

274885 - IMPACT OF DIFFERENT REMIFENTANIL DOSES ON THE NOCICEPTION LEVEL INDEX RESPONSE TO INTRA-OPERATIVE NOXIOUS STIMULI

Author(s)

Etienne Renaud-Roy
Université de Montréal
Primary & Presenting Author

Co-Authors(s)

Pierre-André Stöckle - Université de Montréal
Olivier Verdonck - Université de Montréal
Louis-Philippe Fortier - Université de Montréal
Philippe Richebé - Université de Montréal

Introduction: Several indices have been recently used to monitor nociception intensity under general anesthesia (GA), most of them based on a single parameter. The PMD monitor (Medasense Biometrics, Israel) uses the NOL index, a multiparametric index derived from heart rate (HR), HR variability, plethysmograph wave amplitude, skin conductance, skin temperature and its fluctuations. The index ranges from 0 (no pain) to 100 (max pain). The PMD monitor has been recently shown to have a high sensitivity and specificity to discriminate nociception under GA. With the latest version PMD-200, we tested the NOL response during noxious stimuli at various doses of remifentanil (RF). The hypothesis was an inverse correlation between RF dose and NOL alteration.

Methods: After Ethic Committee approvals, 26 patients received desflurane-RF based GA with an epidural analgesia (EA) for laparotomy. A tetanic stimulation was applied to the forearm of the patients at 4 RF doses (0.005 $\mu\text{g}/\text{kg}/\text{min}$ before and after EA loading, 0.05 and 0.1 $\mu\text{g}/\text{kg}/\text{min}$). Intubation and incision were processed at 0.05 $\mu\text{g}/\text{kg}/\text{min}$ RF dose. Pre- and post-stimulation NOL mean values were compared. ROC curves were constructed to assess the ability of the individual parameter to discriminate between noxious and non-noxious state at RF 0.005 $\mu\text{g}/\text{kg}/\text{min}$. Correlation between RF dose and post-stimulation NOL values was assessed.

Results: AUC for discrimination between noxious and non-noxious states for NOL was 0.92 vs 0.69, 0.71, 0.64 for HR, MBP and BIS respectively. Pre-stimulation NOL values ranged for 5 to 8 with no significant difference when RF infusion increased. Post-stimulation values at RF doses of 0.005 before and after epidural load, 0.05, and 0.1 $\mu\text{g}/\text{kg}/\text{min}$ were, respectively, 24, 21, 14 and 7, significantly higher than the pre stimulation values ($p < 0.0083$). Post-stimulation values significantly decreased when RF dose was higher. Correlation test between NOL values and RF doses was $r = -0.584$ ($p < 0.0001$).

Discussion: In this study, NOL index was the only parameter responding to all noxious stimuli under general anesthesia, regardless to RF dosage. NOL was better for discriminating a noxious from a non-noxious state compared to single measures. NOL values after stimulus decreased with the high dose of RF, showing a significant inverse correlation between opioid dose and NOL index. The high sensitivity and specificity of the NOL index in this study suggests it has great potential as a monitor of nociception intensity during anesthesia.

References:

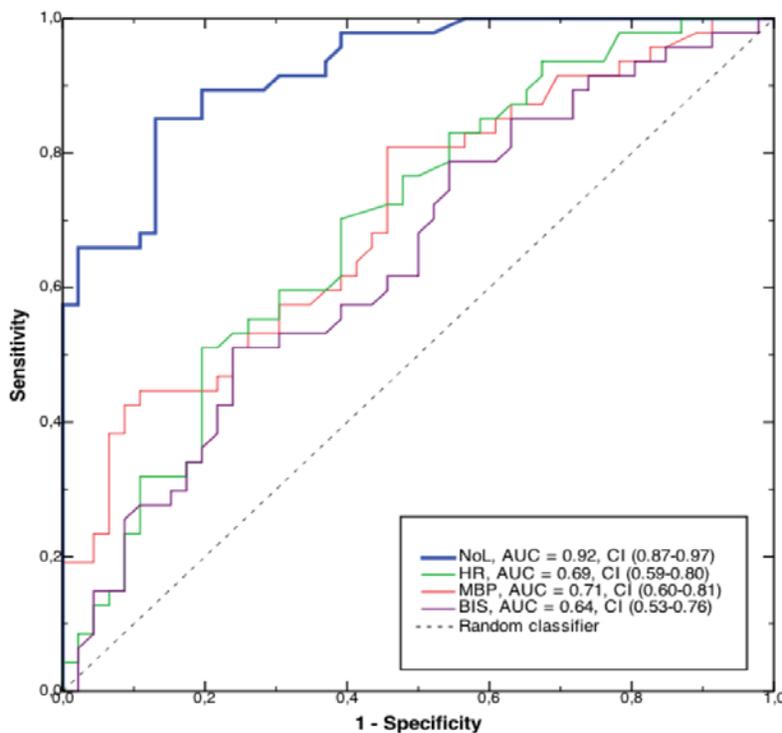
Gruenewald, M., & Ilies, C. (2013). Monitoring the nociception-anti-nociception balance. *Best Practice & Research. Clinical Anaesthesiology*, 27(2), 235–247. <http://doi.org/10.1016/j.bpa.2013.06.007>

Edry, R., Recea, V., Dikust, Y., & Sessler, D. I. (2016). Preliminary Intraoperative Validation of the Nociception Level Index: A Noninvasive Nociception Monitor. *Anesthesiology*, 125(1), 193–203. <http://doi.org/10.1097/ALN.0000000000001130>

Ben-Israel, N., Kliger, M., Zuckerman, G., Katz, Y., & Edry, R. (2013). Monitoring the nociception level: a multi-parameter approach. *Journal of Clinical Monitoring and Computing*, 27(6), 659–668. <http://doi.org/10.1007/s10877-013-9487-9>

Martini, C. H., Boon, M., Broens, S. J. L., Hekkelman, E. F., Oudhoff, L. A., Buddeke, A. W., & Dahan, A. (2015). Ability of the Nociception Level, a Multiparameter Composite of Autonomic Signals, to Detect Noxious Stimuli during Propofol–Remifentanil Anesthesia. *Anesthesiology*, 123(3), 524–534. <http://doi.org/10.1097/ALN.0000000000000757>

Receiver operating characteristics curve



Receiver operating characteristics curve analysis: discrimination of experimental noxious stimulus period from non-noxious stimulus period at minimal remifentanil dosage (0.005 mcg/kg/min). NOL: Nociception Level index; HR= Heart Rate; MBP= Mean arterial Blood Pressure; BIS= Bispectral index.