Impact of anesthesia on patient and endoscopist satisfaction after colonoscopy – A pilot study

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(Received: February 7, 2011; Accepted after revision: August 2, 2011)

Abstract: *Introduction:* Colonoscopy is a standard diagnostic tool for the investigation and surveillance of diseases affecting the colon. The procedure can be uncomfortable and sometimes very painful, resulting in increased cecal intubation time and lower completion rate. However, it seems to be apparent that anesthesia for this procedure increases patient satisfaction; data are lacking about the impact of anesthesia on the technical performance of colonoscopic examination. *Aim:* In our observational survey, we studied patients undergoing colonoscopy with or without anesthesia. We compared patient satisfaction, difficulties in endoscopy, and the impact of anesthesia on the examination room occupancy. *Methods:* We enrolled 60 patients undergoing elective, outpatient colonoscopy because of various reasons. The patients were able to choose between anesthesia and sedation. Difficulties in colonoscopy were evaluated by the endoscopist's rating and by the time to cecal intubation. We assessed patient satisfaction by a numeric rating scale. *Results:* We observed that neither the duration of colonoscopy nor the time spent in the examination room was different in the two groups (p 0.825, 0.998). There was a significant improvement in both patient and endoscopist satisfaction scores in patients undergoing anesthesia (p 0.0007). *Conclusion:* We found that during colonoscopy, compared to sedation, anesthesia increases both endoscopist and patient satisfaction without prolonged occupation of the examination room.

Keywords: anesthesia, outpatient, colonoscopy, endoscopy

Introduction

Colonoscopy is a routine procedure detecting inflammatory bowel disease and colorectal malignancies and other diseases affecting the colon. Because of the benefits of screening colonoscopy, demand has risen in the recent decade. Colonoscopy is also a potentially painful procedure, which can result in patient discomfort and can generate reluctance in patients to undergo the procedure [1]. The goal of sedation is to facilitate endoscopy, to reduce the discomfort during examination, and to make this potentially unpleasant procedure more acceptable to patients. Although there are differences in the medication used, the most common drugs are midazolam and propofol with or without the use of adjuvants [2]. However, the use of sedative medication can prolong the time to discharge, can increase the costs, and can cause significant morbidity; on the other hand, anesthesia can help avoid cardiovascular and psychic complication due to the reduced sympathetic activity during the painful stimuli. Regarding that multicenter, randomized trials and meta-analyses investigated this problem, we do not intend to examine this question in our study [3–6].

Aim

Our hypothesis was that anesthesia increases both patient and endoscopist satisfaction, without decreasing the success rate and with a mild prolongation of procedure time.

Methods

In this non-randomized observational study, we enrolled 60 adult patients between July and December 2009, all of them undergoing elective, outpatient colonoscopy in the same colonoscopy unit in Budapest, Hungary. All of the patients had written informed consent. Exclusion criteria were refusal to sign the informed consent, previous colonoscopy, and high anesthesia risk (ASA III or higher, or other medical conditions that required close hospital background). Every patient received the same bowel preparation regime with sodium phosphate (Fleet phospho-soda, Laboratories Casen-Fleet). The choice between anesthesia and on-demand sedation was offered to every patient. The patients who chose on-demand sedation were the members of the "without anesthesia"

