

*Abstracts of the Scientific Awards of XXXIX COMU 2020 -
Research Classified - Monography*

Outcomes of Surgical and Endovascular Treatments for Fusiform Intracranial Aneurysms: Systematic Review and Individual Participant Data Meta-Analysis

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Introduction: We propose a systematic review and meta-analysis of individual participant data with propensity-score adjustment to compare the functional and angiographic outcomes between surgical and endovascular approaches to FIA.

Methods: We conducted a systematic review based on the PRISMA-IPD guidelines for articles published on the treatment of FIA with individual patient-level detailing. The primary studied outcome was morbidity, and secondary outcomes were angiographic results, recanalization, and retreatment.

Results: Individual data were available for 296 patients in 29 studies. Out of 73 surgical cases, the commonest option was bypassing, combined with clipping, trapping, or excision (N=38, 52.1%). Out of 223 endovascular cases, stenting was the primary choice (N=127, 56.9%). Post-procedure morbidity inflicted 75 patients (25%), of which 22 had been submitted to open procedures (30.1%), and 53 had been treated endovascularly (23.8%). Crude models studied the relationship between surgical treatment and morbidity overall and within each location, and there were no significant associations (Figure 2, all $P > 0.05$). A final multivariable model was fitted, including the covariates rupture status, initial mRS, size, and age (Figure 3). Each additional score in the initial mRS was associated with an odds ratio of 1.79 of post-procedure morbidity (95% CI 1.24 – 2.6). No differences were detected between surgical and endovascular (OR 0.95, 95% CI 0.18-5.11).

Conclusion: Comparing surgical and endovascular procedures, no differences were observed on post-procedure morbidity regardless of aneurysm location. A smaller percentage of unfavorable angiographic outcomes was reported after open procedures, but larger studies are necessary to evaluate those associations.

Keywords: Fusiform aneurysm; Neurosurgery; Endovascular procedures.