Aims We aimed to test the superiority, between two centre-driven strategies, of an interventional strategy with distal balloon angioplasty versus conservative strategy without angioplasty, as first-line therapy for DCI.

Methods Two Centres with either conservative or intensive interventional strategies for treating DCI participated to this 1:1 matched retrospective cohort study. Consecutive patients admitted with aSAH between 2018 and 2019. Radiological DCI, death at 1 month, and favourable outcome at 6-months (modified-Rankin Scale score ≤ 2) were retrospectively analysed and compared between two-centres before and after propensity-score-matching for baseline characteristics.

Results The final analysis included 400 patients (200 in each group). Interventional and conservative groups differed in age (54 vs. 55 yrs, $P=0.040$), smoker (54% vs. 36%) and chronic high-blood pressure (37% vs. 48%), and intensive therapy for DCI including vasospasm angioplasty (38% vs. 0%, $P<0.001$), intravenous milrinone (35% vs. 0%, $P<0.001$), and induced hypertension (0%-vs-22%, $P<0.001$). After PS matching, 159 patients remained in each group. There was no significant difference of incidence of radiological DCI (9%-vs-14%, $P=0.15$), death (8% vs.9%, $P=0.4$), and favourable outcome 74%vs.72% ($P=0.4$) between interventional and conservative groups.

Conclusions This study failed to provide evidence that distal balloon angioplasty significantly improves the outcome following aSAH. Although the effect of unknown confounders between centres cannot be ruled out, our results question the use of such intensive therapies in clinical practice without further optimization and validation.

REFERENCES

- Macdonald RL. Delayed neurological deterioration after subarachnoid haemorrhage. *Nat Rev Neurol* Jan 2014;**10**(1):44–58.
- Brami J, Chousterman B, Boulouis G, et al. Delayed cerebral infarction is systematically associated with a cerebral vasospasm of large intracranial arteries. *Neurosurgery* Feb 1 2020;**86**(2):E175–E183.
- Jabbarli R, Pierscianek D, Rolz R, et al. Endovascular treatment of cerebral vasospasm after subarachnoid hemorrhage: More is more. *Neurology* Jul 30 2019;**93**(5):e458–e466.

Disclosure Nothing to disclose

EP04* EFFICACY AND SAFETY IN THE USE OF STENT-RETRIEVERS FOR TREATMENT OF CEREBRAL VASOSPASMS AFTER SUBARACHNOID HEMORRHAGE

¹J Hensler, ¹F Wodarg, ¹J Madjidyar, ¹S Peters, ²G Cohrs, ¹O Jansen, ¹N Larsen. ¹Department of Radiology and Neuroradiology; ²Department of Neurosurgery, Universitätsklinikum Schleswig-Holstein, Campus Kiel, Kiel, Germany

10.1136/neurintsurg-2021-ESMINT.4

Introduction Cerebral vasospasms are an important cause of considerable morbidity and mortality after subarachnoid hemorrhage (SAH). In addition to conservative therapy, endovascular spasmolysis can play an important role in the management of this disease. Still, optimal management remains controversial. Stent-retrievers may provide an alternative and additional technique for the treatment of cerebral vasospasms.¹

Aim of Study To investigate the feasibility and safety of mechanical spasmolysis with different stent-retrievers.

Methods We retrospectively analyzed all patients with vasospasms after SAH that were treated with percutaneous spasmolysis using self-expanding and adjustable stent-retrievers and

remodeling devices in addition to conventional vasospasm therapy.

Results 21 vessel-segments with vasospasms in 12 patients were included. Spasmolysis with stent-retrievers was conducted in proximal and distal vessel segments without complications. In 42.9% a good effect, in 52.4% a medium effect and in only one case (4.8%) a poor angiographic effect was achieved, respectively. Spasmolysis was more effective in distal vessel segments compared to proximal (reduction of stenosis 56.6% vs. 26.7%, $p<0.05$) and more effective with 3 mm compared to 4 mm stent-retrievers (43.6% vs. 25.8%, $p=0.059$). 71.4% of patients had a favorable outcome (mRS 0–1) at long-term FU (77–226d).

Conclusion Stent-retrievers are frequently used in interventional stroke therapy and may represent a safe and effective treatment option for intracranial spasmolysis after SAH, especially for the more distal vessel-segments. Compared to conventional balloon-PTA, this method seems promising by its ease of use, low risk of rupture and retained blood flow during dilatation, however further improvement of the radial force is recommended.

