

Case Report**Two case reports of successful Endovascular treatment of Vertebrobasilar insufficiency: A Case of an incomplete Balint syndrome and recurrent Vertebrobasilar stroke**

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Introduction

High-grade vertebrobasilar insufficiency is an important cause of posterior circulation stroke. It is characterized by symptoms such as ataxia, diplopia, hemianopia, cranial nerve palsies and decreased level of consciousness. Among rare clinical presentations, Balint syndrome consists of the triad of simultanagnosia, oculomotor apraxia and optic ataxia. It is frequently associated with bilateral ischemic parieto-occipital lesions or some neurodegenerative diseases.

From a therapeutic point of view, there are controversies about the best approach to vertebra basilar insufficiency. The neurologist may choose conservative treatment with optimized clinical therapy or an endovascular treatment approach. The decision about the best treatment for the patient with vertebrobasilar insufficiency depends of the clinical presentation, severity of symptoms, risk of neurological disability and previous functionality. The most effective therapeutic decision must be chosen in order to maintain cerebral perfusion and prevent permanent neurological deficits. Current data are scarce, and best management approaches must be individualized. Some studies suggest efficacy and safety profile of posterior circulation endovascular treatment.

This study aims to describe two case reports of critical vertebrobasilar stenosis. The first case is a case of an incomplete Balint syndrome due to posterior territory hypoperfusion secondary to critical vertebrobasilar insufficiency without permanent acute ischemic injuries, which was completely reversed after endovascular treatment. The second case is a patient with recurrent posterior circulation strokes and high grade vertebrobasilar disease, with tandem lesion, treated with angioplasty and successful reperfusion.

Case 1:

A 73-year-old male patient evolved with bilateral transient amaurosis after myocardial revascularization. Upon examination, he had an homonymous left hemianopsia, optic ataxia and simultanagnosia, without oculomotor apraxia, suggesting an incomplete Balint syndrome. He had no other neurological deficits. Urgent cerebral angiotomography showed subocclusive stenosis of the basilar artery. He was initially treated with Aspirin, Ticagrelor and high dose statins. Brain magnetic resonance imaging showed signs of hypoperfusion in the cerebellar hemispheres and occipital lobes (ASL sequence technique – figure 1), without ischemic lesions.

Cerebral digital angiography was performed and confirmed subocclusive stenosis (> 95 %) in the basilar artery. A microguide was navigated through the stenosis of the basilar artery and positioned in the right posterior cerebral artery. Then, an angioplasty balloon was used to perform the basilar angioplasty. Angiographic control showed satisfactory recovery of the caliber and flow of the basilar artery previously sub-occluded, without any complications.

The patient has evolved with complete resolution of neurological symptoms, without recurrence on long term follow up.

Case 2:

A 64-year-old male patient was admitted in the emergency department with two episodes of transient diplopia and vertigo. He had an antecedent of brainstem stroke one year before these clinical symptoms. Upon examination, he had left lower temporal quadrantanopia, without any other neurological deficits.

Brain magnetic resonance imaging revealed multiple ischemic lesions on different stages evolution in the occipital lobes, with bilateral hypoperfusion. Subacute to chronic ischemic lesions were also present in the subcortical parenchyma and brainstem. There was also tandem lesions with stenosis in the V4 segment of the right vertebral artery and in the distal portion of the V4 segment of the left vertebral artery, close to the origin of the basilar artery. He was initially treated with Aspirin, Ticagrelor and high dose statins.

