AbstractID: 10516 Title: Angiographic analysis of aneurysms treated with a novel self-expanding asymmetric vascular stents (SAVS)

Purpose: To quantify hemodynamic modification in animal model aneurysms caused by image-guided deployment of a new self-expanding asymmetric vascular stent (SAVS) using x-ray contrast digital subtraction angiography (DSA) thus providing an indication of expected treatment outcome.

Materials and Methods: A novel nitinol-SAVS containing a low porosity patch to cover only the aneurysm neck was used to treat five rabbit-model aneurysms. Contrast flow in the aneurysm dome was recorded before-treatment, and after-treatment, using rapid-sequence (15 fps) DSA. The DSAs were analysed using time-density curves (TDC) measuring the contrast in the aneurysm as a function of frame-time for each case. The TDCs were normalized to the maximum value of the initial curve (before-treatment).

Results: Before-treatment TDC's showed clearance of the contrast from the aneurysm dome in less than 3 seconds indicating strong blood flow in the dome. Post-treatment TDC's showed in 3 of 5 cases negligible contrast entering the aneurysms (almost 100% drop in the TDC peak), 1 of the 5 had strong inflow followed by prologue contrast residence in the dome, and the last of the 5 had moderately reduced flow (75% of the initial peak), fast clearance, however only a remnant neck was observed at 30 day follow-up. TDC's generated from the DSA acquisitions of the Nitinol-SAVS-treated aneurysms indicated drastic reduction of the hemodynamic flow in the aneurysm dome and completely successful treatment except for the one case where incomplete treatment was predicted by only moderate flow modification.

Conclusions: Changes in angiographically derived TDC's appear to be a very useful tool to predict treatment outcome. Based on TDC-analysis, the new Nitinol-SAVS is a very promising option for treatment of intracranial aneurysms. (Support: NIH-R01NS43924, NIH-R01EB002873)