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Sedation practices in Gastrointestinal Endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) survey

Authors

Konstantinos Triantafyllou[1,2], Reena Sidhu[3,4], Tony Tham[5], Georgios Tziatzios[6], Claire Guy[7], Helmut Messmann[8], Marianna Arvanitakis[9], Cesare Hassan[10,11], Raf Bisschops[12], Ian Mark Gralnek[13,14]

Institutions

1 Second Academic Department of Gastroenterology, Medical School, National and Kapodistrian University of Athens, Athens, Greece
2 Hepatogastroenterology Unit, Second Department of Internal Medicine-Propaedeutic, Medical School, National and Kapodistrian University of Athens, Athens, Greece
3 Academic Unit of Gastroenterology, Sheffield Teaching Hospitals, Sheffield, UK
4 Division of Clinical Medicine, School of Medicine and Population Health, University of Sheffield, Sheffield, UK
5 Department of Gastroenterology and Hepatology, Ulster Hospital, Dundonald, Northern Ireland
6 Department of Gastroenterology, General Hospital of Nea Ionia "Konstantopoulio-Patision", Athens, Greece
7 TUM School of Medicine and Health, Technische Universität München, Munich, Germany
8 Department of Gastroenterology, University Hospital Augsburg, Augsburg, Germany
9 Department of Gastroenterology, Erasme University Hospital, Université Libre de Bruxelles, Brussels, Belgium
10 Department of Biomedical Sciences, Humanitas University, Pieve Emanuele, Italy
11 Endoscopy Unit, Humanitas Clinical and Research Center – IRCCS, Rozzano, Italy
12 Department of Gastroenterology and Hepatology, University Hospitals Leuven, and TARGID, KU Leuven, Leuven, Belgium
13 Institute of Gastroenterology and Hepatology, Emek Medical Center, Afula, Israel
14 Rappaport Family Faculty of Medicine, Technion Israel Institute of Technology, Haifa, Israel

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Corresponding author
Konstantinos Triantafyllou, MD, PhD, Second Academic Department of Gastroenterology, Medical School, National and Kapodistrian University of Athens, Athens, Greece
ktriant@med.uoa.gr

ABBREVIATIONS

AE	adverse event
ECG	electrocardiogram
EMR	endoscopic mucosal resection
ESD	endoscopic submucosal dissection
ESGE	European Society of Gastrointestinal Endoscopy
ESGENA	European Society of Gastroenterology and Endoscopy Nurses and Associates
EUS	endoscopic ultrasound
ERCP	endoscopic retrograde cholangiopancreatography
GI	gastrointestinal endoscopy
MAC	monitored anesthesia care
NAPS	nonanesthesiologist propofol sedation
Q	question
SaO_2	O_2 saturation

Introduction

The provision of moderate sedation for gastrointestinal (GI) endoscopic procedures is considered the standard of care in most of the world. Endoscopic procedural sedation increases patient compliance, enhances satisfaction for both the patient and the endoscopist, and facilitates procedural safety and effectiveness. Moreover, with the increasing complexity of interventional endoscopic procedures, deeper sedation and even general anesthesia are often required [1]. However, the provision of sedation in GI endoscopy presents several limitations, including prolonged patient recovery times, increased healthcare costs, and greater risks of cardiopulmonary adverse events (AEs) [2]. Furthermore, there is ongoing debate regarding who should legitimately be administering endoscopic procedural sedation, particularly propofol and other novel sedative agents [3, 4]. In tandem, there is varied practice in endoscopists' adherence to guidelines for sedation administration, patients' pre-procedural risk stratification, and the management of sedation-related AEs. In addition, the provision of training in procedural sedation remains nonstandardized and there is a paucity of data on cost-effective approaches to enhance resource use in relation to sedation practices [5, 6, 7].

Currently, sedation and monitoring practices for GI endoscopy vary widely based on endoscopists' and patients' preferences, cultural attitudes, healthcare resource availability, local policies, and national legislation [6, 8, 9]. Previous surveys of sedation practice patterns among endoscopists have revealed variations in sedation rates, preferred sedation regimens, and patient monitoring practices; however, these practices have been subject to change over time [5, 10, 11, 12].

The European Society of Gastrointestinal Endoscopy (ESGE) is comprised of 41 member societies from Europe, North Africa, and the Middle East, as well as thousands of individual members worldwide. The ESGE's mission is to educate, innovate, disseminate, support, and promote quality in the practice of GI endoscopy through published guidance documents.

Given the limited understanding of sedation practices among ESGE individual members, the ESGE Guidelines Committee and Curricula Working Group conducted an online web-based survey among ESGE individual members to obtain information on endoscopists' professional characteristics, prior sedation training, and sedation practices for endoscopic procedures, and information on the patient journey for GI endoscopic procedures from preassessment to discharge. We believe these data, reflecting real-life endoscopy practice, could be a valuable resource to highlight areas to enhance the quality of sedation practice provided to patients undergoing GI endoscopic procedures, improve the provision of sedation training programs, and potentially influence policymaking for procedural sedation.

