

# Anaesthesia in patients undergoing esophago-gastro-duodenoscopy for suspected bleeding

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## ABSTRACT

**INTRODUCTION:** Upper gastrointestinal bleeding (UGIB) is a common emergency. Currently, there are no agreed guidelines on the level of anaesthetic support required in patients undergoing acute esophago-gastro-duodenoscopy (EGD).

**METHODS:** An online questionnaire comprising 19 questions was distributed to all members of the Danish Association of Anaesthesiology and Intensive Care (n = 1,418) and the Danish Society of Anaesthesiologists in Training (n = 566). The questions concerned clinical practice for anaesthesia care to patients undergoing EGD for suspected UGIB and availability of local guidelines.

**RESULTS:** A total of 521 anaesthetists with who had, on average, concluded medical school 14 years earlier (range: 9-27 years) answered the questionnaire. Of the responders, 65.5% (167/255; 95% confidence interval (CI): 59.7-71.3) had provided anaesthesia to five or more patients with suspected UGIB during the previous six months. 32.9% (110/333; 95% CI: 27.9-38.0) had a local guideline for this procedure. Rapid sequence induction was part of the guideline for 71.8% (79/110; 95% CI: 63.4-80.2) in case of general anaesthesia (GA). The preferred choice of anaesthesia was GA with endotracheal intubation (56.2%; 187/333; 95% CI: 50.9-61.5).

**CONCLUSIONS:** We found considerable variation in daily clinical practice of anaesthesia for patients undergoing EGD for suspected UGIB. The fact that anaesthesia for UGIB is a complex emergency procedure may underline the need for development of an international or at least a national guideline.

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**TRIAL REGISTRATION:** not relevant.

Acute upper gastrointestinal bleeding (UGIB) is a common medical emergency worldwide with mortality rates reaching 13% [1] and 15% [2, 3] for in-hospital and 30-day mortality, respectively. Some 22-36% of UGIBs are peptic ulcer bleedings (PUB) [4]. With an incidence rate of 57 per 100,000 person-years, PUB is a common diagnosis in Denmark [5]. The vast majority of patients with suspected UGIB undergo diagnostic and therapeutic esophago-gastro-duodenoscopy (EGD) [6, 2].

Currently, there is no universally agreed approach to the level of monitoring and anaesthetic support required for patients undergoing acute EGD for suspected UGIB. Some EGDs are conducted in general anaesthesia (GA) with endotracheal intubation, some patients are sedated and monitored by either an anaesthetist physician or a nurse anaesthetist (monitored anaesthesia care), some are sedated without being monitored by anaesthetically trained personnel and some receive no sedation [7]. To identify the most cost-effective solutions, health system planners first need better knowledge about current practice of monitoring and care, and about the associated clinical implications. In a previous study of 3,056 EGDs for PUB based on the Danish Clinical Registry of Emergency Surgery (DCRES), we found that 68% of the procedures were conducted under anaesthesia care, whereas 32% were managed by the endoscopy team alone. The prevalence of anaesthesia care varied between hospitals from 6.9% to 98.6%, and there was no association between the prevalence of anaesthesia care and mortality at hospital level [8]. At the individual level, however, anaesthesia care for EGD was associated with a high mortality, most likely because it was the preferred choice for high-risk patients. In another cohort study of 3,580 EGDs for PUB performed under anaesthesia care, we compared endotracheal intubation with monitored anaesthesia care without airway instrumentation and found no difference in 90-day mortality or length-of-stay in hospital [9].

For this very frequent procedure that is conducted in a frail population with a high mortality, a universally agreed approach to monitoring and care may improve quality of care and outcome. To further explore current practice, we conducted a nationwide survey among anaesthesiologists in Denmark, enquiring about local guidelines, practices, individual preferences and routines. We aimed to describe the current practice of anaesthesia care for patients undergoing EGD for suspected UGIB. We expected to find considerable variation in current practice and availability of local guidelines.

## METHODS

This study was a nationwide survey performed among anaesthetists in Denmark.

