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Curriculum on management of acute upper gastrointestinal bleeding: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement

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ABSTRACT

1 Before commencing hands-on upper gastrointestinal bleeding (UGIB) training, trainees should have thorough knowledge of: pathology, vascular anatomy, technical use of devices, clinical care pathways, and all relevant components of pre-, intra-, and postprocedural patient care.

2 Preadoption technical skills required for training in the management of UGIB include adequate scope handling, intubation technique, washing and suctioning of residue, mucosal examination, and handling of accessories.

3 Preadoption technical skills required for training in the management of UGIB should be assessed individually based on a competency framework and not solely on numerical thresholds.

4 The integrative skills required for the management of UGIB do not essentially differ from those needed in other endoscopic procedures and should include adequate situational awareness, collaboration, team leadership, and patient communication in order to ensure short- and long-term goals are achieved.

5 The trainee should reach minimum recommended standards for key performance indicators in upper GI endoscopy before starting training in the management of UGIB.

6 Attendance of at least one half-day training session on a dedicated simulator that provides GI bleeding training at the beginning of training for management of UGIB is advised.

7 Trainees should be supervised directly and carefully during UGIB training for a minimum of 20 procedures with endoscopic stigmata of recent hemorrhage in order to prevent failure of hemostasis and ensure adequate trainee skill acquisition.

8 Trainers should take into account pre-endoscopic and intraprocedural factors predicting outcome, technical complexity, and risk of hemostatic failure when deciding appropriateness and degree of trainee involvement in case management.

9 During their training, trainees should be exposed to all hemostatic modalities, as per ESGE guideline recommendations, and the opportunities for teaching arising from the specifics of each UGIB case.

10 Trainers should use “successful hemostasis,” defined as the absence of any further bleeding (persistent or recurrent bleeding), as the ultimate goal of training in the endoscopic management of UGIB.

11 Patients with recurrent bleeding should be treated by experienced endoscopists or by a trainee under their direct supervision owing to the higher risk of failure of conventional endoscopic treatment.

12 Trainers who are teaching management of UGIB should fulfil the same standards as any trainer of basic endoscopy procedures.

13 Trainees should be exposed to multidisciplinary team discussions and care pathways for failed endoscopic treatment of UGIB.

14 Training centers with limited UGIB case volumes are encouraged to offer short-term immersive training in centers with high volume caseloads of UGIB in order to ensure sufficient exposure for trainees.

15 Competency in managing UGIB is defined as the ability to assess the need for endoscopy, and plan and carry out successful hemostasis.

16 Trainees should manage an indicative number of 30 cases in which successful hemostasis is achieved before evaluation of competence in management of UGIB.

17 UGIB-CAT is advised as a formative assessment tool during training to track acquisition of competence and provide trainee feedback.

18 Trainees should undergo a formal summative assessment of competence in managing UGIB during their training.

19 Endoscopists should continue a period of tracking results and mentored practice with an experienced colleague for at least 6 months after achieving competence in managing UGIB.

20 As trainees move to independent practice, they should have established access to or referral pathways for key supporting specialties involved in the nonendoscopic management of acute UGIB (including emergency medicine, surgery, and interventional radiology).

SOURCE AND SCOPE

This Position Statement is an official statement of the European Society of Gastrointestinal Endoscopy (ESGE). It provides recommendations for a European core curriculum for training in the management of upper gastrointestinal bleeding. The recommendations presented are based on a consensus achieved by endoscopy experts involved in training after reviewing available evidence.

ABBREVIATIONS

CAT	competence assessment tool
DOPS	direct observation of procedural skills
GBS	Glasgow–Blatchford score
KPI	key performance indicator
SBT	simulator-based training
TIPS	transjugular intrahepatic portosystemic shunt
UGIB	upper gastrointestinal bleeding

Introduction

Acute upper gastrointestinal bleeding (UGIB) is a potentially life-threatening event and a strong indication to perform upper GI endoscopy for diagnosis and successful treatment of the underlying lesion. Therefore, managing UGIB is an essential skill for any endoscopist and, as such, the European Society of Gastrointestinal Endoscopy (ESGE) has included it in the list of basic endoscopy skills that must be gained during training [1]. While diagnostic upper GI endoscopy can be performed by nonmedical endoscopists in some healthcare systems, the current document refers to training for medical endoscopists who are also certified to treat bleeding.

Recognizing the accelerated development of new diagnostic and therapeutic techniques, the ESGE tasked the Curricula Working Group with developing minimum standards and training for mainly advanced endoscopic procedures, which are beyond the general training requirements in most countries [2]. While management of UGIB should be mastered by all endoscopists, the advent of more invasive therapeutic procedures (e.g. endoscopic submucosal dissection, bariatric and third-space endoscopy), as well as the technical proficiency required in correctly and safely employing some hemostatic modalities (e.g. cap-mounted clips, thermal coagulation probes), has complicated the landscape of teaching and learning this essential skill.

Previous guideline documents offer valuable guidance on managing variceal [3] and nonvariceal UGIB [4,5], as well as dealing with antithrombotics [6], but do not address training requirements and competence. There is an inherent difficulty in establishing standards for training in acute bleeding as many cases are managed in an emergent fashion by the on-call team when opportunities for mentoring and direct observation of the procedures are fewer. The continuous improvement in simulator technology and increasing availability of simulator-based training (SBT) mitigate some of these difficulties, but we are still confronted with an unmet need to structure training and competence assessment in this field.

Aims

The aim of this ESGE Position Statement is to offer an overview of evidence and to propose: preadoption requirements, steps required for training, and those for achieving autonomy in competently managing UGIB. To this end, we have devised this Curriculum providing guidance based on currently available data and expert opinion on the topic.

Methods

This is a Position Statement developed according to the methodology adopted by the ESGE [2]. It is divided into three key domains: **1** preadoption requirements (defining the skills and competence necessary prior to managing UGIB); **2** structure of training (specifies the steps to acquire competence, and prerequisites for training modules and centers); **3** autonomous implementation and assessment of proficiency (describes prerequisites, and specific numbers and conditions for independent management of UGIB).

For this document, the ESGE Curricula Working Group Chair (T.T.) tasked a project leader (A.V.) who was responsible for coordinating the taskforce members and developing the manuscript. A call for members of the taskforce was open to all active ESGE members until the end of March 2024, and 19 applicants were finally chosen based on expertise, motivation, and diversity. The list was approved by the ESGE Executive Committee and the consequent division into taskforces and respective leaders is available in **Appendix 1s, part a** (see online-only Supplementary material). The online kick-off meeting took place on 24 June 2024, when the authors discussed and revised the outline of the document and key questions, division into taskforces, workload assignments, and methodology proposed by the project leader.

We conducted a systematic literature search in a minimum of two databases using several PICO (population/problem, intervention, comparison, outcome) questions and a standardized format (**Appendix 1s**, **part b**). The available literature was appraised using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system [7], and an initial list of statements was drafted. When framing a PICO question was not considered feasible or there was insufficient evidence to conduct a GRADE analysis, questions were answered through an expert-based review resulting in good practice statements. We decided on a maximum of three rounds of an online Delphi process to reach consensus among panelists. Statements were graded using a 5-point Likert scale (1, Strongly disagree; 2, Disagree; 3, Neither agree nor disagree; 4, Agree; 5, Strongly agree) and consensus was defined as ≥80% agreement (the sum of Agree and Strongly agree). Panelists were asked to consider evidence quality, clinical benefits and harms for patients and healthcare systems, costs, and the potential environmental impact of each statement. After each round of voting the statements were kept, changed, or removed based on the results and suggestions made by the panelists. This process is documented in **Appendix 2s**. Two rounds of voting were needed to reach agreement for all group members, after which the manuscript was reviewed by the ESGE Governing Board and two external reviewers before being submitted to *Endoscopy* for publication.

1 Preadoption requirements

1.1 Cognitive

STATEMENT 1
Before commencing hands-on UGIB training, trainees should have a thorough knowledge of: pathology, vascular anatomy, technical use of devices, clinical care pathways, and all relevant components of pre-, intra-, and postprocedural patient care.
Agreement 100%.

Competence in endoscopic procedures is achieved by developing a set of cognitive, technical, and integrative skills that allow the endoscopist to deliver an efficient and safe endoscopic procedure [1]. Developing the necessary cognitive skills is logically the first step in training and this presupposes a sound preclinical foundation, thorough knowledge of the etiology and pathophysiology behind UGIB, and an understanding of the relevant anatomy and vascular supply to guide therapy. Correct management of UGIB starts prior to the endoscopic procedure and extends well beyond technical success of endoscopic hemostasis. The trainee must have appropriate knowledge of the following:

- **preprocedure steps:** triage and use of risk stratification scores assessing bleeding severity and prognosis, potential etiologies and empiric pharmacological treatments, hemodynamic resuscitation and transfusion algorithms, antithrombotic management, indications and contraindications for endoscopy, timing of endoscopy, and choice of sedation or need for endotracheal intubation
- **intraprocedure care:** recognition and management of underlying pathology, appropriate selection of available endoscopes (e. g. dual-channel gastroscope) and devices, correct set-up of the electrosurgical unit for thermal therapies, treatment strategies and combinations of hemostatic methods, confirmation of successful initial hemostasis or identification of persistent bleeding, and alternatives to endoscopic treatment
- **postprocedure care:** situations requiring further pharmacological/medical therapies or investigations, assessment of recurrent bleeding risk, antithrombotic reintroduction, need for endoscopic reintervention or referral, and salvage measures for recurrent bleeding.

These issues have been comprehensively discussed in recent guidelines that trainees should use as reference [3, 4, 5, 6], according to local and national policies. Trainees should be familiar with a minimum set of commonly recommended classification systems to increase consistency in reporting and postprocedure management [8, 9, 10, 11, 12, 13, 14] (▶ **Table 1**).

1.2 Technical

STATEMENT 2
Preadoption technical skills required for training in the management of UGIB include adequate scope handling, intubation technique, washing and suctioning of residue, mucosal examination, and handling of accessories.
Agreement 100%.

STATEMENT 3
Preadoption technical skills required for training in the management of UGIB should be assessed individually based on a competency framework and not solely on numerical thresholds.
Agreement 100%.

There is little direct evidence regarding the technical competence needed in order to start training in endoscopic hemostasis and international guidelines do not address this issue. Although a predefined level of manual dexterity is not formally required, adequate scope maneuvering capabilities are obviously needed for safe and effective training. Before attempting treatment of an upper GI bleed, a trainee should be able to:

- properly position themselves relative to the patient and equipment in an ergonomic fashion
- easily intubate the esophagus, stomach, and duodenum
- steer the endoscope in a systematic, voluntary fashion
- reach any area of the mucosa through conscious movements, including proper torquing and retroflexion

▶ **Table 1** Minimum set of recommended risk scores and classification systems that a trainee should be familiar with when starting training in the management of upper gastrointestinal bleeding.

Classification/scoring system	Input	Stage	Utility	Reference
Bleeding severity index	Clinical	Preprocedure	Grading of blood loss based on patient presentation Stratifies need for blood products and resuscitation	[8]
Glasgow–Blatchford score	Clinical and biological	Preprocedure	Highest accuracy in identifying low risk patients Evaluates need for in-hospital intervention and risk of death	[9]
Forrest classification	Endoscopic	Intraprocedure	Describes endoscopic stigmata of peptic ulcer bleeding Guides the need for endoscopic hemostasis therapy by predicting risk of ongoing and/or recurrent bleeding	[10]
Baveno classification	Endoscopic	Intraprocedure	Describes esophageal varices (size: small/medium/large; + /- red wale markings) Identifies risk of bleeding and guides the need for treatment	[11]
Sarin classification	Endoscopic	Intraprocedure	Describes location of gastric varices	[12]
CHA_2DS_2-VA score	Clinical and biological	Postprocedure	Estimates thrombotic risk for patients with atrial fibrillation Used to aid clinical judgement in restarting anticoagulants	[13]
HAS-BLED score	Clinical and biological	Postprocedure	Estimates risk of major bleeding in patients with atrial fibrillation Used to aid clinical judgement in restarting anticoagulants	[14]

- maintain good tip control to completely examine the mucosa, properly target the treatment site, and align with the lesion
- control lumen distension through adequate insufflation and desufflation
- efficiently wash off liquids, debris, and bubbles (either by waterjet pump or syringe)
- insert and remove accessories through the working channel(s)
- perform complex synchronous movements (e. g. simultaneously use the foot pedal for continuous washing, control lumen distension, and handle the endoscope and any accessories, such as the wheel of the ligation device or injection needle)
- consider selective use of a side-viewing scope for a lesion in the second part of the duodenum where appropriate.

We propose that trainees should be exposed to devices used in hemostasis soon after starting scope orientation to quickly develop proper handling skills. In more advanced techniques, it is recommended to start by observing and then acting the part of the nurse/assistant in order to learn both technical and integrative aspects of using various tools, before leading a procedure as the main operator. We believe that all endoscopists should have thorough knowledge of all technical details and roles involved in correct handling of accessories that can only be gained through experiencing the tactile sensation of how devices function, repeating “dry runs” of procedural steps, and dealing with potential device malfunctions.

As competence is increasingly recognized as being a dynamic and individualized process, rather than being based merely on a fixed number of procedures, the decision to start training in the management of UGIB should be guided by an individualized assessment conducted by the trainer.

1.3 Integrative

STATEMENT 4

The integrative skills required for the management of UGIB do not essentially differ from those needed in other endoscopic procedures and should include adequate situational awareness, collaboration, team leadership, and patient communication in order to ensure short- and long-term goals are achieved.

Agreement 100%.

STATEMENT 5
The trainee should reach minimum recommended standards for key performance indicators in upper GI endoscopy before starting training in the management of UGIB.
Agreement 100%.

Although recognized as essential components of competency in basic endoscopy [1,2], there is scarce evidence on how to develop the required integrative skills. It is reasonable to assume that training in endoscopic hemostasis presupposes similar integrative skills needed for any endoscopic procedure and should include situational awareness [3], leadership, communication, and collaboration to ensure optimal patient outcomes in the short- and long-term.

UGIB represents a stressful scenario for training both in and outside the endoscopy suite and structured approaches to management are advisable. Sonnenberg et al. [15] stressed that the large number of factors involved in achieving the goal of hemostasis render each individual influence less relevant owing to the availability of alternatives and second chances, while influences causally closest to the ultimate goal (i.e. stable cardiopulmonary status linked to survival) should demand most of the endoscopist's attention. Indeed, the need for adequate preprocedural preparation (including context-specific hemodynamic resuscitation and prokinetics for gastric emptying) has been emphasized in the literature [5], and requires optimal collaboration with connecting specialties such as anesthesiology.

