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[18F]FDG PET/CT in jejunal mucin-producing adenocarcinoma with bilateral ovarian metastases

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ABSTRACT

Small bowel adenocarcinoma is an uncommon gastrointestinal malignancy, and ovarian metastasis from a jejunal primary is rare. We report the [18F]FDG PET/CT findings of a 39-year-old woman with a previously diagnosed moderately differentiated mucin-producing adenocarcinoma arising in a tubulovillous adenoma of the jejunum with visceral peritoneal invasion. The patient had undergone surgery and systemic chemotherapy and was referred for restaging because of bilateral ovarian masses suspicious for Krukenberg tumors. Whole-body [18F]FDG PET/CT demonstrated large bilateral ovarian masses with metabolically active solid components, showing markedly higher FDG uptake in the right ovarian lesion than in the left. A small FDG-avid retroperitoneal focus adjacent to the abdominal aorta at the L4 level was also detected and was suspicious for metastatic involvement. No definite focal FDG uptake was identified at the bowel loops to suggest intraluminal recurrence, and a previously described omental/peritoneal implant showed no definite abnormal [18F]FDG uptake, highlighting a potential limitation of [18F]FDG PET/CT in mucinous peritoneal disease. Histopathologic examination of the ovarian masses confirmed metastatic adenocarcinoma consistent with the known jejunal primary. Based on the imaging, histopathologic findings and overall metastatic disease burden, the patient was referred for second-line chemotherapy and palliative management. This case illustrates the value of [18F]FDG PET/CT in

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restaging metastatic jejunal adenocarcinoma and detecting metabolically active ovarian and retroperitoneal metastatic disease, while emphasizing the need for careful interpretation of non-FDG-avid mucinous peritoneal deposits.

Keywords: Jejunal adenocarcinoma; Small bowel adenocarcinoma; [18F]FDG PET/CT; Ovarian metastases; Krukenberg tumor; Mucin-producing adenocarcinoma

INTRODUCTION

Small bowel adenocarcinoma is a rare gastrointestinal malignancy despite the extensive mucosal surface area of the small intestine [1]. The duodenum is the most commonly involved site, whereas jejunal adenocarcinoma is less frequent [2-4]. Diagnosis is often delayed because symptoms are nonspecific, and many patients present with locally advanced or metastatic disease [1, 2].

Ovarian metastases from gastrointestinal malignancies may exhibit the morphologic features of a Krukenberg tumor, which is classically characterized by metastatic mucin-producing carcinoma containing signet-ring cells [5, 6].

The stomach and colorectum are the most common primary sites, whereas small bowel is an unusual origin for ovarian metastatic disease [5,6]. Recognition of this metastatic pattern is clinically important because ovarian metastases, particularly when bilateral, may mimic primary ovarian neoplasms [6, 7].

[18F]FDG PET/CT combines metabolic and anatomic information Although data specifically addressing small bowel adenocarcinoma are limited, small bowel adenocarcinomas have demonstrated substantial FDG uptake, supporting a potential role for FDG-based imaging in staging and follow-up [8]. In addition, gastrointestinal metastatic ovarian tumors may demonstrate variable and heterogeneous [18F]FDG uptake on PET/CT [9].

We present a case of metastatic jejunal mucin-producing adenocarcinoma with bilateral ovarian metastases, in which [18F]FDG PET/CT contributed to post-treatment restaging by demonstrating metabolically active ovarian disease and identifying an additional suspicious retroperitoneal focus.

CASE PRESENTATION

A 39-year-old woman with previously diagnosed jejunal adenocarcinoma was referred for [18F]FDG PET/CT restaging. The initial diagnosis, established in December 2023, was moderately differentiated mucin-producing adenocarcinoma arising in a tubulovillous adenoma of the jejunum, with visceral peritoneal invasion. She had undergone surgical treatment followed by systemic chemotherapy. During follow-up, contrast-enhanced imaging revealed bilateral ovarian masses suspicious for metastatic involvement, and [18F]FDG PET/CT was requested for post-treatment restaging.

Whole-body [18F]FDG PET/CT was performed from the skull base to the mid-thigh after intravenous administration of 8 mCi of [18F]FDG. The pre-injection blood glucose level was 105 mg/dL. Low-dose non-contrast CT was used for attenuation correction and anatomic localization. PET/CT demonstrated (Figure 1) large bilateral predominantly solid-cystic ovarian masses with metabolically active solid components. The right ovarian mass measured approximately 16×11 cm and showed intense [18F]FDG uptake, with an SUVmax of 10.0 on early images and 11.5 on delayed images. The left ovarian mass measured approximately 17×11 cm and demonstrated lower but persistent [18F]FDG uptake, with an SUVmax of 4.0 on early images and 4.4 on delayed images.