Methods

Study design

A cross-sectional online, web-based survey was conducted between 1 May and 30 June 2024 to assess sedation, analgesia, and anesthesia practices among ESGE individual members.

Development and content of survey instrument

The authors of this manuscript (K.T., R.S., T.T., and G.T.) developed the dedicated 39-item questionnaire. The commercially available version of the web-based Survey Monkey platform (SVMK, San Mateo, California, USA) was used to conduct the survey. The instrument – a semiquantitative questionnaire (full details of the questions and responses are available online at: www.esge.com/sedation-practices-in-gastrointestinal-endoscopy-esge-survey) – was tailored per-physician, without collecting data on individual patients, with only intervals or ranges being reported for quantitative or numerical variables. The questionnaire items comprised the following seven domains:

1. domain A (questions 1–8): demographic and professional characteristics of the participating endoscopist and their endoscopy unit
2. domain B (questions 9–15): sedation training – accreditation practices and quality improvement initiatives for sedation administration
3. domain C (questions 16 and 17): patient preassessment before the delivery of sedation
4. domain D (questions 18–21): patient monitoring requirements during the administration of sedation
5. domain E (questions 22–35): sedation administration practices
6. domain F (questions 36–38): post-endoscopy patient recovery and discharge practices
7. domain G (question Q39): suggestions for topics that new ESGE guidance on sedation, analgesia, and anesthesia administration for GI endoscopy could address that are not adequately covered by the existing guidelines.

The final survey version was reviewed and authorized for online distribution after pilot testing among all authors of this manuscript.

Survey distribution and data collection

The electronic version of the survey was disseminated to ESGE individual members via email accounts stored in the ESGE communication database. Invitations were sent twice (May and June 2024), with a link to the survey and explanations of the purpose of the study. To prevent data duplication, only a single answered questionnaire per user was allowed by the electronic survey software program. All information provided per user was automatically recorded anonymously into an electronic database (Excel; Microsoft, Redmond, Washington, USA).

Acceptance of participation in the survey was considered to be provision of consent for the collection and use of data for scientific purposes. The protocol of this survey was approved by the ESGE Executive Committee. No formal ethical approval was required as no patient-identifiable data were collected.

Statistical analysis

Descriptive statistics were performed with Microsoft Excel. Quantitative data are expressed as mean or median, and categorical data as numbers and percentages.

Results

The initial and follow-up survey invitations were sent 3 weeks apart to 4165 and 4224 individual members, respectively. Overall, of the 937 individual members who opened the survey invitation, 935 members accepted the invitation. Of these, 506 members (54.1%) completed the survey.

