

Unexpectedly Fludeoxyglucose (18F) Avid Well-Differentiated Adenocarcinoma of the Lung

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A 77-year-old female presented to our institution for further evaluation of a pure ground-glass pulmonary nodule (GGN). She had been hospitalized three times for pneumonia over the previous 2 years. She was a former smoker having quit over 30 years ago. The past medical history was significant for prior breast cancer 15 years ago and Non-ST-elevation myocardial infarction 3 months ago. Other than crackles at the right apex, the physical exam was unremarkable. At the time of the patient's NSTEMI, she had a chest computed tomography (CT) that demonstrated a 25 mm pure GGN (Fig. 1A).

As per recent Fleischner Society guidelines for sub-solid nodules, a pure GGN should not be evaluated with positron emission tomography (PET)/CT, but should get a 3-month follow-up CT looking for persistence followed by yearly repeat CTs looking for growth. Instead, the patient proceeded directly to an Fludeoxyglucose (FDG) PET/CT 1 month later that demonstrated no change in CT appearance (not shown) and intense activity throughout the nodule (maximum standardized uptake value [SUVmax] 13.8, Fig. 1B–D). As the most likely diagnosis was an infectious or inflammatory nodule, follow-up imaging was obtained at our institution to ensure resolution. Surprisingly, these findings were persistent with no change on 4-month follow-up diagnostic CT (Fig. 1E) and FDG PET/CT (Fig. 1F). At the time of presentation to our institution, the patient's white

blood cell count was normal at 7.9. The patient underwent a CT-guided core biopsy showing well-differentiated adenocarcinoma with lepidic growth pattern. Subsequent right upper lobectomy and mediastinal lymph node dissection showed a well-differentiated adenocarcinoma with the vast majority of the tumor showing a lepidic growth pattern (Fig. 1G), borderline invasion (6 mm invasion seen in the central scar, Figure 1H), and only rare giant cells with no granulomas. Final stage was T1B, N0, M0. On further investigation, an outside chest CT from 6 years prior was obtained, showing an 11 mm faint pure GGN in the same location, suggesting very slow interval growth (Fig. 1I), also constant with low-grade well-differentiated adenocarcinoma.

This case is unusual as previous studies have demonstrated that slow growing pure GGNs tend to be well-differentiated adenocarcinomas at worst, and typically do not demonstrate FDG avidity above blood pool levels, and nowhere near the activity seen in this case. One would not expect this pathology to result in diffuse intense activity on FDG PET/CT because the cells are low grade and are spread out in space, and there are no significant other pathologic findings to cause inflammatory activity. Intense activity in a pure GGN is more commonly due to infection or inflammation, showing lack of persistence on follow-up imaging.

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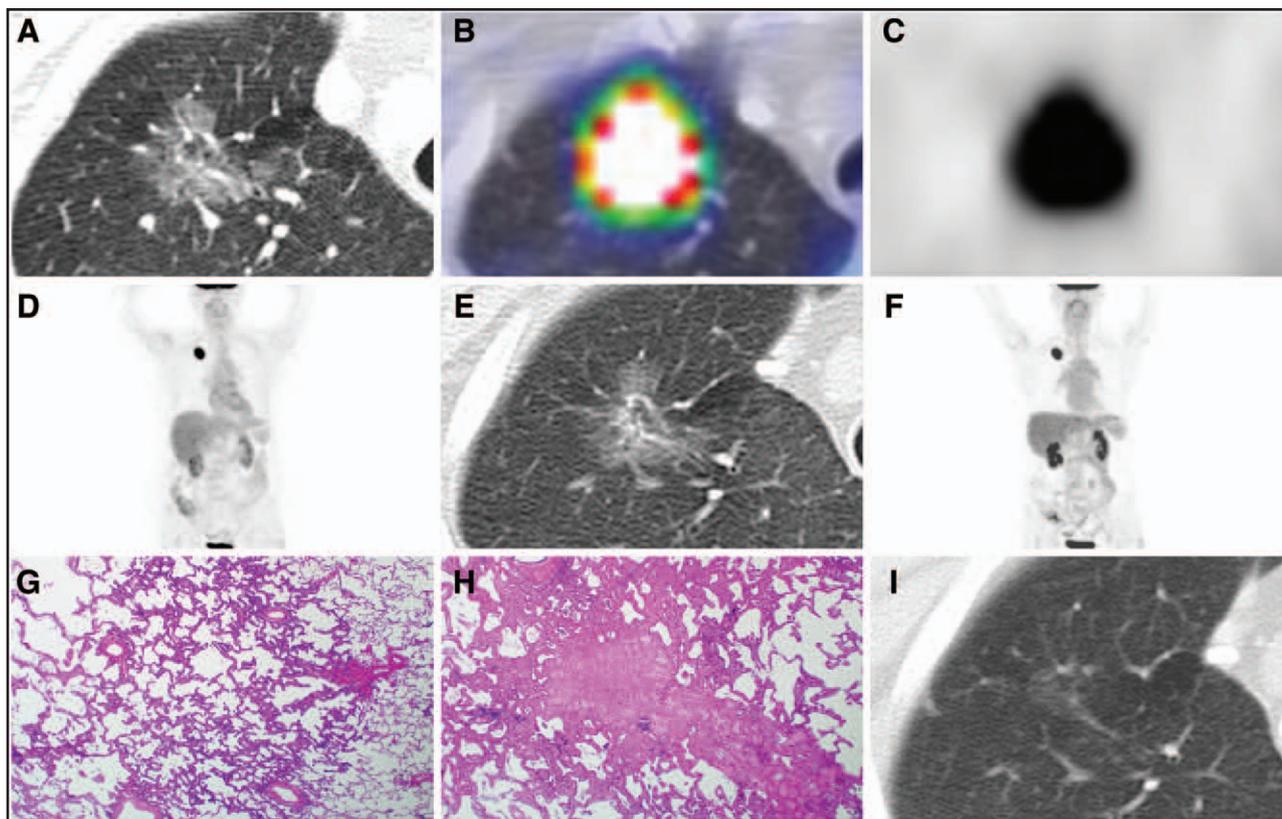


Fig.1. A, Non-contrast CT shows a ground glass pulmonary nodule. B-D, FDG-PET CT 1-month after the initial CT shows the nodule to be intensely FDG avid. Four-month follow-up non-contrast CT shows no change in the appearance of the nodule (E), and the nodule remained FDG avid at 4 months (F). G and H, surgical specimen reveals a well differentiated adenocarcinoma with a lepidic growth pattern. I, CT scan 6 years prior to the patient’s initial presentation shows an 11mm faint pure GGN suggesting very slow interval growth.