

**Abstract O-016 Figure 1** M1 and M2 macrophage expression in aneurysm tissues after endovascular coiling for three treatment-to-sacrifice time groups. A) mean number of M1 macrophages; representative confocal microscopy image of M1 macrophages (60X oil magnification) at 1 month (B), 3 months (C) and 6 months (D); E) mean number of M2 macrophages; representative confocal microscopy image of M2 macrophages (60 X oil magnifications) at 1 month (F), 3 months (G) and 6 months (H). \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$

**Disclosures** Z. Khashim: None. D. Daying: None. D. Yong Hong: None. S. Herting: None. T. Caracena: None. D. Jakaitis: None. D. Maitland: None. D. F. Kallmes: None. R. Kadirvel: None.

#### O-017 EDINBURGH'S WEB EXPERIENCE

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10.1136/neurintsurg-2019-SNIS.17

**Purpose** The Woven EndoBridge (WEB) device has recently gained FDA approval in the United States of America. To increase physician familiarity with the device, its efficacy and safety profile in general usage, we present the Edinburgh case series of WEB usage in both the elective and acute setting.

**Materials and methods** Data was recorded prospectively on all patients who had an aneurysm treated with the WEB device in Edinburgh between February 2014 and October 2018. The information included patient demographics, aneurysm characteristics, procedural information including the use of antiplatelet medication and the size of WEB used, procedural complications as well as clinical and angiographic follow up at three months and one year.

**Results** 45 acute and 46 elective cases were identified. Aneurysm sizes ranged from 2.5 mm to 10.9 mm. Median screening time was 14 minutes. Irrecoverable parent vessel occlusion occurred in 1% (1/91). WEB protrusion which required stent occurred in 3% (3/91). There were no intraoperative ruptures. The WEB device was resized in 12% of cases (11/91). At three months adequate occlusion (complete occlusion or small

neck remnant) was achieved in 92% (68/74), with 8% (6/74) significant remnant, all of which were retreated. Cumulative one year results showed 80% (33/41) adequate occlusion and 20% (8/41) aneurysm remnant, all of which were retreated with stent assisted coil embolization.

**Conclusion** The results confirm that the WEB device allows safe, quick and effective treatment of wide necked aneurysms, both ruptured and unruptured, in day to day practice.

**Disclosures** N. Dobbs: None. J. Du Plessis: None. P. Keston: None. J. Downer: None.

#### O-018 WEB ANEURYSM TREATMENT: 2-YEARS FOLLOW-UP IN THE 3 EUROPEAN GCP STUDIES (WEBCAST, WEBCAST 2, FRENCH OBSERVATORY)

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10.1136/neurintsurg-2019-SNIS.18

**Introduction/Purpose** Flow Disruption with WEB is an innovative endovascular approach for wide-neck bifurcation aneurysms that has been evaluated in 3 European Good Clinical Practice Studies: WEBCAST (WEB Clinical Assessment of Intracranial Aneurysm), French Observatory, and WEBCAST-2. This treatment is associated with a high safety and efficacy at one year.<sup>1</sup> Long-term anatomical results have been very few evaluated. The present work is presenting the 2-years safety and efficacy results in the 3 GCP studies.

**Materials and methods** Out of the 168 patients with 169 aneurysms initially included in the 3 GCP studies, 138 patients were clinically evaluated at 2 years and 120 patients with 121 aneurysms were evaluated by vascular imaging.

**Results** There was no bleeding/rebleeding or thromboembolic complication between 1 year and 2 years. Morbidity and mortality at 2 years were 1.4% (2/138) and 5.1% (7/138), respectively. Two deaths (1.4%) were related to the procedure (retroperitoneal hematoma and brainstem compression). The other deaths were unrelated to the disease or the procedure (cancer: 3 patients; pneumonia: 1 patient; cirrhosis: 1 patient). Anatomical results at 2 years were complete occlusion in 62/121 aneurysms (51.2%), neck remnant in 36/121 aneurysms (29.8%), and aneurysm remnant in 23/121 aneurysms (19.0%). Anatomical results were similar in aneurysms treated with WEB DL and WEB SL/SLS. Between 1 and 2 years, aneurysm occlusion was stable or improved in 103/119 aneurysms (86.6%). Aneurysm retreatment was performed in 14 aneurysms (9.3%), 11 between the procedure and 1 year and in 3 between 1 and 2 years.

