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Dietrich et al. compared the TCD and CTP values with angiography and evaluated TCD and CTP changes before and after patients received intra-arterial spasmolytic therapy.

Retrospective analysis of TCD, CTP, and angiographies of N = 77 patients treated from 2013 to 2016. In 38 patients intra-arterial spasmolysis had been performed, and in these cases TCD and CTP data were compared before and after lysis. Thirty-nine patients had a pathological CTP but no angiographically seen vasospasm.

There was no correlation between the known thresholds of mean transit time (MTT) in CTP and vasospasm or with mean velocities in TCD and vasospasm. After spasmolysis in patients with vasospasms, only the MTT showed significant improvement, whereas TCD velocities and Lindegaard ratio remained unaffected.

TCD and CTP seem to identify different pathological entities of DCI and should be used supplementary in order to identify as many patients as possible with vasospasms after aSAH [1)].

see Transcranial Doppler for vasospasm diagnosis.

Evaluating the proportion of the brain with critical hypoperfusion after SAH may better capture the extent of DCI than averaging CBF across heterogeneous brain regions [2)].

Significant literature shows that perfusion computed tomography (CTP) can provide sufficient information on cerebral hemodynamics and effectively indicate delayed cerebral ischemia (DCI) before the development of infarction. Sun et al. aimed at performing a meta-analysis to provide a more full and accurate evaluation of CTP and CTP parameters in detecting DCI in patients with aneurysmal subarachnoid hemorrhage.

In the PubMed, MedLine, Embase and Cochrane databases analysis published from February 2005 to

February 2013. The extraction of CTP parameters, including cerebral blood volume (CBV), cerebral blood flow (CBF), mean transit time (MTT), time to peak (TTP), interhemispheric ratios for CBV and CBF and interhemispheric differences for MTT and TTP. Pooled estimates of sensitivity, specificity, positive likelihood ratio (PLR), negative likelihood ratio (NLR), diagnostic odds ratio (DOR) and the summary receiver-operating characteristic curve were determined.

Four research studies are met the inclusion criteria for the analysis. The pooled sensitivity, specificity, PLR, NLR and DOR of CTP for detecting the DCI were 82%, 82%, 4.56, 0.22 and 20.96, respectively. Through the evaluation of absolute CTP parameters, CBF and MTT showed diagnostic value for DCI, but CBF and TTP did not. Moreover, CBF ratio, MTT difference and TTP difference showed more diagnostic value than CBV ratio in DCI detection by the assessment of relative CTP parameters.

As a non-invasive and short time-consuming screening method, CTP own a high diagnostic value for the detection of DCI after aneurysm rupture [3].

CTP maps were calculated with tracer delay-sensitive and tracer delay-insensitive algorithms and were visually assessed for the presence of perfusion deficits by two independent observers with different levels of experience. The diagnostic value of both algorithms was calculated for both observers.

Seventy-one patients were included. For the experienced observer, the positive predictive values (PPVs) were 0.67 for the delay-sensitive and 0.66 for the delay-insensitive algorithm, and the negative predictive values (NPVs) were 0.73 and 0.74. For the less experienced observer, PPVs were 0.60 for both algorithms, and NPVs were 0.66 for the delay-sensitive and 0.63 for the delay-insensitive algorithm.

Test characteristics are comparable for tracer delay-sensitive and tracer delay-insensitive algorithms for the visual assessment of CTP in diagnosing DCI. This indicates that both algorithms can be used for this purpose [4].

Whole-brain CT Perfusion (CTP) on Day 3 after aneurysmal subarachnoid hemorrhage (aSAH) allows early and reliable identification of patients at risk for delayed ischemic neurological deficits (DIND) and tissue at risk for delayed cerebral infarction (DCI) [5].

1)

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2)

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3)

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4)
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5)
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