

Contrast enhanced transcranial triggered B mode technology

Contrast enhanced ultrasound transcranial triggered B-mode technology can be used to examine **cerebral perfusion**. However, this technique is still faced with methodological problems, especially the difficulty of overcoming the temporal bone window.

Ten stroke patients (aged 39 to 59 years, mean age 57 years), in whom a decompressive craniectomy due to a malignant space-occupying infarction or intracerebral haemorrhage was performed, were examined with transcranial duplex sonography after application of the contrast agent SonoVue (TM). The transcranial examination was performed using transient response harmonic grey scale imaging with bolus kinetics based on a contrast harmonic imaging software with single-pulse transmission technology. The mechanical index was set at 1.0 to 1.1. Triggered images with pulsing intervals of 1000 ms were used for the evaluation of time intensity curves in several regions of interest. The sonographically imaged areas of hypoperfusion were compared with CT or MRI findings.

After injection of the contrast agent, the perfusion deficit could be detected ipsilaterally according to the affected vascular territory in the area of the MCA in 5 patients, in the area of ACA and MCA in 2 patients, in the area of the MCA, ACA and PCA in one patient and in the area of intracranial haemorrhage in 2 patients. The calculated average peak images corresponded precisely with the superimposed CT or MRI images in shape and size in all patients. Additionally, it was possible to observe several interesting contrast-induced phenomena in the cerebral parenchyma, as well as specific transit-time curve characteristics in the perfusion deficit area.

Using contrast-enhanced transcranial duplex sonography with transient response harmonic imaging, it is possible to depict the perfusion deficit in cerebral microcirculation in patients following decompressive craniectomy and to obtain new insights into the pathophysiology of the hypoperfusion areas. Further studies should be done in stroke patients through the intact skull to standardise this method for early diagnosis of acute deficit in cerebral perfusion ¹⁾.

¹⁾
Bartels E, Bittermann HJ. Transcranial contrast imaging of cerebral perfusion in stroke patients following decompressive craniectomy. *Ultraschall Med.* 2004 Jun;25(3):206-13. PubMed PMID: 15146361.

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