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ED₅₀ and ED₉₅ of remifentanil for tracheal intubation as determined by a monitor of nociception (NOL index)

Intubation tracheal, Pharmacology, agonists opioid, Monitoring, intraoperative

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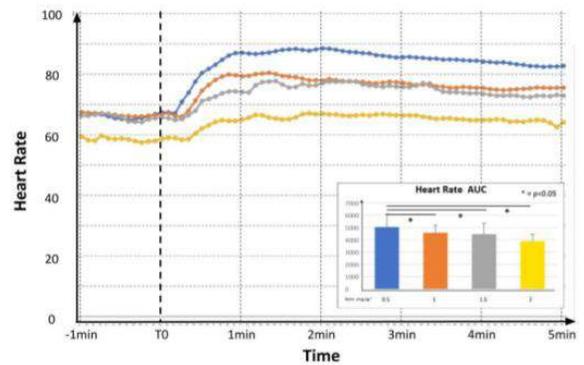
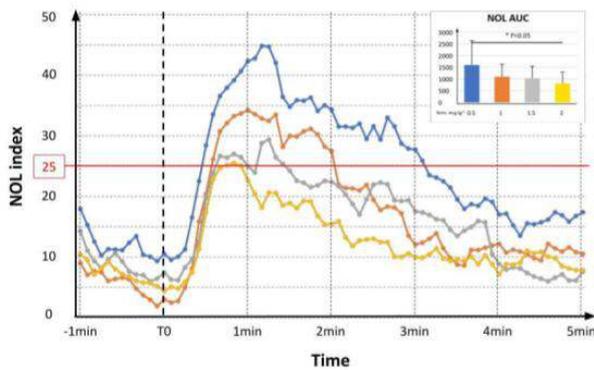
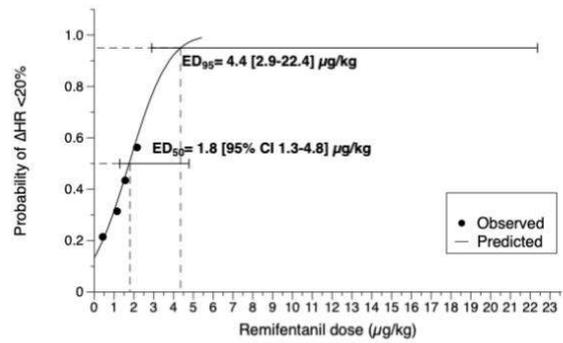
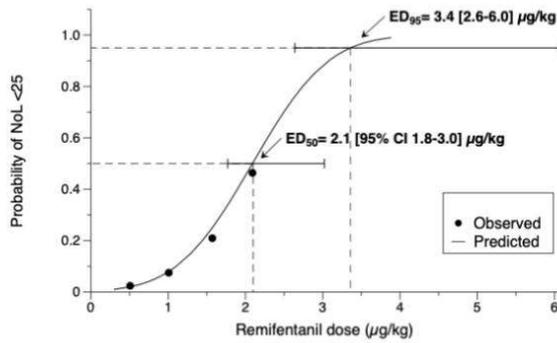
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Background & Study Goal: The use of heart rate (HR) and blood pressure as proxies for nociception is common but imperfect as they have poor sensitivity and specificity. This study used a novel nociception monitoring device, the PMD200, to determine the ED₅₀ and ED₉₅ of remifentanil for the abolition of nociception during intubation.

Materials & Methods: 80 patients with normal airway criteria undergoing surgery requiring intubation received 0.5, 1, 1.5, or 2 µg/kg of remifentanil as part of a standardized induction regimen. Standard anesthetic monitoring as well as the PMD200's NOL index (generated by analyzing parameters associated with autonomic tone) and HR were recorded every 5 seconds before and after intubation. Using a NOL value of 25 (based on previous studies), we determined via probit regression the ED₅₀ and ED₉₅, i.e., the dose needed to avoid nociception in 50% and 95% of patients, respectively. ED₅₀ and ED₉₅ were also calculated based on HR increase of >20%.

Results and Discussion: Data for 74 patients were fully analyzed. ED₅₀ and ED₉₅ were similar for NOL and HR. However, the confidence interval for HR was much wider (Fig 1). 5 minutes after intubation, NOL values had returned to pre-stimulus baseline values whereas HR remained elevated despite the absence of further nociceptive stimuli (Fig 2). Area under the curve (AUC) of NOL variation after intubation as well as AUC of HR were significantly smaller after a 2 µg/kg remifentanil bolus vs 0.5 µg/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]; $p < 0.001$).

Conclusion: The NOL and HR yielded similar ED₅₀ and ED₉₅. However, the NOL appeared to have greater sensitivity and specificity for detecting nociception.



Acknowledgements: special thanks to Nadia Godin and Moulay Idrissi at HMR-CEM TL, and to Medasense Ltd for graciously providing PMD200 device and supplies. This study was supported by the department of anaesthesiology of HMR-CEM TL.