

Focal Hypermetabolism in the Pontine Region: a Coincidental Finding on [¹⁸F]FDG PET/CT that May Demonstrate Osmotic Demyelination Syndrome.

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Abstract

We report a case of a patient with complaints of progressive back pain while being suspected for bacterial arthritis of the left ankle. The [¹⁸F]FDG PET/CT confirmed an arthritis of the left tibiotalar joint without signs of spondylodiscitis. As coincidental finding, remarkably high [¹⁸F]FDG uptake in the pontine region was demonstrated while the patient was not having significant neurological symptoms. The patient appeared to be familiar with alcohol abuses and mild electrolyte disorders (incl. hyponatremia) when admitted to the hospital. Although MRI did not demonstrate the typical signal characteristics, one should always consider osmotic demyelination syndrome (ODS), formerly called central pontine myelinolysis (CPM), in patients with focal high [¹⁸F]FDG uptake in the pontine region and a recent history of overly rapid correction of hyponatremia.

Case report

A 60-year old male patient known with alcohol abuses was admitted to the emergency room with complaints of fever and progressive pain of his red, swollen left ankle. Laboratory tests revealed an elevated C-reactive protein level, leucocytosis and electrolyte disorders, including a mild hyponatraemia (132 millimol per liter). Upon inquiry, he also appeared to have thoracic back pain suspicious for (secondary) spondylodiscitis. Conventional imaging of the thoracic

spine showed no abnormalities. Several days after hospitalization an additional Positron Emission Tomography (PET) with 2-deoxy-2-[fluorine-18]fluoro-D-glucose ([¹⁸F]FDG) computed tomography (CT) was performed which demonstrated an arthritis of the tibiotalar joint and focal high uptake in the vertebral body of L2 without involvement of the intervertebral discus, referred to as active degeneration with an insufficiency wedge fracture of the endplate. As coincidental finding, an area of high uptake in the pontine region was seen while the patient was not showing any neurological

symptoms (figure 1). Differential diagnostic considerations at that time were osmotic demyelination syndrome (ODS) or acute pontine ischemia. Additional magnetic resonance imaging (MRI) images are shown in figure 2.

Discussion

ODS refers to acute demyelination seen in the setting of rapidly corrected electrolyte disturbance, typically in case of a hyponatremia (serum level < 120 millimol per liter) (1). This potentially lethal syndrome could damage the central pontine tissue as well as extrapontine structures. Clinical

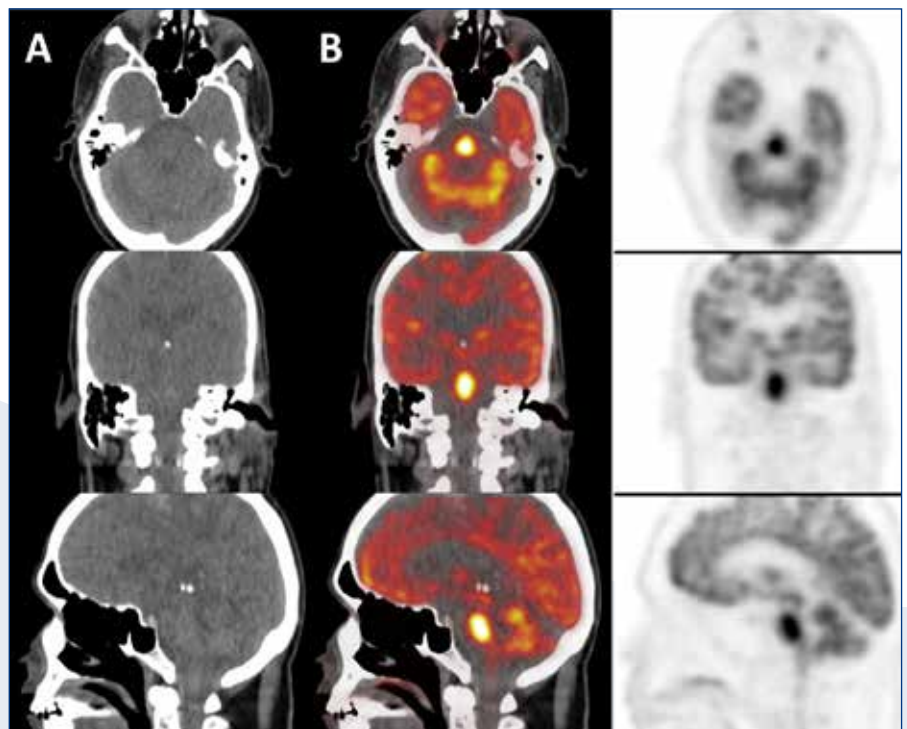


Figure 1. Non-enhanced low-dose computed tomography (CT) images showing no signs of ischemia or intracranial haemorrhage (A). [¹⁸F]FDG-PET/CT transaxial, coronal and sagittal images with high uptake in the pontine region (B).

