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Attitudes and Behaviors of Gastroenterology Specialists Toward Sedation Practices in Endoscopy Units in Turkey: Is Anesthesia Mandatory?

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ABSTRACT

Introduction: At present, sedation and analgesia have become an integral part of gastrointestinal endoscopy. This study aimed to provide data on the attitudes and behaviors of gastroenterology specialists toward sedation practices in endoscopy units in Turkey.

Methods: This cross-sectional and descriptive study included a total of 744 gastroenterology specialists, who are members of the Turkish Gastroenterology Association. They were invited by e-mail to participate in the study. The questionnaire consisted of 18 items on sedation practices implemented during procedures in the endoscopy unit. Questionnaire responses were statistically analyzed.

Results: All patients who underwent endoscopic procedures, such as endoscopic ultrasound, endoscopic retrograde cholangiopancreatography, and endoscopic submucosal dissection, received sedation. The sedation rates were 97.9% (n=138) in colonoscopy and 72.3% (n=102) in gastroscopy. With regard to the frequency of sedation, 33 (23.4%) used sedation for all patients, 55 (39%) used it frequently, and 15 (10.6%) used it rarely. The current anesthesia team in endoscopy units consisted of anesthesiologists (53.2%) and anesthesia technicians (60.3%).

Conclusion: It is necessary to prepare guidelines on sedation use in endoscopy units to assist care providers and health managers in providing quality service.

Keywords: Gastrointestinal endoscopy, Turkey, survey, sedation practice

Introduction

Initially, endoscopic procedures were solely performed for diagnosis; however, they have recently been used frequently for therapeutic purposes. Such procedures are usually performed under sedoanalgesia in the supine, lateral, and prone positions. The quality of the sedoanalgesia and comfort it provides may vary depending on the practitioner's experience level and the drug combinations used.

At present, sedation and analgesia have become an integral part of gastrointestinal endoscopy. Sedation and analgesia aim to enable endoscopists to perform procedures safely and effectively by increasing patient satisfaction and compliance (1,2). However, the use of sedation in gastrointestinal endoscopy includes disadvantages such as prolonged procedure time, increased health care costs, and increased risk for cardiopulmonary complications, which appear as limiting factors (2).

Although various sedation and analgesia techniques are used for gastrointestinal endoscopy procedures, the gold standard is still debated. It is recommended to adapt sedation for each patient according to the clinical risk assessment and type of the planned procedure (3). In some countries, the use of some sedative/analgesic agents is limited to anesthesiologists. There is still ongoing debate about who should be responsible for the use of propofol for sedation. While some studies have reported that propofol can be used safely by an endoscopist for healthy individuals, other studies have disclosed that it can only be used by anesthesiologists trained in the administration of general anesthesia (4,5). Previous studies on sedation models adopted by endoscopists have demonstrated that patient-monitoring practices, such as sedation rates, preferred sedation regimens, and routine use of pulse-oximetry, vary worldwide (6-12).

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Research on endoscopic sedation is important in understanding "where we stand" and planning future strategies. Many national survey studies have been conducted worldwide on endoscopic sedation (6-13). These studies are also highly useful in evaluating the implementation of sedation guidelines in clinical practice (14). However, to the best of our knowledge, no domestic study has been conducted on endoscopic sedation and monitoring practices during gastrointestinal endoscopy in Turkey. Thus, this study aimed to provide data on the attitudes and behaviors of gastroenterology specialists toward sedation practices in endoscopy units in Turkey.

Methods

Study Design

Ethical approval for the study was obtained from Bezmialem Vakıf University Faculty of Medicine Clinical Research Ethics Committee (approval number: 21/30, date: 18.11.2015) and registered on clinicaltrials.gov (identifier: NCT03540238).

Study Protocol

This was a cross-sectional and descriptive study. A total of 744 gastroenterology specialists, who are members of the Turkish Gastroenterology Association, were invited via e-mail to participate in the study. Feedback was received from 141 of the 744 gastroenterology specialists who were sent the questionnaire. The responses were statistically analyzed.

