E-009 COMPLICATIONS IN STENTING WITH OR WITHOUT COILING FOR TREATMENT OF ACUTELY RUPTURED CEREBRAL ANEURYSMS

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Objective The purpose of this study was to report the authors' experiences in stenting for ruptured cerebral aneurysms in the acute period and to evaluate the hemorrhagic and ischemic complications and risk factors.

Methods Between January 2013 and October 2018, fifty-four patients had stenting with or without coiling for treatment of acutely ruptured cerebral aneurysms that were not amenable to coiling alone. Hospital notes were retrospectively reviewed. All patients had a dose of intravenous abciximab 10 mg and heparin 2000 unit before stenting and dual antiplatelet loading and daily treatment started after procedure.

Results Of the 54 patients, twenty-nine (54%) had braided stents, nine (17%) had laser-cut stents, and 16(30%) had flow diverters. Thirty-seven (69%) had also coiling and 17(31%) had stenting alone. There was 2(4%) rebleed in two patients with braided stent and partial embolization resulting in mortality. There were three (6%) procedure-related cerebral infarction. There were 3(6%) significant intraventricular hemorrhage and intracerebral hemorrhage.

Conclusions In patients undergoing stenting for acutely ruptured cerebral aneurysms, partial embolization and ICP catheter insertion were risk factors for complications and mortality. Procedure-related infarction rate was 6%. Stenting could be considered as an alternative treatment strategy for acutely ruptured cerebral aneurysms not amenable to coiling alone.

Disclosures G. Wong: 1; C; Medtronic.

E-010 RELATION BETWEEN BRAIN NATURETIC PEPTIDE AND DELAYED CEREBRAL ISCHEMIA IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HEMORRHAGE

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Background Immune regulation and inflammation is implicated in the development of delayed cerebral ischemia (DCI) in patients with aneurysmal subarachnoid hemorrhage (aSAH). BNP is implicated in fluid dysregulation and inflammation in critically-ill patients. We explored the association between BNP levels and development of DCI in patients with a SAH.

Methodology Patients were enrolled from the Neurological Intensive Care Unit between 2006 and 2015 in the SAH Outcomes Project, a single center, prospective, observational cohort study. Demographic data, treatment and outcomes, and BNP levels at admission and through the hospital admission were noted.

Results In the 149 patients included in the analysis, 79 developed DCI during their hospital course. Significantly higher number of patients in the DCI group had external ventricular drain (EVD) placements ($p=0.008$). The DCI group also had significantly higher rates of rebleeding and

hydrocephalus. In the logistic regression analysis between BNP levels and DCI, there is a significant association with admission BNP and DCI (OR-1.002, 95%CI 1.00–1.004, $p=0.017$), DCI and highest BNP (OR 1.001, 95%CI-1.001–1.002, $p=0.002$), and change in BNP with change in time (OR 1.006, 95%CI 1.002–1.01, $p=0.002$). The ROC curve analysis for DCI based on BNP showed that the highest BNP level during hospital admission (AUC 0.78) was a stronger predictor than the change in BNP over time (AUC 0.776) or the admission BNP (AUC 0.632).

Conclusion There is a significant association between the BNP level and the risk of developing DCI. This increased risk for DCI is associated not only with higher baseline BNP values (admission BNP) but also with the highest BNP level attained during the hospital course as well as the rapidity of change or increase in BNP over time. Hence, BNP values may help to identify SAH patients at high risk of cardiac morbidity and facilitate appropriate triaging.

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E-011 PREDICTORS OF CLINICAL OUTCOME AFTER TREATMENT OF INTRACRANIAL ANEURYSMS WITH THE PIPELINE EMBOLIZATION DEVICE (PED)

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Introduction Flow-diverting stents have revolutionized the endovascular treatment of intracranial aneurysms. The purpose of this study is to identify predictors of adverse outcomes associated with the pipeline embolization device (PED).

Materials and methods A retrospective analysis was performed of all patients treated with PED at a single high-volume center from January 2014 to September of 2018. Clinical outcomes, neurological morbidity/mortality and additional variables were analyzed.

Results 204 aneurysms in 170 patients were treated with PED. Mean length of follow up was 11 months. 181 aneurysms (89%) were located in the anterior circulation, 23 (11%) were found in the posterior circulation. The majority of the aneurysms were saccular (82%), followed by fusiform (11%), blister (4%) and dissecting pseudoaneurysms (3%). Mean aneurysm size was 8.2 ± 5.7 mm with 145 (71%) small aneurysms (< 10 mm), 53 (26%) large aneurysms (10–24 mm), and 6 (3%) giant aneurysms (≥ 25 mm). 92% of aneurysms were unruptured, 8% were ruptured. Neurological symptoms lasting less than 7 days were considered minor. The overall major neurological morbidity/mortality was 4.7% and 1.8% respectively. The all-cause mortality was 2.9%. After Bonferroni correction for multiple testing (significance at 0.004 level), the only significant predictors of neurological morbidity/mortality included the baseline modified Rankin Scale (mRS; $p=0.001$) and aneurysm neck size ($p=0.003$). Aneurysm size ($p=0.006$), rupture at presentation (0.006) anterior versus posterior location ($p=0.02$) did not reach significance for multiple testing. The Platelet Reactivity Unit (PRU), parent vessel diameter and patient age were not associated with adverse events.

