Entropy and surgical pleth index (SPI)– guided depth of hypnosis on general anaesthesia in critically ill polytrauma patients

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Background: Being highly unstable, the critically ill polytrauma patient represents a challenge for the anaesthesia team. The aim of this study was to compare the Entropy and Surgical Pleth Index (SPI) – guided general anaesthesia with standard haemodynamic monitoring methods used in the critically ill polytrauma patients and to evaluate the incidence of hemodynamic events, as well as the opioid and vasopressor demand.

Methods: 72 patients were included in this prospective observational study, divided in two groups, the ESPI Group (N=37, patients that benefited from Entropy and SPI monitoring) and the STDR Group (N=35 patients that benefited from standard hemodynamic monitoring). In the ESPI Group general anaesthesia was modulated in order to maintain the Entropy levels between 40 and 60. Analgesia control was achieved through maintaining the SPI levels between 20 and 50. In the STDR Group hypnosis and analgesia were maintained using the standard criteria based on hemodynamic changes. ClinicalTrials.gov identifier NCT03095430.

Results: The incidence of hypotension episodes was significantly lower in the ESPI Group (N=3), compared to the STDR Group (N=71) ($p<0.05$). Moreover, the Fentanyl demand was significantly lower in the ESPI Group ($p < 0.0001$, difference between means 5.000 ± 0.038 , 95% confidence interval 4.9250 to 5.0750), as well as vasopressor medication demand ($p < 0.0001$, difference between means 0.960 ± 0.063, 95% confidence interval 0.8.334 to 1.0866).

Conclusions: The implementation of multimodal monitoring in the critically ill polytrauma patient brings substantial benefits both to the intraoperative clinical status and to the clinical outcome of these patients by reducing the incidence of anesthesia-related complications.