A Novel experience with the Penumbra 5MAX[™] ACE Reperfusion Catheter in treatment of Severe Cerebrovenous Sinus Thrombosis

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Introduction: Mechanical thrombectomy combined with thrombolysis has been used for severe cerebrovenous sinus thrombosis (CVST) cases who fail to respond to anticoagulation. Since the 1990s, evidence has suggested that dual therapy is relatively safe and valid in achieving rapid recanalization of thrombosed sinuses. We demonstrate a unique yet successful application of the Penumbra 5MAX[™] ACE Reperfusion Catheter (5-ACE) with continuous thrombolytic infusion to achieve recanalization of multiple anticoagulation refractory CVST.

Clinical Presentation: 33 year old female with history of polycystic ovarian syndrome on estrogen pills presented with sudden onset headache. Patient was found to have right transverse sinus and superior sagital sinus thrombosis and was initiated on a heparin drip. However her medical course was refractory to anticoagulation and she subsequently underwent mechanical thrombectomy with partial recanalization using the 5-ACE. The clinical course was further complicated by raised intracranial pressure (ICP) secondary to intracerebral edema causing anisocoria, headache and an attenuation of GCS from 15 to 3, requiring intubation and initiation of neurological hypothermia in conjunction with pentobarbital coma, hyperosmolar therapy, hyperventilation and extra ventricular drain (EVD) to monitor ICP. To augment further recanalization the 5-ACE was applied along with a 5 day indwelling catheter with continuous tPA infusion to the thrombosed dural sinuses. After 42 days of hospitalization ICPs were successfully controlled in addition to achieving sub-total recanalization of the venous sinuses. The patient clinical status improved from a GCS of 3 to 15 with minimal residual neurological deficits by the 42nd day of hospitalization.

Discussion: Originally designed to remove clots in patients experiencing acute ischemic stroke, we demonstrated successful and safe sub-total recanalization of occluded dural venous sinuses via application of the 5-ACE. However, prolonged infusion of thrombolytics may be necessary to maintain CVST revascularization after thrombectomy in refractory cases. Larger studies are needed to validate this assumption.