He was submitted to digital angiography for vertebral artery angioplasty. It revealed marked tortuosity at the origin and in the cervical

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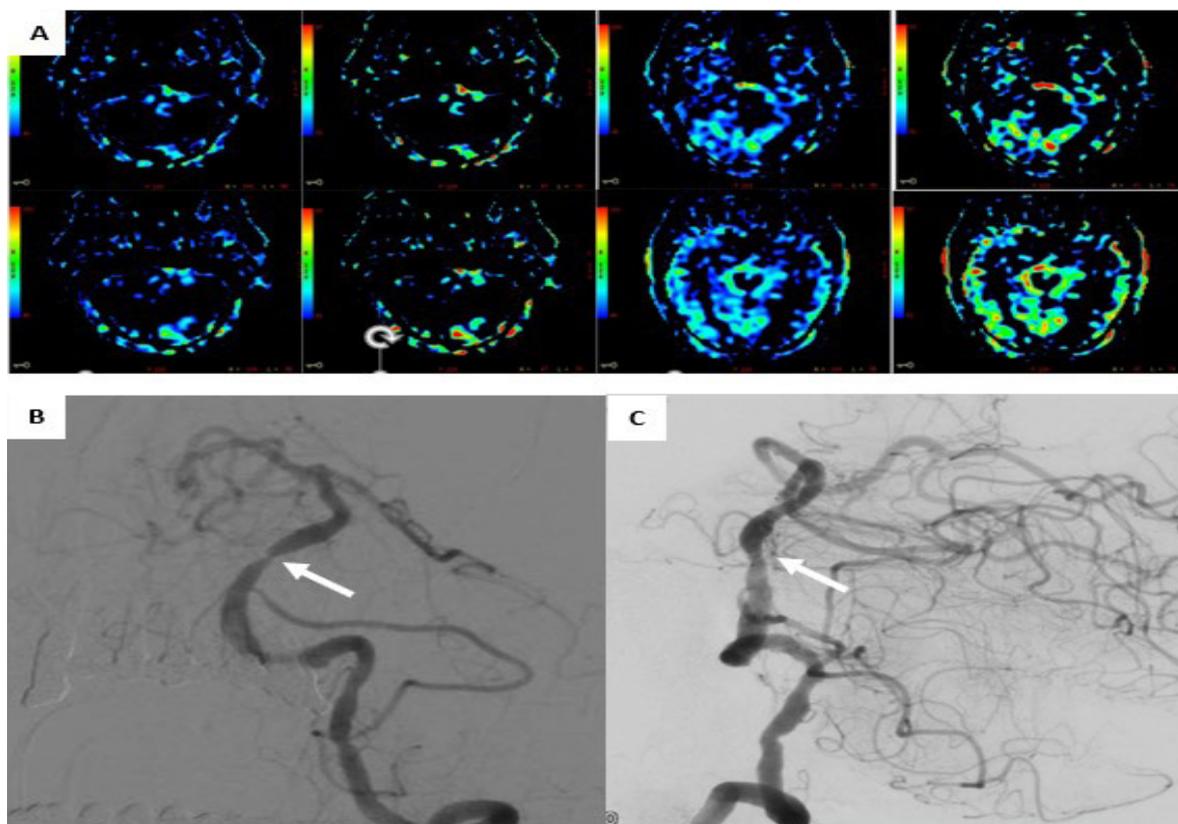


Figure 1: A. MRI ASL technique demonstrating hypoperfusion in the cerebellar hemispheres and occipital lobes, without ischemic lesions. B. Initial angiographic study showed stenosis in two segments of the left vertebral artery and in the basilar artery C. Sub occlusive stenosis of the basilar artery after endovascular treatment with satisfactory outcome (arrow).



Figure 2: A-B. Right vertebral artery with 60% stenosis at V4 segment, below the origin of the right posterior inferior cerebellar artery and another severe stenosis estimated 90% on V4 segment below the junction with the basilar artery (arrows). C-D. Final control angiographic series show right vertebral artery and basilar artery opacification at usual time, with appropriate flow on previously suboccluded segments (arrows).

segment of the left vertebral artery, with 75% stenosis in the V4 segment, close to the emergence of the basilar artery. The right vertebral artery had marked tortuosity and areas of severe stenosis, one of them at V4, below the origin of the right posterior inferior cerebellar artery, with approximately 60% reduction in caliber and another area with stenosis close to 90%, in the V4 segment below the junction with the basilar artery

