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Case Report

The role of 18F-FDG PET/CT in early infectious discitis: a case report after a negative MRI

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ABSTRACT

We present the case of a 70 years old woman with infectious discitis which was detected using Fluorine fluodeoxiglucose positron emission tomography/computed tomography (18F-FDG PET/CT), after a negative magnetic resonance imaging. A *Streptococcus gallolyticus* (bovis gender bacteria) grow on culture. In addition 18F-FDG PET also demonstrated infectious endocarditis which was confirmed by transesophageal echocardiography and a colonic neoplasm. Here we have highlighted the potential role of 18F-FDG PET/CT study in patients with a clinical history suggestive of infectious discitis with a negative or indifferent magnetic resonance imaging.

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Introduction

Vertebral Osteomyelitis is an infectious disease of the vertebral body, also termed spondylodiscitis when the intervertebral disc is involved, which it is avascular. The most frequent symptom of this condition is recalcitrant back pain with no response to conventional therapy with/without fever and elevation of serum inflammatory markers. These nonspecific manifestations often challenge its diagnosis delaying the treatment and leading to several complications like chronic pain, neurological complications and even, death [1–3]. Vertebral osteomyelitis accounts around 1% of musculoskeletal infections and its incidence seems to be rising up as a result of higher life expectancy [1]. Early diagnosis and antibiotic treatment are

essential to give the patient the best chance of a good outcome [1–3]. Pyogenic vertebral osteomyelitis is sometimes the result of hematogenous spreading from a distant focus such as infectious endocarditis [1–3]. *Staphylococcus aureus* is the most frequent isolated organism in literature, followed by *Streptococcus* species. Other nonpyogenic genders such as fungi or micobacteria accounts for less than 10% of the cases [1–3].

Concerning imaging techniques, plain radiography has poor sensitivity in early disease, though magnetic resonance imaging (MRI) offers a good resolution for abscess detection, epidural extension, and vertebral destructions and seems useful even in short evolution. Computerized Tomography (CT) scan detects also patients at early stage and furthermore can guide a biopsy [1–3]. 18-Fluorine fluodeoxiglucose positron emission tomography combined with CT

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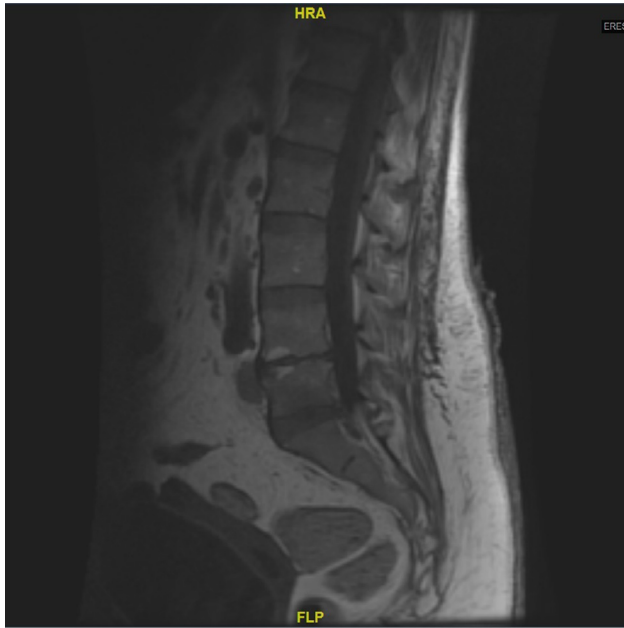


Fig 1 – Sagittal cut enhanced in T1 (FSE).

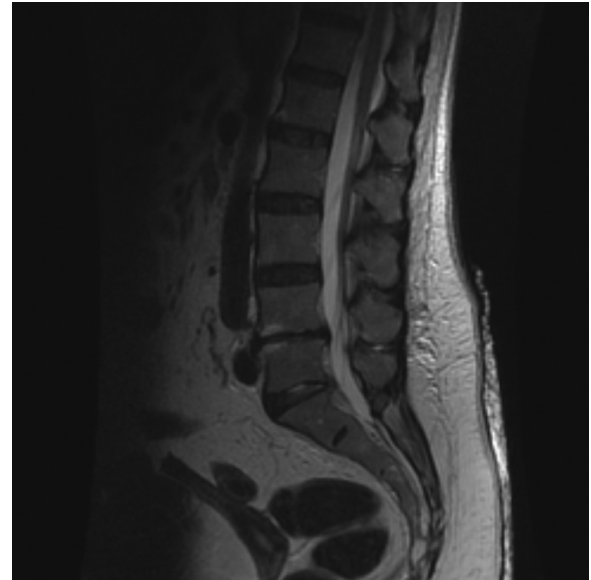


Fig 3 – Sagittal cut enhanced in T2 (FRFSE).