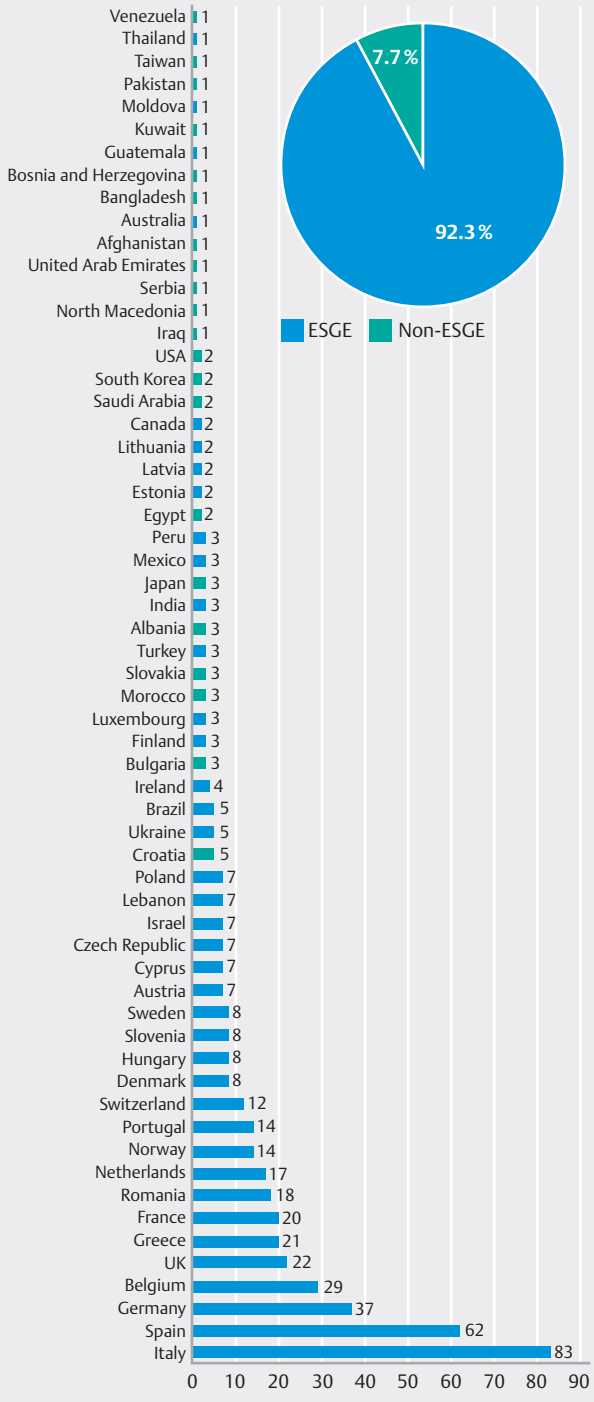
Domain A

The majority (92.3%) of the respondents originated from the 41 ESGE Member Societies (▶ **Fig. 1**); ▶ **Table 1** summarizes their baseline characteristics (Q1–6). Almost all respondents were gastroenterologists by specialty and almost three-quarters worked in Public/University Hospitals (Q3,4). Upper GI (29.8%) and lower GI endoscopies (38.9%), and ERCPs (11.6%) comprised the majority of their endoscopic workload (Q5).

While 16.6% of respondents did not follow any specific guideline regarding sedation administration during endoscopy, 35.8% reported following the previous ESGE sedation guideline [13] and others adhered to local, regional, national, and international guidance (Q8). Respondents reported various available sedation options for GI endoscopy in their respective countries (Q6), with midazolam- (82.0%) and propofol-based (81.8%) sedation regimens being the most commonly used. Unsedated endoscopic procedures were reported by 53.4% of the respondents. ▶ **Table 2** summarizes the sedative/analgesic medications that are restricted to anesthesiologist-/anesthetist-only administration during endoscopic GI procedures in participant countries (Q7), with more than 60% of respondents restricted to anesthetist-only administration of propofol. In addition, in some units, albeit a minority, even midazolam and meperidine/pethidine cannot be administered by the endoscopist, with responses indicating 6.3% (n = 32) and 9.1% (n = 46) of units, respectively.

Domain B

Fewer than 60% of the respondents had undergone specific training in the administration of sedation for endoscopic procedures and 31% reported that this training had occurred during their fellowship training (Q9) (▶ **Table 3**). However, more than 60% had undertaken advanced life support courses, and were trained in airway management techniques, bag valve mask use, and the reversal of sedation with medication (Q10). There were 30% of respondents who indicated they needed obligatory accreditation for sedation administration for digestive endoscopy in their workplace, with the accreditation usually being provided by the local hospital/facility or the local gastroenterology/endoscopy society (Q11,12). To maintain accreditation, endoscopists must undergo a sedation refresher course periodically every 1–5 years (Q13) (▶ **Table 3**).



▶ **Fig. 1** Geographical distribution of respondents to the European Society of Gastrointestinal Endoscopy (ESGE) survey on sedation, analgesia, and anesthesia administration.

Only 5.7% of respondents (29/506) reported the existence of an established quality improvement program for procedural sedation administration in their facility (Q14), with a variety of performance indicators used to measure and improve the delivery of sedation. These quality indicators included the rate and type of AEs (including need for endotracheal intubation, death,

▶ **Table 1** Characteristics of the 506 respondents and their endoscopy practice.

Questions and response options	
Q2 Role, n (%)	
▪ Specialist	468 (92.5)
▪ Trainee	38 (7.55)
Q3 Specialty background, n (%)	
▪ Gastroenterologist	466 (92.1)
▪ Surgeon	30 (5.9)
▪ Nurse	3 (0.6)
▪ Other[1]	7 (1.4)
Q4 Clinical practice setting, n (%)	
▪ Public/university hospital	373 (73.7)
▪ Private hospital	51 (10.1)
▪ Office endoscopy service	25 (4.9)
▪ Public and private sector	57 (11.3)
Q5 GI procedures that comprise respondents' endoscopy practice, %	
▪ Colonoscopy (including polypectomy and small-sized EMRs)	29.8
▪ Advanced upper GI procedures (POEM, ESD, bariatrics, PEG tube placements and dilations)	38.7
▪ Advanced lower GI procedures (large-sized EMRs, ESDs)	3.3
▪ Device-assisted enteroscopy	8.2
▪ ERCP	1.2
▪ Endoscopic ultrasound	11.6
▪ Diagnostic upper GI endoscopy	8.7
▪ Other (mainly capsule endoscopy)	0.1
Q6 Specific guidelines followed regarding procedural sedation in respondents' GI endoscopy practice (multiple answers allowed), %	
▪ None	16.6
▪ Hospital/endoscopic facility guideline	36.2
▪ Region/state endoscopic guideline	26.7
▪ ESGE guideline	35.8
▪ Other international Gastroenterology/Endoscopy Society (e. g. ASGE, BSG) sedation guideline	19.8
▪ Anesthesiology guideline, local	17.4
▪ Anesthesiology guideline, international	9.7

ASGE, American Society for Gastrointestinal Endoscopy; BSG, British Society of Gastroenterology; EMR, endoscopic mucosal resection; ERCP, endoscopic retrograde cholangiopancreatography; ESD, endoscopic submucosal dissection; GI, gastrointestinal; PEG, percutaneous endoscopic gastrostomy; POEM, peroral endoscopic myotomy.
[1] Pediatric gastroenterologist (n = 3), internist (n = 3), anesthesiologist (n = 1).

and length of hospitalization), type and dose of sedation used, use of sedation reversal agents, nonanesthesiologist propofol sedation (NAPS), anesthetist rescue intervention, use of risk stratification indices, use of patient comfort and satisfaction scores, training schedules, and operational and financial issues (Q15).

