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 recent progress.

Enjoy the read!
The Medasense team

Visit us at Euroanaesthesia 2018, 2-4 June

We are excited to be attending the upcoming Euroanaesthesia 2018, 2-4 June, Copenhagen, Denmark. Please come and visit us at **Booth C3-016 in Hall C**, to learn more about the NOL® technology and latest clinical progress.

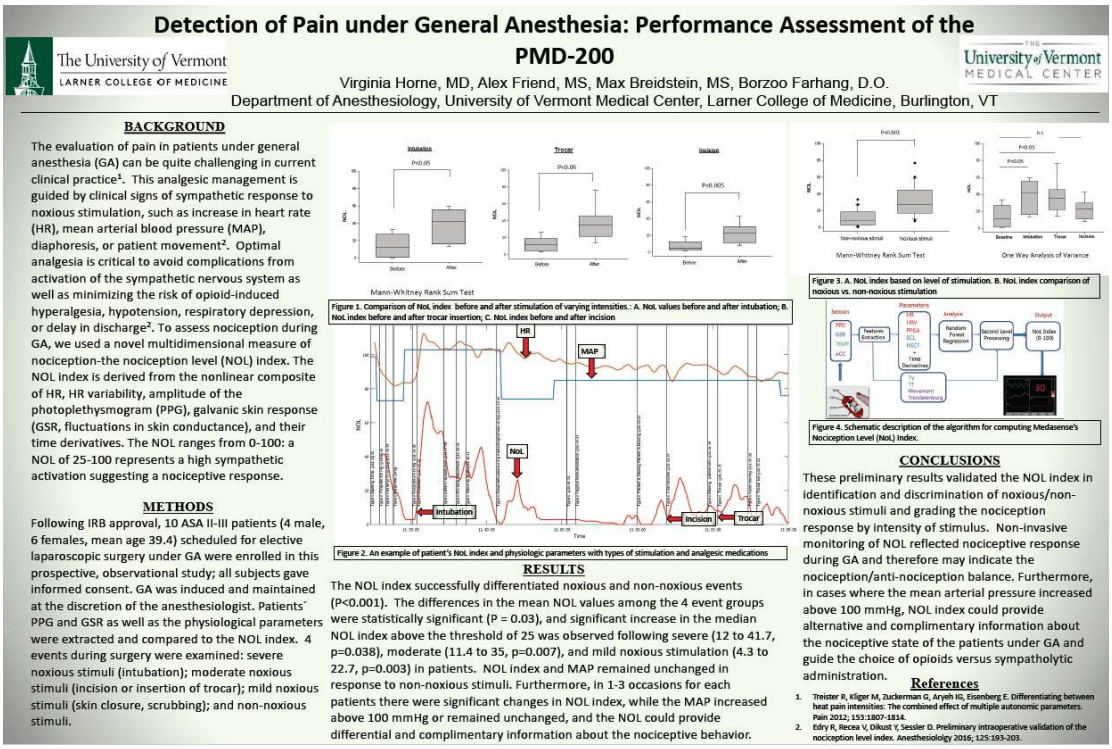
Don't forget to register here for the last few seats at our NOL®Technology User Group Meetup, June 4th, 8:00 - 10:00

NOL® can guide the choice of opioids versus sympatholytic administration, according to latest abstract presented at NEARC

A new NOL® study is led by Dr. Farhang Borzoo and his team from the Larner College of Medicine at the University of Vermont Medical Center. Preliminary results of the study were presented at the 12th Annual New England Anesthesia Residents Conference (NEARC). The study abstract concluded that the NOL® index can:

- Provide alternative and complimentary information to Mean Arterial blood Pressure about the nociceptive state of the patients under general anesthesia.
- Guide the choice of opioids versus sympatholytic administration.

Read the full abstract here.



