P-049 ELECTIVE INTERVENTION FOR UNRUPTURED CRANIAL ARTERIOVENOUS MALFORMATIONS IN RELATION TO ARUBA TRIAL: A NATIONAL INPATIENT SAMPLE STUDY

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Background In 2014, A Randomized Trial of Unruptured Brain Arteriovenous Malformations (ARUBA) concluded that medical management alone for cranial arteriovenous malformations (AVMs) had better clinical outcomes than interventional treatment. The impact of the ARUBA study on changes in the rates of intervention and outcomes is unknown. Thus, we investigated whether the conclusions from ARUBA may have influenced treatment modalities and outcomes of unruptured AVMs.

Methods The National Inpatient Sample (NIS) was queried between 2006 to 2018, for adult patients with an AVM who were admitted on an elective basis. Interventions included open, endovascular, and stereotactic surgeries. Logistic regression was conducted to assess treatment rate for each modality before and after the time-point, odds of non-routine discharge and hemorrhage between the two time-points. Linear regression was used to assess mean LOS between the two time-points.

Results A total of 40,285 elective admissions for AVMs were identified between 2006 and 2018. The rate of intervention was higher pre-ARUBA (n=15,848; 63.8%) compared to post-ARUBA (n=6,985; 45.2%; p<0.001). The rate of open, endovascular, and stereotactic surgeries decreased after the ARUBA Trial time-point (ORs: 0.37, 0.69, and 0.18, respectively; p<0.001). For admissions involving interventions, the odds of non-routine discharge were higher post-ARUBA (OR: 1.24; p=0.043); the odds of hemorrhage were lower post-ARUBA (OR: 0.69; p=0.043); the odds of hemorrhage decreased post-ARUBA, suggesting that it may have influenced treatment practices for unruptured AVMs.


Conclusion The rate of intervention decreased, the rate of non-routine discharge increased, and rate of hemorrhage decreased post-ARUBA, suggesting that it may have influenced treatment practices for unruptured AVMs.
Endovascular therapy remains associated with better in-hospital outcomes, including the younger age population with ruptured or unruptured aneurysms.

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TREATMENT OF ACUTELY RUPTURED INTRACRANIAL ANEURYSMS WITH WOVEN ENDOBRIDGE DEVICE: A SYSTEMATIC REVIEW

Introduction The Woven Endobridge (WEB) device is a barrel-shaped nitinol mesh deployed within the aneurysmal sac. The absence of metallic mesh in the vessel lumen obviates the need for potent antplatelet therapy, which makes this devices interesting for acutely ruptured aneurysms not amenable to clipping or coiling.

Methods We performed a comprehensive systematic search of PubMed, MEDLINE and EMBASE databases following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Keywords combined with Boolean operators to increase search sensitivity and specificity (‘woven endobridge device’ AND ‘ruptured’) were used.

Results Five studies were included, totaling 276 ruptured aneurysms. Overall, 222 (80.4%) were wide-neck and 236 (85.5%) were located in the anterior circulation. Grade of SAH based on Hunt and Hess scale was reported in four studies with 64 (25.7%) of patients presenting with a poor grade (Hunt and Hess 4-5). Intraoperative and post-operative complications occurred in 7.2% (95% CI, 3.8-13.4) and 4.3% (95% CI, 1.9-9.2) respectively. The rate of rebleeding after treatment was 0%. The rates of adequate occlusion and retreatment at last follow-up were 86.5% (95% CI, 75.6-93) and 5.9% (95% CI, 3.2-10.6), respectively. The rate of favorable outcome was 71% (95% CI, 64-77) and mortality was 19.4% (95% CI, 14.3-25.7). The United-States multicenter study reported use of intraoperative single-antiplatelet therapy (SAPT) in 13.1% and dual-antiplatelet therapy (DAPT) in 2.2%, while 18.7% were discharged under DAPT. The remaining 4 European studies reported no use of antiplatelets during follow-ups, while 2 studies reported use of SAPT for 4-6 weeks.

Conclusions Treatment of acutely ruptured aneurysms with WEB device results in high rates of adequate occlusion, with low perioperative complications, no rebleeding and low recurrence. This device is promising for wide-necked ruptured aneurysms that are not amenable to clipping or coiling, considering its lower need for antiplatelet regimen either during procedure or follow-up.

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A NOVEL EX-VIVO MODEL TO SIMULATE DELAYED ANEURYSM RUPTURE AFTER FLOW-DIVERTER TREATMENT

Introduction/Purpose It is estimated that 3-6 million Americans harbor a brain aneurysm and are at risk for hemorrhagic stroke (rupture). Flow-diverter placement in the blood vessel (fine mesh stent placement) across giant intracranial aneurysms (GIAs) is the standard of care. However, up to 20% of these aneurysms still experience delayed aneurysm rupture (DAR). Intra-aneurysmal thrombus formed after a flow-diversion treatment releases matrix metalloproteinase (MMPs) that can degrade the extracellular matrix of an aneurysmal wall and cause delayed rupture. Current in vivo aneurysm models (i.e., swine/canine vein pouch-to-artery anastomosis models and rabbit-estalase models) result in relatively stable aneurysms and do not model giant aneurysms, nor do they simulate the tissue degradation preceding DAR. This study evaluated the mechanobiological properties of mouse arterial wall digestion by MMP-1/2/9 proteins with the aim of creating a novel ex vivo DAR model.

Materials and Methods Abdominal aorta tissue was harvested from homozygous inbred female mice (The Jackson Laboratory, Bar Harbor, Maine) within 3 hours of sacrifice and flushed with phosphate buffered saline. The tissue samples were then divided into 5 groups (n=4 each for group): porcine pancreatic elastase (PPE) treated group, MMP-1 group, MMP-2 group, MMP-9 group, and a cocktail group (3 MMPs were then divided into 5 groups (n=4 each for group): porcine pancreatic elastase (PPE) treated group, MMP-1 group, MMP-2 group, MMP-9 group, and a cocktail group (3 MMPs in equal quantities). Each group includes three trials per group - control trial, low dose trial (0.2 ug/ml) and high dose trial (2 ug/ml). The three trial groups were tested for macroscopic mechanical properties, using non-destructive testing protocols for shear modulus, compression modulus and tensile modulus, with NAU’s HR-2 rheometer (TA Instruments, New Castle, DE). Testing was conducted before (control) and after incubation for 2 hours at 37°C. For microscopic mechanical analysis, prior to tissue fixation, the tissue samples were visualized with confocal microscopy to determine changes in its arterial structure and atomic force microscopy (AFM) to quantify enzyme tissue digestion.