Available pre-endoscopic risk stratification scores aid the endoscopist to assess risk and initiate management pathways, but ultimately the severity and difficulty of treating an upper GI bleed becomes obvious intraprocedurally. Therefore, the endoscopist should prove adaptable, able to quickly adjust therapeutic options and guide the endoscopic team in a timely and efficient manner. Ongoing bleeding and difficult-to-treat causes may benefit from superior expertise, nonendoscopic approaches, or unavailable devices, so recognizing one's limits and establishing decision-making algorithms for stopping the procedure or referring the patient for nonendoscopic therapy may improve outcomes.

Generally, endoscopists tend to focus on the technical success of the procedure, but the known risk for recurrent bleeding of some lesions and the need for postprocedural management (i.e. second-look endoscopy, redo biopsy, eradication of *Helicobacter pylori*, or adjustment of antithrombotics) make standardized follow-up and adequate patient communication essential for good practice. The endoscopy team must also be mindful of the contamination risk in active UGIB and adopt proper positioning and safety measures periprocedurally (e.g. face shields, appropriate gowning [16]).

Finally, ESGE has proposed key performance indicators (KPIs) for any upper GI endoscopy at a service and individual level [17]. We consider that a trainee must reach the recommended minimum standard in the following key domains, outlined in that document, before starting training in the management of UGIB: documentation of procedure duration and completeness (minimum standard >90%), accurate photodocumentation (minimum standard >90%), identification of pathology (minimum standard >90%), and use of standardized terminology (minimum standard >95%).

2 Structure of training

2.1 Steps to acquire competence

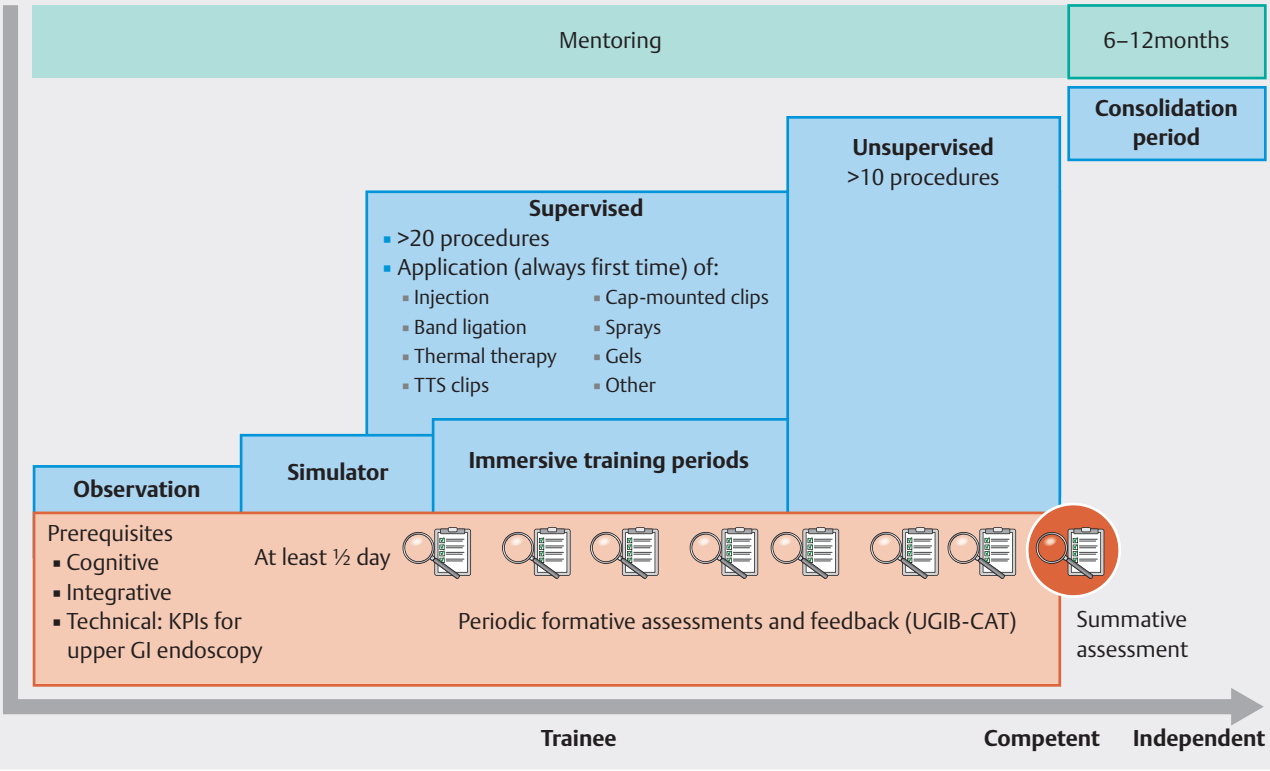
STATEMENT 6
Attendance of at least one half-day training session on a dedicated simulator that provides GI bleeding training at the beginning of training for management of UGIB is advised.
Agreement 100%.

An overview of the steps involved in acquiring and maintaining competence is provided in ▶ **Fig. 1**.

SBT in endoscopy has become more widely available and there is increasing evidence that it confers added, albeit limited, benefit that is transferrable to clinical practice [18]. Broadly, there are four types of simulators: (1) mechanical simulators, (2) live animal models, (3) ex vivo models, and (4) virtual reality (VR) computer simulators. In general, the comparative studies available have focused on ex vivo animal models and no VR simulator was specifically investigated for endoscopic hemostasis.

Most studies on the impact of SBT in endoscopic hemostasis have primarily assessed the improvement in trainees' skills before and after using the simulator. Camus et al. described a live porcine model of bleeding ulcers that was demonstrated to be realistic, reproducible, feasible, time-efficient, and easy to perform [19]. It was favorably assessed as a model for training in endoscopic treatment of bleeding ulcers; however, the use of live porcine models raises ethical and cost issues, with availability limited by the need for a dedicated animal facility. More recently, tissue-free models have been assessed [20,21,22], but these evaluations focused on realism and the suitability for endoscopic hemostasis training, not on proving clinically transferable benefit. In vivo or tissue-free models do offer the benefit of accessible, intensive hands-on courses for fast endoscopic skills training.

The Erlangen Active Simulator for Interventional Endoscopy (EASIE; Erlangen Endo Trainer or Compact EASIE model) has demonstrated a positive effect for SBT for endoscopic hemostasis in improving trainee skills in several randomized controlled trials [23,24,25,26,27,28]. These ex vivo simulators are equipped with prepared pig-organ packages consisting of esophagus, stomach, and duodenum, including artificially sewn-in vessels, polyps, and varices. A blood surrogate is perfused with a roller pump connected to the sewn-in vessels allowing training for several hemostatic techniques (hemoclipping, injection, ligation, coagulation therapy, argon plasma coagulation). In a single-blind, randomized controlled trial, including 28 participants, one half-day of hands-on skills train-



▶ **Fig. 1** An overview of the steps involved in acquiring and maintaining competence.
GI, gastrointestinal; KPI, key performance indicator; TTS, through the scope; UGIB-CAT, upper GI bleeding competence assessment tool.

ing significantly improved performance in nonvariceal bleeding [23], while long-term training in endoscopic hemostasis using the compact EASIE (three workshops in 7 months) showed improved skills compared with a solely clinical education [24].

Scenario-based simulation [28] and lectures can be added to intensive hands-on training [23, 29, 30] and this may increase overall benefit. As is the case for all SBT, proper feedback and debriefing is mandatory for optimal skill acquisition. Ideally, trainees should be exposed to SBT early in their training in the management of UGIB as familiarity with a bleeding scenario might decrease operator anxiety and increase patient safety when compared with the traditional "straight to the patient" learning.

STATEMENT 7
Trainees should be supervised directly and carefully during UGIB training for a minimum of 20 procedures with endoscopic stigmata of recent hemorrhage in order to prevent failure of hemostasis and ensure adequate trainee skill acquisition.
Agreement 95%.

There are no studies comparing supervised with unsupervised procedures during hemostasis training in UGIB, but unsupervised training in UGIB is highly inadvisable owing to the high risk of failure or adverse events. The "see one, do one, teach one" paradigm is obsolete and there is some indirect evidence regarding the impact of experience on achieving hemostasis, which can be used as guidance [31].

In a recent single-center retrospective study, including 787 gastroscopies with signs of recent hemorrhage, Allo et al. created a learning curve for hemostasis by plotting the number of previously performed gastroscopies with endoscopic stigmata of recent hemorrhage against the treatment failure rate defined as failed hemostasis, recurrent bleeding, and necessity for surgical or radiological intervention [31]. The learning curve showed that endoscopists who had performed fewer than 10 emergency GI bleed procedures had higher hemostasis failure rates compared with endoscopists with >51 emergency gastroscopies (39% vs. 25%; $P = 0.04$). The learning curve showed a marked decline in hemostasis treatment failure rates after nine procedures and was followed by a plateau between 20 and 50 procedures.

These data suggest that direct supervision during a trainee's first 20 cases may prevent avoidable failure of initial hemostasis. Owing to the variety in the complexity of cases and hemostatic modalities, it is unlikely that such a low number of procedures is sufficient to ensure proficiency in all hemostatic techniques, but some trainees may be required to perform urgent

endoscopy without the trainer present (e. g. during late shifts) and direct supervision may not be required in all instances. However, because the risk of hemostatic failure is higher for less experienced endoscopists, we strongly advise against unsupervised procedures being carried out early on the learning curve. Furthermore, any introduction of a new hemostatic technique should be closely supervised to ensure correct use of devices that might otherwise lead to preventable adverse events (i. e. by aggravating a bleed or causing perforation during thermal therapy).

Trainers should make all attempts to expose trainees to progressively more difficult cases during their training, despite the lack of a universally accepted definition of what constitutes a "difficult" case of UGIB. In order to structure the progress and match cases to a trainee's level of experience, the trainer should take into account various factors such as clinical context, severity of bleeding, and the risk of adverse outcome should hemostasis be unsuccessful, as well as any inherent risk factors for technical failure (▶ **Table 2**).

STATEMENT 8
Trainers should take into account pre-endoscopic and intraprocedural factors predicting outcome, technical complexity, and risk of hemostatic failure when deciding appropriateness and degree of trainee involvement in case management.
Agreement 100%.

Despite their lack of validation in the context of training in the management of UGIB, it seems reasonable to use established predictors of poor outcome to stratify and select cases by anticipating complexity and deciding on the degree of trainee involvement. For instance, the pre-endoscopic Glasgow–Blatchford score (GBS) is superior to other risk scores for predicting the need for endoscopic therapy, recurrent bleeding, and death, and could be used to select cases for training [32, 33].

In suspected esophagogastric variceal hemorrhage, various pre-endoscopic predictors of poor outcome that can aid in case selection include: liver disease severity, as measured by the Child–Pugh score and the MELD score [3, 4]; the presence of hypovolemic shock; portal vein thrombosis; or history of previous esophageal band ligation [34, 35]. Active bleeding observed during endoscopy, despite the use of vasoactive agents, increases complexity and risk, and is used in addition to the Child–Pugh score to identify potential candidates for a preemptive transjugular intrahepatic portosystemic shunt (TIPS), because of the increased risk of recurrent esophageal variceal bleeding and death [3, 36].

In a case of peptic ulcer bleeding, several endoscopic risk factors for recurrent bleeding and primary failure of endoscopic therapy have been described: active bleeding, large ulcer size (>2 cm), location of the ulcer in the posterior wall of the duodenum or in the high lesser curvature of the stomach, and large visible vessel (>2 mm) [37]. The difficulty of treating proximal body gastric ulcers, as compared with ulcers in the antrum, has been assessed in a simulator study, which concluded that trainees' hemostatic success rate was significantly lower in the former, even after feedback and instruction [20]. An ulcer size of more than 2 cm, location in a high risk area (such as one supplied by the gastroduodenal or left gastric arteries) or with difficult endoscopic access (posterior duodenal wall), presence of a large culprit vessel >2 mm, or an excavated or fibrotic ulcer have been proposed as predictors for failed conventional hemostasis in actively bleeding ulcers and are therefore particularly suited to more advanced and less widely available endoscopic therapy [4, 5, 38, 39]. Such cases seem appropriate

▶ **Table 2** Potential aids for trainers in matching cases of upper gastrointestinal bleeding to trainee experience level.

Domain	Factor	Setting	Rationale
Severity of bleed	▪ Hemodynamic instability despite ongoing fluid resuscitation ▪ Ongoing hematemesis	Pre-endoscopic	Brisk bleeding that requires urgent and expedited treatment
Risk factors for poor outcome	▪ Persistent bleeding after initial hemostatic attempt ▪ Recurrent bleeding ▪ Severe co-morbidities ▪ History of EVBL ▪ High GBS (>8) ▪ High Child–Pugh or MELD score (for EGVH)	Pre-endoscopic	High risk scenarios predicting higher technical difficulty and/or severe outcomes in case of hemostatic failure or prolonged duration
Technical difficulty	▪ Active bleeding (especially Forrest Ia) ▪ Difficult location (cardia, posterior gastric wall, posterior duodenal bulb) ▪ Large or excavated fibrotic ulcer	Endoscopic	More advanced scope and instrument manipulation or hemostatic modalities (e. g. cap-mounted clip) are generally required

EGVH, esophagogastric variceal hemorrhage; EVBL, endoscopic variceal band ligation; GBS, Glasgow–Blatchford score.

for more experienced operators in the course of their training, with limited involvement of novice trainees advisable.

In the end, lacking a validated selection tool for appropriate cases for training, a trainer should use all available pre- and intraprocedural data to decide the degree of trainee involvement for each case in order to avoid compromising hemostasis [40], while maximizing teaching opportunities.

STATEMENT 9

During their training, trainees should be exposed to all hemostatic modalities, as per ESGE guideline recommendations, and the opportunities for teaching arising from the specifics of each UGIB case.
Agreement 95%.