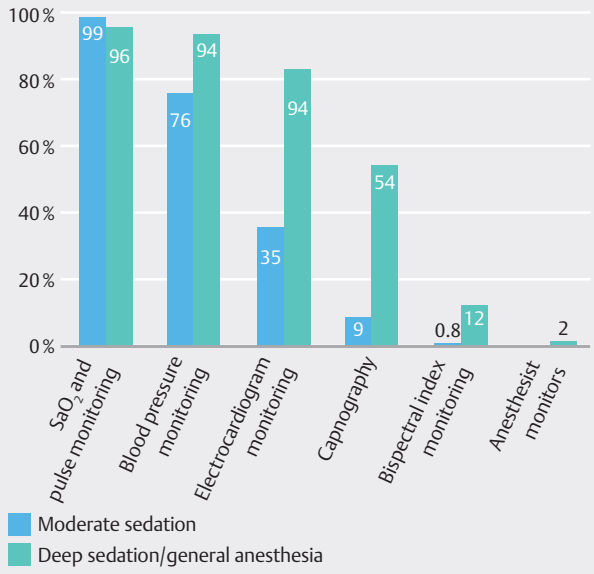
Domain C

Informed consent is a prerequisite for GI endoscopy. According to the survey, informed consent is usually obtained by either the anesthetist, endoscopist, or endoscopy/anesthetic nurse, and this is either verbal (23%) or written (56%). Interestingly, information about the potential advantages of the unsedated or sedation on demand options for diagnostic endoscopy is given

▶ **Table 2** Medications restricted to anesthesiologist-/anesthetist-only administration during endoscopic gastrointestinal procedures in your country (Q7; multiple answers allowed; the sum is >100%).

Medication	n (%)
Midazolam	32 (6.3)
Meperidine/pethidine	46 (9.1)
Propofol	338 (66.8)
Fentanyl	114 (22.5)
Remifentanil	200 (39.5)
Alfentanil	168 (33.2)
Remimazolam	111 (21.9)
Ketamine	296 (58.5)
Dexmedetomidine	169 (33.4)
Nitrous oxide (inhalation anesthetic)	223 (44.1)
Other[1]	10 (2.0)

[1] Etomidate, sevoflurane, curare and other muscle relaxants; propofol variably according to patients ASA score and local regulations.



▶ **Fig. 2** Responses given for the types of monitoring used during sedation.

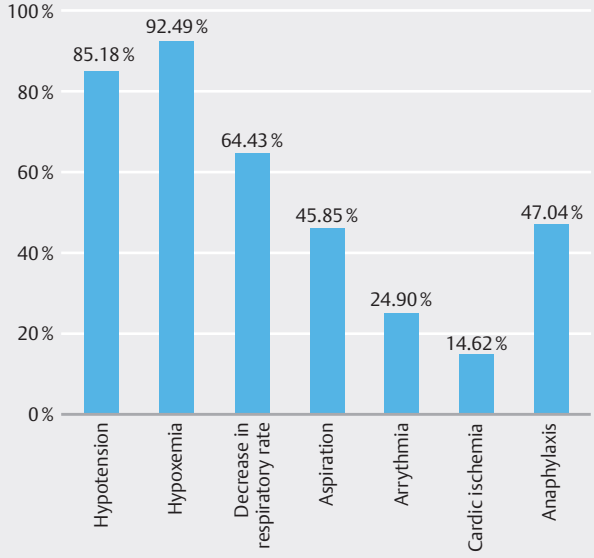
by only 15% of the respondents (Q16). Endoscopists mainly use the American Society of Anesthesiologists (ASA) physical status classification system [14] (64.4%) and the Mallampati score [15] (33.2%) to evaluate patients before sedation administration. To a lesser extent, some respondents reported the use of local pre-endoscopy checklists and clinical judgment only (Q17).

Domain D

▶ **Fig. 2** illustrates the type of monitoring used during procedural sedation. It is evident that more aggressive monitoring is used during deep sedation, compared with moderate sedation, including electrocardiogram (ECG), capnography, and the bispectral index, in addition to SaO_2, pulse, and blood pressure monitoring (Q18,19). The survey also investigated the level of confidence endoscopists had in managing AEs related to the delivery of sedation (Q20). Endoscopists were most confident managing hypoxemia and hypotension (93% and 85%, respectively) and less confident managing cardiac events (15%–25%) (▶ **Fig. 3**). Notably, only 60% of respondents considered the need to use a reversal agent as an AE (Q21).