Fig 2 – Sagittal cut enhanced in T1 with contrast.

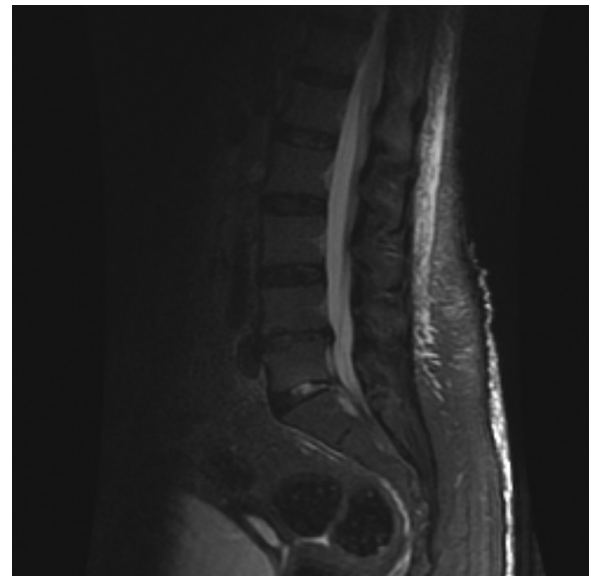


Fig 4 – Sagittal cut STIR.

scan (18F-FDG PET/CT) can be helpful in very early disease and might be useful in uncertain cases [4].

Here, we have aimed to report the potential benefits of 18F-FDG PET/CT imaging for examination of patients with back pain and infectious discitis suspicion with normal or non-definitive MRI.

Case description

We present a 70 years old women, who suffered a rheumatic fever at 20 which induced mitral stenosis treated with commisurotomy at 30 years old. As a consequence, she developed atrial fibrillation and severe pulmonary arterial hypertension. She also suffered of mechanic low back pain due to disc herniation.

The patient came to our emergency department telling a 2 weeks history of progressively increasing dyspnea, leg pitting edema, and fever. Chest x-ray, laboratory blood test, and cultures were performed showing a retrocardiac condensation and neutrophilic leukocytosis associated with high