A subcentimeter [^{18}F]FDG-avid retroperitoneal focus adjacent to the abdominal aorta at the L4 vertebral level was also identified, with an SUVmax of 7.3 on early images and 13.5 on delayed images. This finding was suspicious for additional metastatic disease, representing either a small retroperitoneal lymph node or a peritoneal deposit. No focal abnormal [^{18}F]FDG uptake was identified in the bowel loops to suggest intraluminal recurrence. A previously described omental/peritoneal implant on contrast-enhanced CT showed no definite abnormal [^{18}F]FDG uptake on the current PET/CT study.

No [^{18}F]FDG-avid pulmonary, mediastinal, hilar, cervical, or skeletal metastases were detected. Mild diffuse bone marrow uptake was considered reactive or treatment related. Overall, [^{18}F]FDG PET/CT demonstrated persistent metabolically active stage IV disease, characterized by bilateral metabolically active ovarian masses and a small [^{18}F]FDG-avid retroperitoneal lesion. Histopathologic examination of the ovarian masses confirmed metastatic adenocarcinoma consistent with origin from the known mucin-producing jejunal adenocarcinoma. Based on the imaging and histopathologic findings, the patient was referred for second-line chemotherapy and palliative management.

DISCUSSION

This case illustrates a rare metastatic pattern of jejunal adenocarcinoma with bilateral ovarian involvement. Ovarian metastases with Krukenberg morphology most commonly arise from gastric and colorectal primaries, whereas small bowel adenocarcinoma, particularly jejunal adenocarcinoma, is an unusual source of ovarian metastatic disease [5,6]. In this patient, bilateral ovarian masses in the setting of known mucin-producing jejunal adenocarcinoma raised strong suspicion for metastatic disease, which was subsequently confirmed histopathologically.

[^{18}F]FDG PET/CT provided clinically relevant information by demonstrating viable metabolically active tumor within both ovarian metastases. The right ovarian lesion showed intense [^{18}F]FDG uptake with further increase on delayed imaging, whereas the left ovarian lesion demonstrated lower but persistent uptake. The observed metabolic asymmetry may also reflect differences in viable tumor cellularity and mucin content, both of which can influence FDG avidity in mucinous neoplasms [10].

The detection of a small [^{18}F]FDG-avid retroperitoneal focus adjacent to the abdominal aorta was also clinically relevant. Although sub centimeter lesions may be difficult to characterize by CT alone, focal intense [^{18}F]FDG uptake with increased delayed uptake is suspicious for metastatic involvement in the appropriate oncologic context. This finding contributed to the overall assessment of persistent metastatic disease after prior surgery and systemic chemotherapy.

The absence of definite [^{18}F]FDG uptake in a previously described omental/peritoneal implant was interpreted in the context of prior treatment and the mucin-producing nature of the primary tumor. Mucinous neoplasms may demonstrate reduced FDG avidity, particularly when lesions contain abundant mucin and relatively low tumor cellularity [10]. Therefore, the absence of significant FDG uptake at this site did not necessarily exclude residual disease and emphasized the importance of correlation with anatomic imaging and prior examinations. In contrast, [^{18}F]FDG PET/CT clearly demonstrated metabolically active disease in the bilateral ovarian metastases and the suspicious retroperitoneal focus, thereby contributing to restaging and treatment planning.

This case illustrates that [^{18}F]FDG PET/CT can play an important role in in restaging jejunal mucin-producing adenocarcinoma by identifying metabolically active metastatic disease in clinically significant sites, including bilateral ovarian metastases and small retroperitoneal lesions.

When patients with known gastrointestinal adenocarcinoma and bilateral ovarian masses, [^{18}F]FDG-avid solid components should strongly suggest ovarian metastases' and may directly influence systemic treatment planning.

CONCLUSION

[^{18}F]FDG PET/CT was valuable in post-treatment restaging of metastatic jejunal mucin-producing adenocarcinoma by demonstrating metabolically active bilateral ovarian metastases and identifying an additional [^{18}F]FDG-avid retroperitoneal focus suspicious for metastatic disease. This case highlights that bilateral ovarian masses in a patient with known mucin-producing gastrointestinal adenocarcinoma should raise suspicion for Krukenberg tumors. [^{18}F]FDG PET/CT can provide clinically relevant metabolic information that complements anatomic imaging, helps assess viable tumor burden, and can guide further systemic treatment planning.

