



Dear Colleague,

We are pleased to share with you some of our recent news and activities. Please also follow us on [LINKEDIN](#) to stay up to date on our upcoming events and progress.

Enjoy the read!

The Medasense team

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## **Visit us at Anesthesiology 2018, 13-15 Oct.**

We are pleased to be attending the prestigious ASA (American Society of Anesthesiologists) 2018 Annual Meeting from the 13-15 October, San Francisco, USA. [Please join us at Booth 1442 and don't forget to attend our satellite symposium, MED talks and abstract presentations](#) to learn more about the NOL<sup>®</sup> technology and our latest clinical progress.

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# **New abstract presentations share the potential impact of NOL<sup>®</sup> on patient outcomes**

**The International Association for the Study of Pain<sup>®</sup> (IASP)  
2018**

## ***"Intraoperative nociception monitoring and postoperative recovery after knee arthroplasty"***

P. Lavand'homme, E. Thienpont, M.N. France

In a study with 75 adult patients scheduled for elective knee arthroplasty (TKA) performed under general anaesthesia with local knee infiltration, findings reveal that NOL values above nociception threshold correlated with pain at mobilization on day 1 and pain at movement after 3 months.

The author concludes: the presented results show that control of intraoperative nociception (assessed by NOL index) is important, as it may predict early and longer term postoperative pain.

## **Canadian Anesthesiologists' Society (CAS) 2018 Annual Meeting**

### ***"Combined intraoperative anesthesia & analgesia monitoring impact on safety & recovery: Cinaamon interim analysis"***

Etienne Renaud-Roy, Philippe Richebé, Olivier Verdonck, Manon Choinière,  
Véronique Brulotte, Louis-Philippe Fortier

Combining BIS and NOL to improve patient outcomes has not yet been studied. 30 patients on Enhanced Recovery After Surgery program (colorectal surgery) equipped with low thoracic epidural were randomized to group M (protocol with BIS and NOL) or group C (Standard Of Care). Interim results show that NOL+BIS monitoring had significant impact on recovery outcomes, with faster discharge from post-anesthesia care unit (PACU) and improved pain scores.

## New published studies

### Journal of Anesthesia and Intensive Care Medicine (JAICM)

New study, led by Dr. Pether Jildenstål, Institute of Health and Care Sciences, University of Gothenburg, Sweden. Results show that the NOL index tends to indicate nociceptive responses earlier than hemodynamic outcomes. NOL index can be a physiological marker for optimal analgesic administration and an interesting complement to monitoring equipment intraoperatively. Read the full paper [here](#).

Journal of Anesthesia & Intensive Care Medicine  
ISSN 2474-7453

Research Article  
Volume 12(2) 001-005  
DOI: 10.4173/JAICM.122016

Juniper  
Publishers  
A Step to the Researcher

Anest & Inten Care Med  
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### Monitoring the Nociception Level Intraoperatively - An Initial Experiences

Pether Jildenstål<sup>1,2,3\*</sup>, Katarina Hallén<sup>1</sup>, Katarina Almskog<sup>1</sup>, Johan Sand<sup>4</sup> and Margareta Warren Stomberg<sup>1</sup>

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<sup>4</sup>Submission July 8, 2016; Published July 25, 2016

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**Abstract**  
Background: Estimating pain stimuli in the anesthetized patient can be difficult when based solely upon physiological parameters, especially when vasopressors are used as well. There is an increasing interest during general anesthesia to understand how optimal anesthesia changes by the level of nociceptive stimulation. Objective: nociceptive stimulation measurement monitoring techniques are gaining interest. Although currently, its exact use in routine clinical practice is still not well proven. The aim of this study was to identify relationships between PMD 200 monitoring, Nociception Level (NOL index) and monitored known physiological signs as well as outcomes during general anesthesia.  
Methods: Eight patients between the ages of 43 and 63 years old and scheduled for major head and neck surgery under general anesthesia were observed in this study. NOL index sensor was placed on one of the patient's fingers before anesthesia was induced, and values were extracted during the intraoperative period.  
Results: NOL index values increased intraoperatively during nociceptive stimuli such as jaw lift, endotracheal intubation, catheterization of the bladder, and with surgical skin incision. NOL index increased at several occasions faster, and were more prominent than physiological parameters (HR, BP).  
Conclusions: There are identified relationships between PMD 200 monitoring, NOL index and nociceptive stimulation. NOL index tends to indicate nociceptive responses earlier and more often than hemodynamic outcomes. NOL index can be a physiological marker for optimal analgesic administration and an interesting complement to monitoring equipment intraoperatively worth further studies.  
Keywords: NOL index; Pain; Pain estimation; Opioids; Anesthesia nurse; Vasoreactive drugs

**Introduction**  
There is an increasing interest to understand more how and when the depth of anaesthesia changes by the level of nociceptive stimulation during general anaesthesia. Nociception is the mechanism by which the central and peripheral nervous systems process information about noxious stimuli, whereas pain is the perception generated when this information reaches the cerebral cortex [1]. Under general anaesthesia, patients are unconscious, but their body still shows reflex responses to the surgical procedure, including changes in heart rate and blood pressure, eyes tearing or sweating [2].  
During the past two decades, we have seen great advances in our understanding of pain. In particular the molecular biology of pain and the way in which the central nervous system perceives and processes pain have been transformed [2]. The key to adequate pain management during general anaesthesia, is to assess its presence and severity to identify those signs which require intervention, and by appreciating treatment efficacy [2-3]. In a recent review article (2015) by Covet et al. [4] they addressed the latest important developments in the field regarding objective nociceptive measurements [4]. Non-invasive techniques utilized to measure pain have become clinically feasible [5]. There are several techniques in use, although none of them have been commercially successful globally. The PMD 200 nociception level index (NOL index) is today a commercially available technique which is gaining growing interest [5]. The PMD 200 assess nociception stimuli by a multi-parametric algorithm [6]. The technology objectively quantifies the nociception stimuli (NOL index (0-100)) and interpret the analgesic effect [6].  
Due to the multifaceted nature of pain, PMD 200 focuses on the autonomic physiological integrated response to pain, rather than individual pain pathways. The device consists of a non-invasive finger probe which continuously records multiple pain

J Anest & Inten Care Med 12(2): JAICM.MS.ID.55579(2016) 001

## Minerva Anestesiologica



This prospective, observational [study](#) was led by Prof. Philippe Richebé, Maisonneuve-Rosemont, University of Montreal, Canada. It involved 40 ASA I to III patients undergoing laparotomy under remifentanyl-desflurane anaesthesia with epidural analgesia. The validation study concluded that NOL monitoring is a promising index to assess the level of nociception in patients under general anaesthesia.

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## F1000 Research – the innovative open access publishing platform

Recent publication of a study led by Professor Laurent Bollag, Department of Anesthesiology and Pain Medicine, University of Washington, Seattle, was published in June in F1000 Research.

This pilot study suggests that the NOL index may be a useful tool to evaluate the efficacy of an intraoperative thoracic epidural analgesia.

Read the full paper [here](#).

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**Thank you to everyone who stopped by the Medtronic booth at SFAR (our distribution partner in France) and joined the NOL<sup>®</sup> symposia & workshop**



# NOL<sup>®</sup> technology is now commercially available in Australia!

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We look forward to sharing our clinical progress with you at the ASA conference in October.

If you did not get the chance, please catch-up on our previous newsletter [here](#).

Thank you for your continued support.

Until next time!

The Medasense team

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