

Colonoscopy without sedation

Sedasyonsuz kolonoskopi

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Background/aims: In Turkey, colonoscopy is a procedure generally performed with intravenous sedation and analgesia. Most of the complications of colonoscopy are related to sedation. The aims of this study were to determine the percentage of patients who could successfully undergo nonsedated colonoscopy without sedation and to assess patient tolerance and acceptance. **Methods:** The study included 120 consecutive patients undergoing colonoscopy by two endoscopists in our endoscopy unit. The procedure routinely began without sedation, which was later given (midazolam and hyoscine butylbromide) only if significant discomfort occurred. Parameters of blood pressure, oxygen saturation and heart rate were measured before and during colonoscopy. After the procedure patients were asked to rate their pain on a four point scale 1=no pain, 2=slight, 3=moderate, 4=severe and they were also asked if they would be willing to undergo colonoscopy again without sedation. **Results:** Eighty eight percent of all colonoscopies were completed without sedation. Mean PaO₂ was 96.46 in nonsedated patients and 93.90 (significant $p<0.05$) in sedated patients. No difference was found between blood pressure and pulse rate of nonsedated and sedated patients. The mean pain score was 2.0 for the nonsedated patients and 3.8 (significant $p<0.05$) for the sedated patients. Eighty eight percent of patients stated that they would be willing to undergo colonoscopy without sedation again. **Conclusions:** In experienced hands, colonoscopy without sedation can be completed successfully in most patients, without any complications and use of extra instrumentation.

Keywords: Colonoscopy, unsedated, selective sedation

Amaç: Kolonoskopi genellikle intravenöz sedasyon ve analjezi ile yapılmaktadır. İşlem sırasında ortaya çıkan komplikasyonların çoğu sedasyona bağlıdır. Bu çalışmanın amacı sedasyonsuz kolonoskopi yapılabilen hasta oranını belirlemek ve hastaların işlem sırasında hissettikleri ağrının derecesini ve işlemin tekrarını kabul edip etmeyeceklerini sorgulamak. **Yöntem:** Çalışmaya kliniğimiz endoskopi ünitesinde kolonoskopi yapılan 120 hasta alındı. Hastaların tümünde işleme sedasyonsuz başlandı ve işlem sırasında ağrı oluştuğunda sedasyon ve analjezi uygulandı (Midazolam ve hyoscyamine). İşlem öncesi ve işlem sırasında kan basıncı, oksijen saturasyonu ve nabız takibi yapıldı. İşlem sonrası hastalardan hissettikleri ağrının şiddetini 4 dereceli ağrı akalasında (1=Ağrı yok, 2=Hafif ağrı, 3=Orta ağrı, 4=Şiddetli ağrı) göstermeleri istenildi ve ileride kolonoskopi gerekse aynı yöntemle yapılmasını kabul edip etmeyecekleri sorgulandı. **Bulgular:** Hastaların %88 inde kolonoskopi sedasyonsuz tamamlandı. Sedasyonsuz grupta ortalama Pa O₂ 96.46, sedasyon uygulanan hastalarda ise 93.90 ($p<0.05$) bulundu. Kan basıncı ve nabız sayısı yönünden iki grup arasında fark yoktu. Sedasyonsuz grupta ortalama ağrı skoru 2.0 iken sedasyon uygulanan grupta 3.8 ($p<0.05$) bulundu. Hastaların %88 i işlemin tekrarı gerekirse yine sedasyonsuz yöntemi kabul edeceğini söyledi. **Sonuç:** Deneyimli ellerde hastaların çoğunda kolonoskopinin sedasyonsuz tamamlanabileceği ve sedasyona bağlı komplikasyon riskinin azaltılacağı sonucuna varıldı.

Anahtar kelimeler: Kolonoskopi, sedasyonsuz, selektif sedasyon.

INTRODUCTION

Colonoscopy was introduced in the 1960's and it became a very useful method in the diagnosis and therapy of colonic diseases. According to a consensus statement of the American Society of Gastrointestinal Endoscopy (ASGE) revised in 2000, colonoscopy is generally indicated for the surveillance of colonic neoplasia and evaluation of unexplained anemia, rectal bleeding, identification of abnormalities on barium enema, chronic

diarrhoea and inflammatory bowel diseases (1). In some reports, abdominal symptoms such as pain or abnormal bowel habits were reported as an indication for colonoscopy (2). Colonoscopy is generally performed with intravenous sedation and analgesia because it can sometimes be a painful procedure. Many different sedative and analgesic agents such as nitrous oxide, diazepam, midazolam, hyoscine butylbromide, meperidin + midazo-

lam, meperidine + diazepam, propofol, midazolam + propofol have been used for successful colonoscopy and patient comfort (3-10). However, it is known that intravenous sedation and analgesia may be accompanied by with adverse cardio respiratory reactions such as arterial hypoxemia, myocardial ischemia and cardiac arrhythmias (5,10,11). Recently many reports have demonstrated good patient tolerance of colonoscopy either without sedation or with sedation only if needed during the procedure (12,13). To our knowledge, colonoscopy without sedation has not been studied in Turkey. This prospective study was planned to determine the percentage of patients who could successfully undergo colonoscopy without sedation and to assess patient tolerance and acceptance.

