

Rare Spinal Cord Metastases in a Patient with Medulloblastoma Detected on FDG-PET/CT Imaging

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Abstract

FDG PET/CT as a molecular imaging modality detected spinal cord metastases in a patient with medulloblastoma. Increased FDG uptake was reported as negatively correlated with survival in medulloblastoma in the literature. Although, spinal cord metastases associated with medulloblastoma detected with FDG-PET/CT imaging is a rare condition. To the best of our knowledge, this is the first report on spinal cord metastases from medulloblastoma detected by PET/CT.

Keywords: PET/CT; Medulloblastoma; Spinal cord metastases

Introduction

Medulloblastoma is a highly malignant primary brain tumor that originates on the floor of the skull, in the cerebellum or posterior fossa. Another term for medulloblastoma is infratentorial primitive neuroectodermal tumor (PNET). Medulloblastoma is the most common PNET originating in the brain [1]. All PNET tumors of the brain are invasive and rapidly growing tumors. The PNET tumors of the brain commonly spread through the cerebrospinal fluid (CSF) and frequently metastasize to different locations in the brain and spine. Hereby, we report spinal cord metastases detected on F-18 FDG PET/CT images in a 30-years-old patient with medulloblastoma.

Case Report

A 30 years-old woman with an operation history for cerebellar mass 3 years ago was admitted to our department for restaging with F-18 FDG PET/CT. She had a diagnosis of medulloblastoma on pathology report. She received adjuvant chemotherapy and radiotherapy after first operation and also received chemotherapy and radiotherapy for recurrence 1 year ago. Furthermore, she had a right ventriculoperitoneal shunt operation for hydrocephalus. Vertebral MR imaging was carried out for restaging because of complaints such as numbness in hands and feet, power loss in the feet and inability to walk on clinical follow-up. Spinal cord expansion and increased intensity extending from middle thoracic to lower thoracic regions was determined on MR imaging (Figure 1). In contrast-enhanced images no significant pathological finding was observed. Spinal cord expansion compatible with intramedullary mass was observed in C2-C5 level. She was admitted to Nuclear Medicine Department for restaging with F-18 FDG PET/CT. PET-CT imaging was performed one hour later after the injection of 370 MBq FDG administration. PET/CT images demonstrated diffuse increased FDG uptake (SUVmax: 9.12-10.66) in spinal cord at level C2-C5 and level T5-L2 (SUVmax: 9.41-13.29). Additionally, small focal FDG uptake was

detected in lumbar levels (SUVmax: 3.76-5.47). No additional finding was detected in other areas on whole-body images (Figure 2). The patient received 6 cycles cisplatin-etoposide chemotherapy. After PET-CT imaging, she received radiotherapy.

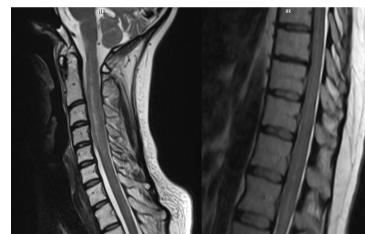


Figure 1: T1A ve T2A sagittal images (with contrast) demonstrate spinal cord expansion and increased intensity. Spinal cord expansion and increased intensity extending from middle thoracic to lower thoracic regions was determined on MR imaging.

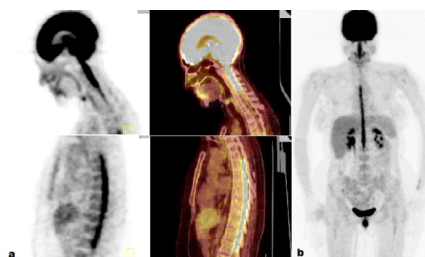


Figure 2: a-PET and PET/CT fusion images. b-PET/CT MIP imaging. PET/CT images demonstrated diffuse increased FDG uptake (SUVmax: 9.12-10.66) in spinal cord at level C2-C5 and level T5-L2 (SUVmax: 9.41-13.29).

Discussion

FDG PET/CT as a molecular imaging modality detected spinal cord metastases in a patient with medulloblastoma. The absence of additional pathological focus on other parts of the body was very useful for therapy planning for the clinician. The cumulative relative survival rate for all age groups and histology follow-up was 60%, 52%, and 47% at 5 years, 10 years, and 20 years, respectively, with children doing better than adults [2]. Increased FDG uptake was reported as negatively correlated with survival in medulloblastoma in the literature. In a study by Gururangan et al. evaluating the [(18)F] fluorodeoxyglucose (FDG) accumulation during positron emission tomography (PET) in patients with medulloblastoma and examining the relationship of intensity of uptake with patient outcome after the initial scan, the authors found significant negative correlation between increased FDG uptake and survival [3]. Demonstration of diffuse leptomeningeal metastasis in a treated case of medulloblastoma and detection of bone marrow metastasis in cerebellar medulloblastoma with FDG-PET were both reported in the literature [4,5]. Although, spinal cord metastases associated with medulloblastoma detected with FDG-PET/CT imaging is a rare condition. To the best of our knowledge, this is the first report on spinal cord metastases from medulloblastoma detected by PET/CT.

Medulloblastoma is one of the most common primary central nervous system malignancies especially in children. However, leptomeningeal dissemination have been associated with medulloblastoma, intramedullary metastases are very rare. Intramedullary metastases are best detected with contrast-enhanced axial sequences on MR imaging.

Medulloblastoma frequently spreads to involve the spinal cord, which significantly reduces patient survival. Staging is usually achieved by MRI of the spine and/or cytology of cerebrospinal fluid (CSF). In a study by Harrison et al. the authors found 100% correlation between MRI and CSF cytology for samples taken by lumbar puncture [6]. They concluded that lumbar CSF cytology may be useful when the MRI is equivocal for the presence of metastatic involvement of the spine by medulloblastoma.

In a study by Mostardi et al. [7], that aims to evaluate the visibility of intramedullary spinal cord metastasis on PET and to correlate PET and MR imaging features, the authors found that most intramedullary spinal cord metastases can be detected on PET when performed near the time of pretreatment MR imaging. Larger lesions with more edema are more likely to be visible. The authors concluded

that spinal cord should be specifically and carefully assessed on PET for evidence of intramedullary spinal cord metastases to provide timely diagnosis.

Detection of these rare metastases through F18-FDG PET/CT has already been reported in the literature for lung cancer, renal cell carcinoma and breast cancer [8-12]. To the best of our knowledge, this is the first report on spinal cord metastases from medulloblastoma or in the other term PNET detected by PET/CT.

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