

Giant Cell Arteritis Causing Symmetric Bilateral Posterior Circulation Infarcts

Devin D Mackay, MD,* Graham R. Huesmann, MD, PhD,* Roseann I. Wu, MD,†
James R. Stone, MD, PhD,† and Misha L. Pless, MD*‡

Abstract: An 82-year-old woman presented with bilateral, symmetric posterior circulation infarctions secondary to giant cell arteritis (GCA). Her atypical clinical presentation included a lack of headache and fever, but she exhibited signs of systemic illness including generalized weakness, cachexia, apathy, and anemia. Laboratory testing revealed a markedly elevated erythrocyte sedimentation rate, but only a borderline elevated C-reactive protein. Head and neck vascular imaging demonstrated a pattern of vertebral arterial narrowing consistent with GCA—a diagnosis confirmed by temporal artery biopsy. Her unusual symptomatic, laboratory, and imaging presentation highlights the importance of considering GCA in the differential diagnosis of unusual bilateral stroke syndromes, where early treatment decreases morbid outcomes.

Key Words: giant cell arteritis, stroke, posterior circulation, temporal arteritis

(*J Clin Rheumatol* 2013;19: 393–396)

Ischemic strokes are most often due to atherosclerotic cerebrovascular disease or embolism and cause infarction in some portion of a vascular territory. Rarely, ischemic strokes may be caused by an inflammatory arteriopathy, as in giant cell arteritis (GCA). Clues to the diagnosis of GCA in a patient presenting with stroke include headache, scalp tenderness, jaw claudication, fever, weight loss, polymyalgia rheumatica, visual loss, and an elevated erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). However, not all patients with stroke associated with GCA exhibit all or even most of the classic signs and symptoms. Sometimes the clue to diagnosis can come from the stroke pattern itself.

CASE REPORT

An 82-year-old right-handed homemaker with a history of hypertension and anemia presented with general decline, weakness, cachexia, apathy, and decreased level of arousal, beginning abruptly 4 weeks prior. She denied headache and was afebrile. Her systolic blood pressure on the day of evaluation ranged between 127 and 169 mm Hg, and diastolic pressures were between 57 and 79 mm Hg. Examination revealed tenderness to palpation over the neck and left temporal artery, normal mental status, no gaze restriction, and normal visual fields. There was symmetric upper-limb dysmetria and marked lower-limb dysmetria. She had a severely ataxic gait and difficulty maintaining an erect posture. Erythrocyte sedimentation

rate was 85 mm/h (reference range, 0–17 mm/h), and CRP was 8.9 mg/L (reference range, <8.0 mg/L). Anemia studies included iron 28 µg/dL (reference range, 30–160 µg/dL), total iron-binding capacity 200 µg/dL (reference range, 230–404 µg/dL), and ferritin 28 ng/mL (reference range, 10–200 ng/mL)—all consistent with anemia of chronic disease. The duration of anemia was unknown. Low-density lipoprotein cholesterol was 124 mg/dL (reference range, 50–129 mg/dL), and the lupus anticoagulant screen was negative.

On hospital admission for further workup, magnetic resonance imaging of the brain demonstrated areas of round, symmetric, T2 prolongation in the middle cerebellar peduncles bilaterally and 2 small foci in the pons. Diffusion-weighted imaging showed hyperintensity (reduced diffusivity) and apparent diffusion coefficient map showed corresponding hypointensity, consistent with subacute infarction (Fig. 1).

Vessel imaging (magnetic resonance and computed tomography angiography) showed multifocal, moderate to severe stenosis in both vertebral arteries throughout their courses, right greater than left (Fig. 2). She was started on intravenous heparin as a bridge to warfarin. A temporal artery biopsy was pursued for diagnostic confirmation of GCA.

Pathologic analysis of a 2.4-cm segment of the left temporal artery showed transmural granulomatous inflammation. The inflammatory infiltrate was predominantly composed of lymphocytes and macrophages as well as occasional multinucleated giant cells, diagnostic of GCA. The artery demonstrated marked intimal hyperplasia with significant luminal narrowing (Fig. 3). Oral prednisone therapy was initiated at 60 mg daily.