There are no data on the sequential learning of endoscopic hemostasis techniques. In real-world practice, a trainee's exposure to different hemostasis modalities is dependent on the particularities of individual cases, availability of instruments, and local guidelines or trainer preference. Nevertheless, the ESGE guidelines offer evidence-based guidance arguing that familiarity with all modalities is recommended in order to effectively treat variceal and nonvariceal UGIB [3,4]. While techniques such as cap-mounted clips or topical agents may not be as widely accessible as band ligators or through-the-scope (TTS) clips, they might actually be easier to learn from a technical standpoint. For instance, treatment of a fibrotic ulcer with adrenaline injection or TTS clips or thermal probes might require significantly more experience and scope control than placing a cap-mounted clip or applying a topical agent. Therefore, prescribing a particular sequence in which a trainee should be exposed to hemostatic equipment and technique is of little practical use, whereas a trainer's choice to teach hemostatic modalities as opportunities arise and according to guideline recommendations is more likely to yield good skills acquisition.

Familiarity with injection and TTS clips should be acquired by all endoscopists early during training and can be easily achieved in an elective setting such as mucosectomy procedures. This allows the trainee to grow comfortable with using hemostatic devices, develop correct injection technique (priming the catheter, identifying the angle of approach, control of targeting, and use of a stabbing motion to penetrate to the desired layer, etc.) and clip application in a low risk scenario, before being introduced gradually to the emergency setting of active bleeding. Similarly, for esophageal variceal band ligation, we recommend that the trainee starts with prophylactic banding for variceal eradication, before moving up to treatment of actively bleeding varices.

The choice of technique or sequence of treatment modalities is highly operator dependent, so it is unlikely that uniform recommendations for gradual introduction of techniques will become available. Use of newer, less available, more expensive, or second-line techniques, such as coagulation forceps, esophageal stenting, cap-mounted clips, and hemostatic powders or gels, is generally at the discretion of the trainer and subject to local availability.

STATEMENT 10

Trainers should use "successful hemostasis," defined as the absence of any further bleeding (persistent or recurrent bleeding), as the ultimate goal of training in the endoscopic management of UGIB.
Agreement 89%.

Achieving complete and long-lasting hemostasis is the aim of endoscopic intervention in managing UGIB and should be the goal of training. From a teaching and learning perspective, it is important to acknowledge that failure to achieve hemostasis can be the result of lesion characteristics (i.e. the bleeding could not have been stopped by an expert in spite of an adequate hemostatic strategy), as well as technical inability (i.e. the trainee has insufficient skills to control the bleeding). Therefore, it is incumbent on trainers to observe, guide, and take over the procedure at their discretion to optimize patient outcome and then provide feedback and structured discussion for each case.

Failed hemostasis may be obvious during the index procedure or become manifest during follow-up through clinical and laboratory signs indicative of recurrent bleeding (i.e. recurrent hematemesis or bloody nasogastric aspirate after index endoscopy; recurrent tachycardia or hypotension after achieving hemodynamic stability; melena and/or hematochezia following normalization of stool color; or a reduction in hemoglobin ≥2 g/dL after a stable hemoglobin value has been attained [4,5,41,42]). Previous ESGE guidelines have defined "persistent bleeding" as ongoing active bleeding refractory to standard hemostasis modalities and "recurrent bleeding" as bleeding following initial successful endoscopic hemostasis [4]. The inability to control bleeding at the end of the index endoscopy [4,5] is also referred to as "failed primary endoscopic hemostasis" and necessitates immediate further management, such as salvage endoscopic modalities (e.g. cap-mounted clip, topical hemostasis powder/gel) or referral to interventional radiology or surgery. On the other hand, recurrent bleeding may be due to inadequate postprocedure management (e.g. in the prescription of proton pump inhibitors or reintroduction of antithrombotics) and may still be amenable to standard hemostatic modalities, and not as technically difficult to treat as persistent bleeding.

Therefore, we suggest using the term "successful hemostasis" to define the goal of training in the endoscopic management of UGIB. In this setting, the term encompasses optimal postprocedure care, aimed ultimately at achieving clinically relevant outcomes such as survival, while recognizing that recurrent bleeding does not necessarily imply inadequate treatment.

STATEMENT 11
Patients with recurrent bleeding should be treated by experienced endoscopists or by a trainee under their direct supervision owing to the higher risk of failure of conventional endoscopic treatment.
Agreement 100%.

Despite primary hemostasis and adherence to best practices in the postendoscopy management of UGIB, recurrent bleeding is not completely avoidable in all cases. To the authors' knowledge, there are no studies describing the outcome of patients with recurrent bleeding treated by trainees in GI endoscopy. Overall, 13% of patients with UGIB develop recurrent bleeding, with the highest rates occurring in patients with peptic ulcer bleeding, varices, and malignancy [43]. A national cohort study of 19 537 patients found that recurrent bleeding from peptic ulceration was associated with a two-fold increase in 30-day mortality and that endoscopic hemostasis was successful in only 78% of patients [44]. Moreover, in cases with recurrent bleeding, the technical difficulty of the procedure may be increased because of previous attempts (e. g. the need to maneuver alongside or remove previously placed clips) and there is a higher likelihood of requiring more advanced endoscopic modalities. Proceeding to temporary esophageal stenting [45] or first-line use of a cap-mounted clip [46] may be needed in a case of uncontrolled esophageal variceal bleeding and these techniques could be beyond the ability of a novice, thereby justifying careful supervision or extremely judicious and limited involvement of novice trainees.

2.2 Prerequisites for training modules, trainers, and training centers

STATEMENT 12
Trainers who are teaching management of UGIB should fulfil the same standards as any trainer of basic endoscopy procedures.
Agreement 89%.

Endoscopic hemostasis is considered a basic endoscopic procedure [1] and should have been mastered by any trainer attempting to teach endoscopy. As in all fields, experience or expertise in managing UGIB does not by itself confer credentialing to the potential trainer. Ideally, trainees should learn how to manage UGIB from trainers who themselves have accumulated significant experience with all relevant care pathways and hemostatic treatment modalities. Dedicated "train the trainers" programs are increasingly available and have been proven to benefit both trainers and their trainees in colonoscopy and other contexts [47], but there is currently no such specific intervention for training in the management of UGIB.

ESGE recommends that trainers for basic endoscopy should be formally trained and credentialed whenever possible or perform a procedure at a technical success rate of over 95% [1, 48]. At the very least, trainers should develop "conscious competence" and be familiar with the general principles of quality training – deconstruction of technique, stepwise approach, the importance of explicit adoption of context-specific goals, debriefing, and feedback [49] – as well as possessing adequate communication and leadership skills. This is especially important in training during urgent, stressful situations such as active UGIB, when a novice endoscopist may experience distress due to cognitive overload, which arises from the need for intense concentration, proprioceptive stimuli from the gastroscope and hemostatic devices, visual input from the endoscopic view, verbal cues from the nursing staff and anesthesiologist, and verbal direction from the trainer.

Owing to the unpredictability of UGIB case volumes in some centers, trainers should be aware of and supervise SBT whenever available and try to match cases to trainees in order to maximize exposure.

ESGE encourages all endoscopy units offering training in the management of UGIB to use the following as guidance for desirable standards.

- (i) Written and/or electronic preprocedure pathways should exist to facilitate the assessment of patients with comorbidities prior to urgent upper GI endoscopy.
- (ii) Written local preprocedure pathways should exist to direct the correct dosing of antithrombotics for patients prior to urgent upper GI endoscopy based on consensus guidelines.
- (iii) Units should have anesthesiology assistance and a transfer pathway in place to manage selected cases of UGIB.
- (iv) All necessary equipment and medication (for anesthesiology and endoscopy) should be available onsite. Equipment checklists should be available and routinely used within the unit to ensure this is the case.
- (v) An institutional policy of managing "out of hours" bleeding and 24/7 on-call availability should be in accordance with current guidelines on timing of endoscopy.
- (vi) Minimum targets for endoscopy service performance measures [50] should be met.
- (viii) There should be onsite access to multidisciplinary care (surgery, interventional radiology) in the event of persistent bleeding, or a structured pathway should exist for patient transfer.
- (ix) Access to SBT for novice endoscopists either onsite or offsite should be encouraged.

STATEMENT 13
Trainees should be exposed to multidisciplinary team discussions and care pathways for failed endoscopic treatment of UGIB.
Agreement 100%.

Despite advances in endoscopic therapy, the risk of recurrent bleeding after initial endoscopic hemostasis remains non-negligible and may require alternative salvage treatment [51]. Current guidelines recommend urgent referral to interventional radiology or surgery for persistent bleeding or recurrent bleeding not controlled by endoscopy [3,4]; this is a vital part of patient care that trainees should learn early on.

A retrospective study of 422 patients admitted for GI bleeding showed earlier intervention, fewer transfusions, decreased length of hospital stay, and fewer readmissions for recurrent bleeding after implementation of a dedicated multidisciplinary team (MDT) protocol [52]. Another retrospective cohort study compared cirrhotic patients with UGIB receiving traditional care with those receiving MDT care in the same hospital [53]. Even though patients in the MDT group showed higher Child–Pugh and MELD scores, this study showed MDT to be a protective factor for recurrent bleeding (37.6% vs. 20.0%; $P = 0.02$) and mortality (35.6% vs. 19.0%; $P = 0.01$) within 1 year. Furthermore, these patients showed less depression and had a better quality of life compared with those in the traditional group.

Trainees should understand the indications for referral, preparatory steps (such as clipping prior to radiology), and implications of salvage modalities for further management, as these can impact patient outcomes. Furthermore, liaising with connecting specialties in MDT meetings or consultations is part of developing the necessary integrative skills in trainees.

STATEMENT 14

Training centers with limited UGIB case volumes are encouraged to offer short-term immersive training in centers with high volume caseloads of UGIB in order to ensure sufficient exposure for trainees.

Agreement 95%.

Opportunities for training in UGIB are fewer outside of high volume emergency hospitals. Endoscopists working in nonacademic or nonemergency settings also often lack access to other specialties and care pathways. Surveys reveal that doctors in rural areas may feel the need for further training in endoscopic procedures, particularly in the management of UGIB [54,55]. In the UK, the first national gastroenterology trainee survey regarding UGIB training was conducted in 2020, with a total of 181 questionnaires collected. Overall, nearly 90% of trainers aimed for additional hemostasis training, with 82% supporting the role of a national standardized course and certification [56].

In the UK, the concept of immersive training during residency with 4-week training blocks focused on endoscopy has been introduced recently with positive feedback [57]. While no comparative data exist so far, dedicated short-time training in high volume centers could be a solution to increase exposure to cases of UGIB for trainees from non-high volume centers, enabling them to reach recommended numeric thresholds for competence evaluation, but it is logistically difficult and dependent upon national and local regulations.

3 Autonomous implementation and assessment of proficiency

STATEMENT 15

Competency in managing UGIB is defined as the ability to assess the need for endoscopy, and plan and carry out successful hemostasis.

Agreement 95%.

Competence is the minimum level of skill, knowledge, and/or expertise derived through training and experience required to perform a task safely and proficiently [58]. Currently, there are no universal KPIs for managing UGIB according to an established multistep quality initiative process for methodology [59]. In this document, we have defined successful hemostasis as the standard goal for managing UGIB because it demonstrates proper use of skills beyond the endoscopic procedure itself and is the most relevant patient outcome. Therefore, we believe competence in managing UGIB should be evaluated by examining the steps integral to obtaining successful hemostasis in different cases. Owing to the variety of these clinical scenarios and wide range and availability of hemostasis modalities and techniques, we consider that extensive practice in all hemostatic modalities may not be required or feasible for all endoscopists to establish competence.

As a minimum, competence in managing UGIB presupposes experience with injection therapy, TTS clips, thermal therapy, and band ligation, whereas experience in using topical agents or cap-mounted clips is encouraged but not mandatory. There is increasing evidence that cap-mounted clips [60] and topical agents may increase the likelihood of initial successful hemostasis and ESGE suggests that these modalities should be considered in persistent bleeding refractory to standard therapies [4]. ESGE also suggests cap-mounted clips should be considered as first-line therapy in selected cases of bleeding: Forrest Ia/Ib ulcers (i.e. ulcer size >2 cm, large visible vessel >2 mm, high vascular area, or excavated/fibrotic milieu) [4]. However, these are weak recommendations with a low quality of evidence for training situations in which supervision is initially advisable. Furthermore, these modalities are still less widely available than conventional hemostatic devices. Therefore, we encourage endoscopists to develop competence in using these devices during formal training whenever possible, but we do not consider them mandatory for establishing competence in managing UGIB at this moment.

As a rule, we recommend that endoscopists use equipment they are comfortable with, and for which adequate training has been achieved. In addition, knowledge of the total available armamentarium, including complementary modalities, such as interventional radiology and surgery, is mandatory to ensure optimal outcomes for more difficult/complex scenarios. Keeping up to date with advances in hemostatic techniques is part of achieving competence in the field. For instance, recent evidence promises a greater recourse to advanced endoscopy or

interventional radiology for treating gastric varices, either through endoscopic ultrasound (EUS)-guided coiling/glue injection [61], or by TIPS, variceal embolization, or retrograde transvenous obliteration [62].

STATEMENT 16
Trainees should manage an indicative number of 30 cases in which successful hemostasis is achieved before evaluation of competence in management of UGIB.
Agreement 95%.

Procedure volume has been consistently incorporated in training programs of various basic and advanced endoscopic procedures (e.g. endoscopic retrograde cholangiopancreatography [ERCP], EUS) and used as a surrogate marker of competence owing to its intuitive relationship with physician experience and patient outcome [63,64]. However, in competence-based training, numeric thresholds are more useful to determine when evaluation for competence should be considered rather than to establish a cutoff for credentialing [65].

Two studies have investigated the requisite number of procedures needed for competence in hemostasis. A prospective single-center study from a large referral center in Milan compared two groups of endoscopists who managed nonvariceal UGIB: a less experienced group (40–70 emergency procedures) and a more experienced group (>100 emergency procedures) [66]. Initial endoscopic hemostasis was achieved in 268/272 patients (98.5%), but the multivariate analysis showed higher rates of recurrent bleeding (odds ratio [OR] 4.5, 95%CI 2.1–9.5) and the need for transfusion of more than 3 blood units (OR 6.9, 95%CI 2.8–17.0) when less experienced endoscopists were involved [66].