Conclusions The PED has a satisfactory safety profile in experienced hands, both on- and off-label. Nevertheless, a poor

clinical baseline and a wider neck independently predict an increased risk of neurological morbidity/mortality.

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E-012 PREDICTORS OF ANEURYSM RECURRENCE AFTER ENDOVASCULAR EMBOLIZATION WITH THE SMART COIL SYSTEM

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Background/Objective Endovascular aneurysm embolization is effective and safe. However, the angiographic recurrence continues to be an issue after endovascular embolization. In this study, we aimed to report the rate of recurrence at 1-year follow up angiography and to investigate the predictors of recurrence.

Methods We used the SMART registry to identify subgroup of patients who underwent endovascular embolization with SMART coils and had one year follow up angiography. The primary outcome of this study was angiography recurrence at 1 year. We used stepwise regression analysis to identify the predictors of recurrence.

Results A total of 466 patients were included of whom 78 (16%) had recurrence at 1 year follow up angiography. Mean age was 60 years and 74% were female. 112 (24%) of treated aneurysms were ruptured and 125 (27%) were ≥ 4 mm in size. On Multivariate analysis, Immediate post procedure Raymond II and III (vs Raymond I), neck size ≥ 4 (vs. <4), stent-assisted coiling, and age were associated with the risk of recurrence at one-year follow-up.

Conclusion In this study we identified the predictors of aneurysm recurrence after endovascular embolization with SMART coils.

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E-013 DELAYED POST-OPERATIVE COIL MIGRATION AFTER SUCCESSFUL BALLOON-ASSISTED COILING OF A BASILAR APEX ANEURYSM

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A 69-year-old female patient presented with a ruptured small basilar apex aneurysm. Balloon-assisted coil embolization was performed, and the patient remained stable post-operatively. A CT-scan performed 12 days after the procedure showed coil migration from the aneurysm, and repeat angiography confirmed coil migration into the left proximal posterior cerebral artery segment. The patient gave consent for a revision procedure, where an LVIS Jr. stent and 7 micro-coils were placed into the aneurysm to re-secure the aneurysm. The patient suffered no further complications and was discharged home on dual antiplatelet therapy. Modified Rankin Score at 90-days was 1. We review the literature regarding delayed coil migration, and discuss management considerations.

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E-014 COIL EMBOLIZATION RESULTS OF THE RUPTURED PROXIMAL POSTERIOR INFERIOR CEREBELLAR ARTERY ANEURYSM: A SINGLE-CENTER 10 YEARS' EXPERIENCE

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Objective To report a single-center experience with endovascular treatment of ruptured proximal posterior inferior cerebellar artery (PICA) aneurysms.

Methods Between January 2007 and December 2016, among 1403 patients with aneurysmal subarachnoid hemorrhage, 15 with ruptured proximal PICA aneurysms underwent endovascular embolization at our institution. Aneurysmal obliteration with a single microcatheter was performed in 9 patients. Additional microcatheter or stent-assisted coil embolization was performed in 4 patients and parent artery occlusion in 2 patients.

Results Immediate angiographic results showed 10 complete occlusions (66.7%, 10/15). Five patients showed incomplete occlusion (remnant neck in 4 patients, remnant aneurysm in 1). Of those, 2 patients experienced recurrence and required conversion to microsurgical clipping. The remaining 2 patients remained in relatively stable condition. Procedure-related complications occurred in 3 patients (20%, with thromboembolic complications in 2 patients and intraprocedural rupture in 1). Clinical outcome was excellent: Glasgow Outcome Score 4 or 5 in 12 of 15 patients (80%). There was no rebleeding during follow-up.

Conclusions Ruptured proximal PICA aneurysms may be effectively treated with endovascular coil embolization. A variety of coil embolization techniques are required to obliterate an aneurysm without parent artery occlusion. Given that recurrence is possible, follow-up is required. Surgical clipping can be performed for recurrence with a relatively low risk of complications, because the aneurysm is unruptured. Coil embolization of a proximal PICA aneurysm in the acute phase can be a good treatment modality with good patient outcomes.

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E-015 INFLAMMATION IN MURINE ANEURYSM HEALING: THE ROLE OF CXCL1

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Introduction Cerebral aneurysms affect up to 5% of the U.S. population and can have devastating consequences. Rupture of cerebral aneurysms results in subarachnoid hemorrhage which has a mortality of up to 40%. Current prophylactic treatment options include surgical placement of a clip or use of coils or flow diverters through an endovascular approach. These options carry significant complication risks with functional disability or death occurring in up to 17.5% of patients after surgical clipping and in up to 8.4% after endovascular treatment. A significant drawback of endovascular coiling is that up to 20% of aneurysms can recur and require retreatment due to incomplete thrombus formation and insufficient fibrotic healing. This high rate of recurrence warrants investigation