The questionnaire consisted of 18 items on sedation use during procedures in the endoscopy unit (Appendix A). Survey questions were related to demographics, types of endoscopic procedures, anesthesia methods, anesthetic agents, monitoring methods, anesthesia team members, pre-anesthetic examination and consent forms, recovery unit, complications, and interventions during sedation.

Statistical Analysis

All statistical analyses were performed using the SPSS 22.0 software package (IBM Corp., Armonk, NY, USA). The sample size was calculated with around 20 individuals falling into each category of questions under the survey. Descriptive statistics of the obtained data were calculated as numbers and % frequencies and presented in Tables. The Fisher-Freeman-Halton test was used to analyze the change in the quality and/or type of people in the anesthesia team according to various factors. A p-value of <0.05 was considered significant.

Results

Demographic Characteristics

Of the 744 gastroenterology specialists invited to complete the questionnaire, 141 (18.95%) participated in the study. Analysis of the demographic characteristics of the participants demonstrated a higher rate of university practice hospital employees and young gastroenterologists who responded to our survey call (Table 1).

Anesthesia Method, Anesthetic Agents, Endoscopic Procedure, and Patient Characteristics

All respondents (100%) used sedation practices in endoscopy units. All patients who underwent endoscopic procedures, such as endoscopic ultrasound, endoscopic retrograde cholangiopancreatography and endoscopic submucosal dissection, received sedation, and the sedation rate was 97.9% (n=138) in colonoscopies and 72.3% (n=102) in gastroscopies. With regard to the frequency of sedation use, 33 (23.4%) used sedation for all patients, 55 (39%) used it frequently, and 15 (10.6%) used it rarely.

Practitioners did not use sedation in 86 (61%) patients who refused sedation, 74 (52.5%) patients with other diseases (cardiac, pulmonary, renal, etc.), 28 (19.9%) elderly patients, and 6 (4.3%) patients with anxiety (Table 2).

Among anesthesia methods, conscious sedation was used by 75.9%, deep sedation by 73%, general anesthesia by 14.2%, and local pharyngeal anesthesia by 65.2% of the respondents (Table 2).

The most commonly used anesthetic agent was midazolam (92.2%), followed by propofol (75.2%), fentanyl (23.4%), ketamine (9.9%), and remifentanil (5.7%) (Table 2).

Endoscopy Unit, Monitoring Methods, Oxygen Administration, Sedation Recovery Unit, and Preoperative Evaluation

Oxygen supply (100%), aspirator (98%), emergency trolley (91.5%), and monitor (90.8%) were available in all endoscopy units at a high rate.

Nasal oxygen was routinely administered to each patient (53.9%), and peripheral oxygen saturation was monitored (97.2%). Sedation recovery was achieved in a separate recovery unit (57.4%).

Table 1. Respondents' demographic characteristics

Demographic characteristics (n=141)		n (%)
Age group (year)	30-49	111 (78.7)
	50-64	29 (20.6)
	≥65	1 (0.7)
Gender	Male	102 (72.3)
	Female	39 (27.7)
Length of experience (years)	0-9	78 (55.7)
	10-19	44 (31.4)
	20-29	16 (11.4)
	≥30	2 (1.4)
Type of hospital	University	75 (53.2)
	Training and research	30 (21.3)
	State	15 (10.6)
	Private	21 (14.9)
Region	Marmara	76 (53.9)
	Aegean	10 (7.1)
	Central Anatolia	23 (16.3)
	Black Sea	7 (5.0)
	Mediterranean	11 (7.8)
	Eastern Anatolian	9 (6.4)
	Southeast	5 (3.5)
Hospital size (number of beds)	<300 (small)	32 (22.7)
	301-500 (medium)	22 (15.6)
	>501 (big)	87 (61.7)

Moreover, 66% performed pre-anesthetic evaluation before the procedure (n=93), and 87.2% routinely received written consent for sedation (n=123).

Anesthesia Team

The current anesthesia team in endoscopy units consisted of anesthesiologists (53.2%) and anesthesia technicians (60.3%). However, there was an increasing trend in endoscopists' preferences toward the presence of an anesthesiologist (86.5%) and anesthesia technician (81.6%), whereas a decrease was observed in the preference rates for nurses and other health personnel.