REFERENCE

- Bhogal P, Loh Y, Brouwer P, et al. Treatment of cerebral vasospasm with self-expandable retrievable stents: proof of concept. *J Neurointerv Surg* 2017;**9**:52–59. doi:10.1136/neurintsurg-2016-012546

Disclosure

Funding No funding was received for this research. Johannes Hensler: Personal fees from consultant activity for Balt, outside the submitted work. Wodarg F: Personal fees from consultant activity for Microvention, personal fees from consultant activity for Acandis, personal fees from consultant activity for Cerenovus, personal fees from consultant activity for Balt, outside the submitted work. Jawid Madjidyar: none Sönke Peters: none Gesa Cohrs: none Olav Jansen: Personal fees from consultant activity for STRYKER, personal fees from consultant activity for Medtronic, personal fees from consultant activity for Covidien, outside the submitted work. Naomi Larsen: none

EP05* EARLY CEREBRAL INFARCTION FOLLOWING ANEURYSMAL SUBARACHNOID HEMORRHAGE IS ASSOCIATED WITH PRIOR CIRCULATORY FAILURE AND SEVERE INTRACRANIAL HYPERTENSION

¹D Simonato, ²RJ Borchert, ¹M Fusch, ³L Cancian, ⁴S Gaugain, ⁵S Froelich, ⁴B Chousterman, ⁶E Hourdard, ⁶M-A Labeyrie. ¹Neuroradiology, Oxford University Hospital NHS Foundation Trust, Oxford; ²Clinical Neuroscience, University of Cambridge, Cambridge, UK; ³Radiology, AULSS6, Padua, Italy; ⁴Intensive Care Unit; ⁵Neurosurgery Unit; ⁶Interventional Neuroradiology, Lariboisière Hospital, Paris, France

10.1136/neurintsurg-2021-ESMINT.5

Introduction Early Cerebral injury (ECI) occurring in the first three days following a aneurysmal subarachnoid hemorrhage (aSAH) is associated with poor outcome and delayed cerebral ischemia.

Aims We aimed to correlate ECI with occurrence of circulatory-failure, and severe intracranial-hypertension.

Methods Two Institutional databases were searched retrospectively to identify consecutive patients admitted within 7 days following aSAH. ECI was defined as any radiological cerebral

infarction identified within 3 days from the onset of bleeding not related to aneurysm repair. Circulatory failure and severe intracranial hypertension prior to ECI, or within 3 days from bleeding if no ECI, were retrospectively determined. The association between ECI, prior circulatory failure, severe intracranial hypertension and patient outcomes was tested using uni- and multivariate analyses.

Results Seven-hundred-and-fifty-three patients with aSAH were included. ECI were observed in 40 patients with a prevalence of 5.3% (95% CI; 3.7–6.9%). New ECI lesions developed in-hospital in 70% of cases. Circulatory failure or severe intracranial hypertension was more common in patients with ECI compared to those without ECI (90% vs. 11% respectively $P<0.001$). In ECI patients, in-hospital occurrence of circulatory failure or severe intracranial hypertension was observed in 60% of cases, and was significantly associated new in-hospital ECI lesions (71% vs. 33% in patients without new in-hospital ECI lesions, $P=0.036$). ECI was independently associated with WFNS grade (OR=2.3, CI95%=1.5–3.6, $P<0.001$), circulatory failure (OR=4.7, CI95%=1.8–11, $P=0.001$), severe intracranial hypertension (OR=11.1, CI95%=3.8–32.3, $P<0.001$), mortality at 1-month (OR=6.3, CI95%=2.9–13.5, $P<0.001$), and poor outcome in survivors (modified Rankin score ≥ 3 at 6-month) (OR=3.8, CI95%=1.22–11.9, $P=0.021$).

Conclusions ECI following aSAH is associated with prior brain haemodynamic impairment occurring mainly in-hospital, representing a potential therapeutic target in poor-grade aSAH.

REFERENCES

- Naidech AM, Drescher J, Tamul P, Shaibani A, Batjer HH, Alberts MJ. Acute physiological derangement is associated with early radiographic cerebral infarction after subarachnoid haemorrhage. *J Neurol Neurosurg Psychiatry* 2006;**77**:1340–1344.
- Cahill WJ, Calvert JH, Zhang JH. Mechanisms of early brain injury after subarachnoid hemorrhage. *J Cereb Blood Flow Metab* 2006;**26**:1341–1353.
- Suwatcharangkoon S, Meyers E, Falo C, Schmidt JM, Agarwal S, Claassen J, Mayer SA. Loss of consciousness at onset of subarachnoid hemorrhage as an important marker of early brain injury. *JAMA Neurol* 2016;**73**:28–35.

