Role of FDG-PET/CT in the evaluation of infectious and inflammatory disease

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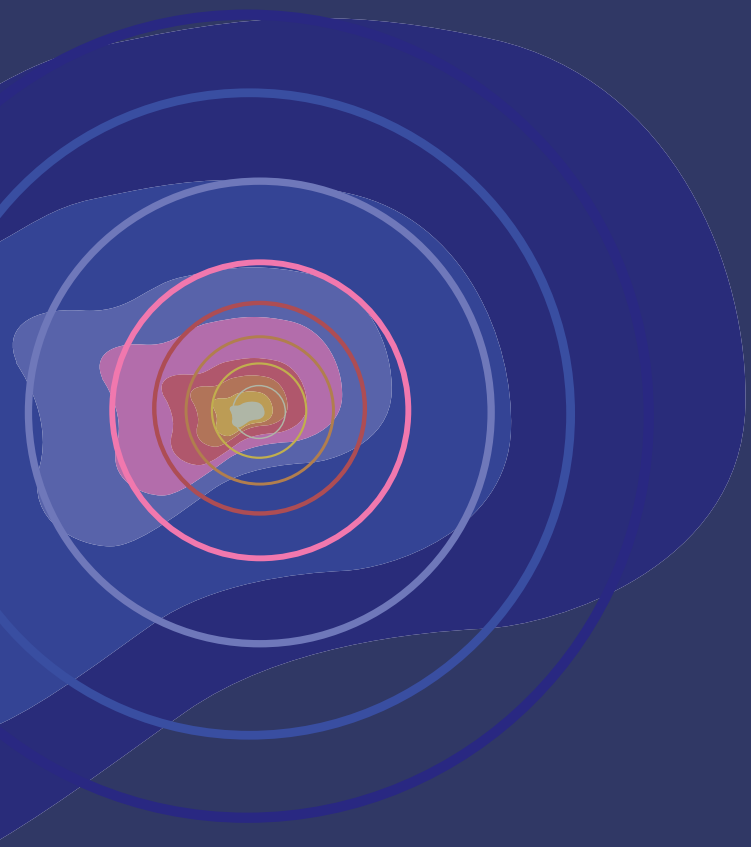
CHAPTER 6

FDG-PET/CT as a new method for diagnosis and whole-body evaluation of Lemierre syndrome



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ABSTRACT

Lemierre syndrome is a rare disease that is defined by a pharyngeal infection, complicated by septicemia and internal jugular vein thrombosis followed by septic emboli. Because of its rarity, a delay in diagnosis is not uncommon. However, given the mortality rate of approximately 2%,prompt diagnosis and detection of septic emboli are essential to initiate prompt treatment, preventing organ damage and ongoing sepsis. We present 3 cases that demonstrate the value of FDG-PET/CT as a possible alternative or adjunct to conventional imaging methods for diagnosis and whole-body evaluation of Lemierre syndrome.

Keywords
FDG-PET/CT, Fusobacterium necrophorum, jugular vein thrombosis, Lemierre syndrome, septic emboli

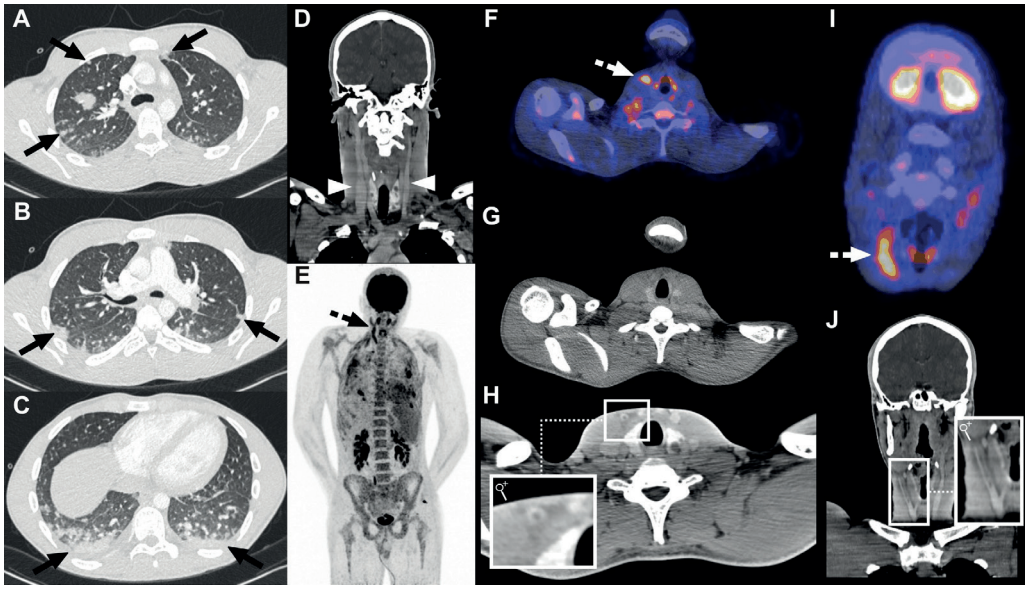

***Figure 1* |**

An 18-year-old man presented with headache, chest pain, nausea, vomiting, shivers, night sweats, and a painful swelling in the right neck. Blood tests showed elevated C-reactive protein (119 mg/L) and thrombocytopenia (59x 10^9 /L).

