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Short Communication

Treatment of In-Stent Restenosis at the Vertebral Artery Ostium: Drug-Coated Ballon Angioplasty

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ABSTRACT

In-Stent Restenosis (ISR), a common long-term complication following Vertebral Artery Ostium (VAO) stenting angioplasty often results in recurrent ischemic stroke. There is currently no standard strategy for management of an ISR that has developed after a VAO stenting angioplasty. Potential candidates include surgery, ballon or stenting-assisted angioplasty, and hybrid recanalization. Drug-coated ballon-assisted angioplasty is an effective and safe therapy for ISR, minimizing excessive stent implantation and open surgery.

Keywords: Drug-coated ballon; In-stent restenosis; Vertebral artery ostium stenosis

INTRODUCTION

Vertebral artery ostium stenosis is a major cause of cerebral ischemia events [1]. Stenting-assisted angioplasty is recommended for patients who have responded poorly to best medical treatment [2,3]. However, in-stent restenosis following VAO stenting is a major concern [4] for which no standard treatment has yet been established. The narrowing of the vertebral artery near its origin, frequently brought on by atherosclerosis, is known as Vertebral Artery Ostium Stenosis (VAOS). This disorder raises the risk of ischemic events, such as stroke, by decreasing blood flow to the brain's posterior circulation. From light headedness and dizziness to more serious symptoms like transient ischemic attacks or posterior circulation stroke, symptoms might vary widely. Hypertension, diabetes, smoking, and hyperlipidemia are risk factors. Imaging methods such Doppler ultrasonography, Computed Tomography Angiography (CTA), or Magnetic Resonance Angiography (MRA) are commonly used to make the diagnosis. Antiplatelet medication, risk factor reduction, and occasionally endovascular procedures like angioplasty or stenting are all part of management. To avoid major problems and enhance patient outcomes, prompt detection and care are essential. Patients with severe stenosis should have imaging and examinations on a regular basis to observe the course of their condition.

DESCRIPTION

Strategies for VAO ISR

There has been no large scale, randomized, clinical trials to investigate post-VAO ISR strategies. Potential candidates include conventional surgery, endovascular, and hybrid surgery. To our knowledge, vertebral endarterectomy is not widely performed because it is technically challenging and lacks the support of evidence-based medicine. Endovascular treatment mainly encompasses balloon [5]/Drug-Coated Ballon (DCB) [6], and stent angioplasty. However, stent angioplasty is rarely performed because passing the catheter is difficult, the lumen diameter being too narrow to readily accommodate an extra stent. A single center has reported on implementation of hybrid recanalization to manage VAO ISR. Considering that hybrid recanalization involves both endovascular and vertebral endarterectomy, patients with vertebral artery occlusion or accompanying distal stenosis following VAO stent angioplasty may be the most suitable candidates for this procedure.

Advantages of DCB angioplasty for VAO ISR

DCBs, which are semi-compliant angioplasty balloons covered with an anti-restenotic drug that is released locally into the vessel wall during balloon contact, are reportedly an effective and safe treatment for ISR following percutaneous artery or carotid artery

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intervention. DCB angioplasty for VAO ISR has several advantages. First, DCBs inhibit intimal hyperplasia and intimal hyperplasia is the most common cause of ISR. Second, in the case of vertebral arteries, especially those of small diameter, DCBs probably have an advantage over other strategies because they lack the metallic layers of conventional stents and thus cause less vessel inflammation. Third, the greatest challenge of a conventional endovascular strategy for VAO ISR has been passing the catheter; whereas in our experience DCBs are very easy to pass when managing a VAO ISR.

Finally, because DCBs can establish revascularization without adding a new stent layer, they may have a role in repeat treatment of VAO ISR.

CONCLUSION

Future research should prioritize performance of prospective, multicenter randomized controlled trials to validate the findings of single center studies and provide high-quality evidence for best clinical practice regarding VAO ISR strategies.

There are currently no long-term data on VAO ISR strategies, especially regarding DCB angioplasty. There is a need to expand the scope of studies to include long-term follow-up to provide crucial data on the durability and safety of DCB-based interventions.

The mechanisms underlying formation of ISR are diverse. Further research should explore personalized treatment strategies that take account of patient-specific factors such as comorbidities and patterns of restenosis. Such studies could include development of algorithms or guidelines to tailor interventions on an individual basis.

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CONFLICT OF INTEREST

None to report.

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