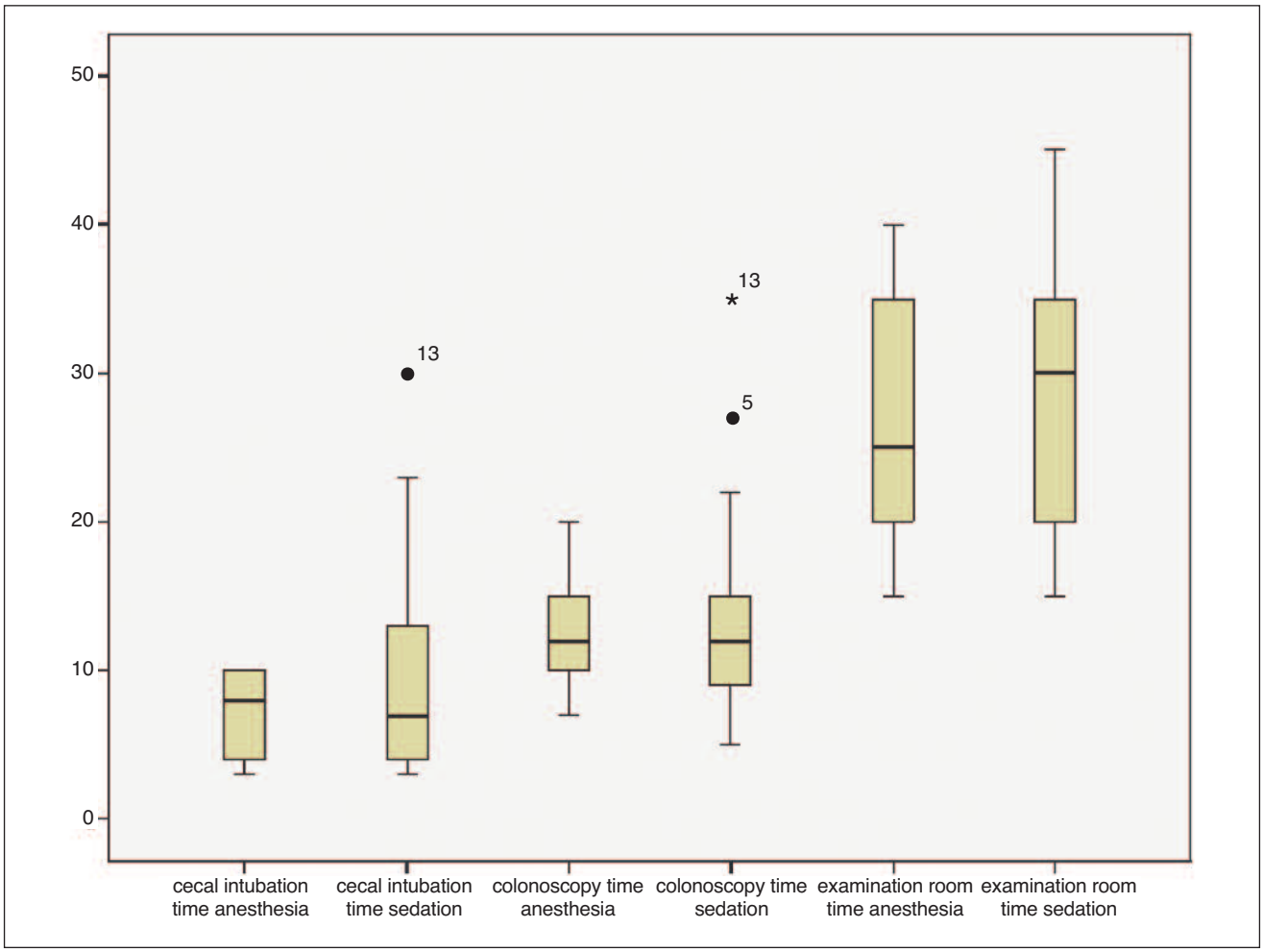

Fig. 1. Time intervals measured. There was no significant difference in either the duration of colonoscopy or the examination room time