Domain E

Propofol sedation can be administered by anesthetists in 83% of respondents' practices and by anesthetic nurses in 29%. For some respondents, it can also be delivered by the endoscopist performing the procedure (23%), the endoscopy nurse (27%), any adequately trained physician (11%), or an endoscopist who is not actively involved in the endoscopic procedure (12%; Q22). NAPS, patient-controlled (analgo)-sedation, target-controlled infusion, and computer-assisted personalized sedation are offered by 35%, 19%, 10%, and 1% of the respondents, respectively (Q23).



▶ **Fig. 3** Respondents' levels of confidence in managing different procedural sedation-related adverse events.

The survey also investigated the use of sedation stratified by endoscopic procedure. The options for unsedated endoscopy, sedation on demand, sedation/analgesia regimens, and general anesthesia that comprise survey participants' armamentarium are shown in ▶ **Table 4**, summarizing the responses to Q24–28. Propofol monotherapy ranked highest among respondents' options in clinical practice, irrespective of the invasiveness of the endoscopic procedure (ranging from 28.8% for diagnostic gastroscopy to 42.5% for endoscopic ultrasound [EUS]). The

▶ **Table 3** Training and accreditation for procedural sedation administration.

Questions and response options	
Q9 Have you received specific training on sedation administration for GI endoscopic procedures? (multiple answers allowed), %	
▪ No	41.3
▪ Yes, during my fellowship	31.6
▪ Yes, once, when I started my clinical practice	20.3
▪ Yes, I undergo scheduled refresher training	20.9
▪ Other[1]	1.6
Q10 Have you been trained in the following? (multiple answers allowed), %	
▪ Airway management techniques	69.8
▪ Oropharyngeal airway management	54.1
▪ Bag valve mask (Ambu) use	65.4
▪ Endotracheal intubation	37.1
▪ Basic life support	86.0
▪ Advanced life support	61.1
▪ Immediate life support	30.0
▪ Reversal of sedation with medication	61.1
Q11 Is accreditation required for you to administer sedation for GI procedures in your setting?, %	
▪ Yes	29.4
▪ No	60.1
▪ Do not know	10.5
Q12 Indicate the responsible accreditation body, %	
▪ Not applicable	64.4
▪ The state/region	5.1
▪ The hospital/facility	13.4
▪ The local gastroenterology/endoscopy society	10.9
▪ The local anesthesiology society	2.5
▪ Other[2]	0.8
Q13 If accreditation is required, how often does it need to be renewed/updated?, n	
▪ Yearly	13
▪ Every 2 years	32
▪ Every 3–5 years	16
▪ Every 7 years	1

GI, gastrointestinal.
[1] Informal training, seminars, and personal training course providers.

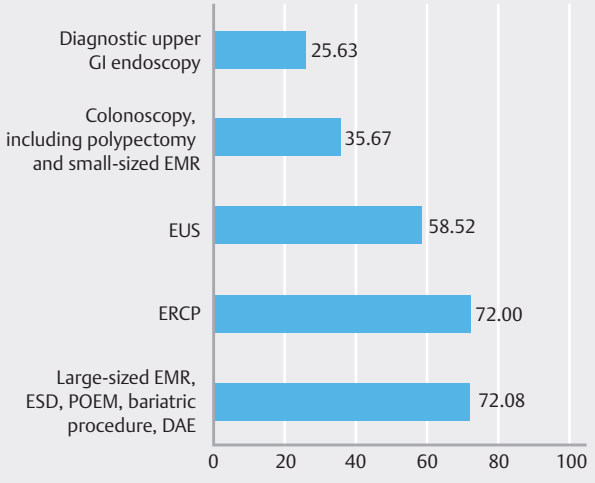
combination of benzodiazepines and opioid medications ranked second (ranging from 16.1% for diagnostic gastroscopy to 26.6% for EUS). Other propofol-based regimens were the third commonest option, being used to sedate patients undergoing ERCP, advanced interventional endoscopic procedures (large-sized endoscopic mucosal resections [EMRs], endoscopic submucosal dissections [ESDs], peroral endoscopic myotomy, bariatric procedures, and device-assisted enteroscopy), and EUS, in descending order. Similarly, general anesthesia was provided in 9.0%, 7.3%, and 1.9% of ERCPs, advanced interventional endoscopic procedures, and EUSs, respectively.

Unsedated endoscopy is used for 23.2% and 13.4% of patients undergoing diagnostic gastroscopy and colonoscopy (including polypectomy and small-sized EMRs), respectively.

▶ **Table 4** Sedation/analgesia regimens administered for the different procedure types (Q24–28), %.