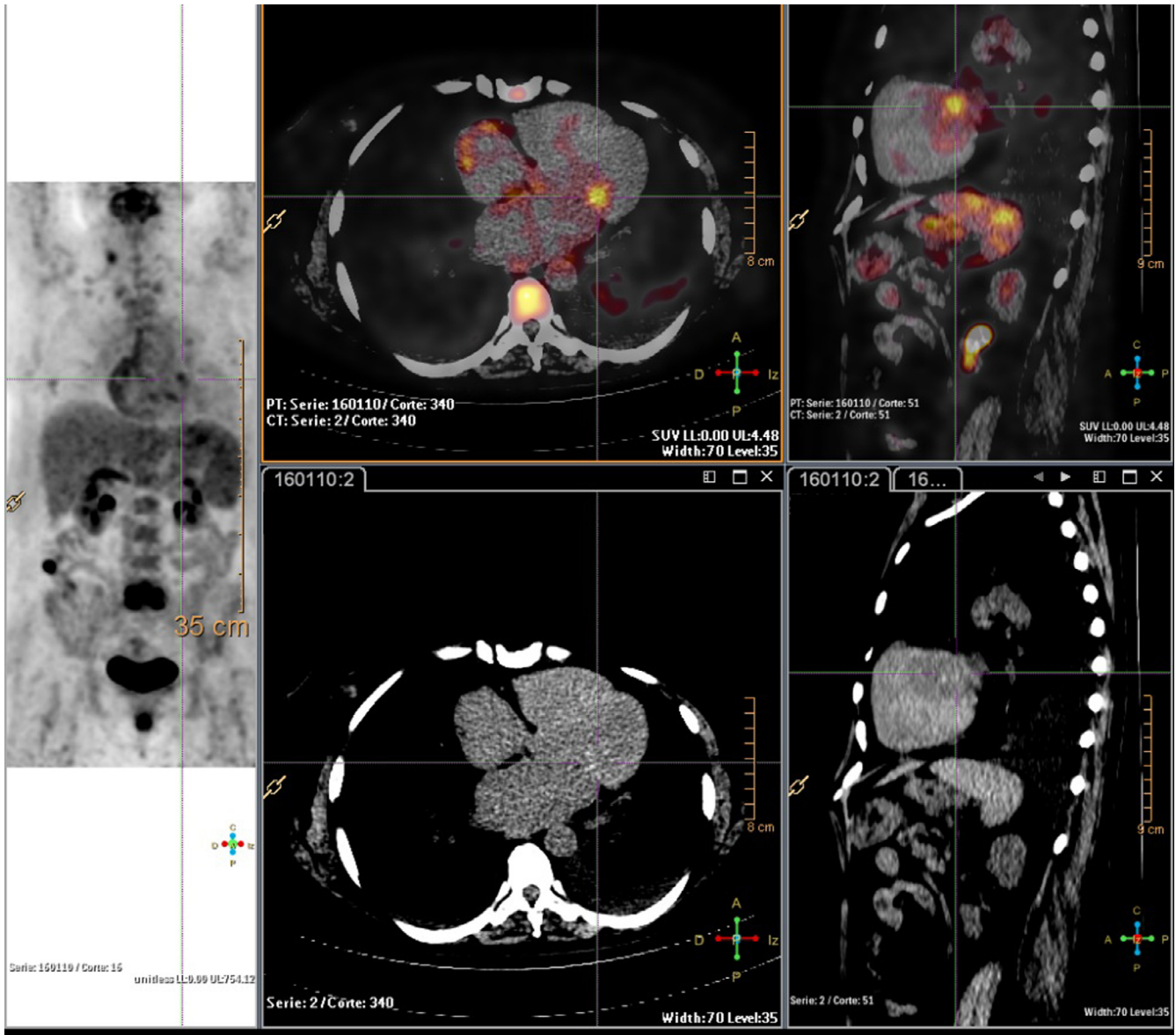


Fig 5 – PET/CT assembly showing uptake around mitral valve.

levels of acute-phase markers. She was admitted to the pneumology department with a clinical suspicion of community acquired pneumonia with secondary cardiac congestive failure due to her cardiopathy. Conventional antibiotherapy was initiated with Levofloxacin.

An improvement of the dyspnea and general status was noted during the hospitalization, but the patient presented new onset inflammatory back pain. Physical examination also revealed a cardiac murmur. A *Streptococcus gallolyticus* (bovis gender bacteria) grow on culture. Multiplanar MRI of the lumbar spine performed in the sagittal, transverse, and coronal planes using T1, T2, Short tau inversion recovery (STIR) after intravenous contrast administration (dimeglumine gadobenate 0.2 mL/Kg) showed L4-L5 disc height loss and osteoarthritis changes in L5-S1 (osteophytes and minimum endplate edema with no contrast capitation) [Figures 1–4](#).

Transesophageal echocardiography confirmed endocarditis. Penicillin and gentamicin treatment was initiated.

A PET/CT was considered in this patient because *S. bovis* gender has been widely associated in literature with gut microbiome translocations in colonic cancer patients [\[5\]](#). Moreover, PET/TC would add information in relation to spine.

Blood glucose level was 86 mg/dL and body mass index was 30.63 kg/m². A dose of 6.23 mCi of 18F-FDG was injected intravenously. PET-CT acquisition was done after a 66 minute uptake period with 3D emission and reconstruction was performed by iterative methods. Contrast enhanced 18F-FDG PET-CT revealed metabolic activity around mitral valve ([Fig. 5](#)). Also, increased 18F-FDG uptake was seen on mediastinal lymphadenopathies (SUVmax 3.3 g/mL). Additionally there was a unique lesion on spleen compatible with