MATERIALS AND METHODS

Between July 2000 and November 2000, 120 out of 220 patients referred to our endoscopy unit for colonoscopy were included in the study. Colonic preparation of 90ml of oral fleet phospho soda the night before and morning of the procedure.

The clinical and demographic characteristics of all patients were recorded prior to examination (Table 1). One hundred patients comprising those with a history of bowel resection, abdominal operations, severe liver disease, cardiac or pulmonary disease, patients with poor colonic preparation, stricture and colonic tumours causing incomplete total colonic intubations and cases where colonoscopy was performed by junior medical staff were excluded. A 20-gauge intravenous cannula was placed in the forearm of patients to establish intravenous access. All endoscopic examinations were performed by two experienced endoscopists in our endoscopy unit and two video colonoscopes (Olympus GIF 240 L and Pentax FC 38 LX) were used. All colonoscopies were begun without premedication. If significant pain occurred, midazolam (starting with 2.5 mg initially and gradually increasing by 1.0 mg until patient comfort had been reached) was given as a single injection or in combination with hyoscine butylbromide (20 mg initially and a further 20 mg when vasovagal reactions recurred). All patients were carefully monitored by pulse oximetry (Nihon Kohden Cardioline) during the procedure. Blood pressure, heart rate and oxygen saturation were measured and recorded every five minutes by a trained endoscopy nurse before and during the procedure a drop in

oxygen saturation below 90% was accepted as oxygen desaturation and supplemental oxygen was given. The duration of time required to reach the cecum was determined with a stopwatch and recorded. Correctly locating the cecum was verified by identification of the ileocecal valve, the valve orifice, the appendiceal orifice and the cecal sling fold.

After the procedure patients were asked to rate their pain on a four point scale, 1=no pain, 2=slight, 3=moderate, 4=severe and they were also asked if they would be willing to undergo colonoscopy again without sedation.

Statistical analysis was performed with SPSS software. The statistical analysis of the effects of gender and age on pain were performed using the chi-square and student t tests. Differences in time of achieving cecal intubations, decline in oxygen saturation and pain scores were compared non-parametrically using Wilcoxon rank-sum test.

RESULTS

A total of 120 patients were included in the study between July 2000 and November 2000 of whom 53% were male and 47% female, with a mean age was 51.5 (range 18-83) years. Colorectal bleeding (44%), anemia (18%) and diarrhea (15%) were the main indications for colonoscopy. These features are shown in Table 1.

Table 1. Patient characteristics.

Patient characteristics	No. of patients (%)
Total no. of patients	120
Age (yrs.)	
Mean	51.5
Range	18-83
Gender	
Male	64 (53%)
Female	56 (47%)
Indication for colonoscopy	
Bleeding	53 (44%)
Anemia	21 (18%)
Diarrhea	18 (15%)
Constipation	8 (7%)
Abdominal pain	6 (5%)
Screening	5 (4%)
Follow-up	4 (3%)
Other	5 (4%)

Table 2. Characteristics of sedated and non-sedated patients.

Variable	Non-sedated	Non-sedated
Total no. of patients	106	106
Mean age (yrs)	51 (18-83)	51 (18-83)
Gender		
Male	57	57
Female	49	49
Completion of colonoscopy	106	106
Mean time to reach cecum	12.5 (5-18)	12.5 (5-18)

Intravenous sedation and/or analgesic drugs were given to 14 (12%) patients, whereas 106 (88%) patients required no medication. When given sedation was 2.5 ± 1.0 mg midazolam as a single injection or in combination with 20mg hyoscine butylbromide.

Severe pain occurred in 14 patients to whom sedation was given (seven of 56 females, 12.5% and seven of the 64 males, 10.9%) which had no significance ($p > 0.05$).

The age range of patients to whom sedation was given was 31-70 (mean 44.5) years, while the range of those in the nonsedated group was 18-83 (mean 51) years, which was statistically significant ($p < 0.05$). This is shown in Table 2.

Complete colonoscopy was performed on all of the patients. The time required to reach the cecum was 12.5 (6-18) minutes in the nonsedated group and 14.5(10-19) minutes in the sedated (only when needed) group. The difference was not significant ($p > 0.05$).

Cardiorespiratory monitoring of all patients by measurement of pulse and blood pressure showed no significant changes in these functions, but changes in oxygen saturation (measured by pulse oximetry) were detected in patients who received sedation varying between 93.30 and 94.60 (mean 93.90), compared to 96.10 and 97.10 (mean: 96.46) in nonsedated patients, (significant, $p < 0.05$).