Contrast-enhanced CT demonstrated multiple pulmonary nodules and consolidations (A and B, arrows) with feeding vessel signs,[1,2] suggestive of septic emboli, and also some pleural fluid (C, arrows). CT showed patent internal jugular veins (D, arrowheads). Blood cultures were positive for Fusobacterium necrophorum. An FDG-PET/CT scan not only confirmed the septic emboli, but also showed an FDG-avid linear structure in the right neck (E and F, dashed arrows). The concomitantly acquired low-dose CT scan (G) could not anatomically localize this FDG-avid structure. Re-evaluation of the previously acquired contrast-enhanced CT revealed the FDG-avid structure to match a filling defect in the right anterior jugular vein, in keeping with thrombus and thus diagnosis of Lemierre syndrome[3–8] (H). The FDG-avid right anterior jugular vein thrombus is also shown on coronal FDG-PET (I, dashed arrow) and contrast-enhanced CT (J).

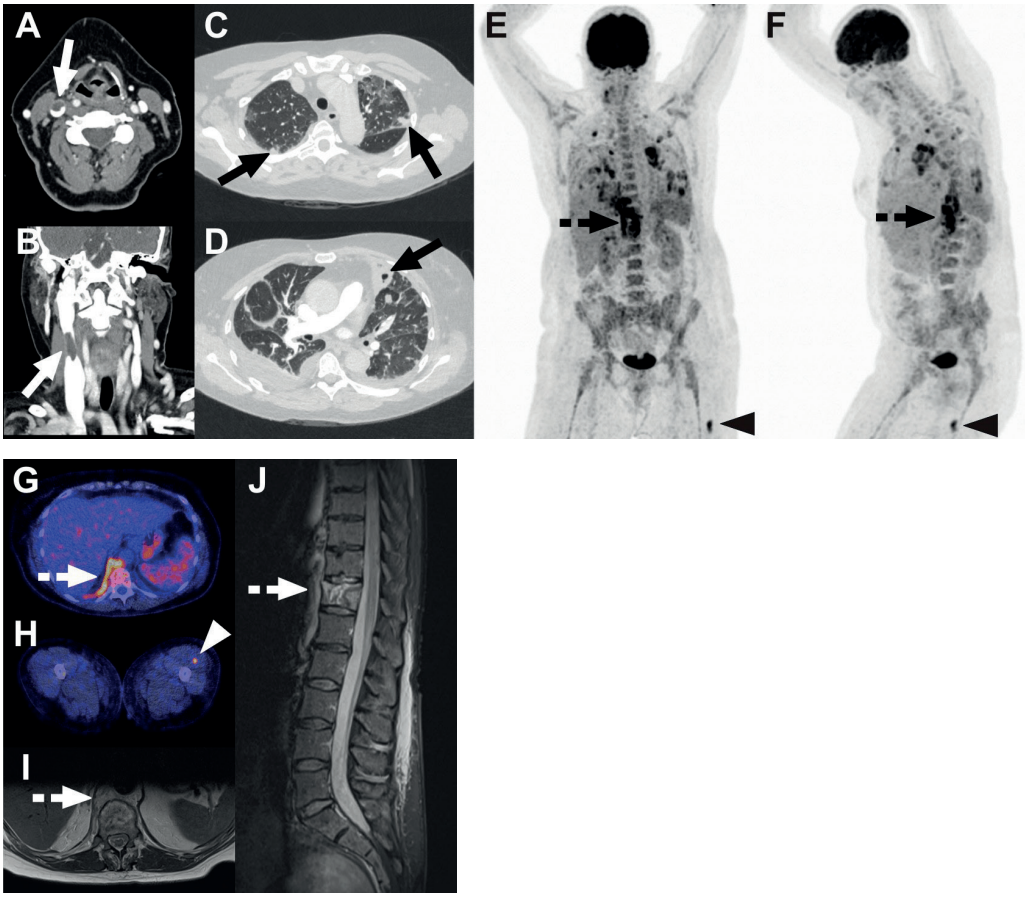

Figure 2 **|**
A 57-year-old woman presented with dyspnea, tachycardia, back pain, and vomiting. Blood tests showed elevated C-reactive protein (333 mg/L), creatinine (325 µmol/L), and urea (17.6 mmol/L), whereas thrombocytes were low (27x 10^9 /L). A blood culture was positive for F. necrophorum and Parvimonas micra. CT showed a partially thrombosed right internal jugular vein (A and B, arrows), multiple lung nodules with feeding vessel signs[1,2] (C, arrows), and a cavitating lesion in the lingula (D, arrow), suggestive of Lemierre syndrome[3–8] with septic pulmonary emboli. Fever persisted and inflammatory markers increased despite antibiotic treatment. FDG-PET/CT was performed, which not only confirmed the right internal jugular vein thrombus and multiple septic pulmonary emboli, but also showed increased FDG uptake around vertebrae T10–L1 (E–G, dashed arrows) and in the left rectus femoris muscle (E, F, H, arrowheads), suggestive of septic emboli.