The European Section and Board of Gastroenterology (ESBGH) recommends that trainees should carry out 30 procedures for UGIB before being assessed for competence [67]; however, exposure to cases of UGIB and education remain suboptimal, and may in fact be declining [68]. It has been reported that not all fellows can reach the numbers suggested as the threshold for competence during their standard training. In a recent survey from the UK, only 60% of final year gastroenterology trainees expressed confidence in managing acute UGIB, and 82% desired additional training [56]. Most trainees reported a serious lack of exposure to hemostatic procedures, while 18.6% of certified gastroenterologists acknowledged total lack of exposure to any type of endotherapy. A European survey of 144 trainees from 16 European countries who were undergoing their final year or had just finished their training reported that half of the participants had performed <30 hemostasis procedures for UGIB [69].

Because there is no direct evidence regarding threshold numbers for competence evaluation in managing UGIB and there is an unmet need for increased exposure to cases during basic endoscopy training, ESGE suggests that a minimum of 30 procedures in cases with stigmata of recent hemorrhage are required before considering evaluation of competence. It is understood that this cutoff may not guarantee that necessary skills in all hemostasis modalities have been gained, as endoscopists neither learn at the same speed nor participate in procedures of similar difficulty level. To ensure competence of this basic endoscopic skill, ESGE encourages further study of learning curves, increased access to UGIB cases during training (e.g. through protected periods of immersion training or daily "protected UGIB slots"), and the establishment of relevant KPIs for training.

STATEMENT 17
UGIB-CAT is advised as a formative assessment tool during training to track acquisition of competence and provide trainee feedback.
Agreement 95%.

STATEMENT 18
Trainees should undergo a formal summative assessment of competence in managing UGIB during their training.
Agreement 100%.

Ideally, assessment of competence takes place during (formative assessment) and at the end (summative assessment) of training and is facilitated by a formal validated tool or structured framework that allows the trainer or proctor to evaluate the components of competence and provide feedback. With evidence supporting their reliability, a number of validated assessment tools for supervised learning events are currently recommended for endoscopic procedures (e.g. Direct Observation of Procedural Skills [DOPS] for diagnostic gastroscopy, colonoscopy and polypectomy, and the EUS and ERCP Skills Assessment Tool [TEESAT]) [70,71,72,73].

A modified version of the DOPS specifically addressing the aspects of therapeutic endoscopic management related to UGIB (UGIB-DOPS) has been developed to improve training and allow evaluation of competency [74]. The form contains a checklist to systematically grade the level of supervision required in addressing all aspects of managing UGIB (preprocedure, intubation, lesion assessment, management of bleeding, postendoscopic management, and nontechnical skills), and teaching objectives for future procedures. We consider that the UGIB-DOPS can be used as a tool in structured formative assessment and may aid in summative assessment, but evidence supporting its role remains scant and validation in prospective studies is needed.

To address the lack of a dedicated competency assessment tool for UGIB, we have developed the UGIB-CAT (UGIB competency assessment tool; ▶ **Table 3**, shown in full in **Appendix 3s**) as part of an established strategy of the ESGE to offer structured assessment of endoscopist competency. The UGIB-CAT translates ESGE guidelines into practical assessment frame-

▶ **Table 3** ESGE competence assessment tool for upper gastrointestinal bleeding (UGIB), both variceal and nonvariceal.

Upper gastrointestinal bleeding: Competence Assessment Tool		
Domains	Nonvariceal UGIB (17 statements): ▪ Premanagement ▪ Field control ▪ Hemostasis ▪ Follow-up Variceal UGIB (21 statements): ▪ Premanagement ▪ Field control ▪ Endoscopic band ligation ▪ Gastric varices ▪ Rescue and TIPS ▪ Follow-up	Each procedural domain is organized in competency statements across three dimensions reflecting the required cognitive, technical, and integrative skills Each competency statement is evaluable though video-based and/or live assessment of the trainee
Scale	5-point Likert scale: ▪ 5, very good ▪ 4, good ▪ 3, adequate ▪ 2, poor ▪ 1, very poor	▪ Minimum standard (score 3, satisfactory): baseline competency expected for safe independent practice under indirect supervision ▪ Excellence (score 5, very good): expert-level performance demonstrating efficiency, anticipation of complications, and optimal technique ▪ Deficiency (score 1–2, poor/very poor): performance requiring intervention or representing patient safety concerns
Score	Overall competency is expressed as: ▪ Percentage score: (raw score/maximum score) ×100 – raw score = sum of individual statement scores – maximum possible score = 85 (nonvariceal), 105 (variceal)	▪ ≥85%: readiness for indirect supervision (independent practice with senior backup) ▪ 70%–84%: competent with targeted coaching needs ▪ 50%–69%: developing competency requiring direct supervision ▪ <50%: Fundamental deficiencies requiring structured remediation

TIPS, transjugular intrahepatic portosystemic shunt.

works for both nonvariceal and variceal hemorrhage and offers a practical score for training situations with the advantage of predefined performance thresholds: ≥85%, readiness for indirect supervision (independent practice with senior backup); 70%–84%, competent with targeted coaching needs; 50%–69%, developing competency, requiring direct supervision; <50%, fundamental deficiencies requiring structured remediation. Owing to the varying difficulties of cases, trainees should be assessed across a spectrum of difficulty levels before summative competency determination. The UGIB-CAT is intended to undergo validation testing, periodic updating according to guideline changes, and integration into a digital-learning management platform (e. g. the ESGE Academy).

Management of UGIB is among the basic skills a trainee needs to master at the end of training and is explicitly included in the national training curricula of endoscopy in most countries. There is a recognized unmet need for exposure to UGIB cases during GI/endoscopy training [56, 68, 69], which may lead to suboptimal training and patient outcomes. Therefore, ESGE recommends that national programs include a formal summative assessment of managing UGIB to gauge competency in the management of UGIB.

STATEMENT 19

Endoscopists should continue a period of tracking results and mentored practice with an experienced colleague for at least 6 months after achieving competence in managing UGIB.

Agreement 89%.

Reaching the minimum standards of competence at the end of training is not the end of the learning process, but rather a checkpoint at which independent practice can start. As mentioned above, many endoscopists are not confident in their hemostasis skills at the end of formal training and opportunities for further training and regular exposure to cases of UGIB are variable. There is no evidence to support a recommendation regarding a volume of cases required per year to maintain competence in managing UGIB. Short-term immersive courses in high volume centers, simulation-based practice, and a period of mentoring may aid in consolidating or regaining competence.

ESGE strongly recommends a period of mentoring when an individual is starting out in independent practice of ERCP or EUS [75], and this is also applicable for UGIB, particularly for challenging cases. It is also advisable for newly independent endoscopists to continue tracking records of their performed cases to document that they retain acceptable endoscopic treatment success rates, as part of a regular assessment process. Although no evidence to support a recommendation as to how long the mentoring period should last is available, a period of at least 6–12 months seems reasonable.

STATEMENT 20

As trainees move to independent practice, they should have established access to or referral pathways for key supporting specialties involved in the nonendoscopic management of acute UGIB (including emergency medicine, surgery, and interventional radiology).
Agreement 95%.

Comprehensive management of UGIB is a challenging and resource-intensive task that may require involvement of multiple other healthcare professionals apart from the endoscopist. In the UGIB context, fostering cross-specialty collaboration is of paramount importance because it promotes an individualized approach to patients that is advantageous for all stakeholders [76]. Development of critical pathways may enable a standardized approach to optimal treatment practices within institutions and networks as evidence accumulates for new treatments and management strategies. For this purpose, a structured template to guide providers in communicating key information in electronic referrals is an evidence-based practice and should be implemented in all healthcare facilities involved [77].

Because UGIB may present as a rapidly evolving situation with potentially fatal outcome, any independently practicing endoscopist should have knowledge of the alternatives to endoscopic treatment for complex cases and have a structured approach to urgent interdisciplinary consultations or expedited referrals to other units. The ESGE guideline for management of esophagogastric variceal hemorrhage strongly recommends endoscopic evaluation within 12 hours and consideration of urgent rescue TIPS for persistent bleeding and pre-emptive TIPS, preferably within 24 hours, for patients at high risk of recurrent hemorrhage [3]. Transcatheter angiographic embolization should also be considered in cases of nonvariceal UGIB in patients with recurrent bleeding and after failure of a second attempt at endoscopic hemostasis, with surgery as an alternative [4]. Given its demonstrated impact on patient outcome, we consider it to be incumbent upon the endoscopist to be prepared for these situations as an integral part of maintaining competency, regardless of the setting in which they practice.

We have identified numerous gaps in the available research on how to teach, gain, and maintain competence in managing UGIB. While there have been attempts at defining quality indicators in UGIB [78], currently there are no universally accepted KPIs on which to judge quality in training and autonomous practice. ESGE encourages high quality studies to make possible the adoption of standardized, evidence-based training and credentialing in this field. As such, we consider the following questions or areas to be important for future research.

1. What is the learning curve for endoscopic hemostasis using different modalities?
2. How should appropriate cases for training according to the level of trainee experience be chosen?
3. What is the impact of short-term immersive training in managing UGIB during fellowship?
4. Which are the KPIs for managing UGIB?
5. Validation and reliability testing of assessment tools (i. e. UGIB-CAT, UGIB-DOPS).

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Contributors' Statement

Andrei Voiosu: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. Marine Camus: Data curation, Formal analysis, Investigation, Supervision, Validation, Visualization, Writing - original draft. Mostafa Ibrahim: Data curation, Formal analysis, Investigation, Supervision, Validation, Visualization, Writing - original draft. Tibor Gyökeres: Data curation, Formal analysis, Investigation, Supervision, Validation, Visualization, Writing - original draft. Ricardo Cardoso: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Takehide Fukuchi: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Krzysztof Kurek: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Vikash Lala: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Stig Borbjerg Laursen: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Alberto Murino: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Katarzyna M. Pawlak: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Keith Siau: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Eoin Slattery: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Paola Soriani: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Alberto Tringali: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Georgios Tziatzios: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Andreas Wannhoff: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - original draft. Lynn K. Debels: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - review & editing. David J Tate: Data curation, Formal analysis, Investigation, Validation, Visualization, Writing - review & editing. Tony Tham: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. Ian M Gralnek: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing.

Conflict of Interest

M. Camus receives fees from Medtronic for study involvement (2025 to present). S.B. Laursen has received fees from Medtronic for participation in a data monitoring committee (2024) and for study involvement (2025 to present). A. Murino has received speaker's fees from Fujifilm (2025), interview fees from Pentax (2026), and a collaboration fee from Applied Medical (2026). K. Pawlak has received speaker's and consultancy fees from Pentax Medical and Boston Scientific (both 2025 to present); she is a co-editor of the journal Endoscopy (2026 to present). A. Wannhoff receives lecture and consultancy fees from Boston Scientific, and lecture fees from Ovesco Endoscopy AG and Olympus (all ongoing); his department received research grants from Ovesco Endoscopy AG (until 2024) and from Boston Scientific (2025 to 2026). D.J. Tate has received consultancy fees from Fujifilm, Olympus, and Pentax (2023 to present). I.M. Gralnek has provided consultancy to Medtronic and Viatris (both 2024 to present), Olympus and Micro-Tech (both 2025 to present), and Magentiq Eye and GistMD (both 2026); he has also received research support from Medtronic (2024 to present). A. Voiosu, M. Ibrahim, T. Gyökeres, R. Cardoso, T. Fukuchi, K. Kurek, V. Lala, K. Siau, E. Slattery, P. Soriani, A. Tringali, G. Tziatzios, L.K Debels, and T. Tham declare that they have no conflict of interest.

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Supplementary material: Curriculum on management of acute upper gastrointestinal bleeding: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement

Andrei Voiosu, Marine Camus, Mostafa Ibrahim, Tibor Gyökeres, Ricardo Cardoso, Takehide Fukuchi, Krzysztof Kurek, Vikash Lala, Stig Borbjerg Laursen, Alberto Murino, Katarzyna Pawlak, Keith Siau, Eoin Slattery, Paola Soriani, Alberto Tringali, Georgios Tziatzios, Andreas Wannhoff, Lynn K. Debels, David J. Tate, Tony Tham, Ian M. Gralnek

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Appendix 1s (part a). Task force members and allocated tasks

Task force 1: **Andrei Voiosu**, Katarzyna Pawlak, Takehide Fukuchi, Andreas Wannhoff, Keith Siau, Tony Tham

Task force 2: **Marine Camus**, Ian Gralnek, Ricardo Cardoso, Stig Borbjerg Laursen

Task force 3: **Ibrahim Mostafa**, Paola Soriani, Alberto Murino, Vikash Lala, Eoin Slattery

Task force 4: **Tibor Gyökeres**, Alberto Tringali, Georgios Tziatzios, Krzysztof Kurek.

UGIB-CAT development: **Lynn K Debels, David J Tate**.

