Surgical Plethysmographic Index reflects sympathetic fluctuations due to surgical stimulation of the carotid baroceptors

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Argomento: Anestesia generale

Background: Little is known about the sympathetic response to stressor like major surgery. In vasculopathic patients, the effects of such response can be deleterious, leading to many cardiovascular consequences due to variations of blood pressure, heart rate, and stress hormones productions. It has been postulated that Surgical Pleth Index (SPI), derived from pulse photoplethysmographic amplitude analysis, reflects sympathetic-mediated vasoconstriction but its changes have not been yet described during major vascular surgery.

Aim: To describe the SPI variations in relationship with the manipulation of carotid glomus in patients undergoing carotid endoarteriectomy.

Methods: Patients undergoing to general anaesthesia for elective tromboendoarteriectomy were studied. Intraoperative monitoring was the same as used in daily clinical practice with the adjunction of SPI monitoring device (GE Healthcare, Helsinki). The anesthesiologists were blinded to the SPI. All data were recorded continuously and exported to a PC for offline analysis. In all patients, anaesthesia were induced with propofol 1-2.5 mg.kg-1 and fentanyl 1.5-3 µg.kg-1, plus a rocuronium bolus 0.4-0.6 mg.Kg-1 for intubation.

Results: 20 patients were studied. SPI fluctuations during the surgery are shown in figure 1. SPI changed significantly during the manipulation of the carotid glomus ($p<0.0001$) as shown in figure 2. Although the SPI after tromboendoarteriectomy was lower than before clamping (44.2, 95%CI 43.3-45 *vs.* 46.6, 95%CI 45.3-47.8, $p <0.05$), such difference was not clinically relevant. No major complications were detected in the postoperative period.

Conclusions: SPI may reflect the sympathetic fluctuations secondary to surgical manipulation of the arterial carotid glomus. If the amplitude of these oscillations might affect the postoperative outcome should be further investigated.

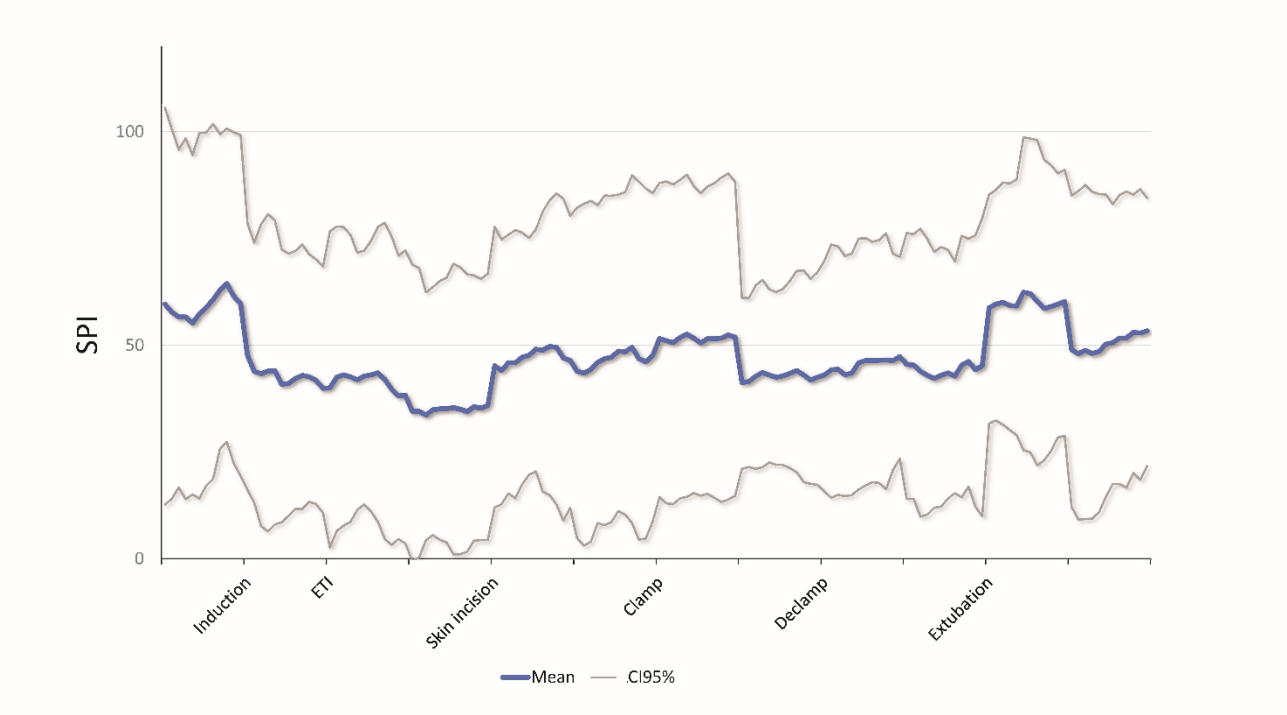

Figure 1

SPI changes during the surgery (mean and 95%CI). Indiction, induction of general anesthesia with loss of consciousness; ETI, endotracheal intubation; Clap, clamping of the internal carotid artery; Declamp, de-clamping of the internal carotid artery.

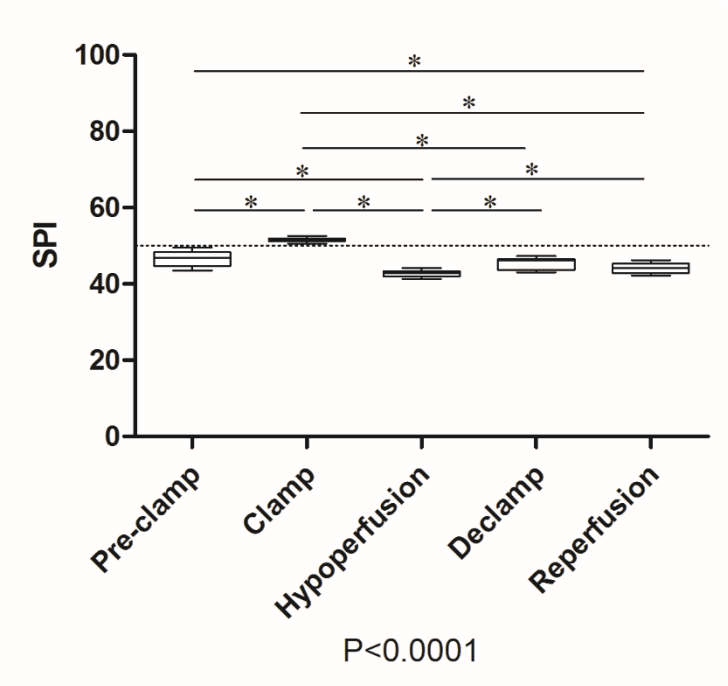

Figure 2

SPI changes due to surgical manipulation of the carotid glomus. Clamp, clamping of the carotid artery; Hypoperfusion, phase of no flow into the internal carotid artery due to clamping. Wiskers represent min to max values. Data were analyzed with one way analysis of variance followed by Bonferroni's *post hoc* test. *p<0.05.