**Conclusion** The great safety and efficacy of WEB aneurysm treatment is confirmed at 2 years follow-up. No adverse events are observed between 1 year and 2 years. Adequate occlusion is observed in a similar percentage of aneurysms at 1 year (79.1%) and 2 years (81.0%).<sup>1</sup> Pierot L, Soize S, Molyneux A, Byrne J, Spelle. Evaluation of the Safety and Efficacy of Aneurysm Treatment with WEB<sup>TM</sup> device in the cumulated population of 3 prospective, multicenter series (WEBCAST, French Observatory, WEBCAST-2). *J NeuroIntervent Surg.* 2018;10:553–559.

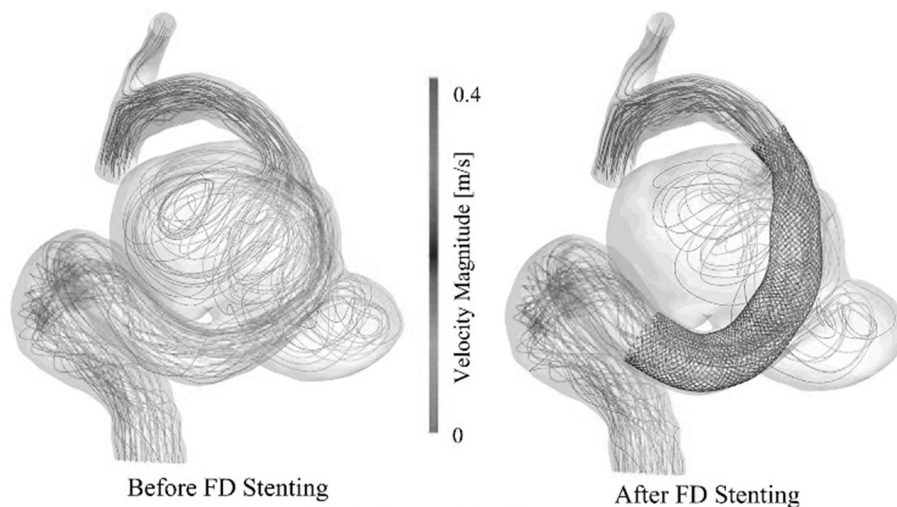
**Disclosures** L. Pierot: 2; C; Balt, Medtronic, Microvention, Phenox, Vesalio. X. Barreau: None. I. Szikora: None. D. Herbreteau: None. J. Byrne: None. L. Spelle: None.

#### O-019 HEMODYNAMIC STUDY ON THROMBOSIS FACTORS IN CEREBRAL ANEURYSMS AFTER FLOW DIVERTER STENTING

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10.1136/neurintsurg-2019-SNIS.19

Flow Diverter (FD) stenting is now widely used to treat large cerebral aneurysms. It induces thrombosis inside the aneurysmal sac. However, thrombosis formation does not always take place and it is believed that the formation of the thrombus is strongly related to hemodynamic factors around the aneurysm. In our previous study, computational fluid dynamics (CFD) has been applied to identify risk factors for aneurysm rupture. In this study, we apply CFD simulations on aneurysms treated by FD to investigate hemodynamic factors that may influence thrombosis formation. We selected 10 FD treated aneurysms which had been followed up for at least 6 months and evaluated their treatment outcome at 6-month follow-up. Five cases were completely occluded (CO) and 5 cases showed residual blood flow (RE). First, we reconstructed patient-specific vessel geometries from digital subtraction angiography data. Next, we deployed FDs based on actual FDs using our original virtual stenting program. Then, we simulated the blood flow and calculated hemodynamic parameters previously identified as risk factors for aneurysm rupture. Various parameters were estimated before and after FD stenting to obtain their change rate. We used the Mann-Whitney U test to compare differences of each hemodynamic parameter between the CO and RE groups. In both groups, the average blood flow velocity was reduced after FD stenting (see figure 1), but the difference between the groups was small. The RE cases had statistically significantly lower pressure loss coefficient (*PLc*) values (i.e., the blood flow entered more easily into the aneurysmal sac for the RE cases) ( $p=0.04$ ). In addition, the CO cases had a greater change rate of minimum wall shear stress (*WSS*) acting on the aneurysmal wall. The averaged minimum-*WSS* change rate of the CO cases was 5 times higher than that of the RE cases, but the difference was not statistically significant ( $p=0.30$ ). In terms of rupture risk, the values of *WSS* and *PLc* suggested that the CO cases had a lower rupture risk than the RE cases (see figure 2). CFD simulations revealed that *PLc* and *WSS* were different for CO cases and RE cases. These hemodynamic parameters were also related to aneurysmal rupture risk. Thrombosis formation may thus be related to aneurysmal rupture risk and CO cases appeared to have a lower rupture risk. These hemodynamic parameters may be useful for the outcome prediction of FD stenting.



**Abstract O-019 Figure 1** Streamline changes