

NOL-GUIDED SEVOFLURANE/FENTANYL ANAESTHESIA

The clinical algorithm described below describes the method used at Leiden University Medical Centre (the Netherlands) and Alrijne Hospital, Leiderdorp, during a comparison study of NOL-guided analgesia vs. standard of care administration of opioids.¹ The study showed that NOL-guided analgesia, under fentanyl/sevoflurane anaesthesia, may reduce postoperative pain in the post anaesthesia care unit (PACU).

A growing body of evidence indicates that postoperative pain is associated with a broad range of adverse outcomes, including increased morbidity, development of chronic postoperative pain and impaired quality of life.² Thus, it is vital to detect and prevent repeated nociceptive responses that could lead to postoperative pain.

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

Type of surgery: Elective open abdominal surgery or laparoscopic/ robot-assisted abdominal surgery without epidural anaesthesia, local blocks or infiltration.

Method: Patients were randomized to receive NOL-guided anaesthesia or standard of care. In both groups, a NOL device was connected, but in the standard care group, the anaesthesia team was blinded to the device.

Anaesthetic technique was identical in the two studies and consisted of 25-50 or 50-100µg fentanyl boluses (analgesia), sevoflurane (anaesthesia maintenance aimed at BIS values 50 ± 5) and rocuronium 0.6 mg kg⁻¹ (muscle relaxant).

Decision algorithm:

In the standard clinical care (SCC) arm, fentanyl boluses were given based on hemodynamic variables such as blood pressure and heart rate. In the NOL-guided analgesia arm, fentanyl dosing was based on NOL values and the clinical/treatment/response algorithm was:

- If the NOL trend line was above 25 for at least 60s, 50-100 µg fentanyl was administered in a patient > 70 kg (154 lbs), and 25-50 µg in a patient of 70 kg or less.
- After fentanyl was given, 5-10 min were allowed before the next evaluation took place.
- In cases where the index decreased below 25, no more fentanyl was administered
- If the index was <25 and the MAP was <60 mmHg, vasoactive medication (ephedrine, phenylephrine, norepinephrine), crystalloids, or both could be given.
- Irrespective of index value, when MAP was >100 mmHg and not responsive to fentanyl, despite adequate and repeated dosing, and BIS values were <55, a vasodilator (nitroglycerine or natrium nitroprusside) or a continuous infusion of remifentanyl could be given.
- If BIS values were >55, the inspired sevoflurane concentration was increased such that BIS decreased below 55, and the patient condition was reassessed.

1. Meijer, F., Honing, M., Roor, T., Toef, S., Calis, P., Olofsen, E., Martini, C., van Velzen, M., Aarts, L., Niesters, M., Boon, M., Dahan, A. (2020). Reduced postoperative pain using Nociception Level-guided fentanyl dosing during sevoflurane anaesthesia: a randomised controlled trial. *British Journal of Anaesthesia*, In Press. DOI: <https://doi.org/10.1016/j.bja.2020.07.057>

2. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. *J Pain Res.* 2017;10:2287-2298