Anesthesia-Related Complications, Frequency of Code Blue, and Causes of Mortality

Desaturation (88.7%) was the most common anesthesia-related complication, whereas respiratory arrest was the most common (32%) cause of mortality. "Code blue" in the endoscopy unit was observed once a year (56.7%) and once a month (12.8%). In addition, 17.7% (n=25) of gastroenterology specialists encountered complications that resulted in mortality.

Relationship Between Anesthesia Team and Sedation Practices

A significant positive correlation was found among centers where anesthesia technicians are present during sedation practices and general anesthesia and deep sedation, midazolam, ketamine, fentanyl and remifentanil use, electrocardiogram (ECG), non-invasive blood pressure, and bispectral index monitoring.

A significant positi ve correlation was found among centers where anesthesia technicians are present during sedation practices and general anesthesia, use of propofol and fentanyl, and use of ECG and non-invasive blood pressure monitoring.

A significant positive relationship was found among centers where nurses are present during sedation practices and conscious sedation.

Those with a code blue frequency of once yearly had a significantly lower frequency of having an anesthesiologist in their team. Those

Table 2. Anesthesia method and anesthetic agents, endoscopic procedure, and patient characteristics

Frequency of sedation use	**n (%)**
All patients	33 (23.4)
Usually	38 (27)
Often	55 (39)
Rarely	15 (10.6)
Patients deemed unfit for sedation	
Patients who refuse sedation	86 (61)
Patients with additional diseases (cardiac, pulmonary, renal etc.)	74 (52.5)
Elderly patients	28 (19.9)
Patients without anxiety	6 (4.3)
Other causes	6 (4.3)
Anesthesia methods	**n (%)**
Conscious sedation	107 (75.9)
Local pharyngeal anesthesia	92 (65.2)
Deep sedation	103 (73)
General anesthesia	20 (14.2)
Anesthetic agent	
Midazolam	130 (92.2)
Propofol	106 (75.2)
Fentanyl	33 (23.4)
Ketamine	14 (9.9)
Remifentanyl	8 (5.7)
Others	10 (7.1)

Table 3. Endoscopy unit, monitoring methods, oxygen administration, sedation recovery area, pre-anesthetic evaluation and consent forms

Equipment	**n (%)**
Oxygen supply	141 (100)
Aspirator	139 (98)
Emergency trolley	129 (91.5)
Monitor	128 (90.8)
Defibrillator	92 (65.2)
Appropriate area with sufficient width	72 (51.1)
Anesthesia device	61 (43.3)
Perfusor	22 (15.6)
Monitoring method	**n (%)**
Peripheral oxygen saturation	137 (97.2)
Non-invasive blood pressure	68 (48.2)
ECG	64 (45.4)
BIS monitoring	8 (5.7)
Capnography	0 (0)
Nasal oxygen administration	**n (%)**
All patients	76 (53.9)
Only desaturated patients	46 (32.6)
Only high-risk patients	32 (22.7)
None	3 (2.1)
Sedation recovery area	**n (%)**
In recovery unit	81 (57.4)
At the operation site	54 (38.3)
In the waiting room	11 (7.8)
In the department	7 (5)
Pre-anesthetic examination	**n (%)**
Yes	93 (66.0)
No	48 (34.0)
Anesthesia consent forms	**n (%)**
We have written consent forms, and I routinely ask patients to complete and sign them.	123 (87.2)
We have written consent forms, but I do not ask all patients to complete and sign them.	17 (12.1)
We do not have written consent forms, and I do not receive written consent from patients.	1 (0.7)

with a code blue frequency of once monthly and once yearly had a significantly higher frequency of having a nurse in their team.

Discussion

Based on our literature review, we think that our study is the first national survey to evaluate sedation practices in endoscopy units in Turkey. With a response rate of 18.95% (141/744), the results of our study were similar to those of Germany (17%), Korea (22.7%), USA (27%), and Portugal (26%) according to gastroenterologists' response rates to survey request. However, it was lower than those of Spain (65%), Switzerland (78%), Italy (41%), and Greece (40%) (6-8,11,12,14-17).