## ORIGINAL ARTICLE

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TABLE 1

Characteristics of the responders (N = 521).

	n	% (95% CI)
Male	341	65.4 (61.3-69.5)
University hospital	326	62.4 (58.2-66.6)
Local hospital	152	29.1 (25.2-33.0)
Private clinic	18	3.5 (1.9-5.1)
Other	26	5.0 (3.1-6.9)
Education level		
Pre-registrar	1	0.2 (-0.2-0.6)
Registrar/resident	55	10.6 (7.96-13.2)
Senior registrar/fellow	96	18.4 (15.1-21.7)
Anaesthesiologist/specialist anaesthetist	352	67.6 (63.6-71.6)
Other	12	2.3 (1.0-3.6)
Missing	5	1.0 (0.15-1.9)
Do you – in your department – assist at EGDs when UGIB is suspected?		
Yes	333	63.9 (59.8-68.0)
No or do not know	169	32.4 (28.4-36.4)
Missing	19	3.6 (2.0-5.2)
On estimation, how many of this type of patients have you anaesthetized the past 6 months? (n = 333)		
0	73	21.9 (18.4-25.5)
1-4	88	26.4 (22.6-30.2)
5-20	126	37.8 (33.6-42.0)
21-40	23	6.9 (4.7-9.1)
> 40	18	5.4 (3.5-7.3)
Missing	5	1.5 (0.5-2.6)

CI = confidence interval; EGD = esophago-gastro-duodenoscopy; UGIB = upper gastrointestinal bleeding.

TABLE 2

Local guidelines: responders with a guideline at the department (N = 110).

	n	% (95% CI)
According to the guideline, does the patient need to be fasting prior to a EGD when UGIB is suspected?		
Yes	17	15.5 (6.7-22.2)
No	54	49.1 (39.8-58.4)
Depends on the haemodynamic status of the patient	22	20.0 (12.5-27.5)
Missing answers	17	15.5 (6.7-22.2)
How are the patients anaesthetized according to the guideline?		
GA with tracheal intubation	38	34.5 (25.6-43.4)
Sedation	5	4.5 (0.6-8.4)
No anaesthesia	2	1.8 (-0.68-4.28)
Sedation or GA with tracheal intubation	15	13.6 (7.2-20.0)
Depends on the haemodynamic status of the patient	29	26.4 (18.2-34.6)
Missing answers	21	19.1 (11.8-26.5)
According to the guideline, when using GA, should this be RSI?		
Yes	79	71.8 (63.4-80.2)
Not specified	9	8.2 (3.1-13.3)
Missing answers	22	20.0 (12.5-27.5)

CI = confidence interval; EGD = esophago-gastro-duodenoscopy; GA = general anaesthesia; RSI = rapid sequence induction; UGIB = upper gastrointestinal bleeding.

ciliation" to ensure the accuracy of the English version. The questionnaire was pilot-tested among ten persons, and few questions were corrected and added before a link to the final questionnaire in Danish was sent by e-mail to all members of the Danish Association of Anaesthesiology and Intensive Care (n = 1,418) and the Danish Society of Anaesthesiologists in Training (n = 566). Members of both societies were physicians at different educational levels in the field of anaesthesiology. Responding was voluntary and no fees were paid. It was a possibility for the responder to submit the questionnaire without answering all questions. Questions 1-6 were related to the general characteristics of the responder including current place of employment and his/her experience with anaesthesia for EGD, questions 7-11 were related to the availability of a local guideline on anaesthesia for EGD, questions 12-17 were related to the responder's daily clinical practice, and questions 18-19 dealt with the responder's experience of complications related to the anaesthesia procedure. The questionnaire was distributed through SurveyMonkey in June 2014, a follow-up reminder was sent in September 2014, and data collection was concluded in October 2014. We assumed that the department had a guideline (question 7) if at least one responder working at the department answered yes to this question.

The full questionnaire is available by request to the first author. The departments that conducted EGDs and the number of EGDs performed in each department during the 2006-2013 period were identified through the DCRES [10].