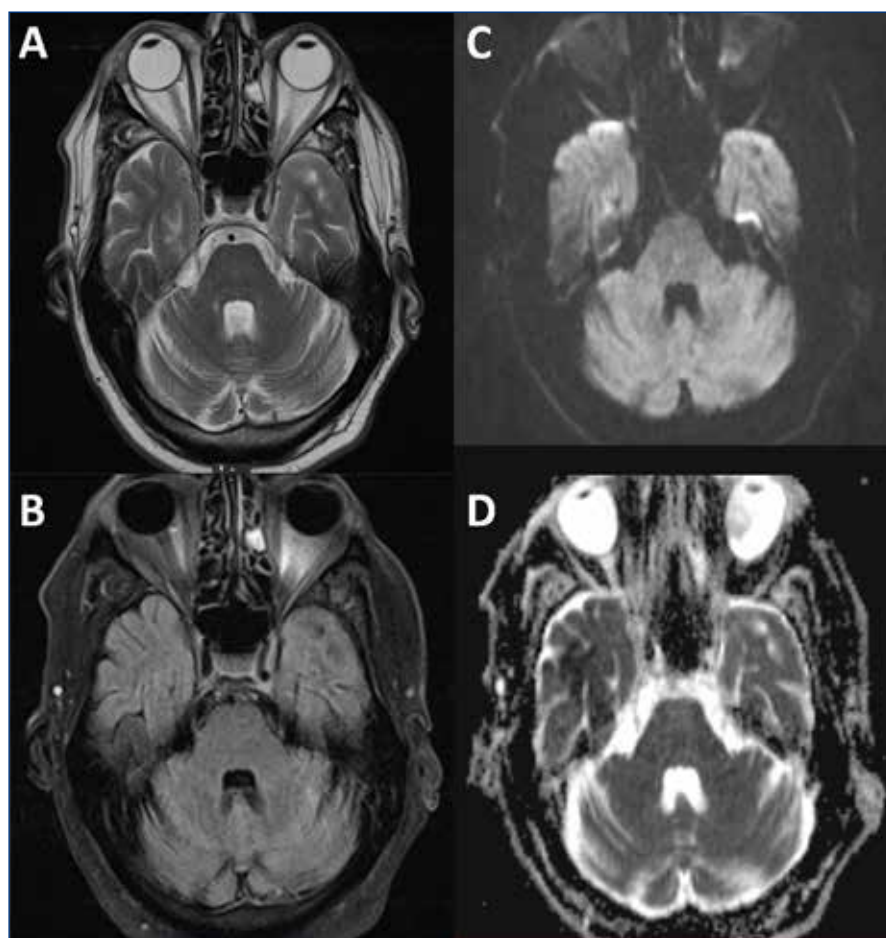


Figure 2. Magnetic resonance imaging (MRI) of the cerebrum. Subtle T2/FLAIR hyperintense signal in the pons (A+B), which corresponds to a small area of diffusion restriction (C) with signal loss on the apparent diffusion coefficient (ADC) image (D).

symptoms may present in phases starting with acute encephalopathy followed by transient improvement and ultimately resulting in spastic quadriparesis, pseudobulbar palsy, coma and death.

In the acute setting, [^{18}F]FDG-PET/CT may demonstrate high uptake in the affected cerebral region (2). On MRI, the earliest change (<24h) is seen on diffusion weighted images (DWI) showing diffusion restriction (and signal loss on apparent diffusion coefficient images [ADC]) in the affected area (3). T2-weighted images

and FLAIR-images are typically showing hyperintense signals in the affected area, although it may take up to two weeks to develop.

Although laboratory tests did not show severe hyponatraemia and MRI only demonstrated subtle signal changes, this case report emphasizes the possibility of early recognition of ODS on [^{18}F]FDG-PET/CT, as demonstrated by a focal area of high metabolisms in the pontine region.

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