

ORIGINAL ARTICLE

Propofol Versus Midazolam/Fentanyl Sedation for Colonoscopy in the Elderly Patient Population

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Purpose: Despite current literature, data on the most effective sedation and best patient outcomes are insufficient for providing recovery time recommendations for elderly patients undergoing colonoscopy with sedation. We sought to identify the best sedation practice for shorter recovery times. Therefore, a study was conducted to examine recovery times among patients older than 65 years undergoing elective colonoscopy with intravenous sedation with either propofol or the combination of midazolam/fentanyl.

Design: A retrospective descriptive, exploratory design was used.

Methods: We retrospectively reviewed data from patients older than 65 years undergoing outpatient elective colonoscopy at our institution between January and December 2013. Recovery times were evaluated for those administered intravenous propofol or a combination of midazolam/fentanyl. Patient demographics and sedation medications were obtained from patient records. A modified Aldrete score greater than 8 was required for discharge. Recovery time was defined as the time from procedure completion to a modified Aldrete score greater than 8.

Findings: Propofol sedation was associated with longer recovery times compared with sedation with a combination of midazolam and fentanyl (mean: 50 minutes versus 31 minutes, $P < .001$).

Conclusions: Propofol sedation was not associated with shorter recovery times. Further studies are needed to validate these findings.

Keywords: colonoscopy, sedation, elderly.

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Conflicts of Interest: none.

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SEDATION IS OFTEN required for the patient's safety and comfort during endoscopic procedures, and it can be used to decrease patient anxiety. The American Society of Anesthesiologists (ASA) defines sedation in terms of depth of consciousness, ranging from minimal sedation or anxiolysis to general anesthesia. The definition of each level of sedation encompasses responsiveness, airway patency, ventilation, and cardiovascular function.¹ Sedation practices have been shown to be safe for most patient populations, including older patients and those with significant comorbidities.²

A significant proportion of patients undergoing colonoscopy are older than 65 years. These elderly patients require a judicious selection of sedation

medications because of the decline in the functional reserve of multiple organs and systems, which can influence drug disposition. Furthermore, comorbidities and polypharmacy are highly prevalent in the elderly patient population.³ In the outpatient setting, this patient population needs to be carefully managed and efficiently transitioned through the postanesthesia care unit (PACU). Recovery time is a significant part of the PACU transition and is recorded as the time from the completion of the procedure to when safe discharge criteria are met. At our institution, outpatient colonoscopies are performed in either an ambulatory endoscopy suite, where conscious sedation is provided by the endoscopist, or in the hospital endoscopy laboratory, where deep sedation with propofol is administered by nurse anesthetists. Both endoscopic settings follow identical standard of care criteria, including discharge criteria scores assigned by certified nursing and allied health staff. The gastroenterologists ordering colonoscopies determine the need for monitored anesthesia care with propofol or conscious sedation with midazolam/fentanyl, depending on the patient's clinical factors, including comorbidities.

The choice of sedation for optimizing recovery time needs more evidence-based guidance. It remains unclear which method of sedation is superior for elderly patients. We hypothesized that the use of propofol sedation would be associated with shorter recovery times when compared with midazolam/fentanyl, regardless of ASA classification.

Methods

This was a retrospective study of patients older than 65 years who underwent elective outpatient colonoscopies between January and December 2013 at a single tertiary institution. The study was approved by the local institutional review board. Patient demographics, including age, gender, weight, ASA classification, and type of sedation, were obtained from patient charts and endoscopy reports. Patients were included if they were older than 65 years, were undergoing outpatient colonoscopy, and were classified as ASA I, II, III, or IV. Patients with preexisting end-stage diseases of the liver, kidney, heart, lungs, brain, or a diagnosis of metastatic cancer were excluded because these diseases typically slow the metabolism of medications. Additionally,

patients were excluded if they were taking medications expected to increase tolerance to sedation (benzodiazepines, long acting or scheduled opioids, antiepileptics, modafinil, amphetamines, or other stimulants). Finally, we excluded patients with allergies to propofol, opioids, or benzodiazepines. A modified Aldrete score was used by all GI endoscopy recovery room nurses to determine the suitability of all patients for discharge after a GI procedure. Every patient was assigned a modified Aldrete score on arrival to the PACU and additional modified Aldrete scores every 15 minutes based on the nurse's assessment per institutional protocol. A modified Aldrete score includes variables of activity, respiration, consciousness, hemodynamic stability, and oxygen saturations for a total score ranging from 0 to 10. A score of greater than 8 was required for discharge from the endoscopy suite. Recovery time was defined as the time from procedure completion to when a modified Aldrete score of greater than 8 was achieved (Table 1).

The main purpose of the study was to compare mean recovery times (in minutes) between patients undergoing outpatient colonoscopy with propofol treatment alone versus treatment with midazolam/fentanyl. Categorical variables were compared using the chi-square test for independence. Continuous variables were compared with a Wilcoxon rank sum test. *P* values less than .05 were considered statistically significant.

Results

During the study period, 219 patients were included. 53% (84) were men. Sixty-one patients (28%) underwent colonoscopy with propofol sedation and had the following ASA classifications: ASA I (*n* = 3), ASA II (*n* = 27), and ASA III (*n* = 31). One hundred fifty-eight patients (72%) underwent colonoscopy with midazolam/fentanyl sedation and had the following ASA classifications: ASA I (*n* = 1), ASA II (*n* = 151), and ASA III (*n* = 6) patients.

The mean patient age in each group was comparable with 73.4 years in the propofol sedation group (range: 66 to 89 years) and 74 (range: 66 to 93 years) in the midazolam/fentanyl group (*P* = .71). Similarly, the number of men in each group was comparable, 51% versus 53% for

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