	Procedure				
	Diagnostic upper GI (n = 501)	Colonoscopy* (n = 500)	ERCP (n = 453)	EUS (n = 429)	POEM, ESD, bariatric procedure, DAE (n = 435)
Unsedated endoscopy	23.2	13.4	–	–	–
Sedation on demand	4.7	3.9	–	–	–
Benzodiazepine only	16.9	5.0	0.8	3.2	1.7
Benzodiazepine and opioid	16.1	28.3	16.8	26.6	21.5
Propofol only	28.8	35.5	34.0	42.5	32.8
Propofol and benzodiazepine	5.1	4.9	10.9	8.7	7.6
Propofol and opioid	3.2	4.5	11.4	7.8	12.6
Propofol, benzodiazepine, and opioid	1.7	3.5	14.6	6.5	11.8
General anesthesia	–	–	9.0	1.9	7.3
Other	1.1	1.1	0.3	1.7	4.4

DAE, device-assisted enteroscopy; ERCP, endoscopic retrograde cholangiopancreatography; ESD, endoscopic submucosal dissection; EUS, endoscopic ultrasound; POEM, peroral endoscopic myotomy.
* Including polypectomy and small-sized endoscopic mucosal resection.



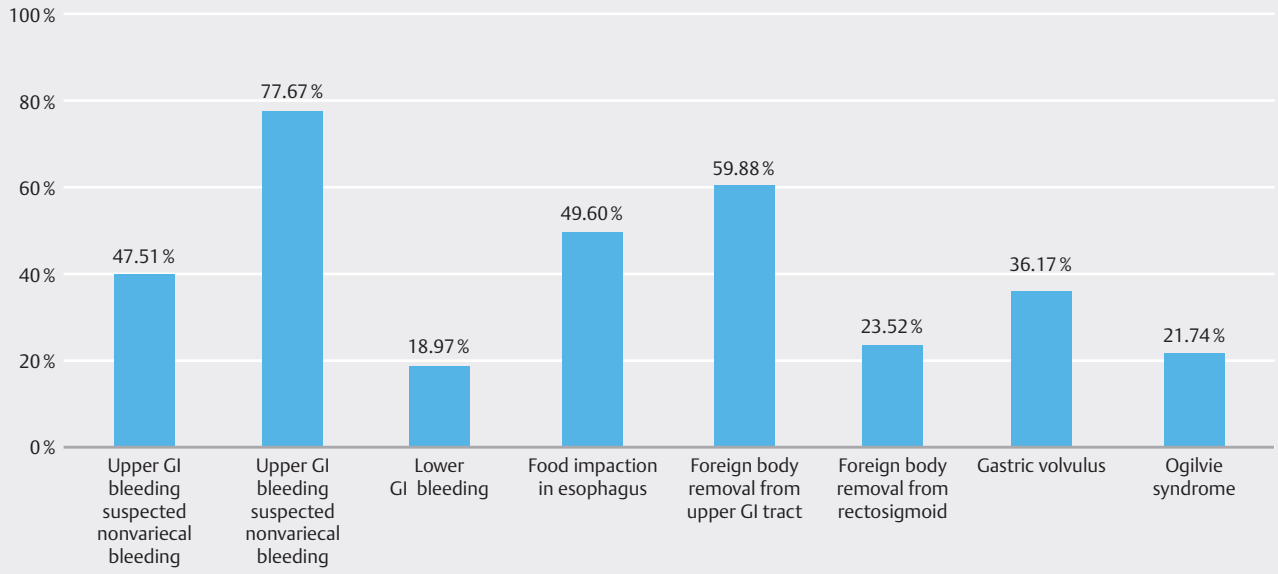
▶ **Fig. 4** Responses given for the use of monitored anesthesia care in different gastrointestinal endoscopic procedures.

Finally, among sedation adjuncts used, topical anesthetic throat spray is used in 40% of upper GI endoscopies, while antispasmodics (e. g. Buscopan) are offered in fewer than 20% of procedures (Q29).

Provision of monitored anesthesia care (MAC; sedation/analgesia administered by an anesthesiology professional) is an option for all endoscopic procedures. As shown in ▶ **Fig. 4**, it is used more commonly during advanced endoscopic procedures: respondents offer MAC in 60%–72% of ERCPs, EUSs, and interventional procedures including large-sized EMRs, ESDs, bariatric endoscopy procedures, and device-assisted enteroscopies (Q30–34). The presence of an anesthetist is often required for endoscopy in an emergency setting, but this practice varies widely (Q35) (▶ **Fig. 5**). In the setting of variceal bleeding, 77% of respondents would request the presence of an anesthetist, while 59% would have a similar preference for foreign body removal from the upper GI tract.

Domain F

▶ **Table 5** (Q36–38) reports monitoring practices after procedural sedation and patient discharge criteria. Most respondents (71%) reported the use of SaO_2, respiratory rate, pulse, and arterial blood pressure for post-procedural monitoring, and patients receive supplementary oxygen. The availability of ECG monitoring and access to a cardiac defibrillator were uncommon (16% and 7%, respectively). The endoscopy nursing personnel or the endoscopy team usually monitor the patient in the recovery phase post-sedation (72%); in the remainder of cases, the person responsible for monitoring is the physician who administered the procedural sedation. Interestingly, only 56% of respondents reported there being specific discharge criteria used in their endoscopy unit, while a case-by-case approach to discharge is taken for the rest of the patients.