Section	**Task force** The leader responsible for each section is in bold	**Maximum length** **(**8000 words) Supplementary material is allowed	**Question** Each question does not necessarily imply a statement.	**Ideas/suggestions for discussion**
1. Introduction	TF1 (**AV**)	400 words	N/A	
2. Methods	TF1 (**AV**)	400 words	N/A	Literature review, Delphi consensus, survey

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3. Pre-adoption	TF1 (**AV**)	1000 words 5 statements max 2-3 tables This section defines skills and competence necessary prior to MUGIB	**Q1: Which are the necessary *cognitive* skills required before training?** P: Endoscopy trainees/ fellows I: Theoretical knowledge of hemostasis C: Standard training O: Safe hemostasis **Q2: Which are the necessary *technical* skills required before training?** P: Endoscopy trainees/ fellows I: Endoscopic technical skills C: Standard training O: Safe hemostasis **Q3: Which are the necessary *integrative* skills required before training?** P: Endoscopy trainees/ fellows I: Dedicated educational interventions C: Standard training O: Safe hemostasis	*Hemostasis is considered part of Basic endoscopic procedures (ESGE PS on Training in Basic Endo) and it is to be expected that few data on pre-adoption skills are available. If no evidence is found, do not use GRADE for your statements -> elaborate Good Practice Statement* - A table summarizing risk scores, mandatory diagnostic classifications, etc. *Points that can be touched upon here include: knowledge of anatomy, types of bleeding, indication for endoscopic vs non-endoscopic treatment; knowledge of ESU and equipment; timing and procedure, consent, risk scores, pre and postprocedural care (i.e. resuscitation, anticoagulants, comorbidities…). These issues have been explored in the guidelines on UGI bleeding.* *Technical skills should include a discussion based on ESGE quality performance measures for UGI endoscopy.*

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4. **Training**	TF2 (**MC**)	1,500-2,000 words Max 5 recommendations Max 2-3 tables/figures	4.1 Steps to acquire competence **Q4: Is simulator training required?** P: endoscopy trainees I: simulators C: no simulators (straight to patients) O: safe hemostasis **Q5: When is supervision mandatory?** P: patients with UGIB I: trainer supervision C: unsupervised endoscopy O: safe hemostasis **Q6: How is the difficulty of MUGIB assessed?** **-pre/intra/post procedurally** **Q7: What defines a "difficult" case of UGI bleeding?** **Q8: Should there be a sequential introduction of hemostatic techniques during training?** **Q9: How is successful hemostasis evaluated?** **Q10: Should rebleeding be treated by the trainee or the trainer?** P: patients with UGIB I: endoscopy by trainer C: endoscopy by trainee O: successful, safe hemostasis	*Little evidence-based data anticipated.* *A table contrasting "easy" vs "difficult" or levels of difficulty in UGIB situations. Assessing "difficulty" can be helpful in matching case to trainee, judging competence and performance. Are there scores similar to SMSA (EMR) which can be implemented in assessment?* *A figure showing proposed gradual approach to cases taking into account the discussion on difficulty and need for supervisor involvement can be used here.* *Since hemostasis is a Basic technique it should be taught by all trainers – refer to trainer requirements in the ESGE PS on Training in Basic endoscopic techniques.*

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	TF3 (**IM**)	1,000 words Max 4 recommendations Max 2-3 tables/figures	4.2 Prerequisites for training modules, trainers and training centers **Q11: What are the requirements for a trainer teaching MUGIB?** P:endoscopy trainers I: dedicated teaching programs (“train the trainers”, etc) C: no dedicated teaching program O: trainee competence in hemostasis **Q12: What are the minimal requirements for a center to offer training in MUGIB?** **Q13: Is access to a multidisciplinary team required when training for UGIB?** P: patients with UGIB I: access to connecting specialties C: no access to connecting specialties O: successful, safe hemostasis **Q14: How can you standardize training in hemostasis outside an Emergency hospital?**	*Access to UGIB cases is limited outside emergency hospitals. Should there be a place for dedicated “immersion” training (short 2-4 weeks) in high-volume centers? Can intra-procedural bleeds (e.g. polypectomy) offer an alternative?*

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5. **Autonomous implementation and assessment of proficiency**	TF4 (**TG**)	1,500-2,000 words Max 5 recommendations This section describes prerequisites, specific numbers and certificates to be obtained, conditions for implementing UGI bleeding independently	**Q15: How is competence in MUGIB defined? Are there KPIs?** **Q16: What is the adequate number of procedures needed before evaluation of competence or certification?** **Q17: Is standardized formative/ summative assessment of performance required?** P: endoscopy trainees I: standardized assessment C: no standardized assessment O: achievement of competence **Q18: Is there a validated tool for assessing competence in MUGIB?** **Q19: Is a volume of cases/year required to maintain competence in MUGIB?** P: practicing endoscopists I: performing above a threshold C: performing less than the threshold O: successful hemostasis **Q20: Which pathways for referral to complementary specialties should be available when practicing independently?**	*There is low likelihood of evidence for thresholds or validated KPIs.* *DOPS for upper GI bleeding is a model for formative assessment. – if data supports it, should it be endorsed? Should the task force proposal another competence assessment tool (similar to EMR – GPAT)?*
6. Conclusions	TF 1	200 words		

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Appendix 1s (part b). Literature search and task force output

Q1: Which are the necessary cognitive skills required before training

PICO

P: Trainees, Gastrointestinal bleeding OR haemostasis OR hemostasis

I: Cognitive skills

C: No cognitive skills

O: Learning curve, rebleeding, mortality, competence

Relevant Results: Nil

Provisional Recommendation:

ESGE recommends that, before commencing hands-on UGIB training, trainees should have the necessary cognitive skills relating to pre-procedural care (e.g. indication and contraindications, safe sedation, consent, resuscitative management, risk scoring, timing of endoscopy), intraprocedural care (e.g. recognition, management and understanding of UGIB lesions, knowledge of endoscopic devices) and post-procedural care (e.g. medical therapies and salvage measures for rebleeding). (Good Practice Statement)

Rationale:

Cognitive skills in endoscopy may be defined as the relevant knowledge required to deliver a competent and safe endoscopic procedure [1]. This includes knowledge underpinning pre-endoscopic care (e.g. indications and contraindications, consent, safe sedation, risk assessment, resuscitative management and timing of endoscopy), intraprocedural care (e.g. recognition, management and understanding of UGIB pathology, knowledge and appropriate selection of available scopes and devices) and post-procedural care (e.g. medical therapies, salvage measures for rebleeding, risk of rebleeding and antithrombotic management). Trainees should be aware of the evidence-based measures for optimizing UGIB management and be familiar with commonly used UGIB

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classification systems (Table 1) [2, 3]. Trainees should have good knowledge on the etiology and pathophysiology of relevant diseases that cause UGIB, in addition to understanding relevant anatomy and vascular supply to guide therapy in cases of refractory bleeding.

Classification / Scoring System	**Use**	**Rationale**
Rockall Score	Severity of UGIB	Predicts risk of haemostatic intervention, rebleeding, mortality
Blatchford Score	Severity of UGIB, Outpatient management if low risk	
Forrest Classification	Peptic Ulcers	Guides management and rebleeding risk
Modified Paquet* classification	Oesophageal varices (size)	
Sarin classification	Gastric varices (location)	

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Q2: Which are the necessary technical skills required before training?

Statements:

1. The ESGE suggest that the motor skills required for entry into MUGIB training should not be solely based on the volume of endoscopic procedures performed. Instead, the decision should be individualized and contingent upon the assessment of responsible supervisors.

2. The ESGE suggests that preadoption motor skills should include proficiency in scope handling and initial devices use, encompassing injection therapy, mechanical hemostasis, thermal therapy, and the application of topical agents.

Bibliographic search

Detail databases, search strategy, total nº of references in the initial search and final number of included/excluded studies. Please save the references included in the search.

- Databases searched: PubMed, Cochrane Library, MEDLINE
- Search strategy: Keywords used: "endoscopy training" " upper GI bleeding" "hemostasis"
- Total number of references retrieved: 461
- Included studies: 1 (only our Position Statement on Basic Endoscopy), no existing studies on pre-adoption/ pretraining motor skills for UGIBM
- Excluded studies: rest

Evidence-based discussion text

There is a notable gap in data regarding the motor competencies required to initiate training in hemostasis. Additionally, there is no conclusive evidence or established international guidelines specifying the necessary motor skills for training in endoscopic hemostasis. The recently published Position Statement for Training in Basic Gastrointestinal Endoscopic Procedures outlines the core competencies for effective training in endoscopic hemostasis management [ ]. This includes techniques such as injection therapy, mechanical hemostasis, thermal therapy, and the application of topical agents.

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Although the exact level of manual dexterity required for scope maneuvering to access the bleeding site has not been definitively established due to a lack of evidence, it is likely that this competency is essential and should be considered a prerequisite skill.

While formal training typically introduces the proper use of equipment, early exposure to devices used in upper gastrointestinal bleeding management (UGIBM) could be beneficial during the preadoption phase, facilitating more effective training and improving motor skills. This can be partially achieved through simulators, during colonoscopy with polypectomy, or through dedicated observerships.

As competence is increasingly recognized as a dynamic and individualized process, rather than merely being based on a fixed number of procedures, the decision to enter UGIBM training should be guided by an individualized assessment by supervisors. Consequently, foundational proficiency in handling endoscopic equipment, including the scope and devices for hemostasis management, should be acquired prior to the initiation of formal UGIBM training.

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Q3: Which are the necessary integrative skills required before training?

P: Endoscopy trainees/ fellows

I: Dedicated educational interventions

C: Standard training

O: Safe hemostasis

Statements:

Each statement should include the strength of the recommendation (Strong or weak) and the quality of the evidence (high, moderate, low, very-low). Start the statement using “ESGE suggests/recommends”.

When no evidence is found, do not use GRADE (no strength or recommendation). Please elaborate Good Practice Statement starting “ESGE suggests…”

1. ESGE suggests …….. (Weak recommendation)

2. ESGE recommends……. (Strong recommendation)

ESGE suggests that the integrative skills required for managing UGIB do not essentially differ from those needed in other endoscopic procedures and should include adequate situational awareness, collaboration, team leadership, and patient communication in order to ensure short and long-term goals.

Bibliographic search

Search strategy for Pubmed:

A)

1.(("skill*"[Text Word]) OR ("performance"[Text Word])) OR ("team performance"[Text Word])

2.((Education[MeSH Terms]) OR (Teaching[MeSH Terms])) OR ("training"[Text Word])

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3.(gastrointestinal hemorrhage[MeSH Terms]) OR (Hemostasis, Endoscopic[MeSH Terms])

4.((("non-technical"[Text Word]) OR ("non technical"[Text Word])) OR ("integrative"[Text Word])) OR ("NTS"[Text Word])

#1 AND #2 AND #3 AND #4: 0 results.

B) ((Gastrointestinal hemorrhage[MeSH Terms]) AND ("training"[Text Word])) AND (hemostasis, endoscopic[MeSH Terms]): 14 results. Relevant: 2.

Search strategy for Google Scholar: (skill OR performance OR team performance) AND (education OR teaching OR training) AND (gastrointestinal hemorrhage OR GI hemorrhage OR GI bleeding) AND (non technical OR integrative)

Results:

Evidence-based discussion text

Although recognized as essential components of competency in basic endoscopy [1,2], there is scare evidence on how to develop the required integrative skills. It is reasonable to assume that training in endoscopic hemostasis presupposes similar skills needed for any endoscopic procedure and should include situational awareness [3], leadership, communication and collaboration to ensure optimal patient outcome in the short and long-term.

UGI bleeding represents a stressful scenario for training both in and outside the endoscopy suite. Sonnenber et al [4] propose a model to identify the key factors ensuring successful patient goals in hemostasis based on a tree-like structure. They underline that the large number of factors involved render each individual influence less relevant due to availability of alternatives and second chances, while influences causally closest to the ultimate goal (i.e. stable cardiopulmonary status linked to survival) should demand most of the endoscopist's attention. Indeed, the need for adequate pre procedural preparation (including context specific resuscitation and gastric emptying) has been emphasized in the literature [], and it requires optimal collaboration with connecting specialties such as anesthesiology.

Available pre-endoscopic scores offer some information allowing the endoscopist to assess risk and initiate management pathways, but ultimately the severity and difficulty of treating an UGIB become obvious intra procedurally. Therefore, the endoscopist should prove adaptable, able to quickly adjust therapeutic options and guide the endoscopic team in a timely and efficient manner. Ongoing bleeding and difficult to treat causes may benefit from superior expertise, non-endoscopic approaches or unavailable devices, so recognizing one's limits and establishing decision-making algorithms for stopping the procedure or referring the patient may improve outcomes.

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Generally, endoscopists tend to focus on the technical success of the procedure but the known risk for rebleeding of some lesions and the need for post procedural management (i.e. second look, redo biopsy, eradication of Helicobacter pylori, adjusting antithrombotics) make standardized follow-up and adequate patient communication essential for good practice. The endoscopy team also must be mindful of the contamination risk when dealing with gastrointestinal hemorrhage and proper positioning and safety measures should be in place periprocedurally.

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Q4 Is simulator training required?

P: endoscopy trainees

I: simulators

C: no simulators (straight to patients)

O: safe hemostasis

Bibliographic search

Search strings used:

1. (((((("Education"[Mesh]) OR "Teacher Training"[Mesh]) OR "Simulation Training"[Mesh]) OR "Teaching"[Mesh])) AND "Gastrointestinal Hemorrhage"[Mesh]– 1,603 results
2. (((((("Education"[Mesh]) OR "Teacher Training"[Mesh]) OR "Simulation Training"[Mesh]) OR "Teaching"[Mesh])) AND "Gastrointestinal Hemorrhage"[Mesh]) AND ("Hemostasis, Endoscopic"[Mesh]) – 120 results
3. Simulator AND "Gastrointestinal Hemorrhage"[Mesh] AND "Hemostasis, Endoscopic"[Mesh] – 69 results
4. Review on abstracts: 9 studies
5. Studies included (after full text reading and checking the references of full-text articles): 12

Statement:

1. **Hands-on simulation-based training for UGIB is useful to gain the appropriate skills. ESGE recommends performing at least one-half day simulation based session during GI fellowship (strong/weak recommendation, moderate quality of the evidence)**

Endoscopy | DOI 10.1055/a-2893-6920 |

Evidence-based discussion text

The first simulators for flexible endoscopy were developed in the 1960s. Broadly, there are four types of simulators: (1) mechanical simulators, (2) live animal models, (3) ex vivo models, and (4) virtual reality (VR) computer simulators. In general, the comparative studies available have focused on ex vivo animal models. No VR computer simulator were specifically investigated for endoscopic hemostasis.

A few studies using the Erlangen Active Simulator for Interventional Endoscopy-EASIE models (Erlangen Endo Trainer or Compact EASIE model) have demonstrated a positive effect of simulator-based training for endoscopic hemostasis and a significant improvement of trainees skills has been documented[1–6]. These ex-vivo simulators are equipped with prepared pig-organ packages consisting of esophagus, stomach and duodenum, including artificial sewn-in vessels, polyps and varices. Blood perfusion is done with a roller pump connected to the sewn-in vessels and blood surrogate. Hemostasis is simulated for the use of several techniques (hemoclipping, injection, ligation, coagulation therapy, argon plasma coagulation). In few studies, based-scenario simulation[6] and lectures were added to the hands-on training[1,7,8]. In one study, long term training was applied (three workshops in 7 months) in endoscopic hemostasis using the compactEASIE and improved skills compared with a solely clinical education[2]. In a single-blind, randomized, controlled trial, with 28 participants, one-half day of hands-on skills training significantly improved performance in non-variceal bleeding[1].

