## **Cerebrovascular reactivity**

Cerebrovascular reactivity (CVR) reflects the capacity of blood vessels to dilate and is an important marker for brain vascular reserve.

The purpose of a retrospective observational study was to investigate the long-term changes in cerebrovascular reactivity (CVR) as a measure of cerebral hemodynamics in patients with Intracranial atherosclerotic stenoocclusive disease (IC-SOD) after they have undergone an Extra intracranial bypass surgery. Twenty-six patients suffering from IC-SOD were selected from the CVR database. Nineteen patients underwent unilateral and 7 underwent bilateral revascularization. CVR measurements were done using Blood oxygen level dependent functional magnetic resonance imaging and precisely controlled CO2 and expressed as  $\Delta$ BOLD (%)/ $\Delta$  PETCO2 (mmHg). Trends in CVR over time were compared in both vascularized and non-vascularized hemispheres. Repeated measures analysis of variance with Greenhouse-Geisser correction was used to determine CVR changes within the grey matter MCA for longitudinal assessments. Overall, re-vascularized hemisphere showed a significant increase in CVR at the first follow-up, followed by a slight decrease at the second follow-up that significantly increased compared to the pre-bypass. However, the changes in the postoperative CVR were quite variable across the patients. Similar variability was seen in subsequent follow-ups, with a slight overall decline in the long term CVR as compared with first post-operative CVR.

The study demonstrates that EC-IC bypass has a beneficial long-term effect on cerebral hemodynamics and this effect varies between patients probably due to the variability in the underlying vascular pattern receiving the bypass. Hence, in the postoperative follow-up of patients routine functional imaging to monitor cerebral hemodynamics may be useful as the risk of stroke and cognitive decline remain present with impaired CVR<sup>1</sup>.

## Mapping

## Cerebrovascular Reactivity Mapping

## 1)

Rosen C, McKetton L, Russell J, Sam K, Poublanc J, Crawley A, Han JS, Sobczyk O, Duffin J, Mandell DM, Tymianski M, Fisher JA, Mikulis DJ, Venkatraghavan L. Long-term changes in cerebrovascular reactivity following EC-IC bypass for intracranial steno-occlusive disease. J Clin Neurosci. 2018 Jun 12. pii: S0967-5868(18)30435-1. doi: 10.1016/j.jocn.2018.06.009. [Epub ahead of print] PubMed PMID: 29907385.

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