When questioned 20 (16.6%) patients experienced no pain, 55 (45.8%) slight pain, 31 (25.8%) moderate pain and 14 (11.7%) severe pain (Table 3). The mean pain score was 2.0 for the non-sedated patients and 3.8 (significant, $p < 0.05$) for the sedated patients. A total of 88% of the patients stated that they were willing to undergo repeat colonoscopy without sedation and there were no patients in this group who experienced such severe pain that it significantly influenced future sedation preference.

No complications were detected during colonoscopy.

DISCUSSION

Colonoscopy can sometimes be a painful procedure. Factors which may increase pain are related with the patient, endoscopist and instruments used. Patient associated factors include a low pain threshold and fear of the procedure. Endoscopist related factors include lack of experience, over insufflation, loop formation and lengthened duration while instrumental factors may include insufficient stiffness, non-availability of overtubes, and fluoroscopy.

In order to prevent pain and maintain patient comfort during colonoscopy, intravenous sedation and analgesia are generally used in Turkey and in many other countries (13). According to Rex et al, the reasons for routine sedation in the United States are unclear but likely to include factors such as training in endoscopy, a general perception that colonoscopy is always painful and the fear among endoscopists in competitive environments that patients who experience discomfort might leave their practice (13).

Recently, a growing body of literature has demonstrated good patient tolerance of colonoscopy either without sedation or with sedation only if needed during procedure and some studies concluded that the routine use of sedation for

Table 3. Pain score and time to reach cecum of patients.

	No of patients(%)	Mean age (Year)	Gender		Time to reach cecum (Minutes)
			Male	Female	
No pain	20 (16.6)	49 (18-75)	8	12	11.4
Slight pain	55 (45.8)	51 (28-83)	32	23	12.4
Moderate pain	31 (25.8)	52 (25-79)	17	14	13.2
Severe pain	14(11.7)	44.5 (31-70)	7	7	14.5

colonoscopy might be unnecessary (5,12,13,15,16). Our study showed that when given as needed, sedation was useful in only 12% of patients in whom colonoscopy was performed.

Cataldo performed colonoscopy without sedation in 258 patients; 61% experienced no pain or mild pain during the procedure, and 84% indicated they would prefer no sedation for colonoscopy in the future (17). Ristikankare *et al* stated that routine sedation for colonoscopy with midazolam was not beneficial in a controlled study comparing sedation with placebo. Their results showed that approximately 50% of patients agreed to a repeat examination while the remaining accepted colonoscopy if necessary (5). Douglas *et al*. reported a 94% satisfaction rate for nonsedated colonoscopy in 35 patients. In our study, 88% of patients completed the procedure without the need for sedation and all of these patients stated that they would be willing to undergo nonsedated colonoscopy in the future if needed (13). On the other hand, 12% of the patients could not tolerate the procedure without the use of sedatives. Thus it is suggested that the use of sedation in colonoscopy when needed is more appropriate than routine use.

It has been previously shown that tolerance of colonoscopy is directly related to the duration of the procedure (18). In our study the duration of the procedure was slightly shorter in the non-sedated group although this was not significant ($p>0.05$). This shows that the time of reaching the cecum varied according to the patient's tolerance. In a study of Eckardt *et al*, the mean intubation time and duration of the total procedure were significantly longer in patients having vasovagal reactions compared to patients who experienced no complications (12).

In his study of 180 patients, Ristikankare stated that premedication with low dose midazolam induces slight but statistically significant decrease in oxygen saturation and concluded that in terms of cardiorespiratory parameters, the colonoscopic examination without any premedication and without an intravenous cannula turned out to be hemody-

namically more stable than examination with sedative premedication. In our study, colonoscopy did not lead to significant changes in cardiopulmonary function in the majority of patients. Median oxygen saturation was similar before (97.1 mm Hg), during (96.3 mm Hg) and after (96.2 mm Hg) the procedure. Similarly, systolic blood pressure and heart rate remained within the same range before, during and after the procedure. These findings correlated with those of Eckardt *et al* who found no significant difference in pulse rate where there was a decrease between the beginning and the end of the procedure (83/min to 79/min). In their study only 1% of patients developed episodes of oxygen desaturation, which correlates at our study, at the same percentage.

In the present study there was a positive correlation between patients pain score and duration of time required to reach the cecum (Table 3). The time required to reach the cecum was longer (12.5-14.5 min.) in our study compared with that of Eckard *et al*. (6.7-7.9 min.). However, unlike Eckard *et al*, fluoroscopy was not used in the present study, which accounts for the difference. Thus endoscopists who are able to intubate the cecum rapidly will rarely observe cardiovascular complications or significant patient discomfort, even when no premedication is used.

We believe that looping, straightening of the colonoscope shaft and over insufflation are responsible for pain during the procedure. As the endoscopist gains experience these maneuvers gradually decrease and the procedure becomes less painful.

The present study shows that the majority of patients undergoing colonoscopy with experienced endoscopists require neither sedation nor analgesia and that when needed, only mild sedation is adequate, which eliminates the need for patient monitoring and the consequent use of extra instrumentation. Additional advantages are that outpatient outpatient examination is possible and that direct conversation between the patient and endoscopist can take place.

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