Subsequent MRI (I, axial T2-weighted scan; J, sagittal STIR T2-weighted scan) demonstrated a paravertebral soft tissue mass (I and J, dashed arrows) and pathologic signal of intervertebral disc T11–T12 and vertebra T12, in keeping with spondylodiscitis and paravertebral abscess. These findings explained the persisting fever and increasing inflammatory markers.

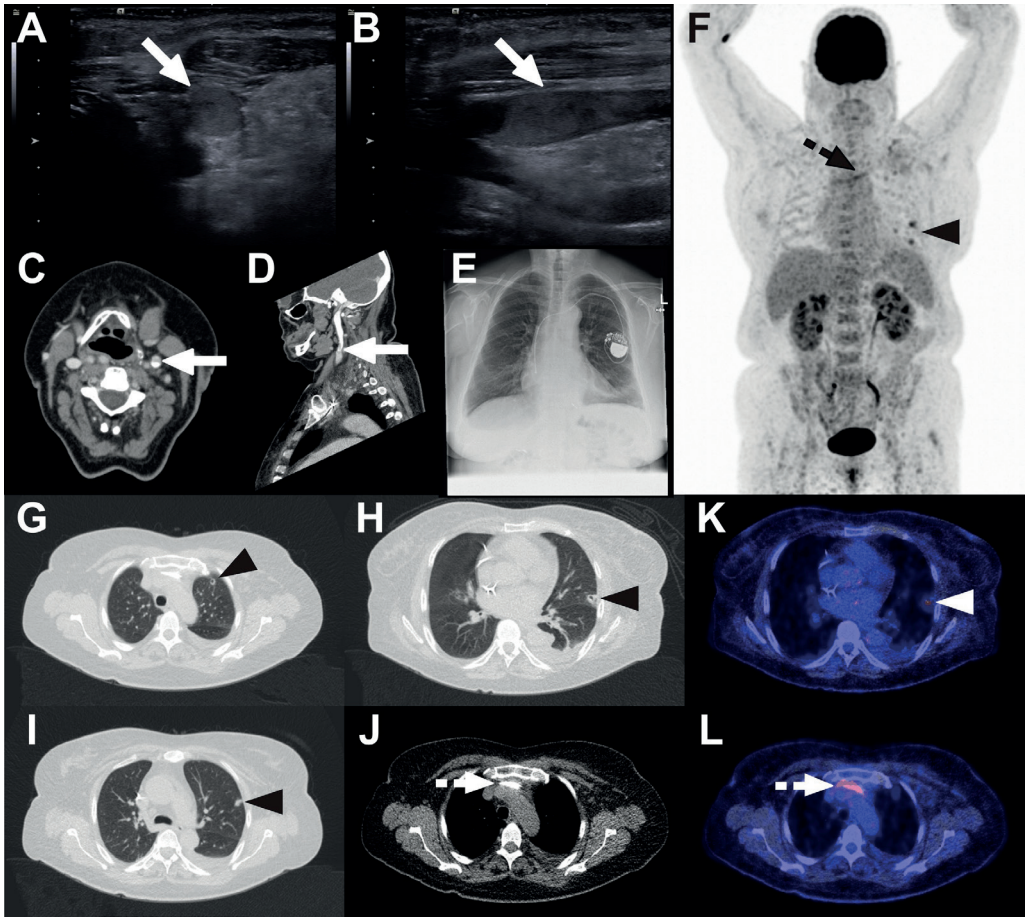

Figure 3 **|**
A 71-year-old woman with previous pacemaker implantation presented with difficulties swallowing, a tender spot in her right lower neck, and night sweats. Ultrasound and subsequent CT showed a thrombus in the left internal jugular vein (A–D, arrows), and a blood culture tested positive for Staphylococcus aureus, which suggested Lemierre syndrome[3–8].
Chest radiograph (E) showed some plate-like atelectasis in the left lower lobe. A transesophageal cardiac ultrasound was inconclusive. FDG-PET/CT showed FDG-avid lung lesions (F, arrowhead) and linearly increased FDG uptake at the level of the sternum (F, dashed arrow). Concomitant low-dose CT (G–J) and fused FDG-PET/CT (K and L) demonstrated several pulmonary nodules, of which some appeared FDG avid and some showed cavitation with a feeding vessel sign[1,2] (arrowheads), in keeping with septic emboli. The linearly increased FDG uptake at the sternal level matched with the pacemaker lead, suggestive of infection. The entire pacemaker was explanted, and microbiological cultures were positive for S. aureus.

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