In our study, sedation practices were applied in the majority of the endoscopy units in Turkey; however, sedation was applied to 72% of the patients (33% for each patient, 39% frequently). This rate was lower than that in the USA (98%) and Germany (82% for gastroscopy and 91% for colonoscopy), similar to that in Greece (68.2%, 2015) (74.8%, 2018), and higher than those in China (48.3%) and India (36.8%) (14,18-21). Available studies have shown that the sedation rate mainly differs according to the hospital type and economic conditions (12,18). In addition to these factors, we think that restricted time because of the high number of patients can be included as one of the reasons that negatively affect our sedation rate.

Table 4. Anesthesia team members

Anesthesia team	**n (%)**
Anesthesiologist	75 (53.2)
Anesthesia technician	85 (60.3)
Nurse	81 (57.4)
Other	24 (17)
Who do you think the anesthesia team should consist of?	**n (%)**
Anesthesiologist	122 (86.5)
Anesthesia technician	115 (81.6)
Nurse	70 (49.6)
Other	3 (2.1)

Table 5. Anesthesia-related complications, frequency of code blue, and causes of mortality

Complications	**n (%)**
Desaturation	125 (88.7)
Bradyarrhythmias	29 (20.6)
Hypotension	25 (17.7)
Nausea/vomiting	13 (9.2)
Other	2 (1.4)
Frequency of code blue	**n (%)**
Once a year	80 (56.7)
Once a month	18 (12.8)
Once a week	2 (1.4)
Other	41 (29.1)
Cause of mortality (n=25)	**n (%)**
Respiratory arrest	8 (32)
Cardiac-related causes	6 (24)
Anaphylactic shock	4 (16)
Hypotension	2 (8)
Bleeding varicose	2 (8)
Anesthesia	1 (4)
Cerebrovascular event	1 (4)
Pacemaker asystole	1 (4)

In India, a study reported therapeutic procedures, high-risk procedures, and patient request as patient selection criteria for sedation (13). In our study, 86 (61%) patients who refused anesthesia and 74 (52.5%) who had other diseases (cardiac, pulmonary, renal, etc.) were included in the patient group in which gastroenterology specialists did not prefer to use sedation. Both studies did not consider advanced age an important criterion for deciding on sedation. In our study, advanced age was another reason for not preferring sedation with a rate of 28%, which was consistent with the literature.

Many studies have investigated anesthetic agents used in endoscopic sedation. These studies show significant differences in drug preference according to the person responsible for the use of sedation. It is universally accepted that midazolam can be used without an anesthesiologist. However, the use of propofol without an anesthesiologist can vary between 0% and 100% depending on the country (7,8,11,15,16). Propofol has advantages in terms of shorter eye-opening and postanesthetic recovery time and higher patient and doctor satisfaction (1,22). However, its potential to cause hemodynamic and respiratory depression is a matter of concern (19). The most commonly used sedative and analgesic agents are propofol (61%) and fentanyl (36.3%) in China, midazolam (52.6%) in India, propofol (24%) in Germany, propofol alone or in combination with midazolam in Korea and Portugal (55.6%), and propofol in Greece (30.8%) (18,19-24). These differences can be explained by medical and legal concerns. Some of these countries allow non-anesthesiologists to perform sedation in gastrointestinal endoscopy. In such cases, sedation is administered by nurses, endoscopists, or other trained personnel. Surveys conducted in the USA, Italy, and Portugal showed that propofol use was almost entirely administered by anesthesiologists, whereas surveys from Germany and Spain showed that propofol was almost entirely administered by non-anesthesiologists (7,11,12,15,16). In our study, the most commonly used anesthetic agents were midazolam (92%) and propofol (75%). A higher rate of propofol use compared with the rate of having an anesthesiologist during endoscopy (53.2%) reflects the use of propofol by gastroenterology specialists. While the American Society for Gastrointestinal Endoscopy and European Society of Gastrointestinal Endoscopy have guidelines for sedation in gastrointestinal endoscopy, unfortunately, we have not found any domestic guidelines published by a relevant association, which leads to applications according to personal preferences in different regions of the country (23,24).