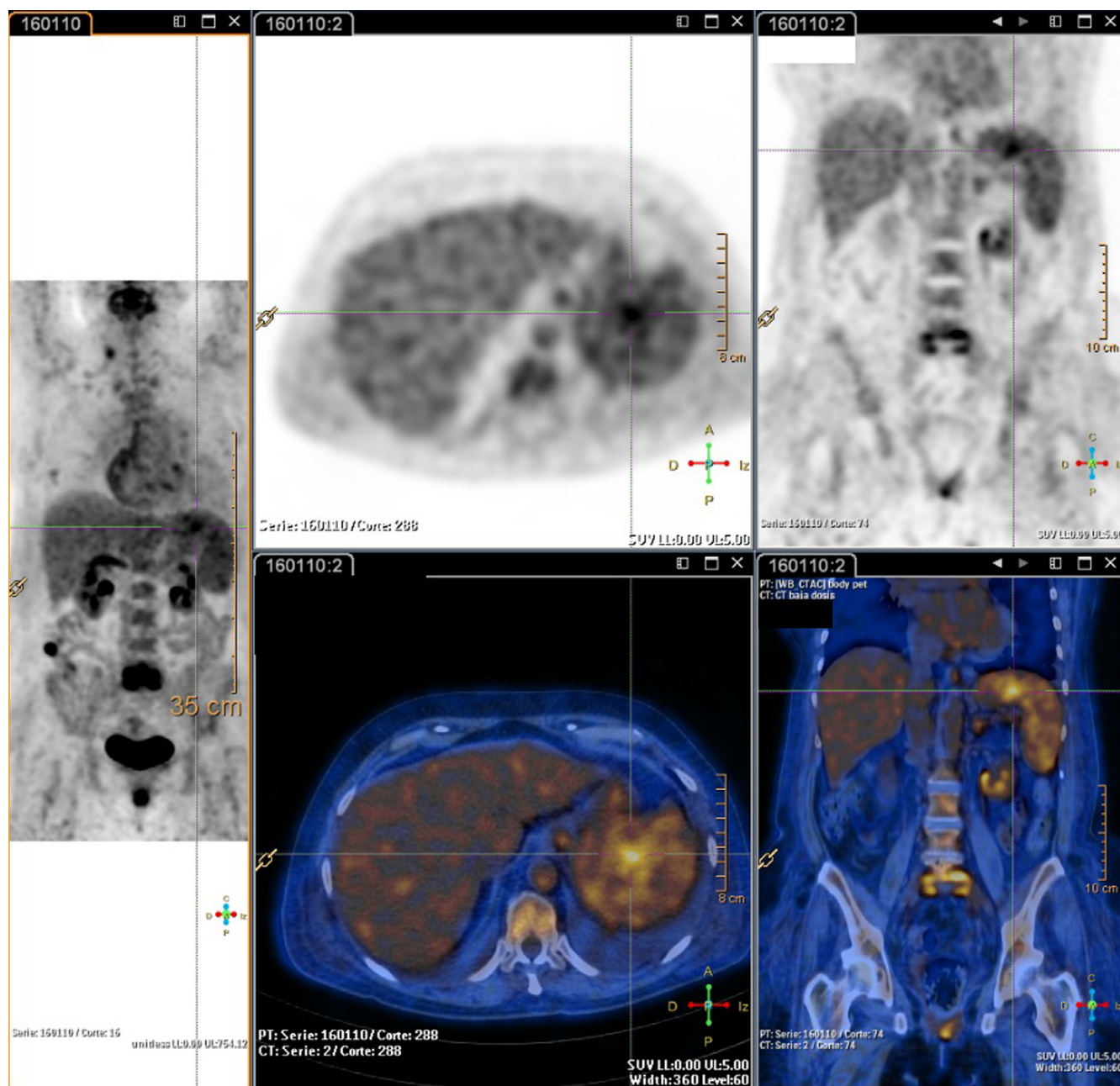


Fig 6 – PET/CT assembly showing splenic infarction.

splenic infarction due to septic embolism and global increased metabolic activity attributed to reticulo-endothelial system activation (Fig 6). Another focus of high intensity 18F-FDG uptake was noted in ascendant colon (Fig 7). Retroperitoneal lymphadenopathies without metabolic impact were noted. Concerning the spine there was a highly increased 18F-FDG uptake between L5-S1 involving both endplates suggestive of infectious process (Fig 8). Not any other musculoskeletal uptake was detected. The conclusion of the 18F-FDG PET-CT confirm our suspicion for infectious discitis and mitral endocarditis, with also a pathological uptake over the ascendant colon that should be evaluated with further studies such as colonoscopy.

Unfortunately the patient died during colonoscopy due to an acute heart failure. In agreement with her family, no necropsy was made.

