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Endovascular Management, with the Use of Solitaire Stent as the First-Line Treatment for Cerebral Vasculitis: A Case Report

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Abstract

Cerebral vasculitis that comprises a group of noninfectious inflammatory vasculitides, can produce a variety of neurologic events, including also life-threatening ones. In this paper we describe the case report of a 37-year-old female patient with cerebral vasculitis manifesting as ischemic stroke of the left cerebral hemisphere. Her clinical status deteriorated, despite immunosuppression. CT angiography demonstrated several occlusions of intracranial arteries. We describe details of endovascular revascularization of intracranial arteries in this patient, with focus at the use of the Solitaire stent, which seems to be particularly useful in such challenging cases. After endovascular repair this patient significantly improved, yet this improvement lasted only 2 months. Then there was a relapse of cerebral vasculitis, which finally resulted in fatal outcome. In our opinion, endovascular treatment for life-threatening cerebral vasculitis should primarily be seen as a treatment that is supplementary to pharmacological management of the autoimmune process.

Keywords

Angioplasty; Cerebral vasculitis; Stents

Introduction

Cerebral vasculitis (CV) comprises the group of noninfectious inflammatory vasculitides, such as giant cell arteritis, Takayasu arteritis, Churg-Strauss angiitis, and many others. CV can produce a variety of neurologic events, usually in young female patients [1]. Neurological symptoms can be variable, but most often seen include a headache, dizziness, transient ischemic attack and stroke [2]. CV is the cause of significant morbidity and mortality (3-11% of all diagnosed cases) among young patients. Majority of fatalities in CV patients are caused by stroke and myocardial infarction.

Case

Here we present the treatment of a 37-year-old woman with clinical signs of CV, possibly due to Takayasu arteritis (precise diagnosis was not possible in this patient since the disease affected only intracranial arteries and autopsy was not performed), who for the second time developed ischemic stroke of the left cerebral hemisphere, with neurological deficit, comprising right-sided hemiparesis and aphasia, which deteriorated despite immunosuppression with prednisone (0.3 mg/kg). CT angiography demonstrated occlusion of the ophthalmic segment (C6) of the left Internal Carotid Artery (ICA) and critical stenosis of the contralateral carotid artery, also in the ophthalmic segment. There were also stenoses of the intracranial part of the right vertebral artery and the left Posterior Cerebral Artery (PCA).

Considering the severe neurological status of the patient, we decided to attempt endovascular revascularization of compromised cerebral arteries. Catheter angiography confirmed complete occlusion of the left ICA and critical stenosis of the left PCA. On the right side, there was a critical stenosis of the communicating (C7) segment of the ICA with the flow toward anterior cerebral artery and contralateral carotid artery. This stenosis has progressed when compared to previous CT angiography of this patient, which was performed during management of the previous stroke. There was also an occlusion of the right middle cerebral artery (MCA) (this territory received inflow from the right vertebral artery) and critical stenosis of the intracranial part of the right vertebral artery (Figure 1 A-D).

An attempt to navigate through occlusion of the left ICA was unsuccessful. Then we tried to manage stenosis of the right ICA. Firstly, we advanced the guiding catheter Chaperon (MicroVention, Tustin, CA, USA) into the supraclinoid (C4) segment of the ICA, afterwards, with the help of microcatheter Rebar®(eV3, Plymouth, MN, USA) we introduced

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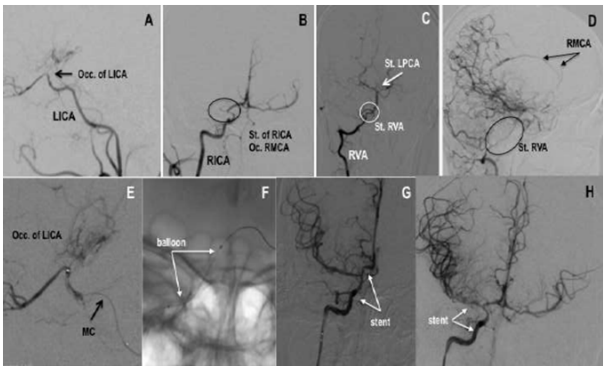

Figure 1: A-Occlusion of the left internal carotid artery (Occ. of LICA) in C6 segment of the artery, with visible small collaterals; B-Critical stenosis of the right internal carotid artery (St. of RICA) in its communicating segment coexisting with occlusion of the middle cerebral artery (Oc. RMCA), visible flow toward the left side; C-Critical stenosis of the right vertebral artery (St. RVA) in V4 segment, coexisting with critical stenosis of the left posterior cerebral artery (St. LPCA); D-Critical stenosis of the right vertebral artery (St. RVA) and visible collaterals to the right middle cerebral artery; E-An attempt to navigate through occluded left internal carotid artery (Occ. of LICA) with the use of supporting microcatheter (MC); F-Inflation of the 2.0/40 mm angioplastic balloon inside critically stenosed right internal carotid artery (distal part of the guide wire is positioned in the left middle cerebral artery); G-Angiography after implantation of the Solitaire stent (stent) into the junction of the right internal carotid artery with the anterior communicating artery; stop of inflow toward the left side is revealed; F-Final results after implantation of the Solitaire stent into the junction of the internal carotid artery with the middle cerebral artery, with good inflow to the middle cerebral artery and improved flow to the left cerebral hemisphere.

the 0,014"guidewire Transend® (Stryker Neurovascular, Fremont, CA, USA) into the left MCA. After the stenosis has been dilatated with the 2.0 mm angioplastic balloon, which was inflated under the pressure of 10 atm for 20 seconds, we advanced the 3 × 30 mm Solitaire™ stent (Stryker Neurovascular, Fremont, CA, USA), which was deployed at the junction of the ICA with the anterior communicating artery. Control angiography revealed a lack of perfusion in this area, despite the injection of vasodilators. Therefore, we removed the stent, and after confirming that there was flow in the arteries on the left side and improved flow in the right MCA, we advanced this stent into the MCA and deployed it at the junction of the ICA with the MCA, using electrolytic detachment of the device. Angiographic control demonstrated the proper positioning of the stent with improved inflow to both cerebral hemispheres (Figure 1 E-H).

After endovascular revascularization of the cerebral arteries, neurological status of this patient significantly improved. She was discharged, with the recommendation of dual antiplatelet therapy (aspirin and clopidogrel). This clinical improvement lasted 2 months when follow up revealed only slight neurological deficit. Control angiography was planned after 1-2 months and any additional revascularization in the cerebral vascular territory depended on the result of this examination. Further treatment of this patient was managed by neurologists. Unfortunately, pharmacotherapy with cyclophosphamide, which was aimed at controlling aggressive vasculitis, resulted in severe myelosuppression. Management with prednisone alone did not prevent from the progression of the disease and after 3 months from the endovascular procedure, this patient presented with clinical signs of another stroke. Endovascular attempts to open occluded stent were not successful and the patient died due to profound cerebral ischemia.

Discussion

In patients with CV and lesions critically compromising cerebral perfusion, endovascular treatment may offer a bridging therapy, until immunosuppression results in an improved status of the diseased cerebral arteries. It should be emphasized that such advanced and severe lesions as in the above-described case are rarely seen in CV patients. Still, they represent an actual therapeutic challenge. An initial satisfactory clinical outcome of this patient after endovascular revascularization resulted from appropriately chosen endovascular armamentarium and good cooperation between neurologists and vascular interventionalists [3-6], still it did not affect clinical course of severe vasculitis in the cerebral vascular territory. Thus, such an interventional treatment should primarily be seen as treatment that is supplementary to pharmacological management of the autoimmune process.

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