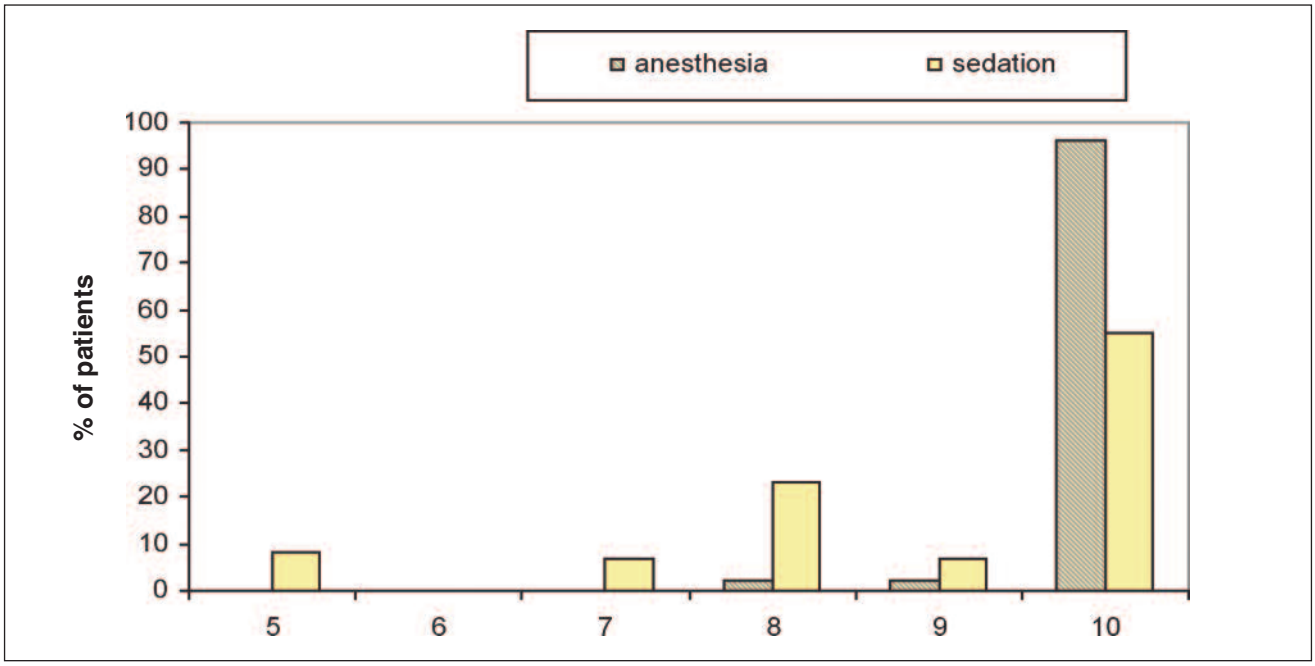

Fig. 2. Patient satisfaction score 10 meant that the procedure was most painless and pleasant, and a score of 1 meant that the procedure was most painful and unpleasant

