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%).¹ Pierot L, Soize S, Molyneux A, Byrne J, Spelle. Evaluation of the Safety and Efficacy of Aneurysm Treatment with WEBTM device in the cumulated population of 3 prospective, multicenter series (WEBCAST, French Observatory, WEBCAST-2). *J NeuroIntervent Surg.* 2018;10:553–559.

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

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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

Abstract O-019 Figure 2 Scatter diagram of hemodynamics parameters

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O-020

VISUAL PROGNOSIS AFTER ENDOVASCULAR TREATMENT OF OCCIPITAL ARTERIOVENOUS MALFORMATIONS

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Introduction Occipital arteriovenous malformations (AVM) carry a high risk of post-operative morbidity because of their anatomic relation to the visual cortex and optic radiations. We report our single-center experience with occipital AVMs, most of which were treated endovascularly, with a special interest for visual impairment after treatment.

Materials and methods From a prospectively collected database, we reviewed the clinical and radiological data of all patients with AVM involving the occipital lobe managed between 1997 and 2017.

The lesions were classified according to the modified Spetzler-Martin grading system. The extension of the nidus to the primary visual cortex was assessed and correlated to the pre- and post-intervention visual symptomatology. Modified Rankin Scale and visual fields were assessed pre and post-treatment and at the last follow-up.

Results Eighty-three patients (47 males [56,6%]) with an occipital AVM were included in the study. Mean age at presentation was 33.5 ± 15.0 years old (min-max = 7-76). Thirty-four patients (40,9%) presented with hemorrhage related to the AVM. Fifty-eight patients (69,8%) underwent endovascular treatment alone, 19 (22,9%) embolization and surgery, 3 (3,6%) embolization and radiosurgery and 3 (3,6%) were conservatively managed.

A complete obliteration of the AVM was achieved in 49 patients (59%). The mean follow-up duration after treatment was 19,4 months (max. 330 months). A post-treatment aggravation of the visual field was found in 3 patients (23%) for ruptured AVMs and in 21 patients (45,6%) for unruptured AVMs (figure 1) (figure 2).

Morbidity rate was 3.75% and mortality rate was 2.5%.

Conclusion Endovascular treatment of occipital AVM ($\pm$ combined with surgery) might be a feasible technique. However

Ruptured AVMs

Abstract O-020 Figure 1