Other studies on simulators and endoscopic hemostasis have primarily assessed the improvement in trainees' skills before and after using the simulator. Camus et al, described a live porcine model of bleeding ulcers that was demonstrated to be realistic, reproducible, feasible, time efficient, and easy to perform[9]. It was favorably assessed as a model for training in endoscopic treatment of bleeding ulcers. However, as it is a live porcine model, it has raised ethical and cost issues as it requires a dedicated facility to be used. More recently, free-tissue models have been described and assessed[10–12]. But these evaluations were focused on the realism and the suitability for endoscopic hemostatic training. In vivo or tissue free models seem also to give the benefit of intensive hands-on, simulation-based courses for endoscopic skills training. Unfortunately, the transfer of these skills to patient-based endoscopy and its impact in real-life practice is usually not described. However, as these training scenarios closely resemble the clinical setting, using the same instruments, it seems common sense that training in these models will at least partially improve the skills necessary to apply these techniques.

Overall, the literature on simulators of endoscopic hemostasis supports the benefit of intensive hands-on, simulation-based courses for endoscopic skills training.

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Question 4 - Table 1. Summary of the included studies – Randomized trials

[8]Author, publication yr	Study Type	Study objective	Participants (n)/ Settings	Intervention	Comparison	Outcomes	Main Results	Conclusion	Quality assessment
Haycock et al Gastrointest Endosc 2009 [1] 6/11/2026 7:55:00 AM	Single-blind, randomized, controlled trial Nationally accredited therapeutic endoscopy course	To evaluate the effect of knowledge-based teaching and hands-on, simulation-based skills training in 4 therapeutic endoscopic procedures: control of nonvariceal upper GI bleeding, polypectomy, stricture dilation, and percutaneous endoscopic gastrostomy (PEG) tube insertion.	28 participants were randomized All participants were given four 40-minute lectures designed to present the knowledge base underlying safe therapeutic endoscopy	Subjects received one-half day of hands-on skills training On ex vivo models (Erlangen Endo Trainer; ECE-Training GmbH, Erlangen, Germany)	No training	Knowledge was assessed by using a multiple-choice questionnaire. Practical skills were assessed using station-specific checklists and a global score.	There was no significant effect of knowledge-based teaching on the participants' practical skills or initial multiple-choice questionnaire score, although there was a trend toward improvement. There was a significant improvement in the subjects compared with the controls in the performance of polypectomy, control of upper GI bleeding, and esophageal dilation. There were no significant differences for PEG tube insertion.	Hands-on skills training significantly improved performance in 3 therapeutic modalities.	High
J Maiss 1 et al Dig Liver Dis 2007 [3]	Single-blind, prospective, randomized trial	To assess if intensive training improve skills in a endoscopic novices group	27 endoscopic novices (medical students, first year residents)	Intensive group (n=14) The intensive group was trained 12 times every second week over 7 months in 4 endoscopic disciplines (manual skills, injection therapy, haemoclip, band ligation) by skilled endoscopist (three trainees/simulator). With the compact EASIE simulator	Control group (n=13) No training	Blinded final evaluation of all participants Assessment was performed (single steps/overall) using an analogue scale from 1 to 10 (1=worst, 10=optimal performance) by expert tutors.	All techniques applied a significant improvement of endoscopic skills and of the performance time in the intensive group compared to the control group ($p<0.001$).	Endoscopic novices acquired notable skills in interventional endoscopy in the simulator by an intensive, periodical training using the compactEASIE.	High

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Maiss, J et al Eur. J. Gastroenterol. Hepatol. 2006 [4]	Single-blind, prospective, randomized trial Nationally accredited therapeutic endoscopy course	Analyze whether repeated EASIE simulator training in endoscopic hemostasis led to superior performance compared with a traditionally educated group	35 French GI fellows	n=18, group B three simulator training with the compactEASIE-simulator equipped with an upper gastrointestinal organ package for bleeding simulation. M0, M4, M7 Both groups performed routine and emergency endoscopies at their home hospitals during the study period.	n=17, only clinical education	Blindly skills evaluation was performed in four disciplines (manual skills, injection/coagulation, clip application and variceal ligation) at baseline and at M9 on evaluation forms (from the prior New York project) were used	The learning curve for group B showed a significant improvement in all disciplines (P<0.004) whereas group A improved significantly in only two of four disciplines at blinded final evaluation (manual skills P=0.02, injection/coagulation P=0.013). The direct comparison of groups B and A at blinded final evaluation showed significantly superior ratings for group B in all disciplines (P<0.006) and significantly shorter performance times in two disciplines (P=0.016 each). The comparison with the similar 'New York project' revealed that preexisting differences in skills were adjusted by the training.	Complementary trainings (three workshops in 7 months) in endoscopic hemostasis using the compactEASIE improved skills compared with a solely clinical education.	

Question 4. Table 3. Summary of the Quality of the included RCT using ROB-2 tool (If RCT are found)

	Randomization process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Bias
Haycock et al 2009 [1]	Low	Some concerns	Low	Low	Low	Low
Maiss et al 2007 [3]	Low	Some concerns	Low	Low	Low	Low
Maiss et al 2006 [4]	Low	Some concerns	Low	Low	Low	Low

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Question 4. Table 5. GRADE table. OUTCOME level

There are four main steps in creating a GRADE table:

1. Choose **one main comparison.**

Main comparison: Endoscopic hemostasis' hands-on training for fellow/GI doctors compared with no training
• _Intervention: Hands-on training
• _Comparison: No training

2. Choose **up to 7 outcomes** to include in the SoF. Include the **main outcomes**
- outcomes : improved skills on endoscopic hemostasis compared to control

Performance ratings
Performance times

3. Assess the quality of evidence for each outcome

Nº of studies and participants	**Outcome**	**Risk of bias**	**Indirectness**	**Inconsistency**	**Imprecision**	**Publication bias**	**Summary of the effect (Relative)**	**Summary of the effect (Absolute)**	**Other**	**Quality of evidence**	**Outcome Importance (Based on clinical relevance)**	**Comments**
RCTs (Start high in evidence) Non-RCT (Start low in evidence)	A separate assessment per outcome	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	e.g. RR, OR	e.g Absolute difference	(upgrading factors, circle all that apply) Large effect (+1 or +2) Dose response (+1 or +2) Effect of plausible residual confounding	⊕⊕⊕⊕ High ⊕⊕⊕□ Moderate ⊕⊕□□ Low ⊕□□□ Very Low	Critical/ Important/ Not important for decision making	
3 RCTs 28+27+35=90 participants	Performance ratings	No Serious (-1)	No Serious (-1)	No Serious (-1)	Very serious (-2)	Very serious (-2)	In all studies: performance ratings were higher in the	Not estimable		⊕⊕⊕	Important	

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							hands-on training (see table below)					
2 RCTs 27+35=62 participants	Performance times	No Serious (-1)	No Serious (-1)	No Serious (-1)	Very serious (-2)	Very serious (-2)	In all studies: performance time were higher in the hands-on training group (see table below)	Not estimable				
Notes		Low risk-of-bias table (table 3, above)	The 3 RCT address PICO similar to the question posed.	The questionnaire or evaluation were not always similar	Few participants							

Performance ratings (blinded final evaluation)

	Haycock et al 2009	Maiss et al 2007	Maiss et al 2006
Injection + clip + coagulation	17 (13-22) 8 (3-11) p<.0001		
Injection		8.0 (7.05–8.55) 5.6 (4.8–6.0) 0.001	8.0 (7.3-9.0) 3.0 (3.0–3.3)c <0.001
Haemoclip application		6.80 (5.75–7.95) 4.0 (3.2–4.80) 0.001	7.5 (5.5-8.8) 2.0 (2.0-3.0) <0.001
Variceal ligation		9.50 (8.33–10.0) 7.67 (5.7–8.4) 0.002	8.0 (7.0-9.0) 1.0 (1.0-1.3) <0.001

Performance times (blinded final evaluation)

	Maiss et al 2007	Maiss et al 2006
Injection	422 (376–525) 550 (450–600) 0.016	370 s (241–480) 695 s (543–753) <0.001
Haemoclip application	375 (281–476) 600 (175–600) 0.016	182 s (167-202) 436 s (355–566) <0.001
Variceal ligation	163 (130–196) 194 (163 –358) 0.068	134 s (113-15) 600 s (600–600) <0.001

Endoscopy | DOI 10.1055/a-2893-6920 |

Question 4. Table 1 bis. Other studies on simulators

NB: none of the studies presented in this table are comparative studies on simulator vs. no simulator for education on endoscopic hemostasis, so they are listed here for the comprehension of the text. I did not prepare a GRADE table.

Endoscopy | DOI 10.1055/a-2893-6920 |

[8]Author, publication year	Study Type	Study objective	Participants (n)/ Settings	Intervention	Comparisons	Outcomes	Main Results	Conclusion
Hochberger J, et al Gastrointest Endosc 2004 [2]	Comparative study of 2 simulators		Ulcer bleeding clipping and injection and variceal bleeding	Eleven structured courses on endoscopic hemostasis for doctors and nurses organized by the same endoscopists from 3/1998 to 5/1999 were evaluated using one of both models. The questionnaires were filled in by 207/291 trainees (71%). Questionnaire before and after the training	The Endo-Trainer was used in 4 (n = 103) 2 h practical training	the compactEASIE in 7 courses (n = 104). 2 h practical training	Previous endoscopic experience was comparable in both groups. The training in both simulators was highly accepted by the trainees (compactEASIE 95% excellent and good versus EASIE (Endo-Trainer) 97%) and did not show any significant difference (P = 0.493). Even in the assessment of the single techniques, no statistical difference was observed. Furthermore, the assessments of the closeness to reality and the endoscopic environment in both simulators were identical.	Both simulators (Endo-Trainer, compactEASIE) are excellent educational tools for interventional endoscopy with a high level of acceptance. The easy-to-handle, "lightweight" compactEASIE is a significant, progress tool for the future.
Maiss, J.et al. J Endoscopy 2005 [5]	Educational study	Analyze EASIE simulator training in endoscopic hemostasis led to increase performance The results were	28 fellows in New York and 36 in France	Intensive groups performing training in endoscopic hemostasis 1-day training course with the compactEASIE The trainees were reevaluated after an intensive 1-day course (with two or three fellows and one instructor per station)	No comparative group	evaluated and timed the fellows in four disciplines to establish baseline skills (manual skills; injection and coagulation; Hemoclip application; and variceal ligation) before and after the training Ordinal scale ranging from 1 to 10 (1 = poorest, 10 = best), recording also mistakes and performance time.	A highly significant improvement ($p < or = 0.001$) was observed in the performance of all endoscopic techniques. A significant reduction in performance time observed with three of the four endoscopic techniques. Successful hemostasis was significantly improved in two out of three techniques	A 1-day training course on endoscopic hemostasis using the compactEASIE simulator is capable of improving the performance of hemostasis procedures.
Fisher L et al Simul Healthc. 2010 [13]	Prospective study non comparative	Realism of the simulation and scenario-based model	23 trainees were enrolled	Two day courses of hands-on simulation and scenario-based model of training The Erlangen Endo-Trainer simulator + SimMan monitor and software package were used to simulate hemodynamic parameters and electrocardiogram	None	The course was evaluated by participants using a standardized questionnaire.	A complex clinical setting of acute gastrointestinal bleeding was recreated with a high degree of realism. All participants reported that the simulated clinical scenario was a positive learning experience, helpful in and performing complex problem-solving tasks in a dynamic environment.	Scenario and simulation-based training in endoscopic hemostasis may provide an opportunity to improve procedural skills and acquire practical experience in managing this medical emergency, which requires the ability to process, integrate, and adequately and quickly respond to complex information in unexpected conditions working as a team leader.

Camus M et al et al Endoscopy 2013 [9]	Comparative Prospective study	Feasibility and reproducibility model Realism of the model Training capabilities of the model for hemostatic techniques	10 endoscopic experts - 4-point Likert scale (realism) 46 French fellows (4-point Likert scale) for training capabilities of the model for hemostatic techniques 46 fellows (4-point Likert scale)	needle injection, bipolar electrocoagulation, and hemoclipping on live animal model of gastric ulcer bleeding	Before and after training for trainees		Successful active ulcer bleeding (Forrest Ib) was achieved in 96.2 % of cases. Endoscopic experts assessed the realism of the ulcers and bleeding at 3.2 ± 0.7 and 3.6 ± 0.7 respectively on a four-point Likert scale. The training significantly improved the endoscopic skills of the 46 fellows ($P < 0.0001$) in all hemostatic techniques	The live porcine model of bleeding ulcers was demonstrated to be realistic, reproducible, feasible, time efficient, and easy to perform. Favorably assessed as an excellent model for training in endoscopic treatment of bleeding ulcers. live porcine model expansive ethical concerns
Chandrasekhara et al Advances in Medical Sciences 2019 [8]	Educational study	Determine if a Quick APC Training Test (QAPCTT) can improve performance and assess proficiency with this modality	Fourteen adult gastroenterology fellows	*in vivo* model before and after an APC curriculum with didactic lectures and additional hands-on experience	None	As trainees performed the test, endoscopic supervisors recorded the time required to complete each task as well as the number of inadvertent mucosal touchdowns. Each participant was assigned a technical proficiency score by supervising endoscopists.	100% of fellows were comfortable with generator settings and APC equipment after the course compared to only 21% ($p < 0.001$) on the pre-test questionnaire. Those deemed technically proficient on the post-course QAPCTT required significantly less time for the task of making a square (100 s *vs*. 215 s; $p = 0.006$) and had significantly fewer inadvertent mucosal touchdowns (5 *vs*. 19; $p = 0.0017$).	Dedicated APC training is required to achieve competence with this modality. The QAPCTT appears improve APC technique and may readily identify trainees in need of additional APC experience to gain proficiency
Dong SL et al Gut and Liver 2019 [12]	Comparative prospective	Suitability of the simulator for hemostasis training (experts questionnaire) procedure time for hemoclipping and injection : experts vs. trainees	21 endoscopists (10 experts and 11 beginners)	3D-printed plastic training simulator for hemoclipping and injection therapy	Experts vs. beginners	Success and time to achieve hemoclipping and injection therapy	All participants completed the hemoclipping and injection methods successfully Realism level of the hemostasis simulator using a 7-point Likert scale The mean score of the hemoclipping module was 6.3±0.5 and the that of the injection module was 6.0±0.6. The mean procedure time for hemoclipping was 72.7±7.1 seconds for the beginner group and 19.7±1.2s for the expert group. The mean procedure time for injection was 92.1±9.8s for the beginner group and 36.3±2 for the expert group. The procedure time of beginner group became shorter with	Participants strongly agreed that endoscopic handling in the simulator was realistic and reasonable for endoscopic training. Notably, all of the participants felt that this training could reduce the risk for patients

