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Previously published drug interaction models do not predict patient response well in endoscopic submucosal dissection procedure sedation

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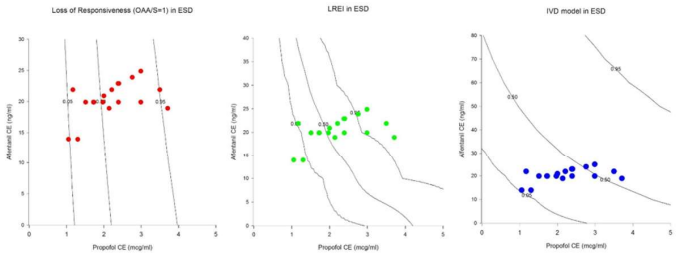
Background and Goal of Study: In recent years, endoscopic submucosal dissection (ESD) was developed to be therapeutic procedures of gastric cancer to enable en bloc lesion resection. Proper sedation is required not only for patient's comfort but also adequate surgical condition to ensure precisely curative resection and reduce surgical complications. The aim of this study was to validate the accuracy of the previously published response surface model (RSM) during ESD in the clinical setting.
Materials and Methods: Twenty enrolled participants from 30 to 80 years old were sedated by propofol combined alfentanil target controlled infusion. We recorded loss of response (LOR), loss of response to esophageal instrumentation (LREI), and intolerable ventilator desaturation (IVD) pharmacokinetic profiles including plasma and effect-site concentrations by using the TIVA trainer simulation program. The modified model was built by plotting the 5%, 50%, and 95% isoboles to predict propofol-alfentanil effect-site concentrations that produced an equivalent effect (figure1). The model prediction accuracy was determined as calculating the difference of accurate predictions percentage between the true response and the model-predicted probability.
Results and Discussion: Our study is the first one to evaluate the accuracy of three response surface models (LOR, LREI, and IVD) in patients undergoing sedation for ESD procedures. The LOR and LREI model seemed to express the trend of probability; however, the prediction accuracy was still poor. Besides, we noted that the patient actually required alfentanil-propofol dosage might be lower than what the original model predicted. Although the majority of our patients fall below the 50% isobole, the IVD model did not predict the two inadequate ventilation episodes.
Conclusion: The previously reported drug-interaction RSMs for upper gastrointestinal endoscopy can predict LOR but not LREI in ESD procedure. The IVD model didn't predict desaturation periods well. Further researches are needed to improve the quality of ESD procedure sedation to aid clinical decision making and practice.



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Deep neuromuscular blockade with sugammadex reversal for cervical spine surgery may not be less costly than standard clinical practice of rocuronium bolus and neostigmine reversal

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Background and Goal of Study: Deep NMB blockade, now easily feasible due to sugamadex availability, does not have a wide use because current indications are limited mostly to laparoscopic surgery and because of constraints related to the cost of sugamadex. We recently concluded a RCT designed to assess if deep NMB and sugamadex reversal reduced anesthetic requirements in patients subjected to cervical spine surgery. 63 patients were randomized to two groups: 1) rocuronium (bolus+infusion) to maintain 1 to 2 Post-Tetanic Counts until the end of surgical dressing, with sugamadex (4mg/kg) for reversal; 2) rocuronium bolus for intubation and reversal with neostigmine if TOF<90%. We found that deep NMB reduced propofol, remifentanil and ephedrine consumption as well as the duration of the procedures and the time from end of surgery to extubation. Here, we present a sub-analysis of the trial results that examines how the differences between the two study groups in terms of drugs consumed and OR occupancy could impact on costs
Materials and Methods: The average difference between groups in the doses of propofol, remifentanil, rocuronium, sugamadex and ephedrine were multiplied by their costs according to the prices applied in our National Health Service. The difference, in €, between the added cost of using a rocuronium infusion and sugamadex (A) and the savings obtained by the reductions in the other drugs (B) was calculated (C). The average difference in OR time, in minutes, between the two groups was obtained (D). The formula X=(60*C)/D was used to obtain the value for the cost per hour of OR occupancy for which the cost of using Deep NMB and sugamadex would be balanced by the savings in drugs used and OR occupancy. The value obtained for X was compared with published values for OR costs at our institution
Results and Discussion: Average doses (mg) for G1 and G2 were: propofol 715 vs 1082; remifentanil 833 vs 1069; Rocuronium for infusion 55,9 vs 0; Sugamadex 284 vs 0. Ephedrine used in 4 pts in G1 and 11 in G2. Neostigmine used only in 5 patients. Time (min) from end of surgery to extubation was G1 3,9 and G2 7,7. Total procedure time (min) was G1 131 and G2 146. Results were: A 113€; B 4,04€; C 109€; D 18,3min. Xwas 357,4€. Hourly OR costs at our institution are much lower: 474€ and 978€ without or with personnel.
Conclusion: Deep NMB and sugamadex may be cost effective due to less use of drugs and OR time.

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Rocuronium for the prevention of incidental surgical movement without deepening laryngeal mask airway anesthesia

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Background and Goal of the Study: Neuromuscular blocking agents (NMBAs) like rocuronium are historically associated with postoperative complications such as residual neuromuscular blockade and postoperative recurarization. These have decreased drastically since the approval of sugammadex. NMBAs are not formally indicated for general anesthesia with laryngeal mask airway (GA-LMA) nor are necessary for lower limb venous surgery. However, NMBAs improve surgical conditions by abolishing intraoperative involuntary reflex movements (IIRM) without increasing anesthetic depth, associated with postoperative delirium and cognitive dysfunction. Our aim was to assess if deep neuromuscular blockade (DNMB) using rocuronium abolished IIRMs and improved surgical conditions while maintaining an appropriate anesthetic depth in patients scheduled for varicose vein surgery under GA-LMA.
Materials and Methods: We conducted a 2-month observational prospective study in patients scheduled for varicose vein surgery under GA-LMA. After informed consent was obtained, demographic, anthropometric and medical data were collected. Some patients' anesthetic management included rocuronium administration and DNMB. Our primary outcomes included IIRMs, surgical conditions (as assessed by the surgeon on an ordinal 1-5 scale) and mean bispectral index (BIS) values. Secondary outcomes included mean percentual intraoperative time with BIS < 40 and presence/absence of ≥ 1 episode of BIS < 40 for ≥ 5 minutes.
Results: We included 16 patients, aged 57.3 ± 14.5 years. Most were women (81,3%) and American Society of Anesthesiologists Physical Status (ASA-PS) I or II (93,8%). 7 underwent surgery under no NMBA and 9 under DNMB. Groups had similar demographics, anthropometric values and ASA-PS. When compared, no differences were found in IIRMs (0,14 vs 0 per surgery, p=0.36), surgical conditions as assessed by the surgeon (4.86 vs 5.00, p=0.36) and mean BIS values (43.0 ± 1.66 vs 48.5 ± 7.5, p=0.08). However, patients who underwent surgery under no NMBA were more commonly overanesthetized. All (100%) showed BIS values < 40 during > 30% of the intraoperative period (vs 22.2% of patients under DNMB). All (100%) had ≥ 1 episode of BIS < 40 for ≥ 5 minutes (vs 37.5%). At last, mean percentual intraoperative time with BIS < 40 was 39.4% (vs 18,5%, p=0.023).
Conclusion: These results suggest that rocuronium and DNMB avoid an increase in anesthetic depth and correlated adverse outcomes in GA-LMA.