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Title: NON-INVASIVE MONITORING OF ABSOLUTE CEREBRAL OXYGEN SATURATION (FORE-SIGHT, CASMED) DURING ELECTIVE SHUNTING PROCEDURE FOR CAROTID ENDARTERECTOMY

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Background and Goal of Study: (required): Cerebral oximetry, based on NIRS, measures regional cerebral tissue oxygen saturation (SctO₂) non-invasively at the microvascular level. The FORE-SIGHT absolute cerebral oximeter, a recently introduced monitoring device, uses 4 precise wavelengths to determine absolute SctO₂. In pts suffering from acute cerebral symptoms or from bilateral high-grade stenosis, a high risk (to 25%) for insufficient collateral circulation during carotid clamping for carotid endarterectomy (CEA) is reported. Therefore, elective shunting is preferred to avoid intra-operative stroke due to hypoperfusion. As the FORE-SIGHT provides an absolute value of SctO₂, we wanted to evaluate threshold SctO₂ values during carotid clamping in these high risk patients.

Materials and Methods: (required): Over a 6-months period, 16 pts scheduled for CEA with elective intraluminal shunting were included. In all pts, CEA was performed under general anesthesia. FORE SIGHT was used to measure bilateral SctO₂, together with routine EEG monitoring to detect intra-operative cerebral ischemia. During CEA procedure, SctO₂ and EEG readings were blinded for interpretation to the anesthesiologist as well as to the surgeon.

Results and Discussion: (required): Mean ipsilateral SctO₂ immediately before clamping was 69.% (65%-77%) and decreased significantly (p:0.0039) by a mean of 8.4% (4%-13%) after cross-clamping. In 4 pts, SctO₂ decreased below 55%. In 3 of these 4 pts, EEG change indicative of ongoing cerebral ischemia were observed. Mean starting SctO₂ in these pts was 65.%, while it was 71% for the other 12 pts (NS). Contralateral SctO₂ was not different (66% - 76%, m72%) and decreased by m2.7% (0%-7%) after cross-clamping. Ipsilateral mean SctO₂ before shunt opening was 61.% and significantly (p:0.0039) increased to mean 68.0% after opening. Contralateral SctO₂ increased non-significantly from 70% to 72% after shunt opening (NS). Ipsilateral mean SctO₂ before shunt closure was 68% (59%-75%) and decreased significantly (p:0.0039) to mean 63% (54%-70%) after shunt closure. In 3 of 16 pts, SctO₂ decreased to 55% or lower, without any change in EEG recordings. Mean SctO₂ in those 3 pts before shunt closure was 60%, whereas it was 70% in the other 13 pts. Contralateral SctO₂ showed significantly less differences.

Conclusion(s): (required): Absolute non-invasive cerebral oximetry seems most promising for its use during CEA procedures. Critical threshold determination as to cerebral ischemia may be difficult, but at least, unique information as to the adequacy of shunt opening may be obtained.