Over 1 year after diagnosis, there were no further strokes, and she had been tapered off prednisone. Warfarin was stopped after 7 months because of a suspicion of gastrointestinal bleeding, without an antiplatelet substitute. A computed tomography angiogram of the head and neck 3 months after her strokes showed no significant changes in the degree of arterial stenosis. The ESR decreased from 85 mm/h at the time of diagnosis to 19 mm/h at 2 weeks later and remained under 15 mm/h for the next 9 months during which follow-up ESR data were available. The hematocrit increased from 29% to 40% at 9 months. At 10 months, iron- and total iron-binding capacity rose to 70 and 334 µg/dL, respectively. Neurologic examination more than 1 year after her strokes was remarkable for mild dysmetria of both upper limbs and marked truncal ataxia, although she was able to walk without assistance.

DISCUSSION

Giant cell arteritis is a systemic vasculitis characterized by subacute granulomatous inflammation of the aorta and its major branches (large and medium vessels) with particular tropism for the extracranial carotid artery branches in patients older than 50 years. Stroke is a rare complication of GCA, accounting for less than 1% of all ischemic strokes,¹ and about 3% of patients with GCA experience an ischemic stroke.^{2,3} Symmetric bilateral infarctions in the middle cerebellar peduncles, as seen in this

From the Departments of *Neurology and †Pathology, Massachusetts General Hospital; and ‡Harvard Medical School, Boston, MA.

The authors declare no conflict of interest.

Correspondence: Misha L. Pless, MD, Department of Neurology, Massachusetts General Hospital, 15 Parkman St, Boston, MA 01945.
E-mail: Pless.Misha@mgh.harvard.edu.

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ISSN: 1076-1608/13/1907-0393

DOI: 10.1097/RHU.0b013e3182a6ffc1

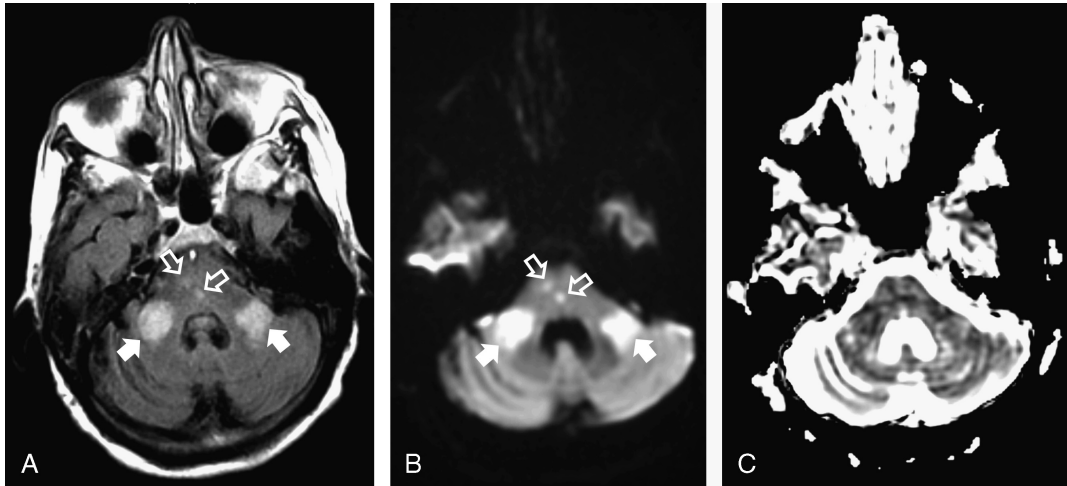


FIGURE 1. Bilateral middle cerebellar peduncle (MCP) and pontine infarcts on brain magnetic resonance imaging. There was no evidence of infarction in other vascular territories. A, T2 FLAIR sequence showing increased T2 signal in pons (outlined arrowheads) and MCPs (solid arrowheads), bilaterally. B, Diffusion-weighted imaging sequence showing restricted diffusion. C, Apparent diffusion coefficient map showing subtle bilateral MCP and pontine hypointensity, consistent with acute infarction.

case, are even rarer⁴ and are often the result of vascular insufficiency in the territory of the anterior inferior cerebellar artery⁵ or the supplying vertebral artery, although the vascular supply can be variable.

