

CT perfusion for acute Ischemic stroke diagnosis

Perfusion CT has proven to be a valuable tool in the diagnosis of [acute ischemic stroke](#) ¹⁾.

In 2013 a systematic review showed that CTP has a high sensitivity and a very high specificity for detecting infarcts ²⁾.

The [CBV](#) ratio is a suitable parameter for evaluating Collateral status (CS) quantitatively for patients with [AIS](#) that can predict patient response to [recanalization](#) ³⁾.

CT perfusion for acute Ischemic stroke diagnosis requires use of [iodinated contrast](#).

Areas of interest are selected from an unenhanced CT scan in the 3 supratentorial vascular territories. [Contrast](#) is given at a standard rate (e.g. 40 ml IV at 5 ml/sec).

Scans through the regions of interest are repeated at intervals, e.g. every 2 seconds for 1 minute. [Acetazolamide](#) (ACZ) ([Diamox](#)®) challenge: after the above, a bolus of 1000mg of IV ACZ is given, and scans are repeated at intervals for approximately 10 minutes, with a final scan usually at 15 minutes. Parameters then calculated from the images: [cerebral blood volume](#) (CBV), [CBF](#), [mean transit times](#) (MTT), and [time to peak](#) (TTP). In ischemic stroke, MTT is almost always increased and CBF is decreased. Abnormalities that can be demonstrated:

1. flow significant stenosis: decreased CBV & CBF, increased MTT and TTP
2. steal: after ACZ challenge, CBV & CBF decrease, often with increases in the corresponding contralateral territory; MTT increases

¹⁾

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Biesbroek JM, Niesten JM, Dankbaar JW, Biessels GJ, Velthuis BK, Reitsma JB, van der Schaaf IC. Diagnostic accuracy of CT perfusion imaging for detecting acute ischemic stroke: a systematic review and meta-analysis. *Cerebrovasc Dis*. 2013;35(6):493-501. doi: 10.1159/000350200. Epub 2013 May 31. PMID: 23736122.

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Hirai S, Tanaka Y, Sato H, Kato K, Kim Y, Yamamura T, Sumita K, Arai T. Quantitative collateral assessment evaluated by cerebral blood volume measured by CT perfusion in patients with acute ischemic stroke. *J Stroke Cerebrovasc Dis*. 2021 Apr 17;30(7):105797. doi: 10.1016/j.jstrokecerebrovasdis.2021.105797. Epub ahead of print. PMID: 33878545.

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