631148 - NOL INDEX SHOWS HIGH SENSITIVITY TO DETECT NOCICEPTION INDUCED BY INTUBATION UNDER DIFFERENT REMIFENTANIL DOSAGES.

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Introduction: The use of heart rate (HR) and blood pressure as proxies for nociception is common but imperfect as they have poor sensitivity and specificity. This study used a novel nociception monitoring device, the PMD200 and its NOL multiparametric index (references: 1, 2, 3) to detect nociception after the clinical stimulus intubation.

Methods: 80 patients with normal airway criteria undergoing surgery requiring intubation received 0.5, 1, 1.5, or 2 mcg/kg of remifentanil as part of a standardized induction regimen. Standard anesthetic monitoring as well as the NOL index (generated by analyzing parameters associated with autonomic tone) and HR were recorded every 5 seconds before and after intubation. Receiver operating

characteristic (ROC) curves were constructed to evaluate the ability of the individual parameter to discriminate between noxious and non-noxious states and confidence intervals of the area under the curves (AUCs) were calculated. This study was registered under clinicaltrial.gov. Scientific and Ethic committees' approval was obtained prior to the start of the study.

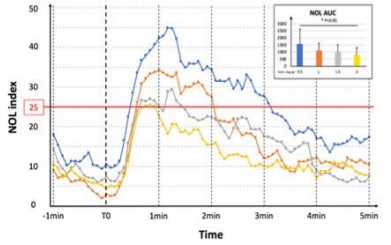
Results: Data for 74 patients were fully analyzed. Airway evaluation criteria were identical for the 4 subgroups receiving either 0.5, 1, 1.5 and 2 mcg/kg of remifentanil at the time of induction of general anesthesia. NOL and HR values before and after the clinical stimulus intubation are presented in the figure. Five minutes after intubation, NOL values had returned to pre-stimulus baseline values whereas HR remained elevated despite the absence of further nociceptive stimuli (Figure parts A and B). Area under the curve (AUC) of NOL variation after the stimulus intubation as well as AUC of HR were significantly smaller after a 2 mcg/kg remifentanil bolus vs 0.5 mcg/kg ($p<0.05$). Receiver operating characteristic (ROC) curves for sensitivity and specificity showed higher ROC AUC for NOL (0.97[0.95-0.99]; $p<0.001$) vs HR (0.82[0.76-0.88]; $p<0.01$) (figure part C, red x mark for NOL threshold at 25). Mean arterial blood pressure and bispectral index were also reported in figure 2 and showed lower sensitivity than NOL and HR.

Discussion: The NOL index appeared to have greater sensitivity and specificity for detecting nociception at the time of intubation than HR, in anesthetized patients.

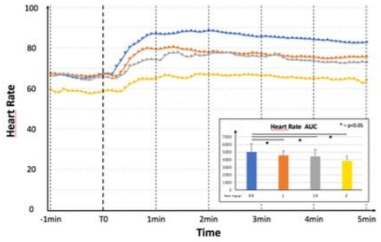
References:
(1) Minerva Anestesiol. 2018 Oct;84(10):1160-1168.Validation of the PMD100 and its NOL Index to detect nociception at different infusion regimen of remifentanil in patients under general anesthesia.Stöckle PA, Julien M, Issa R, Décary E, Brulotte V, Drolet P, Henri M, Poirier M, Latulippe JF, Dorais M, Verdonck O, Fortier LP, Richebé P
(2) Anesthesiology. 2016 Jul;125(1):193-203. Preliminary Intraoperative Validation of the Nociception Level Index: A Noninvasive Nociception Monitor.Edry R, Recea V, Dikust Y, Sessler DI.
(3) Anesthesiology. 2015 Sep;123(3):524-34. Ability of the nociception level, a multiparameter composite of autonomic signals, to detect noxious stimuli during propofol-remifentanil anesthesia.Martini CH, Boon M, Broens SJ, Hekkelman EF, Oudhoff LA, Buddeke AW, Dahan A.

Figure

A

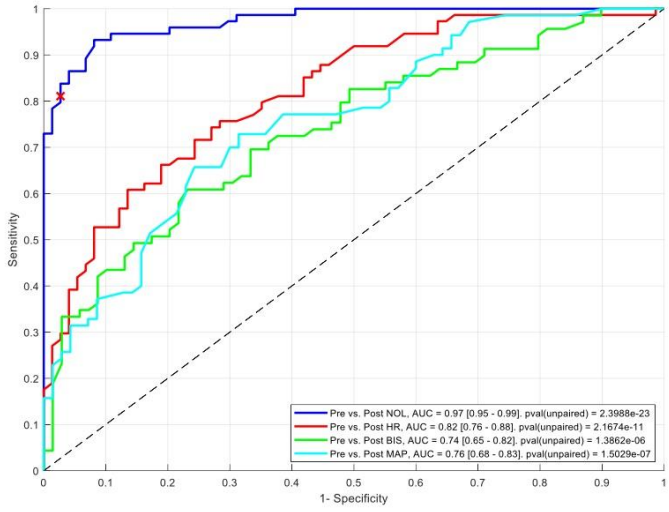

NOL index
Time
-1min
T0
1min
2min
3min
4min
5min
25
NOL AUC

B


Heart Rate
Time
-1min
T0
1min
2min
3min
4min
5min
Heart Rate AUC


Remifentanil 0.5 mcg/kg
Remifentanil 1 mcg/kg
Remifentanil 1.5 mcg/kg
Remifentanil 2 mcg/kg

C


Sensitivity
1- Specificity
Pre vs. Post NOL, AUC = 0.97 [0.95 - 0.99]. pval(unpaired) = 2.3988e-23
Pre vs. Post HR, AUC = 0.82 [0.76 - 0.88]. pval(unpaired) = 2.1674e-11
Pre vs. Post BIS, AUC = 0.74 [0.65 - 0.82]. pval(unpaired) = 1.3862e-06
Pre vs. Post MAP, AUC = 0.76 [0.68 - 0.83]. pval(unpaired) = 1.5029e-07