							repetition and was significantly lower by the fifth trial	
Varshil Mehta et al Cureus 2021 [7]	Prospective study No comparison	To compare the knowledge and skills of the participants in managing upper gastrointestinal bleeding (UGIB) before and after a one-day UGIB haemostasis course	36 individuals	A one-day haemostasis course in line with the British Society of Gastroenterology's Endoscopy The course included lectures on UGIB and its management, which was followed by hands-on training on adrenaline injection, variceal banding, clip placement, thermal therapy, Hemospray® use, Sengstaken-Blakemore tube placement, and Danis stent placement via porcine or plastic models.	None	Pre- and post-course feedback questionnaires consisting of self-assessed ratings related to knowledge, skills, and behaviour relevant to UGIB were offered to all delegates.	Significant improvements were reported post-course ($p < 0.001$), especially in the hands-on and behavioural areas.	Overall, there was a significant improvement in the knowledge, procedural skills, and confidence of the delegates in the management of an AUGIB post-course.
Wichmann D et al J Clin Med. 2023 [11]	Prospective study No comparison	Evaluation of suitability for endoscopic hemostatic training	38 endoscopic (beginners and experts)	animal tissue-free training model of the upper gastrointestinal tract for bleeding therapy ulcer bleeding variceal bleeding	None	Suitability based on scale : one (excellent) to six (bad)	suitability for endoscopic training was 1.4, relevance of the endoscopic training was 1.6, and grading for haptic and optic impression of the model was 1.7	The creation of a gastroscopic model for the training of hemostatic techniques without animal tissues was possible and multiple endoscopic bleeding skills could be trained in it
Kanno T.et al. Endosc Int Open 2024 [10]	Prospective educational study	Evaluate the reproducibility of the clinical difficulty of this model and the effectiveness of simulation-based training for clipping hemostasis	50 gastroenterology residents from Japan and Canada	Simulation-based training program With simulator called "Medical Rising STAR-Ulcer type" to practice endoscopic hemostasis with hemoclips and coagulation graspers	None	Evaluation before and after training for trainees The primary outcome was the success rate for clipping hemostasis measured differences in trainee subjective assessment scores	The hemostasis success rate of the trainees significantly increased after instruction (64% vs. 86%, $P < 0.05$). The success rate for ulcers in the upper body of the stomach (59%), a high-difficulty site, was significantly lower than that for ulcers in the antrum, even after feedback and instruction. Trainee self-perceived proficiency and confidence significantly improved after simulation-based training ($P < 0.05$).	Simulation-based training model as a valuable tool for improving technical skills and confidence in trainees learning to perform endoscopic hemostasis

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Q5 When is supervision mandatory?

P: patients with UGIB

I: trainer supervision

C: unsupervised endoscopy

O: safe hemostasis

Bibliographic search

Search strings used:

1. (((((("Education"[Mesh]) OR "Teacher Training"[Mesh]) OR "Teaching"[Mesh])) AND "Gastrointestinal Hemorrhage"[Mesh]– 1,603 results
2. (supervision) AND (Hemostasis, Endoscopic) – 304 results
3. Study included : 2

Statement:

1. ESGE recommends supervision during training as it seems that less experienced endoscopists tend to underestimate some risk lesions with a negative influence on hemostasis and that it could be effective in improving the skills of trainees (Strong recommendation, very-low quality evidence)

2. ESGE suggests that endoscopy for UGIB should be undertaken by a skilled endoscopist and all trainees should be supervised for endoscopic haemostasis until competence is recognized as acquired by the trainer (Weak recommendation, very-low evidence)

OR

1. In order to understand strategies and risk management, ESGE suggests that a supervision is mandatory if the endoscopist has performed less than 20/30/50 endoscopic hemostatic procedures (Weak recommendation, very-low evidence)

OR

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2. In order to understand strategies and risk management, ESGE suggests that at least the first 20/30/50 procedures in humans should be done under the supervision of a skilled endoscopist (Weak recommendation, very-low evidence)

Evidence-based discussion text

There are no comparative studies between supervision and no supervision for endoscopic haemostasis, only a few questionnaire-based studies. In 2005, Parente et al undertook a 2-year survey in order to assess prospectively the impact of surgeon's experience on the outcome of acute non-variceal upper gastrointestinal (GI) bleeding patients in a large tertiary referral center of western Milan[14]. Two groups of endoscopists : 40–70 emergency procedures (low experience) and > 100 emergency procedures (high experience) were considered. Initial endoscopic hemostasis was achieved in 268 of the 272 patients (98.5%) and 4 patients required immediate surgery for failure of primary endoscopic hemostasis, between June 2001 and July 2003. On multivariate analysis, endoscopist's experience was independently associated with rebleeding rate and transfusion requirements. Therefore, a skilled endoscopist should undertake urgent endoscopy preferentially as less expert staff tends to underestimate some risk lesions with a negative influence on hemostasis.

In a recent retrospective study, including 787 gastroscopies with signs of recent haemorrhage performed between 2015 and 2022 a German university hospital, a learning curve was created for UGIB hemostasis (by plotting the number of previously performed gastroscopies with signs of recent haemorrhage against the treatment failure rate, defined as failed haemostasis, rebleeding and necessary surgical or radiological intervention)[15]. The learning curve showed that endoscopists with experience of <10 emergency procedures had higher treatment failure rates compared with endoscopists with >51 emergency gastroscopies performed (p=0.039) or consultants (p=0.041). The learning curve showed a marked decline in treatment failure rates after nine gastroscopies had been performed by the respective endoscopists followed by a first plateau between 20 and 50 procedures. These data suggest that a minimum number of 20 gastroscopies with signs of recent haemorrhage is necessary before endoscopists should be considered proficient to perform emergency procedures independently. Endoscopists might be considered as advanced-qualified experts in managing UGIB after a minimum of 50 haemostatic procedure performed.

The European Section and Board of Gastroenterology (ESBGH) has arbitrarily recommended a minimum of 30 haemostatic procedures (ref https://www.eubogh.org/blue-book/) to acquire the competence[16]. However, few studies have reported that it seems that fellows are not sufficiently exposed, trained and confident in performing endoscopic hemostasis[17–20]. Therefore, fellows need to be supervised throughout their training. For example, in an European survey study on 144 trainees (16 European countries), half of the participants had performed <30 hemostatic procedures in the upper GI tract[17]. Therefore, fellows need to be supervised throughout their training.

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Question 5 - Table 1. Summary of the included studies

Author, publication year	Study Type	Study objective	Participants (n)/ Settings	Intervention	Comparisons	Outcomes	Main Results	Conclusion	Quality assessment High/mod/low quality
Parente et al [14] 2005	Survey study comparative Prospective	to assess prospectively the impact of surgeon's experience on the outcome of acute non-variceal upper gastrointestinal (GI) bleeding	7 gastroenterologists who were on a 24-h call for emergency endoscopy and whose experience was arbitrarily categorized into two levels according to the number of hemostatic endoscopic procedures done at the time of study.	N=5 High experience endoscopists > 100 emergency procedures	N=2 Low experienced endoscopists 40–70 emergency procedures	Rebleeding rate Transfusion requirement need for surgery length of stay mortality	On multivariate analysis, endoscopist's experience was independently associated with rebleeding rate and transfusion requirements. Odds ratios for low experienced endoscopist were 4.47 for rebleeding and 6.90 for need of transfusion after the endoscopy.	Experience is an important independent prognostic factor for non-variceal acute upper GI bleeding	low
Allo et al [15] 2022	Retrospective study	To create a learning curve for endoscopic hemostasis	787 gastroscopies with signs of recent haemorrhage	None	None	Failure rate	The learning curve showed that endoscopists with experience of <10 emergency procedures had higher treatment failure rates compared with endoscopists with >51 emergency gastroscopies performed (p=0.039) or consultants (p=0.041). The learning curve	a minimum number of 20 gastroscopies with signs of recent haemorrhage is necessary before endoscopists should be	low

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							showed a marked decline in treatment failure rates after nine gastroscopies had been performed by the respective endoscopists followed by a first plateau between 20 and 50 procedures.	considered proficient to perform emergency procedures independently	

Question 5. Table 4. Summary of the Quality of the included observational studies using the Newcastle-Ottawa scale

Author and year	**Selection**				**Comparability**	**Exposure**			**Total score**
Cohort studies	Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start of study	Based on the design or analysis	Assessment of outcome	Follow-up enough for outcomes to occur (30 days)	Adequacy of follow up of cohorts	
Case and control studies	Is the case definition adequate?	Representativeness of the cases	Selection of Controls	Definition of Controls		Ascertainment of exposure	Same method of ascertainment for cases and controls	Non-Response Rate	
Parente et al [14] 2005		1		1		1			3

Question 5. Table 5. GRADE table. OUTCOME level

Main comparison: Role of the experience of the endoscopist for endoscopic hemostasis
- _Intervention: high experience
- _Comparison: low experience

main outcomes
Rebleeding
Need of transfusion after the endoscopy.

Nº of studies and participants	Outcome	Risk of bias	Indirectness	Inconsistency	Imprecision	Publication bias	Summary of the effect (Relative)	Summary of the effect (Absolute)	Other	Quality of evidence	Outcome Importance (Based on clinical relevance)	Comments
RCTs (Start high in evidence) Non-RCT (Start low in evidence)	A separate assessment per outcome	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	No Serious (-1) Very serious (-2)	e.g. RR, OR	e.g Absolute difference	(upgrading factors, circle all that apply) Large effect (+1 or +2) Dose response (+1 or +2) Effect of plausible residual confounding	⊕⊕⊕⊕ High ⊕⊕⊕□ Moderate ⊕⊕□□ Low ⊕□□□ Very Low	Critical/ Important/ Not important for decision making	
1 cohort study 7 participants	rebleeding	Very serious (-2)	Very serious (-2)	Very serious (-2)	Very serious (-2)	Very serious (-2)	OR 4.47 (2.11-9.47)			⊕□□□ Very Low	Important	
1 cohort study 7 participants	number of blood units transfused	Very serious (-2)	Very serious (-2)	Very serious (-2)	Very serious (-2)	Very serious (-2)	OR 6.90 (2.80-16.98)			⊕□□□ Very Low	Important	

Endoscopy | DOI 10.1055/a-2893-6920 |

Q6: How is the difficulty of MUGIB assessed?

Q7: What defines a "difficult" case of UGI bleeding?

Statements:

1. **ESGE suggests that trainer endoscopists should decide, based on the full clinical setting and endoscopic findings if the trainee should attempt therapy. (Best practice recommendation, expert opinion)**

+/- Particular attention must be paid in case of ulcers with high-risk of conventional treatment failure: size > 2 cm, location in an high risk area, a large vessel >2 mm and an excavated or fibrotic ulcer.

Evidence-based discussion text

While it is arguable that the perceived difficulty of a UGIB case could be used to guide trainee involvement in its management, direct evidence for this use could not be found in the literature. The complexity of each scenario cannot be determined solely by endoscopic findings because many other variables are relevant for prognosis and trainee participation is not limited to hemostasis and includes patient selection, consenting and other phases beyond actual endoscopy.

In the absence of a clear definition of how difficulty should be assessed and what a difficult case is, it may be reasonable to use established predictors of a poor outcome, such as the scores recommended by ESGE for patient stratification: the Glasgow-Blatchford Score (GBS) or the Child–Pugh score and the MELD score when variceal bleeding is suspected[21,22]. The GBS is most useful for selecting patients who do not need urgent endoscopy by predicting the likelihood of in-hospital intervention, rebleeding and death. While using a threshold of 7 and above can better select patients who will require endotherapy, it has a suboptimal performance in identifying high-risk patients[23]. A recent meta-analysis including 7 studies with a total of 755 patients concluded that GBS performed poorly in predicting mortality and rebleeding despite being superior to the Rockall score[24].

In esophagogastric variceal hemorrhage (EGVH) the severity of liver disease as measured by the Child–Pugh score and the MELD score is the main predictor of a poor outcome but other pre-endoscopic risk factors have been identified such as hypovolemic shock, presence of portal vein thrombosis or previous esophageal band ligation[25,26]. Active bleeding observed during endoscopy is also a recognized predictor of a poor

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outcome in EGVH and is used in addition to the Child–Pugh score to identify potential candidates for pre-emptive TIPS due to the increased risk of rebleeding and death[27].

In the case of peptic ulcer bleeding, several additional endoscopic risk factors for rebleeding and primary failure of endoscopic therapy have been described, such as active bleeding, large ulcer size, location of the ulcer in the posterior wall of the duodenum or in the high lesser curvature of the stomach[28]. The difficulty of treating upper body gastric ulcers as compared with ulcers in the antrum has been assessed in a simulator study that concluded that trainees' hemostatic success rate was significantly lower in the former, even after feedback and instruction[10]. Some of the characteristics previously listed such as ulcer size of more than 2 cm, location in an high risk area (such as one irrigated by gastroduodenal or left gastric arteries) and additional ones namely a large vessel >2 mm and an excavated or fibrotic ulcer have been proposed has harbingers of failed conventional hemostasis in active bleeding ulcers and therefore particularly suited for advanced endoscopic therapy, particularly the use of a cap-mounted clip[29]. The posterior duodenal wall location is particularly challenging, being the most significant risk factor for cap-mounted clip failure[30].

The prognosis of a UGIB case, beyond the pre-endoscopic defined risk factors and endoscopic findings, can be further influenced by a rebleeding event, as will be discussed in section question 10.

As illustrated above, while several factors influencing prognosis have been determined, they are not adequate to guide trainee involvement. The trainer endoscopist should decide, based on the full clinical setting and endoscopic findings if the trainee should attempt therapy or be substituted by a senior. In fact, given the full picture, an endoscopist judgment can be as precise as prognostic scales[31].

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Q8 Should there be a sequential introduction of hemostatic techniques during training?

Bibliographic search

Search strings used:

1. (((((("Education"[Mesh]) OR "Teacher Training"[Mesh]) OR "Teaching"[Mesh])) AND "Gastrointestinal Hemorrhage"[Mesh]– 1,603 results
2. (supervision) AND (Hemostasis, Endoscopic) – 304 results
3. Studies included : 0

Statement:

No recommendation

Evidence-based discussion text

There are no data on the sequential learning of endoscopic haemostasis techniques. Injection and the use of through the scope clips should be acquired by all endoscopists as one of the first gestures learned, particularly for mucosectomy, and therefore by extension for endoscopic hemostasis. Endoscopies for endoscopic hemostasis are carried out on an emergency basis, so it's difficult to plan ahead. It is more likely to be the encounter with a particular lesion that will guide the sequential introduction of hemostatic techniques: thermal coagulation, ligation, glue... New or second-line techniques should also be considered, and can be learned as soon as a case arises in practice (esophageal stent, OTSC placement, hemostatic powder, etc.) since these are rarer techniques, if the supervisor deems the student's skill level to be sufficient at the time.

