Case Report

Limb-shaking Transient Ischemic Attack Masquerading as Lumbar Radiculopathy from Pericallosal Artery Stenosis Treated Successfully with Intracranial Angioplasty and Stenting

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The pericallosal artery is rarely associated with intracranial atherosclerotic disease and, until recently, was usually not amenable to endovascular therapy with balloon angioplasty and stenting. We present an elderly patient with postural left leg-shaking episodes secondary to pericallosal artery stenosis, which was treated initially with primary intracranial balloon angioplasty, and subsequently, angioplasty and stenting as a result of recurrent stenosis. Both procedures were preformed without complications, and the patient remained free of symptoms on 6-month follow-up. This case demonstrates unique clinical and neuroendovascular aspects; the isolated postural leg-shaking transient ischemic attacks, initially mistaken for radiculopathy and local joint etiology, were found later to be cerebrovascular ischemic in origin. Moreover, the correlation between the findings of computed tomography perfusion and angiography localized the lesion into the medial frontal lobe and pericallosal artery territory. In addition, the technical aspect provides insight into the current state of neuroendovascular techniques, addressing the difficulty of access into very small and distal intracranial arteries affected by stenosis. **Key Words:** Limb shaking—intracranial stenosis—intracranial stenting—neuroendovascular—wingspan—balloon angioplasty—stroke—transient ischemic attack—pericallosal—anterior cerebral artery—leg shaking.

Intracranial atherosclerotic disease (ICAD) is increasingly becoming a well-known etiology of ischemic stroke and may account for 10% of stroke etiology.[1] Currently, ICAD is being treated with maximal medical therapy to control vascular risk factors and with aspirin therapy, which was shown to be equivalent to warfarin in the Warfarin–Aspirin Symptomatic Intracranial Disease (WASID) trial.[2] Surgical approaches with extracranial-intracranial bypass did not show significant benefit over medical therapy alone despite some controversy about the study.[3] Intracranial atherosclerosis remains a major risk for stroke recurrence in spite of treatment with either aspirin or warfarin, with up to 25% risk at 2 years in patients with greater than or equal to 70% stenosis.[4] Recent advances in endovascular revascularization technology have made it a relatively safe alternative to medical therapy for ICAD.[5] Intracranial angioplasty and stenting has come a long way since its first uses. The emergence of specialized stents designed for intracranial arteries, namely Neurolink (Guidant Corp, Indianapolis, IN), Wingspan (Boston Scientific Inc, Fremont, CA), and Pharos (Micrus Endovascular Inc, San Jose, CA), have further advanced

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the technique and made it easier, safer, and more feasible to reach lesions in the distal tortuous cerebral vasculature. Angioplasty and stenting with the Wingspan (Boston Scientific Inc) stent system is approved for ICAD treatment by the Food and Drug Administration after failed optimal medical therapy. Recent data from several clinical registries on the use of Wingspan (Boston Scientific Inc) stent for treatment of ICAD suggest procedural complication rates of 5% to 6%.[6-8]

This is the first reported case to establish the technical feasibility of balloon angioplasty and stenting of distal anterior cerebral artery (A3 segment, i.e., pericallosal artery) stenosis in a patient presenting with leg-shaking transient ischemic attack (TIA). Limb-shaking TIA is an atypical and rare presentation of cerebral artery stenosis.[9-11] On first impression, the symptom is often considered to be focal motor epilepsy or conversion disorder, and therefore pose a challenge for diagnosis; there have been approximately 47 cases reported in the literature.[9-14] This case was misdiagnosed initially as lumbar radiculopathy and local joint disease before the diagnosis of the pericallosal stenosis; furthermore, this case represents the first Wingspan (Boston Scientific Inc) stenting for atherosclerotic disease involving the pericallosal artery.

