NOL-GUIDED ANALGESIA CLINICAL ALGORITHM

The clinical algorithm described below mimics the method used in Leiden University Medical Centre (the Netherlands) during a comparison study of NOL-guided analgesia vs. standard of care administration of opioids[1]. The study showed that NOL-guided analgesia, during a propofol-remifentanil anaesthesia may reduce the use of intraoperative remifentanil by up to 30% and results in a reduction of up to 80% in hypotension events during the procedure.

A growing body of evidence indicates that intraoperative hypotension increases the risk of myocardial injury, acute kidney injury, and mortality.[2] Thus, the importance of the prevention/reduction of intraoperative hypotensive events is obvious.

Patient population: ASA class I-III patients (aged 18 to 80 year) of either sex.

Type of surgery: Elective major abdominal surgical, urologic or gynaecologic procedures under general anaesthesia without epidural analgesia.

Method: All patients received remifentanil/propofol anaesthesia using a target-controlled infusion (TCI) system, relaxation with rocuronium and reversal with sugammadex. During the procedure the bispectral index (BIS), NOL, non-invasive blood pressure (BP) and heart rate (HR) were monitored. Patients were randomized to receive standard of care or NOL-guided analgesia. Propofol was titrated to a BIS value of 50 ± 5.

Decision algorithm:

- In the standard of care group, the TCI was managed by the anaesthesiologist using standard of care monitoring. In the NOL group, the NOL trend line was observed during noxious stimuli and the clinical/treatment/response algorithm using remifentanil was:
- If the NOL trend line fluctuates within the recommended values of 10-25, no action is required.
- If the NOL trend line fluctuated above 25 for over 120 seconds:
  - If 25<NOL<45 - gradually increase remifentanil levels in steps of 0.5 ng/mL.
  - If NOL >45 - gradually increase remifentanil levels in steps of 1.0 ng/mL.
- If NOL<10 for over 120 seconds during noxious stimulation, decrease remifentanil levels in steps of 0.5 ng/mL.
- Following increase or decrease of analgesia, allow an observation window of 5 minutes before making any additional change (to ensure analgesic onset).
- NOL<10 during a "no noxious stimuli period", is not considered an overdose.

1. *Meijer et al., (2019), Nociception-guided versus Standard Care during Remifentanil–Propofol Anesthesia: A Randomized Controlled Trial. Anesthesiology.*
2. *Salmasi V. et al., (2017), Relationship between Intraoperative Hypotension, Defined by Either Reduction from Baseline or Absolute Thresholds, and Acute Kidney and Myocardial Injury after Noncardiac Surgery. Anesthesiology.*