

# An Unexpected Abdominal $^{18}\text{F}$ -Fluorodeoxyglucose (FDG) Uptake on Positron Emission Tomography (PET) in a Patient with Limited Stage Small Cell Lung Cancer

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We report the case of an unexpected  $^{18}\text{F}$ -fluorodeoxyglucose-avid lesion in the right lower abdomen in a patient with otherwise “very limited” (T1N0) small cell lung cancer (SCLC). Additional imaging and endoscopic studies showed no abnormality. The patient was treated for presumed very limited disease SCLC, with resection, adjuvant chemotherapy, and prophylactic brain irradiation. Follow-up fusion positron emission tomography-computed tomography revealed an unusual SCLC complication.

**Key Words:** Appendix, Metastasis, Small cell lung cancer, Fusion PET-CT, Staging.

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A 61-year-old male patient was referred to our institution after a chest radiograph for nonproductive cough had revealed a right hilar mass. He was an active, 45 pack-years, smoker. His medical history was unremarkable, except for a left-sided pneumonia 6 years ago. He had no other symptoms and clinical examination was normal.

Chest computed tomography (CT) showed a hilar mass in the right upper lobe (29 × 20 mm) and enlarged mediastinal nodes in the right paratracheal space. Bronchoscopy was normal, no pathologic diagnosis was obtained. Extrathoracic conventional imaging was normal as well. On positron emission tomography (PET), there was intense  $^{18}\text{F}$ -fluorodeoxyglucose (FDG) uptake in the thoracic lesion (not shown) and a small hot spot in the right lower abdomen (Figure 1). Visual correlation with abdominal CT could not pinpoint at an anatomic lesion and colonoscopy was normal, including the transition to the ileum and appendix. The clinical diagnosis

was suspected primary lung tumor, with a clinical stage T1N0M0. After a negative mediastinoscopy, the patient had a right superior lobectomy with complete mediastinal lymph node dissection, for a pT1N0 small cell lung cancer (SCLC) (size 27 mm × 26 mm × 22 mm). Surgery was followed by adjuvant chemotherapy (six cycles of carboplatin area under the curve = 5 on day 1, in combination with etoposide 100 mg/m<sup>2</sup> on days 1–3) and prophylactic cranial radiotherapy (30 Gy in 15 fractions of 2 Gy). No thoracic radiotherapy was given.

One year after the initial diagnosis, the patient had anorexia and weight loss. Restaging including fusion PET-CT revealed further increase of uptake in the right lower abdominal lesion, suggestive of appendix localization (Figure 2). At exploratory laparoscopy, an abnormal appendix was removed. Histology revealed metastasis of chromogranin-positive small cell carcinoma, of pulmonary origin, as confirmed by positive thyroid transcription factor-1 staining (Figure 3). Recent evaluation including PET-CT showed no evidence of recurrence 15 months after initial diagnosis.

## DISCUSSION

SCLC has a high tendency to metastasize early in the course of the disease, and at diagnosis about 70% of patients have extensive disease. Most commonly, distant spread occurs in the liver, brain, bone, bone marrow, and adrenal glands. Metastasis to the appendix is extremely rare, and the literature consists mainly of sporadic case reports.<sup>1</sup> Isolated appendix metastasis is even more unusual, and we retrieved only one prior case.<sup>2</sup>

This case also illustrates the accuracy of FDG-PET in SCLC. The main goal of baseline SCLC staging is to distinguish patients with limited disease, candidates for intensive multimodality treatment, and those with extensive disease, who will have palliative chemotherapy. Compared with the key role of PET in the staging of NSCLC, there is no large-scale evidence in SCLC. Many series, however, point at the added value of FDG-PET in detection of extensive disease missed at conventional imaging, except for brain metastasis.<sup>3</sup> In one of the largest with 120 patients, FDG-PET

