Interesting images

Diagnosis and assessment of the treatment response in a case of giant cell arteritis using $^{18}$F-FDG PET/CT

Diagnóstico y evaluación de la respuesta al tratamiento en un caso de arteritis de células gigantes con $^{18}$F-FDG-PET/TC


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A 56-year-old woman complained of a five months history of low-grade fever, headache, cough, weight loss, backache, weakness and muscle pain in the lower extremities with progressive difficulties of gait. Physical examination was normal. Biochemical data showed an erythrocyte sedimentation rate (ESR) of 94 mm/h, a C-reactive protein (CRP) of 4.2 mg/dl, and a normocytic anemia with hemoglobin of 11.3 g/dl. All other laboratory tests, including thyroid hormones, tumour markers, rheumatoid factor, total complement level, anti-streptolysin O (ASLO), virus serology, antinuclear antibody (ANA), antiproteinase-3, antimyeloperoxidase antibody and angiotensin-converting enzyme (ACE) were negative.

Chest X-ray, abdominal ultrasonography, and thoracic and abdominal CT were performed and reported as normal. Therefore, a $^{67}$Ga-citrate scan was requested but planar whole-body views and thoracic SPECT showed no abnormality.

In this context, and as giant cell arteritis (GCA) and/or polymyalgia rheumatica was suspected, an $^{18}$F-FDG PET/CT scan was requested.

$^{18}$F-FDG PET/CT was performed 90 min after intravenous injection of 7 MBq/kg of $^{18}$F-FDG. Basal glucose serum level was 91 mg/dl. First, a low-dose CT scan was acquired and data were used for attenuation correction and anatomical localization purposes. Following the CT scan, a whole-body PET scan including extremities was acquired (2 min per bed). The images were reconstructed using an iterative OSEM algorithm (2 iterations and 8 subsets) and a Gaussian filter of 5 mm. The images obtained revealed a well defined increased $^{18}$F-FDG lineal uptake along the walls of the supra-aortic trunks, thoracic and abdominal aorta (Figs. 1A, 2A and B), initial part of the iliac arteries, and femoral and tibioperoneal arteries (Fig. 3A). Based on $^{18}$F-FDG PET/CT findings and increased levels of ESR and CRP, a diagnosis of GCA was established.

A biopsy of the right temporal artery performed after PET/CT was reported as myointimal fibrosis.

Treatment with oral prednisone (40 mg daily) and methotrexate (2.5 mg) was initiated and an early clinical improvement was evident, with remission of fever, headache, muscle pain and weakness and also ESR and CRP returned to normal levels.

The $^{18}$F-FDG PET/CT scan was repeated 4 months later to evaluate the response to therapy, following the same protocol as the previous one. At this time, the patient was receiving a decreasing regimen of prednisone (25 mg daily) and metotrexate (2.5 mg). The images obtained showed a reduction in the intensity of $^{18}$F-FDG uptake in all vascular regions affected (Figs. 1B, 2C and D), especially marked in the femoral and tibioperoneal arteries (Fig. 3B), related to a good response to treatment.

Several studies have demonstrated that $^{18}$F-FDG PET/CT is a useful non-invasive functional imaging technique for assessing the activity and extent of large vessel vasculitis. In our case, $^{18}$F-FDG PET/CT examination contributed to the management of the patient in two ways. First, for the diagnosis of GCA in a setting where non-specific symptoms of the disease were present and temporal artery biopsy was negative, something which is not rare. Second, and in addition, the follow-up $^{18}$F-FDG PET/CT proved its value to assess the treatment response by showing a decrease of the uptake by the vessel walls in the vascular regions involved, as it has been previously reported.
Figure 1. Sagittal PET and PET/CT fused images of the pretreatment study (A, upper row) show a well-defined lineal uptake along the vessel walls of the thoracic aorta. Sagittal PET and PET/CT fused images 4 months after therapy (B, lower row) show a decrease in the intensity of $^{18}$F-FDG uptake in the thoracic aorta wall.

Figure 2. Thoracic (A) and abdominal (B) axial PET and PET/CT fused images of the pretreatment study. Thoracic (C) and abdominal (D) axial PET and PET/CT fused images after treatment show an important decrease of the $^{18}$F-FDG uptake in the aorta wall.
Figure 3. MIP images of the lower extremities. The pretreatment PET/CT scan (A) shows a very intense $^{18}$F-FDG uptake along the femoral and tibioperoneal arteries. The PET/CT performed after treatment (B) reveals a striking decrease of the uptake.

References