According to our survey results, the most common monitoring method was monitoring of peripheral oxygen saturation (SpO_2, 97%), consistent with those in several other countries (7,11,12,17,25). Despite its widespread use, the SpO_2 can show higher oxygen levels than the arterial oxygen value, even if severe alveolar hypoventilation occurs (20). Continuous capnographic monitoring is recommended by the American Society of Anesthesiologists (ASA) to evaluate the adequacy of ventilation

Table 6. Relationship between the anesthesia team and sedation practices

		An anesthesiologist is present		An anesthesia technician is present		A nurse is present	
	Top	**n (%)**	**p**	**n (%)**	**p**	**n (%)**	**p**
Anesthesia method							
Conscious sedation	107	53 (49.5)	0.088	61 (57)	0.113	66 (61.7)	**0.049**
Deep sedation	103	62 (60.2)	**0.005**	66 (64.1)	0.094	58 (56.3)	0.400
General anesthesia	20	19 (95)	**<0.001**	17 (85)	**0.011**	13 (65)	0.314
Local pharyngeal anesthesia	92	46 (50)	0.194	54 (58.7)	0.366	56 (60.9)	0.172
Anesthetic agents							
Midazolam	130	65 (50)	**0.008**	77 (59.2)	0.294	77 (59.2)	0.124
Propofol	106	61 (57.5)	0.054	76 (71.7)	**<0.001**	62 (58.5)	0.404
Ketamine	14	13 (92.9)	**0.001**	11 (78.6)	0.116	9 (64.3)	0.402
Fentanyl	33	30 (90.9)	**<0.001**	29 (87.9)	**<0.001**	19 (57.6)	0.575
Remifentanyl	8	8 (100)	**0.005**	7 (87.5)	0.103	7 (87.5)	0.076
Other	10	7 (70)	0.220	0	**<0.001**	3 (30)	0.069
Monitoring							
ECG	64	49 (76.6)	**<0.001**	44 (68.8)	**0.044**	33 (51.6)	0.132
Non-invasive blood pressure	68	51 (75)	**<0.001**	53 (77.9)	**<0.001**	38 (55.9)	0.424
Peripheral O_2 saturation	137	72 (52.6)	0.360	82 (59.9)	0.479	78 (56.9)	0.430
Capnography	0	0 (0)	-	0	-	0 (0)	-
Bispectral index	8	7 (87.5)	**0.047**	7 (87.5)	0.103	1 (12.5)	0.100
Oxygen administration							
All patients	76	43 (56.6)	0.241	50 (65.8)	0.102	46 (60.5)	0.265
Only desaturated patients	46	21 (45.7)	0.143	25 (54.3)	0.206	26 (56.5)	0.510
High-risk patient	32	19 (59.4)	0.276	15 (46.9)	0.061	14 (43.8)	0.058
None	3	2 (66.7a)	0.548	1 (33.3)	0.347	2 (66.7)	0.612
Code blue frequency							
Once a year	80	34 (42.5b)		48 (60)		56 (70.0b)	
Once a month	18	11 (61.1a)	**0.018**	11 (61.1)	0.868	9 (50.0b)	**0.002**
Once a week	2	1 (50ab)		2 (100)		0 (0.0a)	
Other	41	29 (70.7)		24 (58.5)		16 (39.0a)	

(21). However, capnographic monitoring was not performed in any center included in our survey. We believe that future guidelines will help increase its implementation with the conveyance of the importance of capnographic monitoring.

In our study, blood pressure and ECG monitoring rates were 45-48% in the follow-up of cardiac effects. Blood pressure and ECG follow-up were performed in India (42.1%), Italy (30%), and China (79.3% and 76.5%, respectively) (11,13,25). We believe that low ECG rates result from the fact that ECG monitoring requires a specific perspective and assistant health personnel trained in this regard (device setup and electrode placement). A review of competent association guides in these fields demonstrates that ECG is considered among basic monitoring methods. Despite these guidelines, a low rate of ECG monitoring applied by practitioners may also cause medicolegal problems.