Discussion

For the author opinion, this clinical case highlights the importance of clinical suspicion because an elective imaging technique such as MRI failed detecting discitis, probably because it was at a very early stage. PET/CT ended up as a great tool in this scenario owing to its higher sensitivity for acute

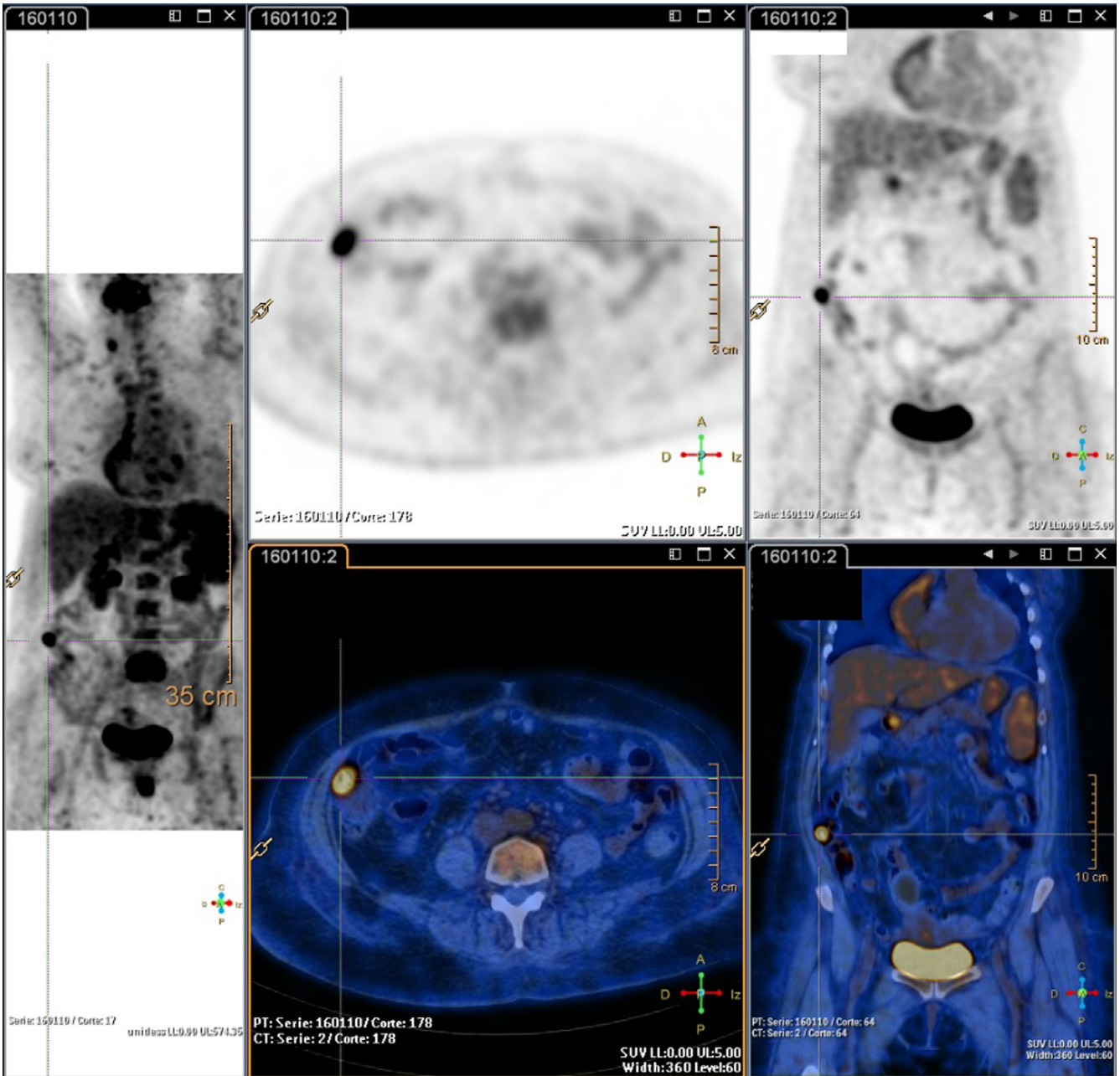


Fig 7 – PET/CT assembly showing uptake in ascendant colon.

infectious diseases. This fact has been reported previously [6,7], but further studies are needed so as to determine its proper role. A recent study comparing MRI and PET/CT concluded that both techniques are quite useful being the PET stronger searching septic metastases and MRI superior detecting epidural extension [7].

