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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2)
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3)
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