## Statistics

The responses to each question were counted and summarized, including any missing answers, and presented as numbers and proportions with 95% confidence intervals (CIs). For this, we used Stata version 13.1 (StataCorp LP, College Station, TX).

*Trial registration:* not relevant.

## RESULTS

### Responders

A total of 521 responders who on average had concluded medical school 14 years (interquartile range: 9-27) completed and returned the questionnaire. Due to the unknown overlap between members of the two professional societies, the response rate can be calculated to 26-37%. Of the responders, 76.3% (255/333; 95% CI: 71.7-80.9) had provided anaesthesia to one or more patients with suspected UGIB during the previous six months, of whom 65.5% (167/255; 95% CI: 59.7-71.3) had provided anaesthesia to five or more patients (Table 1).

A questionnaire comprising 19 questions was developed; the questions were written in Danish and then translated into English with "back translation and recon-

### Local guideline

Of the responders, for 32.9% (110/333; 95% CI: 27.9-38.0) a local guideline was available for the provision of anaesthesia care during EGD for patients with suspected UGIB, and 64.4% (215/333; 95% CI: 59.3-69.5) responded that no local guideline was available. Among those who stated that no local guideline was available, 39.5% (85/215; 95% CI: 33.0-46.0) were working at departments where one of more colleagues answered yes to the same question. About one third (34.1%; 87/255; 95% CI: 28.3-39.9) of those who had anaesthetized at least one patient who was suspected for UGIB during the previous six months worked at a department with a guideline. Of those with an available guideline, 21.8% (24/110; 95% CI: 14.1-29.5) responded that the guideline had been updated during the past year and 79.1% (87/110; 95% CI: 71.5-86.7) answered that they followed the guideline. The guidelines differed in choice of anaesthesia and with respect to the fasting requirement (Table 2).

### Choice of anaesthesia

Of the responders who provided anaesthesia for EGD, the main choice of anaesthesia was GA with endotracheal intubation (56.2%; 187/333; 95% CI: 50.9-61.5), 10.2% (34/333; 95% CI: 7.0-13.5) would choose sedation and 18.0% (60/333; 95% CI: 13.9-22.1) answered that it depended on the haemodynamic status of the patient (6.0% missing answers). When performing GA, 80.8% (269/333; 95% CI: 76.6-85.0) would choose rapid sequence induction (11.2% missing answers). Of the responders, 17.7% (59/333; 95% CI: 13.6-21.8) reported that their choice of anaesthesia was not influenced by the endoscopist's preference, and 28.8% (96/333; 95% CI: 23.9-33.7) replied that the decision on anaesthesia was made in consultation with the endoscopist. To the question enquiring if the responder would delay an EGD in a haemodynamically stable patient due to lack of fasting, 43.8% (146/333; 95% CI: 38.5-49.1) answered no, 26.1% (87/333; 95% CI: 21.4-30.8) answered yes, 3.0% (12/333; 95% CI: 1.1-4.8) were unable to decide/did not know and 14.7% (49/333; 95% CI: 10.9-18.5) stated that it depended on the endoscopist's assessment (11.7% missing answers). In cases where sedation was chosen, and the procedure was not possible to complete, 74.5% (248/333; 95% CI: 69.8-79.2) would convert to GA with endotracheal intubation (11.7% missing answers). Some 39.0% (130/333; 95% CI: 33.8-44.2) had at least once experienced an anaesthesia-related complication in this patient group (Table 3).

### Procedure frequency

A total of 28 departments conducted a total of 14,157 EGDs in patients with suspected UGIB during the 2006-



TABLE 3

	GA with TI	Sedation	No anaesthesia
Cardiovascular	101	37	11
Aspiration	63	60	16
Unexpected complicated airway	37	6	0
Hypoxia: saturation < 80%	30	48	13
Respiratory arrest	3	21	5
Death	13	8	5
Other	3	3	4

GA = general anaesthesia; TI = tracheal intubation.