The typical pattern of inflammatory narrowing of cranial arteries in GCA spares the intracranial vertebral arteries, with the exception of the most proximal 5 mm of the intradural portion.⁶ Wilkinson and Russell⁶ critically examined the pattern

of arteritic involvement in a total of 12 autopsy cases of GCA (4 primary cases and 8 cases from available literature). They found that arterial segments with significant elastic tissue in the media and the external elastic lamina correlated with increased arteritic involvement. There is less elastic tissue in these arterial layers in the intracranial vasculature than in the extracranial arteries, suggesting that the elastic tissue may be the target of the inflammatory response in GCA. Specifically in the vertebral

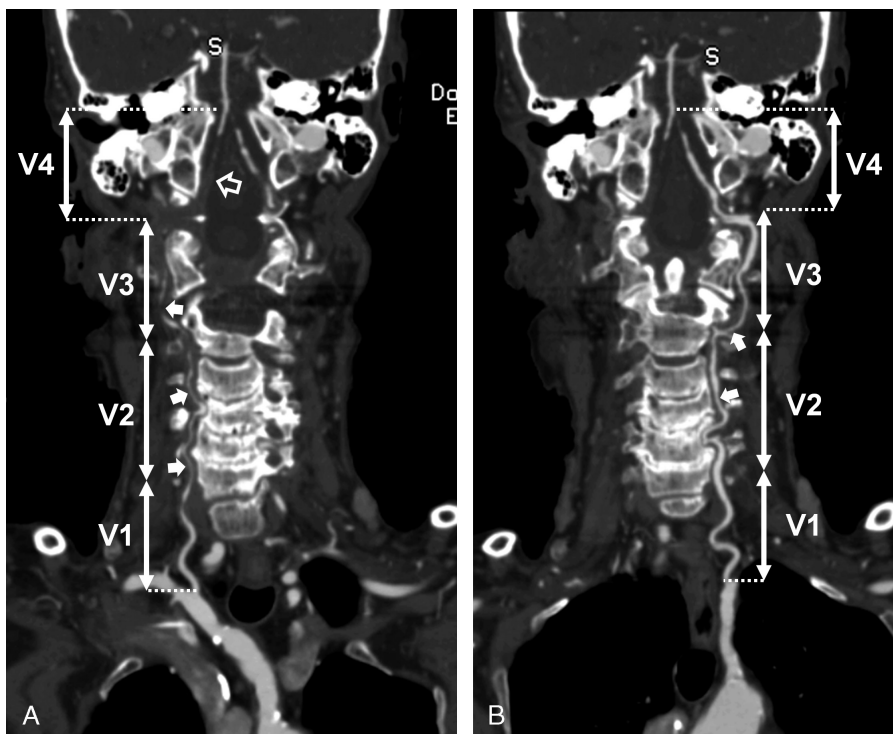


FIGURE 2. Curved reformats of an anteroposterior view of the vertebral arteries from a computed tomographic angiogram. A, Right vertebral artery course (arrows) showing significant stenosis (solid arrowheads) and contrast nonopacification (outlined arrowheads) through the V2, V3, and proximal V4 segments. B, Left vertebral artery course showing V2, proximal V3, and distal V4 stenosis (solid arrowheads).

