Abstract 0-002 Figure 1

aneurysm occlusion by the end of procedure also showed a significant correlation with WEB compaction at last follow-up.

Disclosures N. Adeeb: None.

0-003 CLEVER: CLINICAL EVALUATION OF WEB 17 DEVICE IN INTRACRANIAL ANEURYSMS. SAFETY RESULTS FOR RUPTURED AND UNRUPTURED ANEURYSM AT 30 DAYS

1L Spelle*, 2C Cognard, 3I Szikora, 4V Costalat, 5F Wodarg, 6D Herbreteau, 7S Fischer, 8M Möhlenbruch, 9C Papagiannaki, 10J Kliisch, 11R Rautio, 12J Numminen, 13A Berlis, 14J Downer, 15M Bester, 16S Velasco, 17T Liebig, 18J Byrne, 19L Pierot. 1NEURI, the Brain Vascular Center, Bicêtre Hospital, Paris, France; 2Interventional Neuroradiology, Hôpital Purpan, Toulouse, France; 3National Institute of Neurosciences, Budapest, Hungary; 4Guil de Chauliac, Montpellier, France; 5Universitätsklinikum Schleswig-Holstein, Kiel, Germany; 6CHRU Bretonneau, Tours, France; 7Universitätsklinik Knappschaftskrankenhaus, Bochum, Germany; 8Universitäts Klinikum, Heidelberg, Germany; 9CHU Rouen, Rouen, France; 10Helsinki Hospital, Erlat, Germany; 11University Hospital, Turku, Finland; 12Helsinki University Central Hospital, Helsinki, Finland; 13Klinikum, Augsburg, France; 14Western General Hospital, Edinburgh, UK; 15University Medical Center Hamburg-Eppendorf, Hamburg, Germany; 16CHU, Poitiers, France; 17LMU Klinikum, Munich, Germany; 18University of Oxford, Oxford, UK, 19CHU Maison Blanche, Reims, France

10.1136/neurintsurg-2022-SNIS.3

Results From March 2019 to February 2021, 163 patients (mean age, 58.1 years; 68.1% of women) with 103 unruptured aneurysms and 60 ruptured aneurysms were enrolled. The aneurysms locations were on the ACom (37.4%), the MCA bifurcation (30.1%), the PCom (10.4%), the BA (8.6%), the ICA (3.7%), the pericallosal artery (3.7%), the ACA (0.6%) and other locations (5.5%). The aneurysms treated were ranging from 2 to 9.2 mm (mean maximum sac width = 5.0 mm). The WEB procedure was completed with success in 163 patients (100%). 147/163 (90.2%) of aneurysm were treated only with WEB implant and adjunctive implant devices were used in 16/163 (9.8%) of cases. For this report covering analysis of data up to 30 days, the primary safety endpoint was the proportion of patients with death of any nonaccidental cause or any major stroke (defined as ischemic or hemorrhagic stroke resulting in an increase of 4 points or more on the NIHSS) within the first 30 days after treatment. Two major strokes on 2/163 patients (1.2%) met the primary safety endpoint. The mortality rate at 30 days was 0%. A detailed description of events reported from per procedure up to 30 days will be provided with a specific attention to the aneurysm initial presentation (ruptured vs unruptured). The 12 months data are not yet available so will not be presented.

Conclusion These results show good safety profile at 1 month, with low rate of neurological or neurovascular event with permanent deficit and no mortality at 30 days. These data confirm the safety of WEB use in intracranial aneurysm treatment, unruptured as well as ruptured, and are consistent with the results published up to date.


0-004 MAPPING WALL TENSION, WALL SHEAR STRESS, AND ANEURYSM WALL ENHANCEMENT IN 3D

1A Raghuraman*, 2A Galloy, 3M Nino, 4S Sanchez, 5M Hikkeron, 6S Raghavan, 7E Samaniego. 1Neurology, The University of Iowa Carver College of Medicine, Iowa City, IA; 2Roy J Carver Department of Biomedical Engineering, The University of Iowa, Iowa City, IA

10.1136/neurintsurg-2022-SNIS.4

Introduction/Purpose Computational fluid dynamic (CFD) and finite element (FEA) simulations can provide insight into the unique physical environment that precedes aneurysm rupture. Areas subject to decreased mechanical stresses may rupture because of inflammatory changes in the aneurysm wall. Topographic analysis of aneurysm wall enhancement (AWE), wall shear stress, and wall tension in three dimensions may identify aneurysmal compartments more susceptible to rupture.