▶ **Fig. 5** Responses given for the use of monitored anesthesia care in different endoscopic emergencies.

▶ **Table 5** Patient monitoring during recovery and decision to discharge.

Questions and response options	n (%)
Q36 Who is responsible for patient monitoring during recovery, and for discharge in your practice?	
▪ The endoscopist/team, in most cases	138 (27.3)
▪ The physician/team who administered sedation/analgesia, in most cases	66 (13.0)
▪ The endoscopy facility nursing personnel, in most cases	228 (45.1)
▪ The anesthesiology team, in most cases	70 (13.8)
▪ Other[1]	2 (0.0)
Q37 What monitoring tools are used during the recovery phase post-procedure?	
▪ O_2 provision, SaO_2, respiratory rate, pulse, and arterial blood pressure monitoring	359 (70.9)
▪ O_2 provision, SaO_2, respiratory rate, pulse, arterial blood pressure monitoring, and electrocardiogram	81 (16.0)
▪ O_2 provision, SaO_2, respiratory rate, pulse, arterial blood pressure monitoring, electrocardiogram, and cardiac defibrillator	37 (7.3)
▪ Combinations of the previous mentioned tools	20 (3.9)
▪ Nothing	7 (1.4)
Q38 Are there specific discharge criteria in your facility?	
▪ Yes	285 (56.3)
▪ No, we decide on a case-by-case basis	201 (39.7)
▪ Do not know	20 (3.9)

[1] Department of pediatrics team; recovery unit nurses.

Domain G

Domain G invited respondents to use free text with an open-label answer format. There were 387 respondents (77%), who suggested a total of 908 topics to be addressed by new ESGE guidance documents on sedation, analgesia, and anesthesia administration for GI endoscopy (Q39). A summary of the 10 most frequent suggestions is presented in ▶ **Table 6**. More than one-fifth of the respondents highlighted the need for specific standardization of propofol administration, with NAPS being the most commonly suggested mode of delivery. Gui-

▶ **Table 6** The 10 most frequent suggestions for topics to be addressed in new ESGE guidance for gastrointestinal endoscopic procedural sedation administration (Q39).

Suggested topic	n (%)
Standardization of propofol use and NAPS	190 (20.9)
Specific training for sedation administration	111 (12.2)
Clarification of anesthetists' involvement in sedation administration	55 (6.1)
Monitoring during sedation and recovery	49 (5.4)
Selection criteria (patient/procedure) for the type of sedation	39 (4.3)
Development of specific discharge criteria after recovery	26 (2.9)
Nurses' involvement in sedation administration	26 (2.9)
Standardization of dosing schemes for specific patients/procedures	25 (2.7)
Recognition and management of sedation-related adverse events	31 (3.4)
Use of novel sedation medications (e. g. remimazolam)	22 (2.4)

NAPS, nonanesthesiologist propofol sedation.

dance on specific training in procedural sedation and clarification on the requirement for anesthetist-led sedation administration was requested by 12% and 6% of respondents, respectively. Other suggestions included best practice guidance on post-procedural monitoring requirements, patient selection, and the standardization of discharge criteria following sedation.

Discussion

Almost 20 years after a survey on sedation practices for diagnostic gastroscopy was performed among ESGE member society representatives [16], this is the first ESGE-led survey of its individual members on sedation practices in GI endoscopy. Among the 506 responses, half originated from six countries: Italy (16.4%), Spain (12.3%), Germany (7.3%), Belgium (5.7%), United Kingdom (4.3%), and Greece (4.2%). The response rate to this survey was high, suggesting a high level of interest in this topic among ESGE members. Although reflecting real-life endoscopy practice, the results of this survey should however be interpreted with caution. The survey results may not only be country specific, but may also be indicative of respondents' locally available resources. Previous large surveys from other organizations have largely focused on anesthetic services or sedation practices in other specialties [17, 18].

There are several key themes that have emerged from this survey. While midazolam- and propofol-based sedation regimens are commonly used, the provision of propofol remains restricted to delivery by anesthetic personnel in more than 60% of cases. Propofol has been shown to have a narrow therapeutic window, with overdosing resulting in hypotension and apnea, and, unlike benzodiazepines and opiates, it does not have a reversal agent; however, meta-analyses have shown comparable safety profiles for propofol and standard sedation regimens involving benzodiazepines and opioids [2, 19]. The large ProSEd 2 study, including 368 206 endoscopies, showed lower AEs for propofol monotherapy compared with other sedation regimens [20]. In addition, a Spanish study [21] that evaluated 33 195 endoscopy procedures showed that sedation, as administered by a trained endoscopist, is safe, effective, and efficient.

The debate around who should be administering propofol continues to be worthy of discussion. In some countries, NAPS has been successfully developed, showing no increase in AEs, high procedural success, and good patient satisfaction [22, 23, 24]. The out-of-operating-theatre provision of propofol sedation is also an attractive option for reducing operating theatre use. The combination of NAPS and propofol delivery within endoscopy units would seem to be a cost-effective option, particularly with the rising demand for complex GI endoscopy procedures, but it is limited by the legislation within certain countries and local resource availability [7, 13]. Multicenter and international studies addressing both of these aspects are warranted.