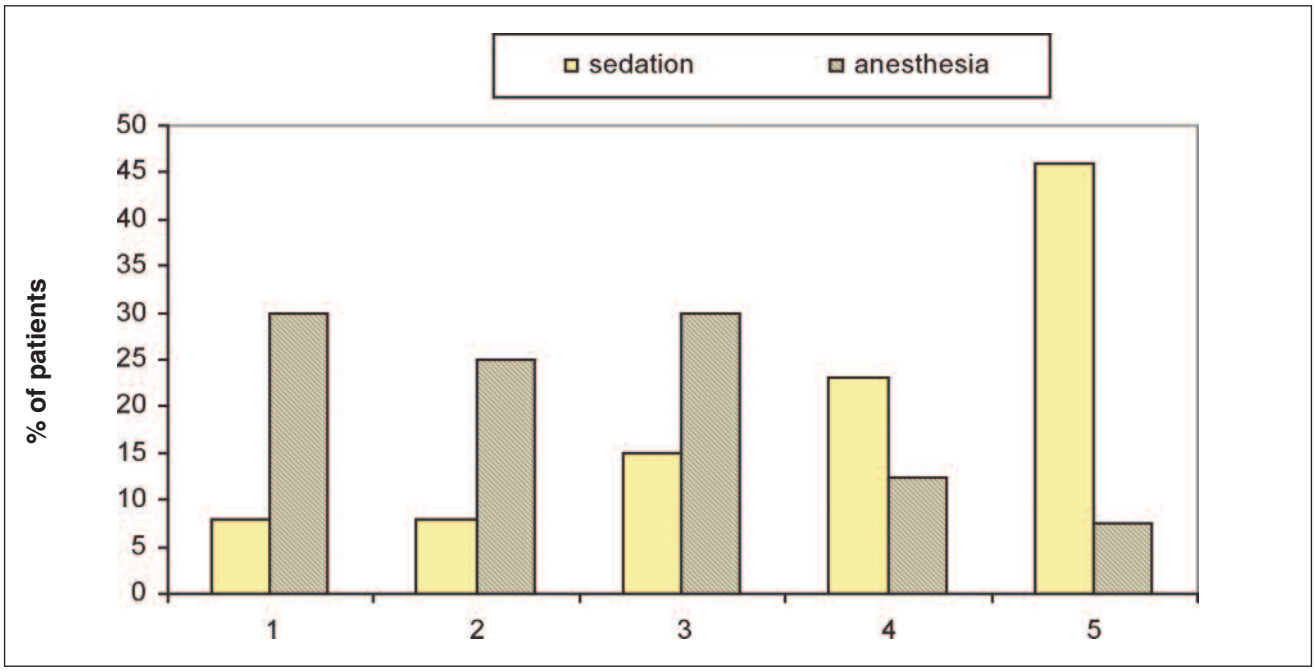

Fig. 3. Endoscopist satisfaction scores 1 meant that the procedure was very easy to do and 5 meant that the procedure was very difficult to do. The endoscopist said that the procedure was easier to perform in the anesthesia group

group, while the patients who chose anesthesia became the members of the "anesthesia" group. The anesthesiology examination took place just before the procedure, outside of the examination room.

The participants of the "without anesthesia" group received midazolam (5 mg bolus iv) and tramadol (100 mg iv) medication on request. In the "anesthesia" group, we administered 10 mg lidocain and after that bolus propofol (1 mg/kg completed by 0.25 mg/kg/30 s as needed) until deep sedation (Aldrete sedation score 8) was achieved. The anesthesia was maintained by repeated boluses of propofol (0.5 mg/kg) in order to ensure its continuity without protective reflexes. We monitored all the patients according to national standards (continuous pulse oximetry, electrocardiogram (ECG), intermittent noninvasive blood pressure) under the presence of a trained anesthesiologist [7]. During colonoscopy, all patients lay in left lateral position. All examinations were performed by the same experienced endoscopist.

Times for the following events were recorded: entering the examination room, insertion of the colonoscope, time to cecal intubation, removal of colonoscope, and transportation to recovery room. From these times, we calculated intervals of examination room time (entering the examination room–transportation to recovery room), colonoscopy time (colonoscope in–colonoscope out), and time to cecal intubation (colonoscope in–cecal intubation) *(Fig. 1)*.

After the examination, the patients were transported to the recovery room from where they were discharged home 1 h later, in stable condition.

Before discharge, every patient was interviewed by an independent nurse, who recorded patient satisfaction on a numeric scale. On the visual analogue scale, 1 meant that the procedure was the most unpleasant or painful and 10 meant that it was painless and pleasant *(Fig. 2)*. The endoscopist also rated the difficulty of the procedure on a scale 1–5 (1 meant very easy, 5 meant very difficult) *(Fig. 3)*.

For the statistical analysis, we used Student's *t*-test and variance analysis (SPSS Statistics 17.0, MS Excel).