Materials and Methods Unruptured aneurysms were prospectively imaged with 7T MRI. Aneurysms were segmented on T1 post gadolinium contrast imaging and analyzed with CFD and FEA. AWE normalized to the corpus callosum was mapped in 3D using orthogonal probes to capture the entire aneurysm wall on 7T MRI. The mean value of all probes was defined as the 3D circumferential AWE (3D-CWA). Aneurysms more enhancing than the corpus callosum (3D-CWA≥1) were classified as 3D-CWA+. Contour maps of time-
averaged wall shear stress (TAWSS), wall shear stress gradient (WSSG), oscillatory shear index (OSI), and wall tension (WT) were registered and synchronized for compartmental analysis of the aneurysm wall. Five areas of interest from AWE maps were manually probed in all aneurysms: areas of maximal, mean (3D-CAWE), and minimal MRI signal intensities in the dome, the neck, and areas of focal aneurysm wall enhancement (FAWE). Figure 1 Aneurysm blebs were also manually probed in saccular aneurysms.

**Results** Twenty-six aneurysms (6 fusiform and 20 saccular) were analyzed. 3D-CAWE and 95th percentile WT were positively correlated to aneurysm size (Spearman’s rho = 0.416 & 0.657, p=0.034 & p<0.001 respectively). Fusiform aneurysms had a higher 3D-CAWE and 95th percentile WT than saccular aneurysms (p=0.046 & p=0.003 respectively). 3D-CAWE+ aneurysms (N=8) had thicker walls (p=0.008), higher 95th percentile WT (p=0.03) and higher median TAWSS (p=0.045). In saccular aneurysms, WT was significantly lower in the bleb compared to areas of minimal SI (p=0.028). In areas of FAWE, WT and WSSG were significantly lower compared to the neck (p=0.010 & p=0.027 respectively).

**Conclusions** The pattern of 3D AWE combined with CFD and FEA analysis may identify areas of the wall more likely to grow or rupture.

**Disclosures** A. Raghuram: None. A. Galloy: None. M. Nino: None. S. Sanchez: None. M. Hickerson: None. S. Raghavan: None. E. Samaniego: None.

**Abstract O-004 Figure 1**

O-005 **MESENCHYMAL STEM CELL-DERIVED EXTRACELLULAR VESICLES AS A COILING ADJUNCT TO IMPROVE INTRACRANIAL ANEURYSMAL HEALING IN A RABBIT MODEL**

B Belanger*, J Phelps, A Bromley, A Sen, A Mitha. University of Calgary, Calgary, AB, Canada

10.1136/neurintsurg-2022-SNIS.5

**Background** Although endovascular coiling has become a standard of care for treatment of intracranial aneurysms, up to 30% of treated aneurysms will recur. Using mesenchymal stem cells (MSCs) as an adjunctive therapy can potentially improve aneurysm healing, but the injection of cells may be impractical for routine use. Moreover, increasing evidence has found that the therapeutic effects of MSCs may be due to their release of a heterogeneous population of lipid membrane-bound nanoparticles called extracellular vesicles (EVs). Similar to MSCs, EVs can also localize to areas of inflammation, but have many advantages over a cell-based therapy including a better safety profile, reduced immunogenicity, and simplified production and storage. (Yuana et al., 2013, Bang&Kim 2019; Natasha et al., 2014, Gonzalez-Gonzalez et al., 2020) The purpose of this study, therefore, was to determine the effect of MSC-derived EVs in an in vivo aneurysm model.

**Methods** Aneurysms were created as previously described in two female New Zealand White rabbits (Belanger et al., 2021). Four weeks after creation, animals underwent digital subtraction angiography (DSA) to determine aneurysm size and patency. After the deployment of one to two framing coils in the aneurysm to stagnate flow, EVs from 6x107 adipose-derived MSCs were injected directly into the aneurysm sac using the same SL-10 catheter. Aneurysms were then coiled to completion with a goal packing density between 20% and 30%. Ninety days later, animals were sacrificed for histological processing and were compared to historical controls (Herting et al., 2019) in terms of aneurysm size, coil length per aneurysm, packing density, neointimal thickness, and histological healing score (Dai et al., 2006).

**Results** For the experimental group, aneurysm size, coil length per aneurysm volume, and packing density were 61.78 mm³±22.11, 0.52 cm/mm³±0.036, and 26.24%±1.75 while Herting et al. reported 119.3 mm³±114.9, 0.417 cm/ mm³±0.18, and 24.3%±7.8, respectively (mean±SD). There was no significant differences in these metrics between the two groups (p=0.53, 0.76, 0.50, respectively (Student’s T-test)). Comparison of neointimal thickness between the experimental group and historical controls was also not significantly different (0.03um±0.029 vs. 0.03um±0.01, p=0.99 (Student’s