The increasing use of sedation brings with it the inherent risk of sedation-related AEs. This survey identified that there is a large gap in the provision of training in endoscopy procedural sedation. There were 40% of respondents who had not had any structured training prior to delivering sedation, while, in a third of those who had received training, this training had been provided during their "fellowship" years. Endoscopists reported feeling comfortable at managing hypoxemia, but less confident in managing some less common AEs, such as cardiac events.

National gastroenterology/endoscopy societies need to bridge this gap to address sedation training and offer courses that suit the requirements of their national laws and regulations. At the local level, hospitals can set up sedation committees to implement sedation policy, which should also include sedation training [25]. Some national societies are already revising their GI curriculum to include aspects of sedation and managing sedation-related AEs. Simulation training for endoscopy teams, particularly in managing more complex scenarios,

would also be a helpful adjunct to standard training [26]. In this respect, the implementation of the ESGE and ESGENA curriculum on sedation [27] in a big endoscopy unit in Italy resulted in a very small number of AEs that occurred during moderate or deep sedation, all of which were managed by endoscopy staff without the need for anesthesiologist assistance [28]. Moreover, the ESGE curricula working group is also making inroads by updating the existing guidance on sedation to provide a framework for what training in sedation should encompass.

Training in sedation should be a continuous process. While maintaining certification in advanced life support would confer benefit in the identification of aberrant cardiac rhythms and sedation-related practices, there is an inherent lack of clear parameters on how competence in the provision of sedation should be assessed and how frequently this should be done. While there are established pathways for anesthetic colleagues, there is a paucity of data in the GI literature and any such recommendations need to be achievable, with the criteria not being too stringent, which would deter the gastroenterology/endoscopy community from changing and adopting new practices.

The ESGE Quality Improvement Initiatives have been instrumental in setting standards and improving quality in the majority of endoscopic specialty areas and the respective services [29]. Worldwide there have been several steps taken to measure quality within the provision of sedation, with patient- and clinician-centered outcomes being developed [30, 31]. Patient satisfaction has increasingly been measured in routine endoscopy as a marker of quality. Poor patient tolerance often results from a mismatch between the expectation of what sedation entails compared with the true endoscopic experience [32].

This survey also highlights that, in many endoscopy units, there are no set standards on what tools should be used in the post-procedural monitoring of patients. This appears to be dependent on local infrastructure and the availability of equipment beyond the provision of standard blood pressure, pulse, and pulse oximetry monitoring. Capnography has increasingly been used for deeper sedation in complex endoscopic procedures, but the body of evidence has largely been derived from procedural sedation for dental procedures [33]. Interestingly, ECG monitoring and access to a cardiac defibrillator are available in only a minority of recovery facilities, even though cardiac AEs can occur not only during the endoscopic procedure but also during patient recovery. Owing to the paucity of clinical data, specific tools for post-procedural recovery monitoring have not been specified, even in the most recent European and American sedation guidelines [34, 35, 36].

The respondents to this survey have highlighted the lack of use of specific criteria or scoring (e.g. ASA and Mallampati scores) in the preassessment of patients prior to endoscopy. In this respect, ESGE and ESGENA provide a generic safety checklist, which includes checking the ASA and Mallampati scores, and strongly recommend its use as part of standard practice before endoscopy [37]. There is however no patient recovery phase in this checklist, so it cannot provide guidance to the 44% of respondents who reported that there were no set parameters or criteria being used for safe patient discharge. Apart from the duration and complexity of the endoscopic procedure, studies have demonstrated that AEs related to sedation are largely dependent on the functional reserve and ASA status of the patient [20]. There are many endoscopy units that carry out both the preassessment process before endoscopy and discharge post-endoscopy to a high standard. Therefore, sharing of good practice among organizations would ensure a cost-effective and patient-centered approach while prioritizing patient safety.

Emergency endoscopy (e.g. GI bleeding, foreign body removal) is a higher risk procedure. Careful preassessment is required to ascertain the best modality of sedation for the proposed procedure and whether the support of an anesthetist is required. The survey showed 77% of respondents would request the presence of an anesthetist for cases of variceal bleeding, where there may be significant blood in the upper GI tract. Studies have demonstrated that the risk of aspiration in emergency endoscopy is high and prophylactic endotracheal intubation may be indicated in specific cohorts [38].

Managing sedation in GI endoscopy requires a multifaceted approach. The ESGE will be updating its guideline on the provision of sedation, in tandem with the update of the ESGE curriculum on sedation, to help its members address their practice and training needs.

Conflict of Interest

Ian M. Gralnek - Astra-Zeneca, Check Cap, Boston Scientific, Clexio Biosciences, Motus GI, Vifor Pharma, Medtronic, Olympus None of the rest authors declared any conflict of interest related to this manuscript

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