In our survey, supplemental nasal oxygen administration was routinely preferred (53%). The use of supplemental oxygen has been associated with a reduced incidence of hypoxemia during moderate sedation (26-29). It is also recommended by the ASA (19). Continuous nasal oxygen is applied in China (95.5%), whereas nasal oxygen is administered in Korea (52.6%), Italy (39.3%), and USA (72.7%) (7,11,17,25). This rate was 76% in the present study.

We found that necessary emergency equipment such as oxygen supply (100%), aspirator (98%), emergency vehicle (91.5%), and monitor (90.8%) were provided at a high rate, whereas the rate of defibrillator availability (65.2%) was relatively lower. These rates were higher than those of China and Greece and similar to India (13,25,30). Generally, one should watch out for potentially fatal side effects of sedation and consider safety parameters. Emergency equipment should be provided to ensure patient safety.

A preoperative pre-anesthetic evaluation was performed by 66% of the respondents, whereas 34% did not perform a pre-anesthetic evaluation. A survey conducted in Korea with a similar rate (38.3%) found that the practitioners never used the ASA classification for preprocedural evaluation or they seldom used it (17). High ASA classification, a definite risk factor for complications, is now recommended as an important quality indicator for all gastrointestinal endoscopic procedures.

We found that anesthesia technicians (60.3%) constituted the majority of the anesthesia team, followed by nurses (57.4%) and anesthesiologists (53.2%). However, when asked about the preferences of gastroenterology specialists, the majority (86.5%) preferred an anesthesiologist. In another survey study, with regard to preference for sedation to be administered by an anesthesiologist for endoscopic procedures, the majority of the respondents (68% versus 32%) stated that they would prefer the presence of an anesthesiologist (8). The high demand for the administration of sedation by an anesthesiologist was associated with concerns regarding medicolegal and patient comfort.

The most common complication during sedation was desaturation (88.7%), and code blue occurred once yearly at 56.7% and once monthly at 12.8%. Moreover, 17.7% (n=25) of the gastroenterology specialists encountered complications that resulted in mortality. Among the causes of mortality, respiratory arrest had a rate of 32%. These results highlight the importance of close monitoring of vital signs and airway management during sedation. Necessary interventions should be performed when required. The risks for patients and physicians increase when ambient light is reduced during endoscopy procedures, the endoscopist concentrates on the procedure, and a nurse working with endoscopist's directives is present. The results of our survey also reveal the importance of such awareness.

Study Limitations

This study provides an insight into current national approaches toward sedation use in gastrointestinal endoscopy. However, this study has some considerable limitations. First, only 18.95% of the associate members responded to our survey; therefore, the results may not fully reflect the overall situation in Turkey. Second, a significant majority (53%) of the gastroenterologists responding to our survey worked in university hospitals, and a substantial portion consisted of young physicians (30-49 years old, 78.7%). Such sample heterogeneity can be considered a limiting factor in adapting our results to the whole country. Moreover, this survey type bears several well-known systematic biases, such as recall bias and self-report bias.

Conclusion

We believe that our study provides an insight into current sedation practices in endoscopy units where procedural complexity is experienced. We observed that gastroenterology specialists prefer a competent anesthetist to administer sedation during the procedure. We also determined that those without such an opportunity acted based on their personal experiences on how to proceed. We believe that it is necessary to prepare guidelines on sedation use in endoscopy units to assist care providers and health managers in providing quality service.

Ethics Committee Approval: Ethical approval for the study was obtained from Bezmialem Vakıf University Faculty of Medicine Clinical Research Ethics Committee (approval number: 21/30, date: 18.11.2015).

Informed Consent: Informed consent wasn't obtained.

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Appendix A. Survey form

Attitudes and behaviors of gastroenterology specialists toward sedation practices in endoscopy units in turkey: is anesthesia mandatory?

Dear Gastroenterology Specialist:

Our survey invites all gastroenterology specialists in Turkey to respond questions regarding sedation practices you apply in endoscopy units. Through this survey, we aim to determine national sedation practices and experiences and preferences of gastroenterology specialists in endoscopy units.