Results

Sixty-two patients signed the informed consent. From these eligible 62 patients, we excluded two from the study. One patient had severe pulmonary hypertension (pulmonary pressure 70 mmHg), and she was referred to the hospital to perform the procedure under hospital settings. The sec-

Table I Demographic data

	With anesthesia	Without anesthesia	*P*-value
Gender %			
Male	47.5 (19)	73 (14)	0.179
Female	52.5 (21)	27 (6)	
	Mean ± SD	Mean ± SD	
Age (years)	51.4 ± 16.5	46.6 ± 14.4	0.353
Body weight (kg)	73 ± 15	69 ± 7	0.243
Indication for colonoscopy %			
Screening	35 (14)	25 (5)	0.82
Bleeding	20 (8)	15 (3)	0.81
Abdominal discomfort	25 (10)	15 (3)	0.88
Other	20 (8)	45 (9)	0.16

ond patient had severe chronic obstructive pulmonary disease (COPD) (resting $PaCO_2$: 68 mmHg), who was also referred for hospital admission. The groups were equivalent for age, gender, and indication for colonoscopy *(Table I)*. In the sedation group, 82% of the patients received sedative medication and 23% received analgesic medication.

We found no significant difference in examination room time (anesthesia group 27.9 ± 2.9 min, sedation group 27.2 ± 5.0 min; p 0.825) and in the duration of colonoscopy (anesthesia group 12.2 ± 1.9 min, sedation group 12.2 ± 3.3 min; p 0.998). In the sedation group, time to cecal intubation tended to be a little shorter, but the difference was not significant (anesthesia group 8.7 ± 1.9, sedation group 6.9 ± 3.3; p 0.353).

The completion rate was 100% in the sedation group; however, in the anesthesia group, in one patient cecal intubation was unsuccessful. No major complication developed during the procedures. In the anesthesia group, although we recorded arousal during the colonoscopy in four patients, none of them had a recall of the event later. One patient in the anesthesia group showed mild hypotension; the blood pressure normalized after intravenous cristalloid infusion.

All the patients, in both groups, were satisfied with the procedure, but in the anesthesia group patients gave significantly higher scores (p 0.0007). According to the endoscopist's opinion, the procedure was less difficult in the anesthesia group (p 0.0003).

Discussion

Colonoscopy can be unpleasant; according to the investigation of Baudet et al., almost 25% of the sedated patients experience some type of undesirable effect during the procedure [3]. The current literature is controversial on the benefits of anesthesia, mostly because the cardiorespiratory side effects [4, 8, 9].

Sarkar et al. found that midazolam sedation improved the patient's tolerance to colonoscopy, and after dose reduction, the cardiovascular complication rate decreased [10]. A randomized, double-blind study performed by Mandel et al. found that with midazolam/fentanyl sedation, the examination room time was longer, but with propofol/remifentali sedation, respiratory depression occurred more often. We have to point out that in this study, the gastroenterologist administered the sedative medication [8]. Padmanabhan et al. found that the vital signs were not different in patients sedated with propofol (with or without adjuvants) or midazolam, but when propofol was used alone as a sedative agent, the examination room time was prolonged [9].

We observed that anesthesia makes colonoscopy more convenient to the patients, with the same success rate as sedation, without prolonging the procedure.

The most important limitation of this observational study was the lack of randomization. The patients were offered to choose between anesthesia and sedation; so we cannot exclude the influence of different attitudes, and thresholds to pain. It is possible that those who chose anesthesia had more fear and were more susceptible to pain.

Because of ethical considerations, it is difficult not to obey the patient's request, but by excluding the patients with previous experience in colonoscopy, we assume to exclude those patients who had difficulties in their previous examination and thus are supposed to have more difficult anatomic situation (which results in delayed cecal intubation and more intensive pain) or decreased tolerance to pain.

The endoscopist was not blinded; this could be partly responsible for the marked difference in the difficulty scores; however, it is technically impossible to avoid this type of error.

According to the current literature, major complications of colonoscopy are rare, the incidence of significant respiratory compromise (aspiration and bronchospasm) is less than 0.1%, and the incidence of hypoxemia (oxygen saturation <85%) is 0.25% [3, 6]. In our study, among the 60 patients, no major complication occurred.

Conclusion

The use of anesthesia markedly increases patient satisfaction and has no impact on time or success rate. Contrary to our hypothesis, anesthesia does not prolong the total procedure time; hence, with the use of a recovery room, it has no undesirable effect on examination room occupancy.

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