

treated by immediate induction to systolic values above 180mmHg (iHTN_{imm}). Both groups were compared concerning the need for additional endovascular rescue treatment, the occurrence of DCI caused infarction and clinical outcome assessed by the extended Glasgow outcome scale after 12 months.

Results: The rate of refractory DCI requiring additional rescue therapy was comparable in both groups (48.9% in iHTN_{incr}, 40% in iHTN_{imm}; $p=0.332$). However, immediate induction was associated with a significantly lower risk of DCI induced infarction (29.5% vs. 51.1%; $p=0.015$). This is also reflected in a trend towards a higher rate of favorable outcome as measured by the GOSE after 12 months in the iHTN_{imm} group. (60.5% vs. 45.2%; $p=0.110$).

Conclusion: In this observational trial, initial aggressive elevation of blood pressure was associated with a lower rate of DCI induced infarction and better outcome when compared to an incremental adjustment of blood pressure, possibly due to a more timely compensation of misery perfusion. Future studies will have to determine the additional value of more detailed approaches such as optimal cerebral perfusion pressure (CPP_{opt}) in the treatment of delayed cerebral ischemia.

BRAIN AND SPINE 1 (2021) 100307 100347 DECOMPRESSIVE HEMICRANIECTOMY AFTER SUBARACHNOID HAEMORRHAGE – JUSTIFIABLE IN LIGHT OF LONG-TERM OUTCOME?

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Background: Decompressive hemicraniectomy (DHC) is a lifesaving procedure able to alleviate refractory intracranial hypertension and prevent death. The spectrum of indications for this procedure is expanding and we present long-term results in a series of patients suffering from aneurysmal subarachnoid hemorrhage (aSAH). DHC for this indication remains controversial as refractory intracranial pressure is indicative of severe and diffuse cerebral damage. The goal of this analysis is to identify predictors of favorable outcome after DHC in aSAH patients.

Methods: All aSAH cases treated between 2010 and 2019 in a single institution were included. Patients additionally treated with decompressive hemicraniectomy due to refractory intracranial hypertension, were identified. The occurrence of DCI and DCI-related infarctions was noted and clinical outcome was assessed by means of the Glasgow outcome scale after 12 months.

Results: Of all 337 aSAH cases, 64 (19.0%) were treated with DHC. Hemicraniectomy was performed on average 4.0 ± 3.9 after the initial hemorrhage. Of all DHC treated patients only 9 (14.0%) cases reached favorable outcome and 43 (67.2%) patients survived the first year. The necessity for DHC was higher in younger ($p = 0.002$) patients with more severe SAH according to Hunt & Hess ($p < 0.001$) and modified Fisher grading ($p < 0.001$). Surgically clipped patients ($p = 0.015$), patients suffering from DCI ($p = 0.001$) or DCI-related infarction ($p = 0.028$) were more likely to require DHC. In multivariate analysis, only younger age ($p = 0.017$) was associated with favorable outcome after DHC.

Conclusion: Decompressive hemicraniectomy, though lifesaving has only a limited probability of offering survival in a clinical favorable condition. The decision to perform DHC has to be critically evaluated on an individual basis. We identified young age to be the sole independent predictor of favorable outcome after DHC in SAH.

BRAIN AND SPINE 1 (2021) 100307 100348 EVALUATION OF TRANSCRANIAL DOPPLER IN COMPARISON WITH COMPUTED TOMOGRAPHY ANGIOGRAPHY IN EARLIER DETECTION OF VASOSPASM: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: Cerebral vasospasm is a life-threatening complication affecting 50% - 90% of patients with aneurysmal subarachnoid hemorrhage (aSAH). Digital subtraction angiography (DSA) is the gold standard to detect vasospasm. Computed tomographic angiography (CTA) is a newer, less invasive imaging technique, while Transcranial Doppler (TCD) is a widely used non-invasive method to detect vasospasm. Previous studies have shown these methods detect vasospasm; however, their reliability compared to DSA remains controversial. This study aimed to compare CTA and TCD to detect vasospasm in aSAH patients in reference to DSA.

Method: A literature search was conducted on PubMed, EMBASE, and Cochrane up to September 2020 for studies evaluating the diagnostic testing criteria of either CTA or TCD compared to DSA. The DerSimonian-Laird random-effects model was used to pool sensitivity and specificity, and to then calculate pooled likelihood ratio positive (LR+) and likelihood ratio negative (LR-).

Results: Out of 2070 studies, 19 met the inclusion criteria. Overall, 607 patients and 3870 arterial segments were analyzed. In reference to DSA the pooled sensitivity was higher for CTA (83%; 95%CI: 71.7%, 90.8%) than TCD (50%, 95%CI: 35.6, 64.4%). Pooled specificity was also higher for CTA (94.8%, 95%CI: 90%, 97.3%) than TCD (83.8%, 95%CI: 75.7%, 89.5%). This led to a derived pooled LR+ in favor (>10) of CTA (16.0) but not TCD (3.09). Pooled LR- was not in favor (>0.1) of CTA (0.18), yet, still better than TCD (0.60) when compared to the gold standard (DSA).

Conclusion: Despite TCD being a frequent modality for vasospasm detection, this meta-analysis confirmed that CTA had better sensitivity, specificity, LR+, and LR- values than TCD. Therefore, CTA can be used in preference to TCD for ruling in vasospasm. However, to rule out vasospasm, CTA was still better than TCD but not a better alternative than DSA.

BRAIN AND SPINE 1 (2021) 100307 100349 PREVENTIVE EFFECT OF VITAMIN D IN TREATMENT MANAGEMENT OF INTRACRANIAL ANEURYSM

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Background: Unruptured intracranial aneurysm (UIA) poses a therapeutic dilemma in which the risk-benefit analysis of invasive intervention has to be balanced against the natural history of the disease. To date, there is no medical treatment to prevent aneurysm development and subsequent progression to rupture. We explored the vitamin D system because of its known anti-inflammatory and anti-tissue-remodeling effect as a potential treatment for UIA.

Methods: 25-vitaminD3 levels tested between 2008-2016 and data of SAH patients admitted during the months with a peak versus nadir of VitD3-values were analyzed, retrospectively. We prospectively correlated VitD3 with size and number of aneurysms at the rupture time in patients admitted between 2017-2019. An experimental mice shear stress model and cell culture model were used to investigate the effect of 1,25-dihydroxy-vitaminD3 (1,25-VitD3) and acting mediators in this mechanism.

Results: Based on the retrospective analysis demonstrating an increased frequency of aneurysm rupture rate in patients during the low vitamin D period in winter, we started the prospective study evaluating plasma vitamin D levels at admission. VitD levels were inversely correlated with aneurysm size as well as number of aneurysms. Low number of aneurysms was significantly associated with sufficient plasma Vitamin D level as an independent factor in a multivariate analysis.

From bedside back to bench, active 1,25-VitD3 hormone attenuated the natural history of remodeling in mice basilar artery. Deletion of the vitamin-D-receptor in myeloid cells decreased the protective 1,25-VitD3 effect. Cell-culture of vascular fibroblasts confirmed the anti-tissue remodeling effect of 1,25-VitD3.

Conclusion: 1,25-VitD3 attenuates aneurysm development and subsequent progression to rupture. However, VitD-administration should be tested as optional treatment in management of patients with UIA.