After the initial control angiographic series, exchange guide wires and a guide catheter were used to reach the origin of the cervical segment of the right vertebral artery. Another vertebral catheter was used through the other femoral access and positioned in the left subclavian artery for stabilization of the left vertebral artery during therapy of the right vertebral artery. With an angioplasty balloon the tortuosity of the right vertebral cervical segment was rectified, allowing the guide catheter through the stenosis towards the basilar artery. Then, with the microguide positioned in the basilar artery, the microcatheter was replaced again and angioplasty was performed in the most critical stenosis located in the high intradural segment of the right vertebral artery achieving complete resolution of the stenosis, with slight parietal irregularity and significant improvement in basilar artery opacification. Next, angioplasty of the stenosis located at the beginning of the intradural segment of the right vertebral artery, below the origin of the plaque, proceeded in the same way, obtaining partial resolution, with a reduction in the degree of stenosis. The final control angiographic series showed improvement of the perfusion on the posterior circulation territory, with no signs of embolism in the intracranial circulation. He was asymptomatic by the time of hospital discharge.

Discussion

Vertebrobasilar insufficiency is defined as a transitory ischemia of the vertebrobasilar circulation, generally due to atherosclerosis disease and hemodynamic changes, representing a considerable risk for posterior circulation stroke. Also, about a third of patients with vertebrobasilar TIA have elevated mortality and fatal events. Symptomatic vertebrobasilar stenosis and acute vertebrobasilar occlusion reaches up to 21% and 84% of mortality rates, respectively.

The most common symptoms are dizziness, vertigo, headaches, vomit, diplopia, blindness, gait and limb ataxia, imbalance, drop attacks, oropharyngeal dysfunction and weakness in both sides of the body. Once suspected, the investigation consist of tomography or magnetic resonance imaging, but digital angiography remains as the gold standard exam to elucidate vertebrobasilar stenosis, despite its inherent risks of complications. Based on current data, there is a high prevalence of occlusion of proximal region of vertebral arteries.

Previous studies have shown that basilar artery occlusion is preceded by prodromal symptoms in >60% of patients.²

Despite the current disagreements regarding the therapeutic approach, the endovascular treatment modality should be usefully considered, especially in critical situations with a high prediction of negative outcomes and performed at expertised centers. There are still few data on mechanical endovascular approach regarding posterior circulation infarcts population, suggesting good functional outcomes and best overall survival, but comparative controlled trials with clinical therapies must be in course^{7,8}.

According to current data, many studies such as CAVATAS (Carotid And Vertebral Artery Transluminal Angioplasty Study) and SAMMPRIS (Stenting and Aggressive Medical Management for Preventing Recurrent stroke in Intracranial Stenosis) intended to better understand differences of outcomes between conservative and angioplasty treatment on vertebrobasilar disease associated to stroke. Risk of periprocedural stroke was consistently higher for distal vertebral artery or basilar artery stenosis than for proximal vertebral artery stenosis. Findings pointed that stenting was associated with a worse outcome than medical treatment, but no consistent evidence was determined. Still, previous studies reported 57% of successful treatment with endovascular angioplasty on vertebrobasilar stroke patients.

In current clinical practice, EVT of a symptomatic high-grade (>70%) VA stenosis is a reasonable therapeutic option to improve the vertebrobasilar blood supply, with good long-term outcomes.³ Thus, we illustrate an atypical case of Balint Syndrome associated with critical basilar stenosis, occipital hypoperfusion without evidence of an ischemic process, completely reversed after stent-assisted angioplasty. Also, a vertebrobasilar stroke case with critical stenosis, with imminent signs of basilar occlusion and brainstem infarction, treated with catheter guided angioplasty, turned to asymptomatic. We believe that individualization of treatment is necessary, choosing endovascular treatment for patients with clinical instability, mainly in specialized centers that offer experienced neurointerventionist service.

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Ethical Approval

Ethical approval was not required, we had patient and familiar authorization to use these data.

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