Detection of Pain under General Anesthesia: Performance Assessment of the PMD-200

The University of Vermont LARNER COLLEGE OF MEDICINE

University of Vermont MEDICAL CENTER

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BACKGROUND

The evaluation of pain in patients under general anesthesia (GA) can be quite challenging in current clinical practice[1]. This analgesic management is guided by clinical signs of sympathetic response to noxious stimulation, such as increase in heart rate (HR), mean arterial blood pressure (MAP), diaphoresis, or patient movement[2]. Optimal analgesia is critical to avoid complications from activation of the sympathetic nervous system as well as minimizing the risk of opioid-induced hyperalgesia, hypotension, respiratory depression, or delay in discharge[2]. To assess nociception during GA, we used a novel multidimensional measure of nociception-the nociception level (NOL) index. The NOL index is derived from the nonlinear composite of HR, HR variability, amplitude of the photoplethysmogram (PPG), galvanic skin response (GSR, fluctuations in skin conductance), and their time derivatives. The NOL ranges from 0-100: a NOL of 25-100 represents a high sympathetic activation suggesting a nociceptive response.

METHODS

Following IRB approval, 10 ASA II-III patients (4 male, 6 females, mean age 39.4) scheduled for elective laparoscopic surgery under GA were enrolled in this prospective, observational study; all subjects gave informed consent. GA was induced and maintained at the discretion of the anesthesiologist. Patients´ PPG and GSR as well as the physiological parameters were extracted and compared to the NOL index. 4 events during surgery were examined: severe noxious stimuli (intubation); moderate noxious stimuli (incision or insertion of trocar); mild noxious stimuli (skin closure, scrubbing); and non-noxious stimuli.

Figure 1. Comparison of NoL index before and after stimulation of varying intensities.: A. NoL values before and after intubation; B. NoL index before and after trocar insertion; C. NoL index before and after incision

Mann-Whitney Rank Sum Test

Figure 2. An example of patient's NoL index and physiologic parameters with types of stimulation and analgesic medications

RESULTS

The NOL index successfully differentiated noxious and non-noxious events (P<0.001). The differences in the mean NOL values among the 4 event groups were statistically significant (P = 0.03), and significant increase in the median NOL index above the threshold of 25 was observed following severe (12 to 41.7, p=0.038), moderate (11.4 to 35, p=0.007), and mild noxious stimulation (4.3 to 22.7, p=0.003) in patients. NOL index and MAP remained unchanged in response to non-noxious stimuli. Furthermore, in 1-3 occasions for each patients there were significant changes in NOL index, while the MAP increased above 100 mmHg or remained unchanged, and the NOL could provide differential and complimentary information about the nociceptive behavior.

Figure 3. A. NoL index based on level of stimulation. B. NoL index comparison of noxious vs. non-noxious stimulation

Mann-Whitney Rank Sum Test

One Way Analysis of Variance

Figure 4. Schematic description of the algorithm for computing Medasense's Nociception Level (NoL) Index.

CONCLUSIONS

These preliminary results validated the NOL index in identification and discrimination of noxious/non-noxious stimuli and grading the nociception response by intensity of stimulus. Non-invasive monitoring of NOL reflected nociceptive response during GA and therefore may indicate the nociception/anti-nociception balance. Furthermore, in cases where the mean arterial pressure increased above 100 mmHg, NOL index could provide alternative and complimentary information about the nociceptive state of the patients under GA and guide the choice of opioids versus sympatholytic administration.

References

1. Treister R, Kliger M, Zuckerman G, Aryeh IG, Eisenberg E. Differentiating between heat pain intensities: The combined effect of multiple autonomic parameters. Pain 2012; 153:1807-1814.
2. Edry R, Recea V, Dikust Y, Sessler D. Preliminary intraoperative validation of the nociception level index. Anesthesiology 2016; 125:193-203.

First NOL®Symposium in Romania

A special thanks to everyone who attended the NOL® technology symposium at SRATI 2018 – the 44th congress of the Romanian society of anaesthesia. The symposium, guided by Prof. Bubenek and Dr. Ruth Edry, shared interesting cases of improved intraoperative pain management.

Thank you for visiting us at HOSPITALAR

A great first-time exhibition at Hospitalar 2018 in Sao Paulo, Brazil. We are grateful to all who visited our booth and attended our special lecture on "Artificial Intelligence: Analyzing Pain-related Parameters".

NOL® is now officially a registered trademark!

We are delighted to see the clinical momentum growing for the NOL®technology – thank you to everyone for attending our events and supporting Medasense.

Catch-up on our previous newsletter here.

Until next time,
The Medasense team