Anaesthesia-related complications experienced by the responders. The values are n.

2013 period. Of all EGDs, 17.3% (2,455/14,157; 95% CI: 16.7-17.9) was performed at one of the 21.4% (6/17) departments that did not have a local guideline. All of the departments without local guidelines were located at local hospitals. Overall, 57.3% (8,117/14,157; 95% CI: 56.5-58.1) of all EGDs were performed at local hospitals.

### DISCUSSION

In this national questionnaire-based survey, we found a considerable variation in training level, choice of anaesthesiological methods and experience among Danish anaesthesiologists providing anaesthesia care to persons undergoing EGD for suspected UGIB, and established that the majority do not have access to a local guideline.

A strength of this study was the collection of information directly from the anaesthesia providers and not from clinic or hospital managers, as this reflects daily clinical practice, hence revealing for example discrepancies between availability and actual knowledge of local guidelines. Another strength was the study's nationwide design, including information from a broad range of hospital levels and a variety of training levels, ranging from pre-registrar to specialist anaesthesiologist. The volunteer response procedure is a limitation because responders may differ from non-responders, thereby increasing the risk of selection bias. The overlap between members of the two professional societies to whom the questionnaire was delivered could increase the likelihood that the same person may have responded twice. Furthermore, inconsistency between actual practice and what the person remembers and therefore replies to the questionnaire may introduce recall bias.

No previous studies have examined this research question. No larger randomized controlled trials exist to inform best practice for anaesthesia care to patients undergoing EGD for suspected UGIB. An observational study of 3,580 Danish patients found no difference in mortality or length of stay in hospital between endotra-

cheal intubation and monitored anaesthesia care [9]. Previous smaller studies [11-13] are inconclusive.

The reported number of procedures done by each physician was low in this study, which is assumedly related to the fact that it is an emergency procedure often conducted by whoever happens to be on call. The large variation in current practice may be due to a combination of lack of a guideline, diverse recommendations in different local guidelines, lack of familiarity with the procedure and differences in anaesthesia culture. The relatively high number of anaesthetists having experienced complications confirms the risks related to the procedure. The lack of a guideline may be partly due to the lack of evidence concerning best practice. Presumably, the number and consistency of local guidelines would increase if a national guideline was available. Another factor could be lack of prioritization and attention to this procedure from the department managers. Also, frequent departmental shifts among registrars in specialist training in Denmark, staying only 3-12 months in each department, could lead to an inconsistent approach to the procedure. Another interesting finding was the large proportion of anaesthetists who seemed to have no knowledge of an existing guideline at their department. This could indicate a need for department managers to ensure better introduction to the department, including to existing local guidelines, when new registrars and specialists are hired. Finally, the general medical culture as well as individual experience may influence the anaesthetists' approach to using a guideline.

The relatively low procedure frequency per physician and the diverse training levels of anaesthetists conducting anaesthesia care during EGD procedures underline the need for a standardized approach. Until higher-level evidence is available, for example from large RCTs, recommendations will need to be based on best available level of evidence. Given the high mortality and morbidity in this patient group and to guide inexperienced anaesthetists in particular, a clinical practice guideline on anaesthesia care to patients undergoing EGD for suspected UGIB is warranted. Even an expert consensus-based guideline will be useful [14]. An international guideline would be preferable, and as a minimum the guideline should be developed at the national level in Denmark.

## CONCLUSIONS

We found considerable variation in the reported current practice of anaesthesia for patients undergoing EGD for suspected UGIB. Furthermore, we found a low procedure frequency per physician, and few responders reported that a local guideline was available. Surprisingly, a large proportion of anaesthetists seemed to have no knowledge of the existing guideline at their department.

Anaesthesia care for patients with UGIB is a complex and serious emergency procedure, which underlines the need for the development of national as well as international clinical practice guidelines.

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**CONFLICTS OF INTEREST:** Disclosure forms provided by the authors are available with the full text of this article at [www.danmedj.dk](http://www.danmedj.dk)

## LITERATURE

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