Case Report

An 85-year-old right-handed woman with a history of hypertension was experiencing involuntary limb shaking and twitching, with intermittent associated loss of all motor function of her lower left extremity; no other neurologic signs or symptoms were present. These symptoms only occurred with activity and when the patient was upright, indicating a postural element. She was highly functional, active, independent, and able to carry out all activities of daily living. Initial evaluation included magnetic resonance (MR) imaging (MRI) of cervical and lumbar spine to assess for possible radiculopathy, which was the prime suspect for her symptoms. She underwent MRI of her knees and hip joints. Studies showed age-appropriate degenerative changes and nothing specific attributed to symptoms. She was then referred to a neurologist, who performed MRI of the head and MR angiography of the head and neck. A small focal area of subacute infarction involving the right side of the corpus callosum in the territory of the right anterior cerebral artery was noted on diffusion-weighted MRI (Fig 1, *A*). Head and neck MR angiography displayed high-grade stenosis with string sign at the right pericallosal artery (Fig 1, *B*). After 6 months of refractory symptoms despite optimized medical therapy and significant disability from the postural symptoms, which prevented the ability to perform daily activities, and evidence of penumbral area on computed tomography (CT) perfusion, endovascular therapy was recommended. The initial endovascular therapy plan was to perform balloon angioplasty only, without stent implantation. Given the patient's age, this was thought to provide durable stroke prevention along with continued antiplatelet therapy. Digital subtraction angiography demonstrated a long segment of critical stenosis in the proximal right pericallosal artery with estimated 10-mm length and greater than 95% diameter stenosis (Fig 1, *C*). The stenotic segment of the pericallosal artery was crossed and a 1.5- × 15-mm Gateway balloon (Boston Scientific Inc) was advanced and inflated across the lesion with several inflations to cover the length of the stenosis. This resulted in near complete reconstitution of the stenosed segment to normal vessel caliber (Fig 1, *D*). No periprocedural complications were encountered, and she was discharged home the following day.

Initially, the patient remained symptom free without leg-shaking TIAs. However, after 6 weeks, her symptoms began to reoccur with increasing frequency. Within 2 more weeks, the symptoms were approximately of the same frequency and severity as before the procedure. In spite of combination antiplatelet therapy, this postural recurrent TIA was presumed to be related to restenosis of the previously angioplastied pericallosal segment. The

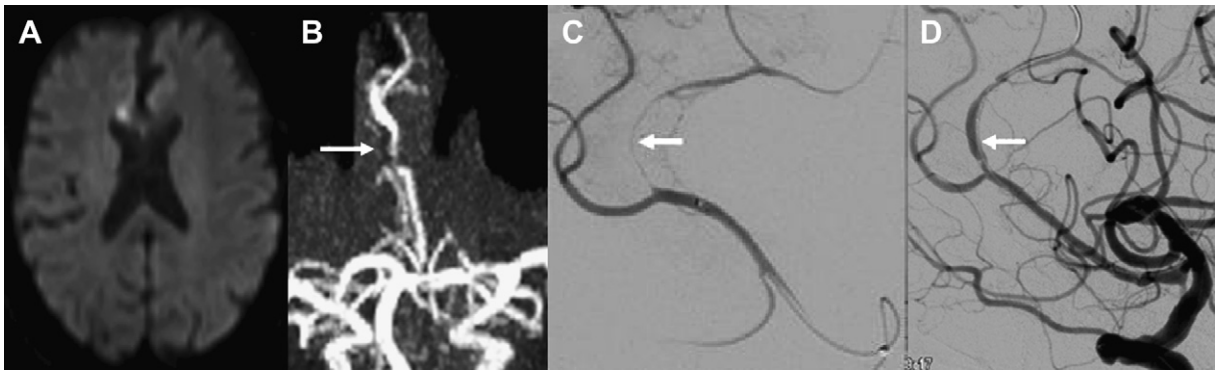

Figure 1. *Diffusion-weighted MRI showing only positive small and focal hyperintense lesion at right anterior corpus callosum (A). MR angiography in anterior projection is showing critical pericallosal artery stenosis with string sign (B). Digital subtraction angiography of right anterior cerebral artery via microcatheter (C) performed 6 months after MRI showing critical stenosis of pericallosal artery starting at A2 segment bifurcation. Balloon angioplasty using 1.5- × 15-mm balloon with final result showing near complete reconstitution of pericallosal artery lumen (D).*