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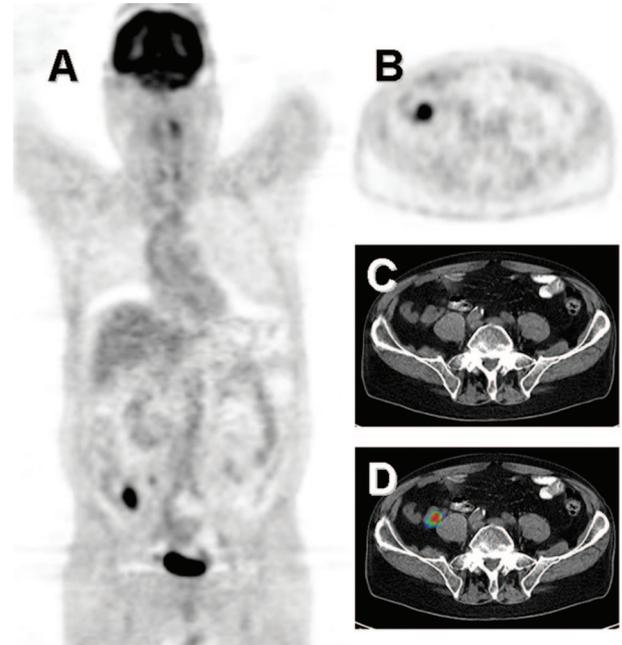
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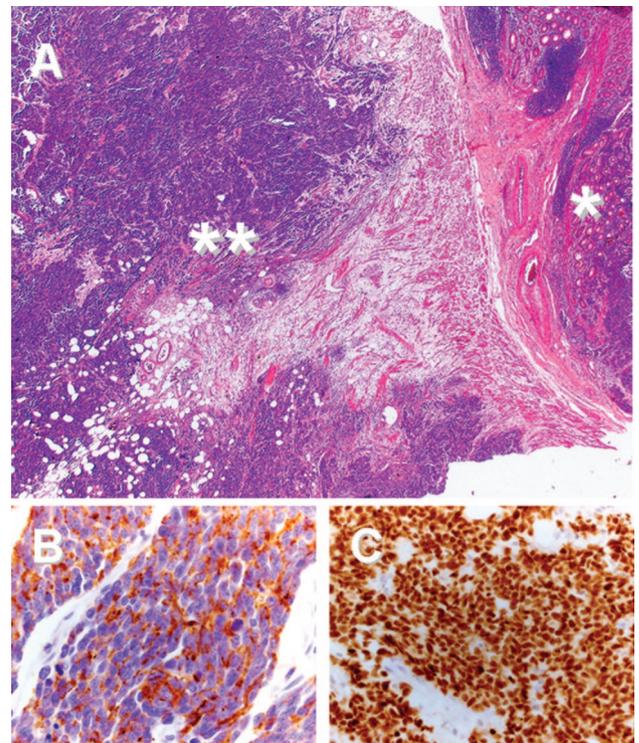
**FIGURE 1.** FDG-PET scan at initial staging showing focal FDG uptake (arrow) in the right lower abdomen.

resulted in correct upstaging to extensive disease in 10 and downstaging in three patients.<sup>4</sup> Whether FDG-PET will replace other more established staging modalities remains to be determined by larger prospective randomized controlled studies.

In our patient, the finding of a small FDG-avid lesion in the right lower abdomen was disregarded based on the knowledge that false-positive FDG uptake over the colonic area is common, and on the normal results of CT and colonoscopy. Fusion PET-CT at that time might have been more helpful, as evolving evidence supports the use of fusion images in correctly localizing foci with increased FDG uptake, especially in abdominal staging.<sup>5</sup> If the finding had been pursued by diagnostic laparoscopy initially—to exclude a synchronous second primary tumor or more importantly metastatic disease—this would have significantly altered our therapeutic approach.



**FIGURE 2.** Imaging at restaging. Coronal and axial PET slices demonstrate further increase of focal FDG uptake in the right lower abdomen (A, B). Area of increased uptake was localized to the appendix by fusion PET-CT (C, D).



**FIGURE 3.** Histology of resection specimen (hematoxylin-eosin,  $\times 12$ ), showing normal mucosal glands (\*) and infiltration of serosa by tumor cells (\*\*). Tumor had positive chromogranin (B) and thyroid transcription factor-1 staining (C).

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