

Topic: 17.1. Sedation, analgesia and delirium: clinical studies

Title: Exploring the use of an innovative technology for pain assessment during mediastinal tube removal in cardiac surgery patients in the intensive care unit: The Nociception Level (NOL) Index™

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Text: **INTRODUCTION.** The patient's self-report is the gold standard measure of pain; however, it is not possible to obtain it in all patients in the intensive care unit (ICU) due to inability to communicate. In such situations, behavioral scales are alternative measures as no physiologic methods are available. Indeed, single physiologic parameters (e.g., heart rate, blood pressure) are not valid for ICU pain assessment.² The newly developed Nociception Level (NOL) index (Medasense, Israel) incorporates several physiologic parameters to estimate the pain level.³ It has been validated in anesthesia,^{3,4} but its use in the ICU is new. **OBJECTIVES.** This study explored the ability of the NOL index to detect pain during mediastinal tube removal (MTR) in cardiac surgery ICU patients. **METHODS.** A prospective cohort study design was conducted in an ICU in Montreal, Canada. Adult patients admitted for elective cardiac surgery and able to self-report postoperatively were eligible. Patients were asked to self-report their pain intensity with the 0-10 Numeric Rating Scale (NRS). The NOL index is a single number from 0 to 100 obtained through a non-invasive finger probe, and for patients under general anesthesia values >25 are indicative of pain. It incorporates heart rate, heart rate variability, plethysmograph wave amplitude, skin conductance level, number of skin conductance fluctuations, and their time derivatives, using a non-linear regression algorithm to estimate the pain level.³ Data was collected at rest pre-procedure (T1), during MTR procedure (T2), and 15 minutes post-procedure (T3). The sample and study variables were described, and ROC curve analysis of the NOL index for the detection of the patient's pain intensity at T2 was performed. **RESULTS.** Fifty-four cardiac surgery ICU participants (72% males, mean age=66) were included. Descriptive findings (median, percentiles 25%-75%) were the following at T1 [pain intensity (2.00, 0.00-5.00), NOL (19.11, 7.64-26.16)], at T2 [pain intensity (6.00, 3.00-9.00), NOL (28.90, 23.23-35.74)], and at T3 [pain intensity (3.00, 0.00-5.00), NOL (8.62, 2.76-15.82)]. At T2, the NOL (>34) showed a sensitivity of 80% and a specificity of 70% to classify participants with no or mild pain (0-4) to those with significant pain (5-10) with an area under the curve (AUC) of 0.79 (95% CI:0.63-0.94). **CONCLUSIONS.** Pain intensity and NOL values were higher during MTR compared to rest pre/post. The NOL's ability to detect pain during MTR in this ICU group was good. Some factors (e.g., anxiety, stress) in awake patients may be reflected in the study results. Research on the NOL's validity for ICU pain assessment is on-going. **REFERENCE(S).**
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