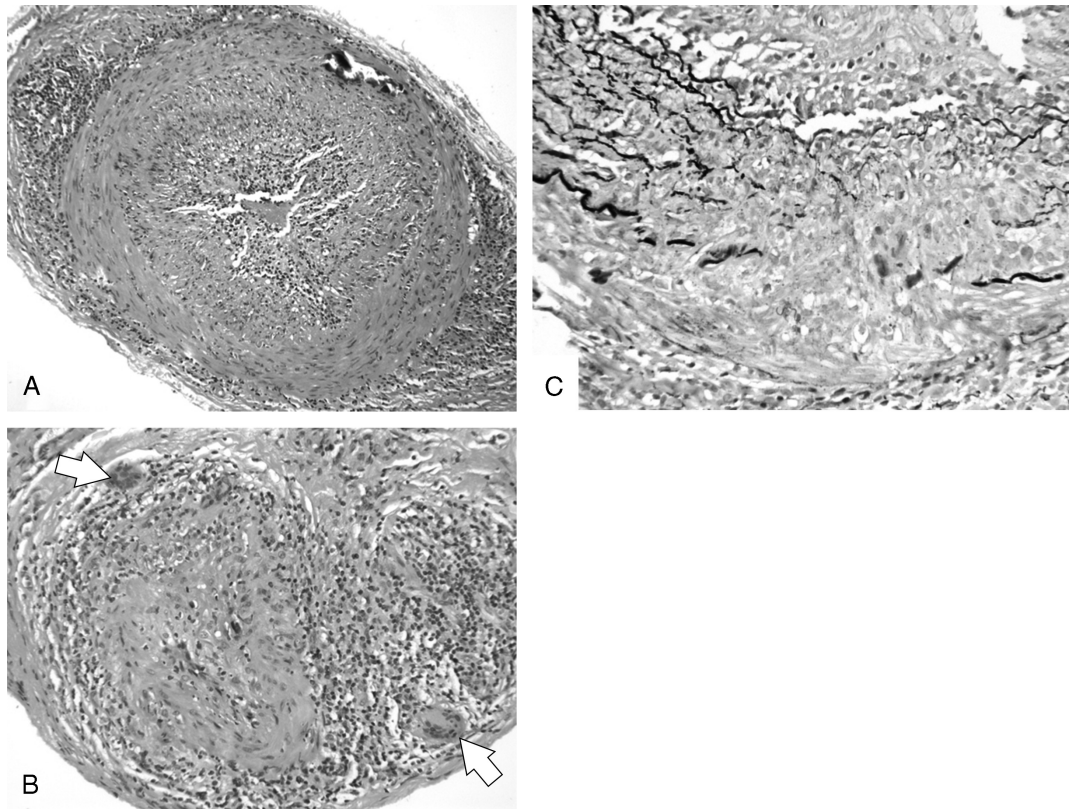


FIGURE 3. Temporal artery biopsy showing evidence of GCA. A, Hematoxylin-eosin (H&E)-stained section at 100 \times magnification showing the main superficial temporal artery with transmural granulomatous inflammation composed of macrophages and lymphocytes with marked intimal hyperplasia narrowing the lumen. There is focal calcification of media in the top right. B, H&E-stained section at 200 \times magnification showing a branch from the superficial temporal artery with granulomatous inflammation, vascular wall injury, and intimal hyperplasia. Note the giant cells in the upper left and lower right portions (arrows). C, Elastic stain demonstrating fragmentation of the elastic lamina, consistent with GCA. Available in color online at www.jclinrheum.com

arteries, there is an abrupt decrease and almost total loss of elastic tissue in the arterial walls that starts 5 mm before dural penetration and ends within 5 mm beyond the point of perforation.⁶ As a result, posterior circulation intracranial vasculitis due to GCA has been described in only a handful of autopsy-proven case reports.^{4,7} Bilateral cerebellar infarcts have only been rarely described.⁷ Most bilateral posterior circulation infarcts reported in the literature have been the result of atherosclerotic disease.⁸

Atherosclerosis can cause bilateral vertebral artery narrowing and even occlusion, but most typically in a pattern that involves atheromatous plaque accumulation at the origin and terminus (most proximal V1 and most distal V4 segments) of the vertebral arteries. In GCA, narrowing most typically occurs throughout the V3 segment, which is extradural, and most proximal V4 segment.^{6,7} A pattern suggestive of GCA with intradural extension was seen in our patient (Fig. 2). Bilateral vertebral artery occlusion causing bilateral cerebellar strokes has been reported in GCA.⁹

Of the typical modifiable risk factors for stroke, our patient had only hypertension. A retrospective review of 287 consecutive patients in Lugo, Spain, with biopsy-proven GCA showed that GCA patients with hypertension exhibited a significantly higher risk of stroke than did those with normotension.³ It is possible that atherosclerosis also contributed to our patient's stroke syndrome.

In our patient, typical symptoms of GCA including headache, fever, scalp tenderness, and jaw claudication were not

present, although she exhibited other signs of systemic disease, including cachexia, failure to thrive, and anemia. Interestingly, there is evidence that the absence of fever and higher hemoglobin values in GCA are associated with fewer ischemic events. There is further evidence to support that these signs are a marker of a weaker systemic inflammatory response, which results in reduced inflammation-induced angiogenic activity that may play a compensatory role for ischemia in patients with GCA.^{10,11}

The CRP was near normal at 8.9 mg/L, and although it is a more sensitive marker than ESR for a positive temporal artery biopsy result,¹² the present case illustrates the utility of obtaining both tests in the laboratory screening of patients with suspected GCA.

This case highlights the importance of considering GCA in unusual presentations of posterior circulation strokes. Its debilitating natural history and responsiveness to treatment emphasize the importance of early diagnosis and intervention.

KEY POINTS

- Giant cell arteritis should be considered in the differential diagnosis of bilateral symmetric stroke syndromes involving the posterior intracranial circulation.
- Vertebral artery stenosis characteristic of GCA most typically occurs throughout the V3 and most proximal V4 segments, whereas atherosclerotic arterial stenosis is most common in the proximal V1 and distal V4 segments.
- Although CRP may be a more sensitive marker than ESR for a positive temporal artery biopsy result, obtaining both ESR and

CRP laboratory tests may increase the diagnostic yield in unusual presentations of GCA.

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