Processed Quantitative EEG Monitoring Reduces Postoperative Nausea and Vomiting in Nonsmoking Patients Undergoing Laparoscopic Tubal Ligation

Cassingham S. F., Khan M., Alaniz P., Munsterman L., Smith C., Kaji S. *Proceeding of the 2006 Annual Meeting of the International Anesthesia Research Society*: S-163.

Introduction

This study uses processed quantitative EEG (QEEG) monitoring to assess anesthetic depth during laparoscopic tubal ligation to determine the effect on postoperative nausea and vomiting. Previous studies have documented the efficacy of processed QEEG monitoring in decreasing anesthetic usage and minimizing complications, including postoperative nausea and vomiting (1). Unlike previous studies, this study includes only non-smoking patients.

Method

Following IRB approval, this study randomly assigned 19 ASA I or II non-smoking subjects to QEEG monitoring, group A, n=10, or control, group B, n=9. Group A received an Isoflurane/65% N2O/ 35% O2 anesthetic titrated by QEEG. Processed QEEG monitoring was performed with the Physiometrix PSA 4000. The PSA 4000 expresses the QEEG as the Patient State Index (PSI). PSI range from 0, indicating EEG burst suppression, to 100, indicating full consciousness. A PSI less than or equal to 50 is indicative of an anesthetic depth sufficient to ensure amnesia. Group B received an Isoflurane/65% N2O/35% O2 anesthetic titrated by standard clinical methods. Premedication, 0.04mg/ kg midazolam, and induction agents, 4mg/kg sodium pentothal, 1.5mcg/kg fentanyl, and 1mg/kg rocuronium, were identical in both groups. Muscle relaxation was reversed with 0.05mg/kg neostigmine and 0.6mg atropine in all patients. Postoperative personnel were blinded to anesthetic titration methods.

Results

All subjects experienced an unremarkable operative course. All participants required postoperative analgesia, 2-6 mg morphine IV, in the recovery room. QEEG titration in Group A resulted in a 20% incidence of postoperative nausea and vomiting compared to 33% for the control group. Two of ten subjects from group A and three of nine controls in Group B experienced nausea followed by emesis. All patients who experienced nausea and vomiting responded to IV phenergan without further complaint. None of the remaining patients in either group experienced nausea without emesis. There were no complaints of nausea after discharge from the recovery room.

Discussion

This study is the first to exclude smoking as a confounding variable in assessing the efficacy of processed QEEG monitoring in reducing postoperative nausea and vomiting. To avoid the anti-emetic benefit of propofol, sodium pentothal was used as the primary induction agent. Preliminary results of this ongoing study reveal a 39% reduction of postoperative nausea and vomiting in subjects undergoing QEEG anesthetic titration compared to routine clinical titration methods. Comparing the QEEG titrated group to the 45% standard incidence of postoperative nausea in gynecological laparoscopic procedures (2,3) yields a significant 56% reduction in postoperative nausea and vomiting. These early findings support QEEG monitoring as a method to reduce postoperative nausea and vomiting. The utility of QEEG monitoring will be further investigated as this study achieves full enrollment.

(1) Nelskyla, Anesthesia and Analgesia. 93:1165-9, 2001; (2) Erickson, Acta Anaesthesiol Scand. 1995:39:377-80; (3) Gupta, Anesthesia and Analgesia. 99:1173-9