

Extent of Collateral Circulation in Predicting Symptomatic Cerebral Vasospasm, Cerebral Infarctions, and Delayed Cerebral Ischemia in Aneurysmal Subarachnoid Hemorrhage

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Introduction

Cerebral collateral circulation has been studied extensively in ischemic stroke where it has been shown to be an independent predictor of reperfusion, final infarct size, and clinical outcome. Little is known about the significance of the cerebral collateral circulation in the setting of vasospasm secondary to aneurysmal subarachnoid hemorrhage (aSAH). This study sought to determine the associations and clinical importance of cerebral collaterals circulation in this patient population.

Methods

We evaluated 64 aSAH patients who were enrolled into a prospective observational cohort study and had CT angiographic evidence of vasospasm in the anterior circulation who underwent diagnostic cerebral angiograms between day 5 and 7. Angiograms were evaluated by 2 blinded neurointerventionalists. Two statistical models were generated comparing good collateral grades to poor collateral grades and another model comparing any collaterals with patients who had no collaterals.

Results

The inter-rater reliability for the collateral grades, measured using the weighted kappa statistic, was 0.632 implying substantial agreement.

Mild vasospasm was more frequent in patients with poor collateral grades compared to patients with good collateral grades (32% vs. 4% $p=0.012$). There was no difference in outcomes between the collateral groups with regards to DCI, functional or cognitive outcome.

Patients with collaterals were more likely to have severe vasospasm (62% vs. 33% $p=0.023$) and less likely to have mild vasospasm (37% vs. 9% $p=0.007$).

In a multivariable model vasospasm severity remained associated with collateral status.

Conclusions

Patients with mild vasospasm were more likely to be associated with poor collateral grades rather than good collateral grades. Additionally patients with severe vasospasm were more likely to have collaterals and patients with mild vasospasm were less likely to have any collaterals. Further research is needed to determine whether collateral grades are related to the

Learning Objectives

Little is known about the significance of the cerebral collateral circulation in the setting of vasospasm secondary to aSAH.

Patients with mild vasospasm were more likely to be associated with poor collaterals and severe vasospasm were more likely to have collaterals.

References

Liebeskind DS, Tomsick TA, Foster LD, Yeatts SD, Carrozzella J, Demchuk AM, et al. Collaterals at angiography and outcomes in the interventional management of stroke (ims) iii trial. *Stroke*. 2014;45:759-764

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