sarcoma is even rarer. With the rapid increase in the utilization and acceptance of PET/CT imaging in oncological practice, it is playing an ever-increasing role in detecting malignant spread to several unexpected sites. This report is, to the best of our knowledge, the first description of the PET/CT findings of this extremely rare entity.

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Métastasis epidural medular del sarcoma de Ewing por PET/TC: presentación de un caso

R E S U M E N

El diagnóstico precoz de la enfermedad metastásica vertebral es importante, porque la evolución clínica depende de la situación neurológica en el momento del diagnóstico. La metástasis epidural del sarcoma de Ewing en la médula espinal es poco común. A pesar de que se ha descrito en pocos casos de sarcoma de Ewing primario extraesquelético, la afectación epidural es extraordinariamente rara. Incluso es más rara la afectación metastásica epidural secundaria a sarcoma de Ewing. Con el rápido incremento en la utilización y la aceptación de la PET/TC en oncología, la técnica está desempeñando un papel creciente en la detección de metástasis en localizaciones anatómicas inesperadas. A la luz de nuestro conocimiento, este trabajo presenta la primera descripción de los hallazgos de la PET/TC en esta entidad clínica extremadamente rara.

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Introduction

Ewing’s sarcoma has a propensity to metastasize to the lung, bone and bone marrow. Epidural involvement is very uncommon. Here we report the rare case of an 8-year-old boy, who was diagnosed with epidural spinal metastasis from a skeletal primary, based on PET/CT studies.

Case report

An 8-year-old boy, who was a known case of Ewing’s sarcoma left femur, was referred for PET/CT (positron emission tomography/computed tomography) study after receiving multidrug chemotherapy consisting of vincristine, doxorubicin, cyclophosphamide, ifosfamide and etoposide for assessing response to treatment. However, there was deterioration of his symptoms over the ensuing five months. At the time of the study, the boy complained of pain in his left lower extremity, with progressive gait disturbance and low back pain. An 18F-FDG (fluoro-deoxyglucose) PET/CT study was performed 60 min after intravenous injection of 370 MBq 18F-FDG, subsequent to a 6-h fast with a whole body full ring PET/CT camera (Discovery STE16-GE, USA) which provided three-dimensional acquisition, processing and display of CT, PET and PET/CT images. The CT portion was performed according to a soft-tissue protocol, using an intravenous bolus of iohexol (Omnipaque 300; GE Healthcare) iodinated contrast 60 s before the CT acquisition on a 16-slice scanner. Finally, the acquisition of PET emission images was performed (2 min per bed position).

The CT data were used for attenuation correction of PET emission images, and for fusion with PET data for accurate localization of lesions. Non-attenuated data were reconstructed after scan acquisition had been completed. Reconstruction of attenuation corrected data was executed concurrently. All digital images were interpreted on a dedicated ADW workstation (Figs. 1–3).

There was evidence of a lytic-sclerotic lesion with permissive cortical destruction with accompanying periosteal reaction involving the neck and proximal part of left femoral shaft, and extending into the femoral epiphysis. This was associated with a moderately enhancing soft tissue mass, circumferentially encasing the proximal part of left femur up to the mid-shaft, with loss of tissue planes with the overlying muscles. The bony and soft tissue component of the mass showed heterogeneous uptake of the
Fig. 1. PET (MIP) image showing FDG avid mass left femur (thick arrow). Increased FDG uptake also noted at the level of D11 vertebra (thin arrow). Diffusely increased reactive uptake noted in the spleen (dotted arrow) and to a lesser extent in bone-marrow of multiple vertebrae. FDG avid metastatic lesions noted in bilateral lung fields. Coronal CT image in bone window shows a lytic-sclerotic lesion with permeative cortical destruction and associated periosteal reaction in proximal part of left femur. Axial CT image in soft tissue window shows a heterogeneously enhancing soft tissue lesion encasing the left femur.

Fig. 2. Sagittal CT image shows a moderately enhancing epidural lesion at D11 vertebra, indenting the thecal sac (arrow). Corresponding PET/CT fused image shows an intensely FDG avid focus at the above site (arrow). Remaining vertebrae show diffusely increased reactive bone marrow uptake.
Ewing’s sarcoma is a kind of undifferentiated reticulocytic sarcoma, which was first reported in 1921 by James Ewing. It represents the second most common primary bone malignancy in childhood and adolescence, with an estimated annual incidence of 0.6 per million population. It can occur anywhere in the body, but it is most commonly observed in the long bones of the arms and legs, the pelvis and in the chest. The predominant sites of metastasis include the lung (38%), bone (including the spine; 31%), and the bone marrow (11%). Metastasis of Ewing’s sarcoma to the central nervous system is relatively infrequent, and most of the previous reports have demonstrated involvement of the bony calvarium or brain parenchyma. Epidural metastasis from Ewing’s sarcoma is even more uncommon, and most of the lesions described, have been located in an intracranial, extradural location. Metastatic epidural involvement of the spine secondary to Ewing’s sarcoma is extremely rare.

The commonest malignancies involving the spinal epidural space are metastatic lymphomas, nerve sheath tumor, meningiomas, hemangiomas and metastases from systemic cancers.

There have been few reports of cases of primary extraskeletal Ewing’s sarcoma occurring in a paravertebral location, with a predilection to infiltrate through neural exit foramina. It differs in presentation from skeletal Ewing sarcoma in several respects.

The average age of occurrence is 20 years, in contrast to 10 years for skeletal Ewing sarcoma.

In the present case, the patient, an 8-year-old boy, was already under treatment for a histopathologically proven Ewing’s sarcoma at a skeletal site. The extraskeletal epidural involvement occurred secondarily. There are very limited reports in the existing literature about Ewing’s sarcoma metastasizing to the spinal epidural space.

The cases of Ewing’s sarcoma with epidural involvement (both primary and secondary) that have been described in the past have been diagnosed per-operatively or on MRI studies. With the rapid increase in the utilization and acceptance of PET/CT imaging in oncological practice, owing to its superb integration of metabolic with structural information, it is playing an ever-increasing role in detecting malignant spread to several unexpected sites. Currently, 18F-FDG is the most widely used radiopharmaceutical for oncological imaging. Among the available tools for bone imaging, PET/CT enables the acquisition of high quality skeletal images with 18F-sodium fluoride, owing to high bony uptake, rapid clearance from blood and dosimetry.

The present case, to the best of our knowledge, is the first description of a case of extradural spinal metastases from Ewing’s sarcoma of the bone, which was picked up on the basis of a PET/CT scan.