Disclosure Nothing to disclose

EP06*

THE SUBARACHNOID HEMORRHAGE EARLY BRAIN EDEMA SCORE (SEBES) AS RADIOGRAPHIC MARKER OF CLINICALLY RELEVANT INTRACRANIAL HYPERTENSION AND UNFAVORABLE OUTCOME AFTER SUBARACHNOID HEMORRHAGE

¹M Said, ¹M Guemues, ¹A Herten, ¹TF Dinger, ¹M Chihi, ¹M Darkwah Oppong, ²C Deuschl, ¹KH Wrede, ³C Kleinschnitz, ¹U Sure, ¹R Jabbarli. ¹Department of Neurosurgery and Spine Surgery; ²Department of Diagnostic and Interventional Radiology; ³Department of Neurology and Center for Translational and Behavioral Neurosciences, University Hospital of Essen, Essen, Germany

10.1136/neurintsurg-2021-ESMINT.6

Introduction The severity of early brain edema after aneurysm rupture was reported to be strongly associated with the risk of poor outcome after aneurysmal subarachnoid hemorrhage (SAH).

Objective/Aim Using the recently developed SEBES, we analyzed the predictors of early brain edema and its impact on the complications related to intracranial pressure (ICP) increase after SAH.

Methods All consecutive SAH cases treated between January 2003 and June 2016 with assessable SEBES were included

(n=745). Data on demographic characteristics, previous medical history, initial severity of SAH, need for conservative ICP treatment and decompressive craniectomy, occurrence of cerebral infarcts and unfavorable outcome at 6 months (mRS ≥ 2) were collected. Univariable and multivariable analyses were performed.

Results Younger age (<55 years, adjusted odds ratio [aOR] = 3.16, $p<0.0001$), female sex (aOR=1.64, $p=0.005$), poor initial clinical condition (WFNS=4–5, aOR= 1.74, $p=0.002$), presence of intracerebral hemorrhage (aOR=1.63, $p=0.011$), hypothyroidism (aOR=0.60, $p=0.043$) and renal comorbidity (aOR=0.29, $p=0.014$) were independently associated with the SEBES (scores 3–4). There was an independent association between the SEBES=3–4 and the need for conservative ICP treatment (aOR=2.43, $p<0.0001$), decompressive craniectomy (aOR=2.68, $p<0.0001$), development of cerebral infarcts (aOR=2.24, $p<0.0001$) and unfavorable outcome (aOR=1.48, $p=0.047$).

Conclusions The SEBES is a reliable predictor of ICP-related complications and poor outcome of SAH. Along with age- and sex-related predisposition to early brain edema, presence of certain comorbidities like hypothyroidism and renal diseases seem to play a protective role in the severity of early brain edema after SAH.

REFERENCES

- Ahn SH, Savarraj JP, Pervez M, Jones W, Park J, Jeon SB, et al. The subarachnoid hemorrhage early brain edema score predicts delayed cerebral ischemia and clinical outcomes. *Neurosurgery* 2018;**83**(1):137–45.
- Rass V, Helbok R. Early brain injury after poor-grade subarachnoid hemorrhage. *Curr Neurol Neurosci Rep* 2019;**19**(10):78.
- Eibach M, Won SY, Bruder M, Keil F, Herrmann E, Berkefeld J, et al. Age dependency and modification of the subarachnoid hemorrhage early brain edema score. *J Neurosurg* 2020:1–7.

Disclosure Nothing to disclose

EP07*

LONG-TERM RESULTS OF COMPLEX WIDE-NECKED INTRACRANIAL ANEURYSMS TREATED WITH STENT-ASSISTED COILING USING LOW-PROFILE ACANDIS ACCLINO STENT SYSTEMS

D Grieb, K Melber, F Boxberger, M Schlunz-Hendann, F Brassel. Department of Radiology and Neuroradiology, Sana Kliniken Duisburg, Duisburg, Germany

10.1136/neurintsurg-2021-ESMINT.7

Introduction Little data exists on endovascular treatment of complex intracranial aneurysms with the Acandis Acclino low-profile self-expanding closed-cell stent systems and is mainly limited to short- or midterm results.

Aims To report our long-term, single-center experience with the three generations of Acclino stents in the treatment of complex intracranial aneurysms.

Methods 64 aneurysms were treated electively using 91 Acclino stents. Single stent-assisted coiling was the preferred treatment in 40 cases and the kissing-Y stenting technique in 24 cases. We analyzed demographic data and long-term results.

Results All stents were successfully deployed with immediate complete or near complete occlusion achieved in 92.2%. Follow-up was available in 57 cases (89.1%) with a mean follow-up of 37 months (range 6–80 months). A complete or near complete long-term occlusion was achieved in 49 cases (86% RROC I/II). Eight residual aneurysms (14% RROC III) were