In conclusion, normal X-ray or MRI does not exclude Spinal infection in early stage. When a clinician faces a case with high clinical probability of vertebral osteomyelitis and MRI do not offer support in diagnosis, we suggest performing an 18F-FDG PET/CT.

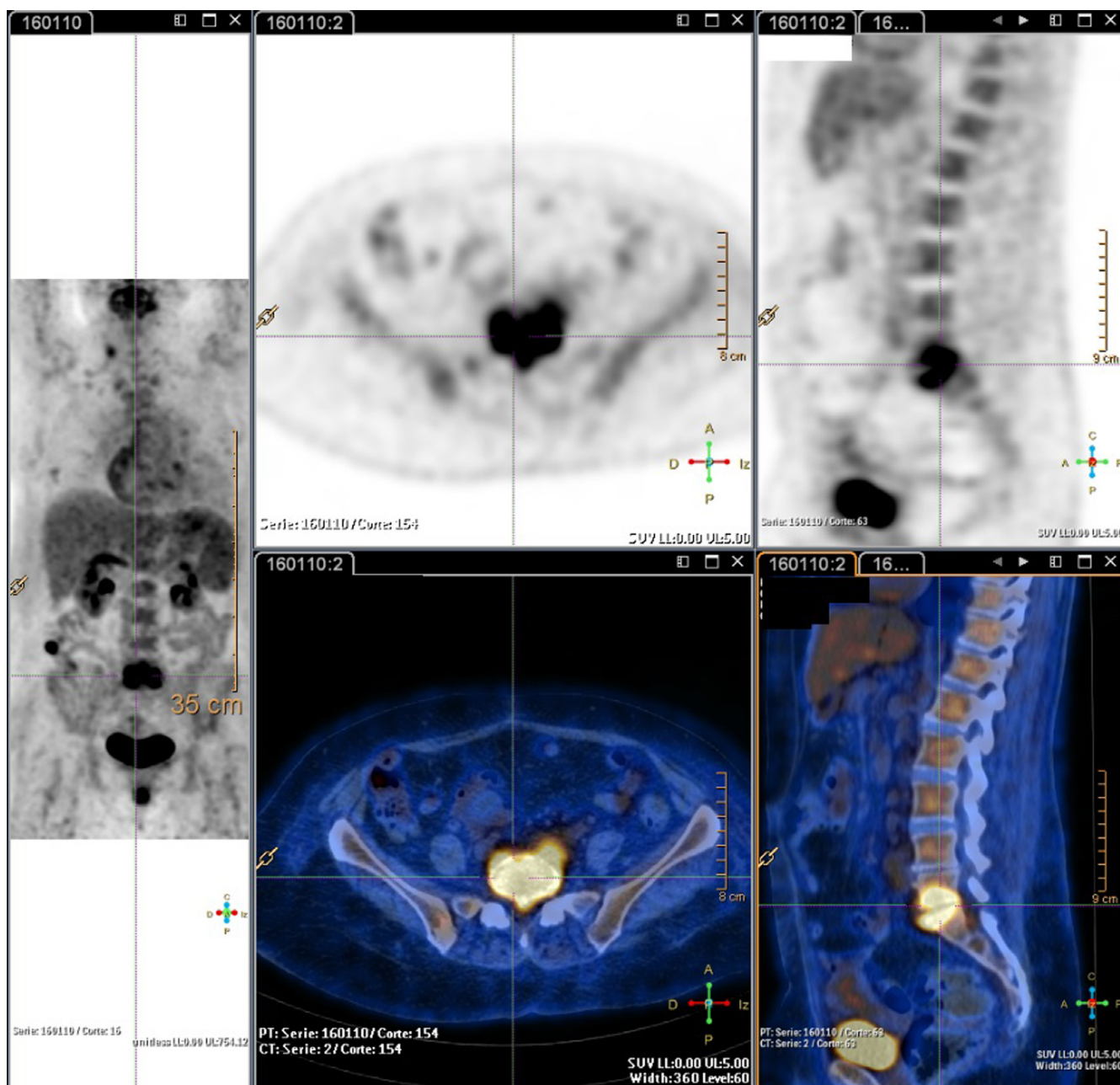


Fig 8 – PET/CT assembly showing uptake in L5-S1 space.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2019.04.006.

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