Hemodynamic modification and EEG monitoring during carotid surgery: a review of the hemodynamics and the neurological perioperative complications in 275 consecutive cases.

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Summary: Endarterectomy (CEA) is the standard treatment for carotid stenosis. Continuous EEG is one of the monitoring used to detect cerebral ischemia. When this occurs, the EEG changes and the hemodynamic variations induced either spontaneously or by the anesthesiologist are not described. We therefore reviewed the peroperative electronic records of our patients anaesthetized for CEA to describe these modifications. We also study predictive factors of cerebral ischemia from the data extracted from our database.

Material and Methods: This retrospective single centre study, reviewed the data recorded by our anesthesia information management system (Innovian Anesthesia Drager) from 275 patients who underwent CEA from 01/2012 until 12/2016. General anesthesia with propofol and remifentanyl controlled by TCI using the Schnider and the Minto models was used. A continuous EEG using 10 leads placed according to the "10-20" international system was used in all cases for brain monitoring and was continuously observed by a neurologist. The cases for which an EEG modification was observed around the clamping time were reviewed by a single neurologist to confirm the changes and the exact timing of the event. The mean blood pressures (MPB mmHg) were extracted from our database from 20 minutes before to 20 minutes after the event. For analysis we used Mann-Whitney and Fischer Test statistics, and ANOVA test was used for the statistical analysis of the mean blood pressures.

Results and Discussion:

29 (10,54%) patients presented significant EEG changes. 27 of them required a shunt and only 2 responded positively to an increase in MBP.

The MBP recorded during the clamping was however significantly higher in this group (96.8 (+/- 12.0) vs 89.6 (+/- 9.6) (p=0.001)).

The most frequently reported EEG change was lateralized attenuation (72%), occurring mostly within the first 20 seconds (75% of cases), as seen in previous studies (1), (2).

The patients with a contralateral stenosis > 80% showed more EEG changes (P=0.045), as seen in previous studies (3), (4). None of the other recorded perioperative data were associated with an EEG change.

Patterns of EEG alteration induced by clamping (n = 29)

Conclusion: An increase in MBP was observed in the EEG delta group, however most of these patients still required shunting. The cause of this modification is not obvious from our data and should be further studied.