

CEREBRAL BLOOD FLOW AUGMENTATION AS A TREATMENT FOR ACUTE ISCHEMIC STROKE

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Acute ischemic stroke is the leading cause of chronic disability and the third most common cause of death in the developed world. Currently approved treatment options include the use of antithrombotic medications (prevention of recurrent stroke or myocardial infarction) and thrombolysis (limiting extent of injury from the acute stroke). While very effective, thrombolytic therapy is currently being offered to less than 1% of acute stroke patients worldwide. Major reasons for the low usage include the very short time window, the need for imaging prior to treatment, expense and the risk for brain hemorrhage. Neuroprotection, despite extensive research over the last 20 years, has been a dismal failure in the acute stroke settings. There is a need to evaluate alternate strategies to prevent brain damage in patients presenting with an acute stroke.

An augmentation of cerebral blood flow to the tissue at risk after an acute ischemic stroke is another strategy that has been shown to improve tissue salvage in experimental models in rats. The blood flow can be augmented through several techniques, including an increase in intravascular volume, hypertensive therapy or diverting blood from the lower extremities to the head. My presentation will focus on transient partial occlusion of the aorta. This technique has been studied in animal models of transient and permanent focal ischemia and in patients with acute ischemic strokes.

In rodent models of focal cerebral ischemia, occlusion of the distal aorta attenuated cerebral damage from arterial occlusion for up to 18 hours after the insult. We have recently used the technique in combination with rt-PA recently. The combination did not increase the risk of complications but seemed to be additive in decreasing brain infarction volume after embolic arterial occlusion of the MCA.

In preliminary clinical studies, the procedure of transient partial occlusion of the aorta was well tolerated. Blood flow studies showed an increase of approximately 30% in blood flow to the brain as the balloons were inflated in the aorta. Compared to historical controls, there was a significant improvement in the treated group. The encouraging results from early studies has resulted in further clinical trials where augmentation of blood flow to the brain after an acute ischemic stroke is being tested as an option to improve clinical outcome after an acute ischemic stroke. Presently, one randomized multicenter and two non-randomized studies are evaluating the efficacy of temporary partial aortic occlusion in management of acute stroke.

I will be presenting a review on the basic and clinical experience with cerebral blood flow augmentation with partial temporary occlusion of the distal aorta during this presentation.