MALIGNANT PERITONEAL MESOTHELIOMA IN A TREATED PATIENT OF PLEURAL MESOTHELIOMA DETECTED ON 18F-FLUORODEOXYGLUCOSE POSITRON EMISSION TOMOGRAPHY SCAN

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ABSTRACT Malignant peritoneal mesothelioma is a rare entity arising either as a primary malignancy or as part of pleuro-peritoneal manifestation. We report a case of a forty-three-year-old male who was previously treated for malignant pleural mesothelioma and underwent F-18-Fluorodeoxyglucose positron emission tomography-computed tomography (FDG PET-CT) for evaluation of weight loss and abdominal discomfort of recent onset. The scan revealed extensive metabolically active mass like thickenings of peritoneum at multiple sites that turned out to be of mesothelial origin on peritoneal biopsy. No metabolically abnormal findings were revealed in the chest region on the scan. Our case demonstrates the role of FDG PET-CT in detecting sites of malignant mesothelial involvement other than pleura.

KEYWORDS FDG PET-CT, Malignant peritoneal mesothelioma, Diffuse peritoneal mesothelioma

Introduction

Malignant mesothelioma is a rare sinister tumour arising from mesothelial cells of serosal membranes, including pleura (70%), peritoneum (30%) and other sites, including pericardium and tunica vaginalis (1-2%) [1]. Malignant pleural mesothelioma (MPM) metastasizes to the lung or intrathoracic lymph nodes; however, distant extra-thoracic metastasis rarely occurs. FDG PET-CT has an important role in staging, recurrence detection, assessment of response to therapy and prognosis in MPM [2]. However, evaluation of peritoneal malignant mesothelioma (PMM) using FDG PET-CT has been infrequently reported in the literature as it is less frequent and may develop as the primary malignancy or as part of pleuro-peritoneal disease complex [3].

Case report

A 43-year-old male presented with a history of worsening episodes of abdominal fullness, discomfort after meals, and weight loss of five kilograms over three months. He was diagnosed with MPM on histological evaluation of pleural nodule three years ago. He had received treatment that included right extra-pleural pneumonectomy, chemotherapy and radiation to surgical bed in the chest. Regular follow up, including clinical examinations, blood analyses, chest radiographs and thoracic CT scans, remained normal, excluding the possibility of local recurrence. He underwent computed tomography (CT) scan to evaluate abdominal symptoms that revealed thickening of bowel loops. Antibiotics and proton pump inhibitors were prescribed that did not alleviate his symptoms. At three months since the onset of symptoms, an FDG PET-CT scan was performed for further evaluation using intravenous administration of 350 MBq...
of 18F-FDG. PET-CT scanner (GE Discovery STE scanner) was used to perform whole-body imaging from skull to thighs. On greyscale, maximum intensity projection, coronal and sagittal fused slices, right lung resection was noted with shifting of mediastinal structures to the right hemithorax and elevation of right hemidiaphragm (Figure 1A). No abnormal metabolic findings were observed in the thoracic cavity to suggest local and regional recurrence, however, hypermetabolic findings are visible in the location below the diaphragm (Figure 1A). The scan revealed multiple sites of hypermetabolic (SUVmax 8.5) peritoneal and omental mass like thickenings, more marked in peri-hepatic, sub-hepatic, right paracolic and intestinal serosal locations as demonstrated by fused axial slices favouring diffuse disease (Figure 1B). Histology findings of a biopsy specimen from the peritoneal disease site confirmed malignant mesothelioma (Figure 2).

**Figure 1:** Panel A shows Maximum intensity projection (MIP), Coronal and Sagittal images of FDG PET-CT scan. Panel B shows fused axial slices at different levels through abdomen. Multiple hypermetabolic mass like regions of peritoneal thickening (red arrows) are observed that proved to be malignant peritoneal mesothelioma on histological evaluation.

**Discussion**

PMM accounts for about 12.5% to 30% of malignant mesotheliomas. Inhalation or ingestion of asbestos is considered the main etiological factor for peritoneal type but with a lower association than pleural mesothelioma [4]. PMM may originate from either parietal or visceral peritoneum and shows different histological subtypes of which epithelioid subtype is the most common, constituting approximately 75% of peritoneal mesotheliomas [5]. The peritoneal mesothelioma may present as a distinct primary malignancy or a pleuro-peritoneal extension of PMM. Both have been described on FDG PET-CT scans in the published literature [6, 7]. PMM may have localized behaviour demonstrating solitary well-circumscribed mass or more frequent diffuse variety as seen in our case; the localized type has a much better prognosis as the tumour can be easily resected [8]. CT scan has relatively poor accuracy in identifying early PMM and trans-diaphragmatic extension of primary pleural variety [2]. FDG PET-CT has higher sensitivity and specificity in detecting metastases in lymph nodes and distant sites, thereby helpful in the staging of both localized and diffuse types [9,10]. Higher SUV demonstrated by lesions on FDG PET-CT is associated with poor prognosis. PET-CT also has higher accuracy for treatment response evaluation in malignant mesothelioma [11]. However, a curative surgical treatment was not possible in the setting of extensive peritoneal disease (as in the present cases).

Additionally, there has been a previous history of the treatment of MPM through surgery, chemotherapy, and radiotherapy in our case. The patient developed the peritoneal disease after two years of completion of the treatment mentioned above and therefore considered a case of primary PMM rather than a trans-diaphragmatic extension of previously treated pleural disease. Chemotherapy was offered to the patient with poor response and futile outcome as predicted by high SUV on FDG PET-CT.

**Conclusion**

In conclusion, we report a rare case of PMM with uncommon presentation occurring in a patient with a previous history of therapy for MPM, demonstrating a diffuse pattern of peritoneal disease, which were detected on FDG PET-CT. FDG-PET-CT appears to be a valuable imaging modality in evaluating PMM and may predict treatment outcomes based on SUV. However, care may be taken in interpreting PET-CT scans as such findings resemble other diseases, and histological evaluation remains the gold standard.

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**Conflict of interest**

There are no conflicts of interest to declare by any of the authors of this study.
References


