A Review of Current Literature of Interest to the Office-Based Anesthesiologist

Sprung J, Deljou A, Schroeder D, Warner D, Weingarten T. Effect of propofol infusion on need for rescue antiemetics in postanesthesia care unit after volatile anesthesia: a retrospective cohort study. *Anesth Analg*. 2024;139(1):26–34. doi:10.1213/ANE.0000000000006906

This retrospective analysis examined the anesthetic records of 47,847 patients undergoing procedures with volatile agents, with or without propofol infusion, at a single institution from May 2018 through December 2020. The study tested the hypothesis that adding a propofol infusion to a volatile-based anesthetic would be associated with a dose-dependent decrease in the use of rescue antiemetic drugs in the postanesthesia care unit (PACU). The length of recovery room stay for both groups was also compared. Inverse probability of treatment weighting (IPTW) analysis was performed to assess whether propofol was associated with a decreased need for rescue antiemetic therapy in the PACU. Overall IPTW rescue antiemetic use was 4.7% for 17,573 patients who received propofol and 8.2% for 30,274 who did not. This effect associated with propofol was present regardless of the intensity of the antiemetic therapy used, procedural duration, and type of volatile agent. The effect was dose dependent, with little additional benefit found when the propofol rate exceeded 100 mcg/kg/min. Patients who received antiemetics required longer PACU recovery time than those who did not receive antiemetics; however, the use of propofol did not affect recovery time. The authors concluded the addition of propofol is associated with a dose-dependent reduction in the need for rescue antiemetics regardless of the number of prophylactic antiemetics, duration of procedure, and type of volatile agent used, without affecting PACU recovery time.

Comment: Dose dependency is a feature of receptor-mediated actions. In vitro studies have demonstrated propofol to be a potent 5-HT3 receptor antagonist, as is ondansetron. Propofol has been shown to inhibit the limbic system and may interact with the chemoreceptor trigger zone. Although the study is limited by its retrospective design, the size of the population and data provide compelling evidence to consider the incorporation of a propofol infusion at the end of a volatile anesthetic to reduce the need for rescue antiemetics. The 100 mcg/kg/min plateau is also consistent with spontaneous ventilating general anesthesia, allowing continuation of the propofol infusion right up to the termination of the case, as is common in many dental anesthetics.

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Sen S, Potnuru PP, Hernandez N, et al. Glucagon-like peptide-1 receptor agonist use and residual gastric content before anesthesia. *JAMA Surg*. 2024;159(6):660–667. doi:10.1001/jamasurg.2024.0111

The use of glucagon-like peptide-1 (GLP-1) receptor agonists has been associated with slow gastric emptying, leading to residual gastric content (RGC) in patients presenting for general elective procedures despite following recommended preoperative fasting guidelines. Increased RGC is one of the main factors associated with perioperative aspiration risk under general anesthesia. The authors hypothesized that GLP-1 receptor agonist use would be independently associated with a higher prevalence of increased RGC upon gastric ultrasound (GUS) examination. This cross-sectional study examined 124 patients who fasted for the guideline-recommended duration prior to undergoing GUS before their planned surgical procedure. The prevalence of RGC on gastric ultrasonography was 56% in the GLP-1 group compared with 19% in nonusers, a significant difference after confounder adjustment. The authors concluded once-weekly dosing of a GLP1-agonist was associated with increased RGC as identified on GUS 7 days after discontinuation prior to elective surgery.

Comment: The likelihood of dental anesthesia providers encountering a patient on a GLP-1 agonist continues to increase. As of June 2024, approximately 12% of US adults aged 18 years or older report having ever used a GLP-1 agonist medication according to the results from a KFF (formerly Kaiser Family Foundation) poll involving about 1500 respondents. That percentage is up from 8% in a similar poll taken June 2022.[1] Currently, the American Society of Anesthesiologists have recommended discontinuation of these drugs 7 days prior to elective surgery; however, this recommendation was made on limited evidence and expert opinion. A meta-analysis published in May 2024 challenges the 7-day stipulation, noting that glycemic control can be difficult to maintain when GLP-1 therapy is discontinued for that length of time.[2] The authors of this study acknowledge that the small study population limits extrapolation of their results but cite agreement with 2 other studies of gastric residual volume in patients undergoing elective esophagogastroduodenoscopy.

