E-201 OUTCOMES OF FLOW DIVERSION OF MIDDLE AND ANTERIOR CEREBRAL ANEURYSMS AND THE INCIDENCE OF NEO-INTIMAL HYPERPLASIA

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Introduction Flow diversion of distal aneurysms like the middle cerebral artery (MCA) and anterior cerebral artery (ACA) is a safe and effective treatment modality for wide necked aneurysms, not amenable to any other endovascular approach. We present our experience with flow diversion of distal vasculature and the outcomes.

Materials and Methods Distal aneurysms were defined as MCA and ACA aneurysms. All distal aneurysm treatments performed with a Pipeline embolization device (PED) from September 2017 to January 2020 were collected in a prospectively maintained database. Patient demographics, clinical, and angiographic outcomes including digital subtraction angiography were registered. 6 month follow up angiograms were performed when possible to look for resolution of the aneurysm and the incidence of neo-intimal hyperplasia.

Results A total of 36 distal aneurysms were treated by pipeline flow diversion, of which 19 were MCA aneurysms and the rest were ACA aneurysms. Mean age is 58 ± 11 years. 6 month follow up is available for 21 of the 36 treated cases, with 3 being lost to follow up and the rest awaiting 6 month follow ups. From the follow ups available ($n=21$), the incidence of complete aneurysmal resolution was 76% (16/21). Neo-intimal hyperplasia was seen in 52% (11/21), and all cases with intimal hyperplasia were asymptomatic and had complete aneurysmal resolution. All cases of neo-intimal hyperplasia were mild to moderate and were managed by continuing dual antiplatelet therapy for another 6 months. There were 2 complications in the entire cohort- 1 intracerebral hemorrhage and 1 groin pseudo-aneurysm. There was 1 asymptomatic pipeline occlusion with no clinical manifestations.

Conclusion In our experience, flow diversion of distal wide necked MCA and ACA aneurysms is a safe and effective treatment strategy. The presence of neo-intimal hyperplasia after flow diversion of distal aneurysms is a frequent finding at 6 month follow up angiography but has been clinically asymptomatic in all cases.

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E-202 CREATION OF A LARGE ANIMAL ANEURYSM MODEL FOR NEUROCURE LIQUID EMBOLIC ASSESSMENT

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Introduction We developed a clinically relevant *in vivo* animal model of large, wide-neck aneurysm morphologies to study aneurysms with traditionally-high recanalization rates (up to 70% recurrence) post-treatment. This model will be treated with a new liquid embolic device under development: NeuroCURE (Anevas Technologies, Inc. (ATI), Flagstaff, AZ). NeuroCURE® is delivered using dual-microcatheter techniques (device delivery behind temporary balloon/stent protection). NeuroCURE is an elastic gel material that can completely fill and stabilize aneurysms long-term, potentially reducing the recanalization risk of larger aneurysms. High recanalization rates of current endovascular devices can be partially attributed to inadequate modeling of larger aneurysms during preliminary device testing in animal models, resulting in incomplete data sets prior to device approval.

Materials and Methods The large animal model was developed in canines by the Neurosurgery Research Center at Barrow Neurological Institute (BNI) and ATI. Both swine and canines exhibit adequate blood-flow, blood pressure, and vessel size to accommodate larger aneurysm models and dual microcatheter techniques - which are not feasible in the current rabbit-elastase models. Canines have been adopted over swine because they exhibit a healing response comparable to humans. Swine exhibit an overly-aggressive clotting cascade. A lateral wall aneurysm was surgically created by anastomosis of an external jugular vein (EJV) segment onto the common carotid artery (RCCA) in the neck. The EJV segment was sewn along circular sidewall cuts (5 – 7 mm diameter) in the RCCA to form a wide-neck aneurysm. The distal EJV was tied off at a dome height ≥ 10 mm. The animals were survived at least 2 weeks pre-embolization.

Results Angiographic imaging verified the model forms into a patent aneurysm with large dome and wide-neck morphologies ($<2:1$ midline-dome:neck (D:N) ratio - figure 1A). Histology verifies healing of the aneurysm neck (re-established endothelial layer). The 2-week survival prior to device treatment allows for differentiation of the model versus the device healing response for short- and long-term studies.

Abstract E-202 Figure 1 A Large, wide-neck, lateral-wall aneurysm model in canine, B. histology of aneurysm surgery survived 2 weeks pre-embolization. Endothelial layer at the neck has healed