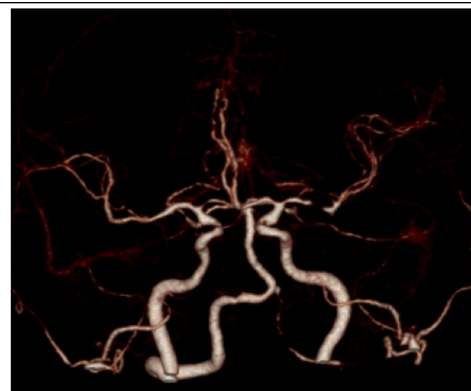


Introduction

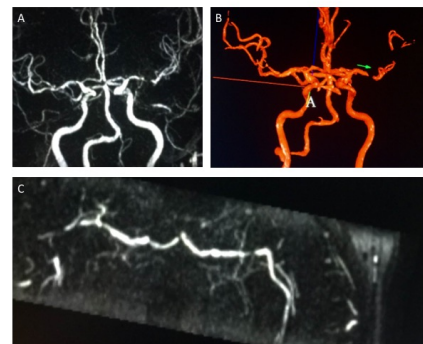
Background: The management of severe intracranial atherosclerotic disease (ICAD) remains controversial. The Stenting and Aggressive Medical Management for Preventing Recurrent Stroke in Intracranial Stenosis (SAMMPRIS) trial has eroded enthusiasm for endovascular stenting of ICAD due to a combination of high periprocedural morbidity and lower-than-anticipated event rates for those being managed medically. Submaximal balloon angioplasty has been demonstrated to be safe and efficacious for the treatment of ICAD, but indications for its use remain unclear. Interventional cardiologists have developed treatment algorithms for coronary atherosclerotic disease using well-validated pressure measurements across symptomatically stenotic lesions. It may be therefore possible to develop analogous criteria for the treatment of intracranial lesions using pressure-sensing guidewires.

Perfusion CT



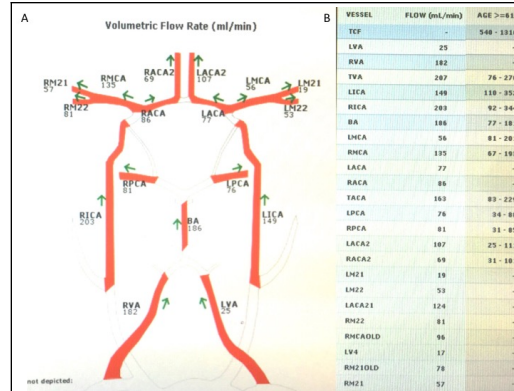
Left M1 stenosis

MR Nova



Increased velocities on MR flow study

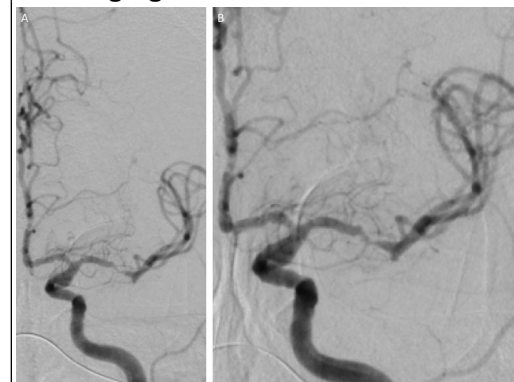
Following presentation with progressive episodes of garbled speech, a patient was found to have an 84% stenotic lesion of the left M1. Quantitative magnetic resonance demonstrated a 59% flow reduction compared to the contralateral M1 segment. The patient underwent an unsuccessful trial of dual antiplatelet therapy, and continued to experience symptomatic episodes in a pressure-dependent manner.



MR flow velocities by arterial distribution

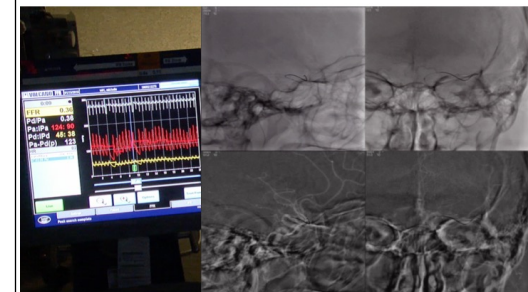
The patient underwent cerebral angiography with measurement of the pressure gradient across the stenotic lesion using an ultrasonic pressure-sensing guidewire prior to successful submaximal balloon angioplasty with residual 32% stenosis. Following the procedure, the patient had resolution of pressure-dependent symptoms.

Angiograms at 1 month interval



Pre-plasty demonstrating persistent stenosis of left M1

Fractional Flow reading



Pressure wire reading while advanced across stenotic lesion

Conclusions

The use of pressure-sensing guidewires to assess pressure gradients and vascular reserve across intracranial stenotic lesions may allow the endovascular neurosurgeon to better understand which lesions will benefit from intervention, resulting in the development of objective ICAD treatment algorithms.

Post-plasty angiogram



Improved diameter of previously stenotic left M1 segment