Zadrazil M, Marhofer P, Opfermann P, et al. Liposomal bupivacaine for peripheral nerve blockade: a randomized, controlled, crossover, triple-blinded pharmacodynamic study in volunteers. *Anesthesiology*. 2024;141:24–31. doi:10.1097/ALN.0000000000004988

This randomized, triple-blind, prospective study followed 25 volunteers aged 18 to 55 years (body mass index, 18–35 kg/m^2)

who received 2 ulnar nerve blocks under ultrasound guidance. Using a crossover design with a washout phase of 36 days or more, 1 block was performed with liposomal bupivacaine and another with plain bupivacaine. Which came first was determined by randomization. Sensory data were collected by pinprick testing, and motor data collected by thumb adduction. The contralateral arm was used for comparison for both. Endpoints included success, time to onset, and duration of blockade. Residual efficacy was assessed by the volunteers keeping a diary. Statistical analysis included Wilcoxon signed rank and exact McNemar tests as well as a generalized estimation equation model. Successful sensory blockade was noted in 8 of 25 volunteers (32%) after liposomal bupivacaine and in 25 of 25 (100%) volunteers after plain bupivacaine ($P < .0001$). Significant differences emerged for time to onset, defined as 0% response to pinpricking in 4 of 5 hypothenar supply areas ($P < .0001$), and for time from onset to 80% ($P < .001$) or 20% in 1 of 5 areas ($P < .001$). Carryover effects due to the randomized sequencing were unlikely (estimate, −0.6286; sequence effect, 0.8772; $P = .474$). Self-assessment greater than 3.5 days did reveal intermittent but unpredictable episodes of residual sensory blockade for liposomal bupivacaine only. The results show that liposomal bupivacaine is not a suitable "sole" drug for intraoperative regional anesthesia. Findings of its limited long-term efficacy add to existing evidence that a moderate effect, at best, should be expected on postoperative pain therapy.

Comment: Two recent meta-analyses have reported insufficient evidence to support the routine use of liposomal bupivacaine as a strategy for postsurgical pain control. In 2021, Hussain et al[3] found perineural liposomal bupivacaine was not superior to nonliposomal bupivacaine for peripheral nerve block analgesia. In 2023, Jiang et al[4] concluded liposomal bupivacaine did not appear to improve the postoperative analgesic, rehabilitation, or safety outcomes when used for wound infiltration. This study is consistent with those findings.

Berens RJ, Greene CC, Frahm CE, McCormick ME, Hoffman GM. Does anesthesia duration or number of cases per patient predict safety events? *Paediatr Anaesth*. 2024;34(6):568–574. doi:10.1111/pan.14861

This observational retrospective records review analyzed the electronic records of 8082 patients who received general anesthesia or sedation for dental-related procedures in a large university hospital between June 1, 2015, and December 31, 2021. The investigators sought to determine differences in the number of perioperative safety events between patients who received comprehensive dental care under a single long anesthetic compared with multiple anesthetics. The primary outcome was the occurrence of a safety event, as defined by the American College of Surgeons and the American Society of Anesthesiologists. Anesthesia time, physical status, sex, location of care, age, number of total cases, and number of multispecialty cases were recorded and used as independent variables. Univariable and multivariable logistic regression models were used for analysis. Children receiving care lasting for 4 or more hours under general anesthesia were associated with an increasing probability of an adverse event compared with children receiving care that took less than 4 hours under general anesthesia. The authors concluded that limiting dental care under general anesthesia to multiple short cases may decrease the risk of adverse perioperative events when compared with completing all treatment in 1 long operation.

Comment: This study confirms other reports of an increasing probability of adverse safety events when the duration of general anesthesia exceeds 4 to 6 hours.[5,6] However, significant methodological flaws limit the conclusions and application of these observations to the pediatric dental anesthesia setting. In collecting data, cases presenting for oral surgical procedures were blended with pediatric dental rehabilitation. The reported average duration of 100,000 hospital dental rehabilitations has been recorded as approximately 1 hour while most oral surgical procedures fall within 30 to 60 minutes.[7] In both cases, anesthetic duration falls well below the 4-hour threshold noted by the authors, making their findings appear unrelated to the reported practices of US dentists.

Chalitsios CV, Luney MS, Lindsay WA, Sanders RD, McKeever TM, Moppett I. Risk of mortality following surgery in patients with a previous cardiovascular event. *JAMA Surg*. 2024;159(2):140–149. doi:10.1001/jamasurg.2023.5951

This longitudinal, retrospective, population-based cohort study drew data from the Hospital Episode Statistics for National Health Service England. Over a span of 11 years, the clinical records of 877,430 patients undergoing noncardiac, nonneurologic surgery in England were examined. The primary outcome was 30-day, all-cause mortality. Secondary outcomes included postoperative mortality at 60, 90, and 365 days. Among patients with a prior cardiovascular event, overall increased risk for postoperative mortality was demonstrated within 11.3 months, with an interval of 14.3 months for the subgroup elective surgery and 7.3 months for emergency surgery. The authors concluded surgery within 1 year of an acute coronary event or stroke was associated with increased postoperative mortality.

Comment: The large size of this study lends significant credence to its findings; however, a notable limitation of this study is that the data was drawn solely from hospital inpatients. Additionally, no information on lifestyle and other risk factors is found. The recommended deferment period cited by the authors is longer than the recommendations from a 2021 scientific statement from the American Heart Association/American Stroke Association that indicated individuals should wait at least 6 months, and possibly as long as 9 months, after

a stroke before undergoing nonurgent surgery to reduce risk of a recurrent stroke.

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