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# Are We Missing Diagnosis of Large Vessel Vasculitis? Role of $^{18}$F-Fluorodeoxyglucose PET-CT Scan

*To the Editor:*

This case illustrates the potential benefit of molecular imaging in the diagnosis of large vessel vasculitis. The incidence of large vessel vasculitis is 0.02% of the population. The prevalence of involvement of extracranial vessels in giant cell arteritis is approximately 15%. Large vessel vasculitis is underdiagnosed substantially as proven by autopsy observations. A tardy diagnosis of thoracic large vessel vasculitis can lead to further vascular complications, including aneurysmal formation and occlusive disease.

## CASE REPORT

A 69-year-old man with a medical history of C5-C6 quadriplegia and atrial fibrillation presented to the clinic reporting left temporal area discomfort for 2 weeks associated with visual alteration. He denied tongue or jaw claudication. No tenderness over the superficial temporal artery territory was present, and the remainder of the physical examination results were unremarkable.

Abnormal laboratory study results included an elevated erythrocyte sedimentation rate (45 mm/h), elevated C-reactive protein level (7.3 mg/dL), and elevated interleukin-6 level (17.4 pg/mL). The results of other laboratory studies, including antinuclear antibody, complement C3 and C4, immunoglobulin-G subclass 4, c-anti-neutrophil cytoplasmic antibody, p-anti-neutrophil cytoplasmic antibody, SSA and SSB antibodies, ribonucleic protein antibody, and hepatitis panel, were negative.

The patient was administered 60 mg of prednisone empirically for suspected diagnosis of giant cell arteritis. A temporal artery biopsy and $^{18}$F-fluorodeoxyglucose (FDG) positron emission tomography (PET) computed tomography (CT) scan of the aortic arch and temporal vessels were performed (**Figure 1**). Bilateral temporal artery biopsy results were negative for giant cell arteritis. $^{18}$F-FDG PET scan revealed increased uptake in the thoracic aorta continuing into the abdominal aorta, without abnormal vascular uptake in the head and neck, suggestive of large vessel vasculitis as seen in a variant of giant cell arteritis. Four weeks later, his C-reactive protein level decreased to <0.29 mg/dL and erythrocyte sedimentation rate decreased to 32 mm/h. A control $^{18}$F-FDG PET-CT scan 2 months later showed a reduction in FDG uptake with minor residual disease. Furthermore, thoracic magnetic resonance angiography showed no evidence of arteritis. Steroid treatment was tapered over the next 3 months, and methotrexate was started. A follow-up $^{18}$F-FDG PET scan is scheduled in 3 months.

## DISCUSSION

Patients with large vessel vasculitis regularly present a set of nonspecific symptoms and laboratory tests, which make their diagnosis and follow-up challenging. Standard diagnostic procedures include biopsy, angiography, ultrasound, and magnetic resonance angiography. These procedures are invasive or detect only morphologic changes that mainly occur in later stages of the disease.

The underlying principle of PET imaging in inflammatory processes is the increased accumulation of glucose and structurally related substances, such as FDG, into inflammatory cells. PET-CT imaging is not included in any vasculitis classification criteria, but it is used increasingly to diagnose large vessel vasculitis given the ability to reveal increased metabolism and functional alterations that precede the morphologic changes.

The common $^{18}$F-FDG uptake pattern found in giant cell arteritis is linear and continuous, and thoracic vessels are affected most frequently, followed by the abdominal vessels. Limitations include variability regarding the diagnostic criteria (visual scoring systems for $^{18}$F-FDG uptake, semiquantitative uptake values) used for differentiation between affected and unaffected vessels and for assessment of disease activity.

## CONCLUSIONS

Recent studies have shown $^{18}$F-FDG PET-CT sensitivities between 56% and 100% for detecting giant cell arteritis.[1,2] Normal magnetic resonance angiography and CT angiography can be misleading, showing no inflammatory process of vessels. In patients with a negative biopsy or atypical presentation, this procedure is often indispensable in establishing the diagnosis. This is clinically significant because patients with giant cell arteritis with aortic involvement are prone to aneurysm formation and should be monitored clinically.[3] The use of whole-body scanning via $^{18}$F-FDG PET-CT may provide a more sensitive imaging

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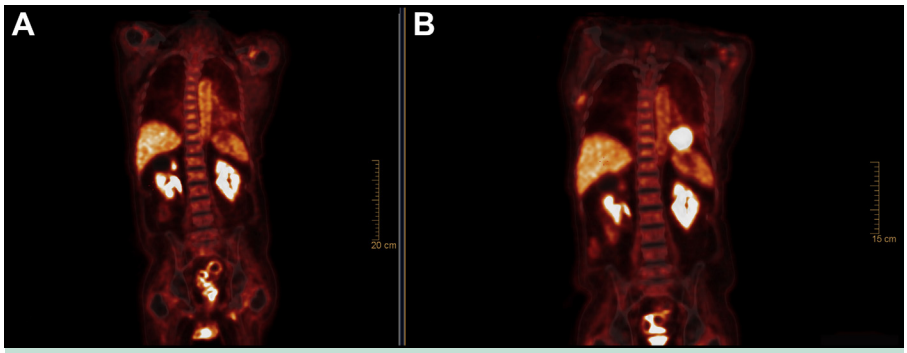


**Figure 1** $^{18}$F-FDG PET-CT scan, coronal view. (**A**) Increased uptake in the thoracic aorta. (**B**) Minor residual disease after 8 weeks of immunosuppressive therapy.

modality that could lead to a shorter diagnostic workup and be a valuable tool to monitor treatment response.

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