Ethical considerations

Written informed consent for publication of this case report and accompanying images was obtained from the patient. The authors confirm that the report was prepared in accordance with institutional ethical standards and the principles of the Declaration of Helsinki.

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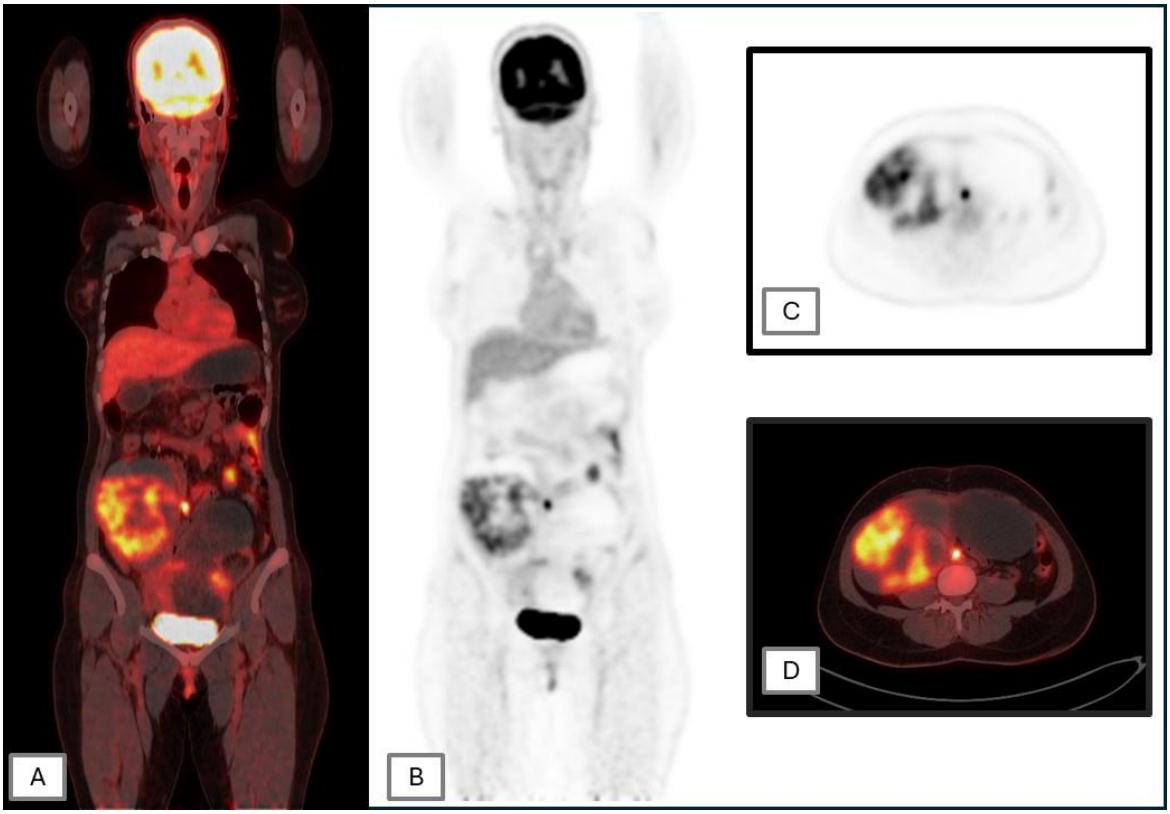


Figure 1. [18F]FDG PET/CT findings. Coronal fused PET/CT (A) and maximum-intensity-projection PET (B) images demonstrate large bilateral, predominantly solid–cystic ovarian masses with metabolically active solid components. The right ovarian mass measured approximately 16×11 cm and showed intense [18F]FDG uptake, with SUVmax values of 10.0 and 11.5 on early and delayed images, respectively. The left ovarian mass measured approximately 17×11 cm and exhibited lower but persistent uptake, with corresponding SUVmax values of 4.0 and 4.4. Axial PET (C) and fused PET/CT (D) images further demonstrate the hypermetabolic solid component and a sub-centimeter [18F]FDG-avid retroperitoneal focus adjacent to the abdominal aorta at the L4 level, with SUVmax values of 7.3 and 13.5 on early and delayed imaging, respectively