Thank you for participating in our 10-minute survey.

- Age:

- Gender: Female..... Male.....

- Length of experience as a gastroenterology specialist: .....

- What type of hospital are you working in? University ..... Training and Research ..... State ..... Private .....

- Province: .....

- Number of beds in the institution: .....

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1. In your endoscopy unit, do you use sedation for patients during diagnostic and/or therapeutic procedures, interventions, and operations?

a. Yes
b. No

2. If yes, how often do use it?

a. Every time
b. Usually
c. Frequently
d. Rarely

3. Is there a specific patient group for which you do not prefer to use sedation?

a. Patients who refuse sedation
b. Elderly patients
c. Patients without anxiety
d. Patients with other diseases (cardiac, pulmonary, renal etc.)
e. Other (……)

4. In which procedures and interventions is sedation used in the endoscopy unit?

a. Gastroscopy
b. Colonoscopy
c. EUS

d. ERCP

e. ESD

f. Other (……)

5. Which sedation method or methods are used in the endoscopy unit?

a. Conscious sedation

b. Deep sedation

c. General anesthesia

d. Local pharyngeal anesthesia

e. Other (……)

6. Which agent or agents do you prefer the most for patients undergoing sedoanalgesia in the endoscopy unit?

a. Midazolam

b. Propofol

c. Ketamine

d. Etomidate

e. Thiopental

f. Fentanyl

g. Alfentanyl

h. Remifentanyl

i. Other (……)

7. What facilities and equipment are available in the endoscopy unit where you apply sedation?

a. Oxygen supply

b. Aspirator

c. Anesthesia device

d. Defibrillator

e. Monitor

f. Perfusor

g. Emergency trolley

h. Appropriate area with sufficient width

8. Which monitoring methods do you use as part of your sedation practices in the endoscopy unit?

a. ECG

b. Non-invasive blood pressure

c. Invasive arterial monitoring

d. Peripheral oxygen saturation

e. Capnography

f. TOF monitoring

g. Arterial blood gas analysis

h. BIS monitoring

i. Other (……)

9. Do you apply nasal cannula oxygenation to all patients in the endoscopy unit?

a. All patients

b. Only desaturated patients

c. Only high-risk patients

d. None

10. Who among the following is included in the anesthesia team of the endoscopy unit of your current institution?

a. Anesthesiologist

b. Anesthetic technician

c. Nurse

d. Other (……)

11. Who do you think the anesthesia team should consist of?

a. Anesthesiologist

b. Anesthetic technician

c. Nurse

d. Other (……)

12. Do you perform pre-anesthesia examination by listing patients to be sedated in the endoscopy unit?

a. Yes

b. No

13.Do you receive written consent from patients you sedate in the endoscopy unit or from their legal guardians for those who are unable to give consent, and do you have written informed consent forms?

a. We have written consent forms, and I routinely ask patients to complete and sign them.

b. We have written consent forms, but I do not ask all patients to complete and sign them.

c. We do not have written consent forms, and I do not ask patients to sign them.

14. Where do you compile outpatient data who received sedation in the endoscopy unit?

a. Operation site

b. Department

c. Waiting room

d. Recovery unit

e. Other (……)

15. What is the most common intraoperative complication you encounter in the endoscopy unit?

a. Desaturation

b. Hypotension

c. Bradyarrhythmias

d. Nausea/vomiting

e. Other (……)

16. What is the frequency of code blue in the endoscopy unit?

a. Everyday
b. Once a week
c. Once every 2 weeks
d. Once a month
e. Once a year
f. Other (……)

17. Have you encountered anesthesia-related complications resulting in mortality in the endoscopy unit?

a. Yes
b. No

18. For those who responded yes to question 18, what was the cause(s) of mortality?

(……
……)

THANK YOU

EUS: Endoscopic ultrasound, ERCP: endoscopic retrograde cholangiopancreatography, ESD: endoscopic submucosal dissection, BIS: bispectral index, TOF: train-of-four