

Intra-arterial Vasodilator use for Treatment of Reversible Cerebral Vasoconstriction Syndrome: Applying Endovascular Techniques to the Treatment of Vasculitic Diseases.

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Introduction

Reversible cerebral vasoconstriction syndrome (RCVS) is a neurologic disorder where persistent untreated cerebral vasoconstriction can lead to permanent neurologic disability and even death. There is currently no standard treatment algorithm. Patients are typically treated with oral calcium channel blockers. Reports of endovascular treatment of RCVS is sparse. We report the largest published case series to date of intraarterial verapamil infusion for the treatment of RCVS.

Methods

A retrospective review was performed on records from the neuroendovascular database of patients who were treated at a single institution for RCVS from 2011 to 2016.

Learning Objectives

By the conclusion of this session, readers should be able to describe the benefits of endovascular treatment for reversible cerebral vasoconstriction syndrome. Endovascular therapy should be included in the list of potential treatment options for patients diagnosed with RCVS.





Figure 1: 43 year-old female who had blood, plasma, and platelet transfusions for severe anemia secondary to uterine fibroids, developed headaches and then a seizure. MRI diffusion weighted imaging (A) showed ischemia in bilateral occipital lobes. MRA head (B) showed multiple areas of narrowing and loss of time of flight signal bilaterally in anterior and posterior circulations. Cerebral angiogram, right internal carotid artery injections, pre- (C) and post- (D) intra-arterial verapamil infusion showed improvement in vessel caliber and flow in the right middle and anterior cerebral arteries. Similar improvements were seen in the left ICA circulation after IA verapamil. The patient was treated again with IA verapamil the following day because of right arm weakness and increased left MCA Transcranial Doppler velocities. She improved neurologically and was discharged to a rehab facility with partial visual field deficits.



Figure 2: 35 year-old female who underwent cesarean section and delivery of a healthy baby at 39 weeks gestation because of pre-eclampsia had headaches and then developed right hand weakness two weeks later. MRI diffusion weighted imaging (A) showed scattered areas of ischemia in bilateral cerebral hemispheres,

left worse than right. MRA head (B) showed multiple areas of narrowing bilaterally in the anterior circulation. Cerebral angiogram, left internal carotid artery injections, pre- (C) and post- (D) intra-arterial verapamil infusion showed dramatic improvement in vessel caliber and flow in the left middle and anterior cerebral arteries. Similar improvements were seen in the right ICA circulation after IA verapamil (not shown). Her right-sided weakness improved and she was

discharged home. She had no neurologic deficits at two month follow-up.

Results

A total of six patients were treated with intra-arterial verapamil, all with immediate radiographic improvement and improved neurologic outcomes post procedurally and upon discharge. Patients also received oral nimodipine, verapamil, or amlodipine. The average length of hospitalization was 9 days. One patient required a second infusion of verapamil for persistent neurologic deficits. One patient had a femoral artery pseudoa-neurysm treated successfully with thrombin injection. There were no other other complications. Average admission NIH Stroke Score (NIHSS) was 4.33 (0 to 16) and upon discharge was 0.5 (0 to 2). NIHSS improved on average by 3.66 (0 to 16).

Conclusions

Neuroangiography is not only an important diagnostic tool, but is also a successful therapeutic option for the treatment of RCVS. Intra-arterial infusion of verapamil in addition to oral calcium channel blockers can provide rapid and sustained improvement in symptoms of RCVS and has a low complication profile.

References

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