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Q9 How is successful hemostasis evaluated?

Statements:

Each statement should include the strength of the recommendation (Strong or weak) and the quality of the evidence (high, moderate, low, very-low). Start the statement using “ESGE suggests/recommends”.

When no evidence is found, do not use GRADE (no strength or recommendation). Please elaborate Good Practice Statement starting “ESGE suggests…”

ESGE recommends that successful hemostasis is the absence of further bleeding (persistent and recurrent bleeding). Strong recommendation, high quality evidence

Previous guidelines

ESGE recommends that “persistent bleeding” be defined as ongoing active bleeding refractory to standard hemostasis modalities. Strong recommendation, high quality evidence.[32]

ESGE recommends that recurrent bleeding be defined as bleeding following initial successful endoscopic hemostasis. Strong recommendation, high quality evidence[32]

Bibliographic search

Detail databases, search strategy, total nº of references in the initial search and final number of included/excluded studies. Please save the references included in the search.

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Search strings used:

1. "Gastrointestinal Hemorrhage"[Mesh] AND "Hemostasis, Endoscopic "[Mesh] AND “success” (266 results)
2. Studies included : 0

Evidence-based discussion text

The definition used for successful hemostasis in literature was the ability to control bleeding at index endoscopy[22,32,33]. Failure is defined by the persistence of bleeding. ESGE recommends that persistent bleeding be defined as ongoing active bleeding (spurting, arterial pulsatile bleeding, or oozing) that is present at the end of index endoscopy refractory to endoscopic hemostasis modalities (strong recommendation, high quality evidence)[22,32]. This is also referred to as “failed primary endoscopic hemostasis”[32,34].

Failure can also be defined by recurrent bleeding[33]. ESGE recommends that recurrent bleeding be defined as bleeding following initial successful endoscopic hemostasis (strong recommendation, high quality evidence)[22,32]. Clinical evidence for recurrent bleeding is commonly defined as follows: recurrent hematemesis or bloody nasogastric aspirate after index endoscopy; recurrent tachycardia or hypo tension after achieving hemodynamic stability; melena and/or hematochezia following normalization of stool color; or a reduction in hemoglobin ≥ 2 g/dL after a stable hemoglobin value has been attained[22,32,33,35].

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Question 10 - Should rebleeding be treated by the trainee or the trainer?

Statements:

1. **ESGE suggests that patients with rebleeding from peptic ulcers and varices are treated by experienced endoscopists, based on high risk of failure of conventional endoscopic treatment, and high risk of case fatality (expert opinion, Weak recommendation)**

Bibliographic search

Search strings used:

1. (((((("Education"[Mesh]) OR "Teacher Training"[Mesh]) OR "Simulation Training"[Mesh]) OR "Teaching"[Mesh])) AND "Gastrointestinal Hemorrhage"[Mesh] – 217 results
2. "Gastrointestinal Hemorrhage"[Mesh] AND "rebleeding" – 3338 results
3. "peptic ulcer"[Mesh] AND "Rebleeding" - 493
4. "peptic ulcer"[Mesh] AND "Recurrent bleeding" – 218 results

Evidence-based discussion text

To the authors' knowledge, there are no studies describing the outcome of patients with rebleeding treated by trainees in GI endoscopy. Overall, 12% of patients with UGIB develop rebleeding with the highest rates occurring in patients with peptic ulcer bleeding, varices and malignancy[36]. A national cohort study (n=19,537) found that endoscopic haemostasis was only successful in 78% of patients with peptic ulcer rebleeding and that rebleeding was associated with a twofold increase in 30-day mortality[37].

Moreover, patients with variceal or non-variceal rebleeding may have frequent need for more advanced endoscopic procedures (esophageal stent, over-the scope-clip, multiple treatment...) justifying the presence of an experienced endoscopist[38,39].

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Question 11: What are the requirements for a trainer teaching MUGIB?

P:endoscopy trainers

I: dedicated teaching programs (“train the trainers”, etc)

C: no dedicated teaching program

O: trainee competence in hemostasis

Statements:

There is currently no structured, validated and shared training program for gastroenterologist fellows regarding the MUGIB. Therefore, there is no specific training program for trainers. Considering the potential benefits of initial experiences reported in literature, ESGE suggests that both gastroenterologist fellows both trainers should participate in specific training program to improve the learning process, patients’ outcome and safety.

Bibliographic search

Detail databases, search strategy, total nº of references in the initial search and final number of included/excluded studies. Please save the references included in the search.

Bibliographic search strategies were performed in **PubMed and Embase** from 2001 until 09/10/2024 using the following search strategies:

Question: What are the requirements for a trainer teaching MUGIB?
P: endoscopy trainers
I: dedicated teaching programs (“train the trainers”, etc)
C: no dedicated teaching program
O: trainee competence in hemostasis

***Search string (Pubmed)*:** (*Training* OR *Teaching* OR *Fellow*) AND (NVUGUB OR endoscopy hemostasis) OR (*train-the trainers digestive endoscopy*)

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Results of the bibliographic searches

Four hundred (n = 400) articles were found and, after removing duplicates, 31 studies were considered potentially relevant and acquired in full text.

Two hundred-one (n = 367) were not pertinent.

Included Studies

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Evidence-based discussion text

Endoscopic hemostasis is considered as a basic endoscopic procedure, as defined by the ESGE/ESGENA combined statement on training in gastrointestinal (GI)l endoscopy [1]; however, to date, no specific training or "train the trainers" program on MUGIB has been described. Since the expertise of the senior endoscopists alone may not be sufficient to ensure effective teaching, conscious competence is required at every stage of the complex teaching process. Developing an effective teaching program is essential for offering successful and safe growth, which is of pivotal importance both for physicians and patients.

Coderre et al. [2] proposed an initial educational intervention model for both trainees and trainers in colonoscopy. The authors assumed that a novice endoscopist may experience distress due to cognitive overload, which arises from the need for intense concentration (especially in urgent settings), proprioceptive stimuli from the gastroscope and hemostatic devices, visual input from the endoscopic view, verbal cues from the nursing staff and anesthesiologist, and lastly verbal direction from the trainer.

In order to avoid this overload, the trainer should:

- deconstruct the competence that the trainee should learn in different and progressive tasks
- define, before the procedure, the skill that the trainee should obtain
- clearly explain every single step of the procedure
- use simple instructions during the procedure (i.e., tip up, tip down, tip left, tip right, clockwise torque, anti-clockwise torque, inflate, suction, advance/push forward, withdraw/pull back, stop and slowly)
- progressively increase the complexity of tasks during the training
- organize debriefing and receive feedback from all the staff at the end of each procedure (trainee and nurse staff)
- receive feedback from all the staff at the end of every procedure
- Behind a good trainee there's a good trainer and vice versa. Pre-and post- qualitative assessment of both trainees and trainers are advisable to improve the whole learning process.

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Additional considerations:

Regarding the use of endoscopic training models, these have been developed over the past decades [3]. Surveys on the use of these tools have shown an improvement in practical skills among fellows [4]. These encouraging results suggest the potential value of practical training sessions into the curriculum for gastroenterologists. Training on live animal models, such as for endoscopic mucosal dissection, may be more realistic, but difficult to be offered to all gastroenterologist fellows in a view of equal and standardized training program [5].

Finally, in the complex process of developing a structured training program, formal ergonomic training in endoscopy should be mandatory for both trainees and trainers, considering sex-based differences, as emerging data indicate increasing rates of post-endoscopic injuries [6].

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Table 1. Summary of the included studies

Study (Author, year)	MNVUGIB	Study design	No. of subjects	Mean Age (y)	Intervention: (Training)	Comparator: No training	Outcome in intervention arm	Outcome in comparator arm	Further investigation outcome	Comments	Quality of study
Sonnenberg A, 2002	NA	Pilot	NA	NA	Individuation of a mathematical influence model	NA	To develop general rules on how to pursue a therapeutic goal of interventional endoscopy that can be utilized as tools in endoscopy training.	NA	NA	It can be a "white board" on which build a theorical step by step approach to NVUGIB.	Low
Hayes S, 2010	NA	Survey	22	NA	Telephone interview to health care providers (Directors, Physicians and Nurses)	NA	To assess health care providers' barriers to the implementation of practice guidelines on NVUGIB in Canada.	NA	To design educational and behavioral interventions on all level	This knowledge (of barriers and needs) allows to create a tailored system of educational interventions from the ER to the endoscopy room and the ward. This improvement will also shape the fellows training.	Low
Asotibe J, 2021	NA (Teaching vs non-teaching)	Retrospective cohort study	94900 NVUGIB patients	62.8 vs 64.8	Teaching Hospitals	Non-Teaching Hospitals	To assess different worse outcomes during hospitalizations between teaching and non-teaching hospitals including mortality, median length of stay, and total hospital charges	Patients in teaching hospitals had a 10% adjusted increased odds of getting endoscopy for hemostasis	Patients admitted at non-teaching hospitals for an NVUGIB had better outcomes during hospitalizations	No information on the involvement of fellows, the training or expertise of the fellows.	Low
Sharbatji M, 2024	NA (Teaching vs non-teaching)	Retrospective cohort study	132085 NVUGIB patients	63.7 vs 65.6	Teaching Hospitals	Non-Teaching Hospitals	Hospital mortality, percentage of patients requiring inpatient endoscopy, and endoscopic therapy, packed red blood cell transfusion, length of stay, and total hospitalization charges.	Higher rates of in-hospital therapeutic endoscopy, length of stay, and total hospital charges.	Similar mortality, rates of in-hospital endoscopy, and early endoscopy	No information describing the involvement of fellows or their training expertise.	Low
Cooper G, 1998	NA (Teaching vs non-teaching)	Retrospective cohort study	1031 NVUGIB patients	NA	Teaching Hospitals	Non-Teaching Hospitals	To evaluate differences between the 2 kinds of hospitals	Higher rate of endoscopic therapy, recurrent bleeding	Similar rate of endoscopic procedures	Aged study	Low

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Choi J, 2016	NA	Retrospective study with a prospective cohort database	1584 NVUGIB patients	65 vs 64	HCV teaching hospital high-volume centers (>equal to 60 NVUGIB pts/y)	LCV teaching hospital low-volume centers (<60 NVUGIB pts/y)	To evaluate continuous bleeding after treatment, re-bleeding, necessity for surgical/other retreatments, and death within 30 days.	Significant difference in the incidence of poor outcome between the HVC and LVC groups. The incidence rate of poor outcome in high-risk patients (Rockall score C8) in HVC was lower than that in high-risk patients in LVC.	No significant difference in poor outcome in the lower-risk patients in either group	No information about the volume of total hospital beds and the number of physicians.	Low
Siau K, 2022	Only diagnostic upper GI endoscopy	British consensus statements	NA	NA	32 recommendation statements, including focus on train-the-trainers course	NA	To allow an adequate training in upper GI endoscopy, essential for procedural effectiveness, patient comfort and safety.	Definition of competence, acquisition of competence, assessment of competence and post-certification support	NA	Only diagnostic, not therapeutic Focus on TTT	Moderate
Schlosser S, 2024	GI Endoscopy Training	Survey	958 responses, trainers and trainee	NA	Anonymous questionnaire to evaluate expectations concerning training for gastroenterology board certification by trainers and trainees in Germany	NA	To improve training in Gastroenterology in Germany	Trainers and trainees agree that internal training should take place during working hours and that external training should be supported through a training budget, supervisor's presence should initially support resident physicians' training	Trainers considered over- time essential for good continuing education, a view that trainees did not share. Trainees consider research work-time, trainers not.	First step to create a structured training program to know the thoughts of people involved	Low
Ratcliff E, 2021	GI Endoscopy Training	Survey	129 responses	NA	Online survey	NA	To explore the experience of training and of providing trainer feedback for all disciplines of endoscopy trainees.	Outlined the qualities of an ideal endos- copy trainer		This survey does not cover the trainer's perspective which would be helpful to confirm or refute perceived trainee concerns.	Low

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Mousset R, 2022	Training	Online national survey	180	33.1	There is currently no standardized or systematic training approach. This study evaluated and compared the status of gastrointestinal endoscopy training programs in all teaching hospitals in the Netherlands from a resident perspective.	NA	Most residents were satisfied with the endoscopy training program and endos- copy supervision in their teaching hospital	Main differences: participation in a preclinical endoscopy training course, exposure to endoscopy simulator training, criteria used to determine the level of supervision; lack of uniformity in teaching methods and styles between different endoscopy supervisors in the same hospital.		Not trainers' perspective; not collection of the number of endoscopic procedures.	Low
Metha V, 2021	one-day UGIB haemostasis course (theorical and practical)	Prospective	36	NA	To improve MNVUGIB	NA	Significant improvement in the knowledge, procedural skills, and confidence of the delegates in the management of an AUGIB post-course.			Small sample size, self-assessed questionnaire	Low
Ismail F, 2024	Endoscopic Assessment Tools: Direct observation of procedural skills (DOPS), Global Assessment of Gastrointest inal Endoscopic Skills (GAGES), Assessment of Competency in Endoscopy (ACE) tool	A mixed methods quantitative -qualitative approach was employed, specifically utilizing a deductive-sequential design where the primary component was quantitative , and the secondary component was qualitative.	9	NA	To improve training program	NA	DOPS tool performed favorably in the qualitative assessment		gastroenterology training programs match their learning outcomes with the available assessment tools to decide which may be the most appropriate one for their need and context	Small sample size, single center, upper GI endoscopy and colonoscopy, not MNUGIB	Low

Hocherberger J, 2004	Training with 2 endoscopic simulators	Prospective	291	NA	New CompactEASIE vs old Endo-trainer		Both simulators (Endo-Trainer, compactEASIE) are excellent educational tools for interventional endoscopy with a high level of acceptance.			corporate training of doctors and nurses, closeness-to-reality training.	Low
Hocherberger J, 2005	Training with simulator vs not simulator	RCT	37	NA	Simulator+ clinical endoscopic training	clinical endoscopic training only	compactEASIE simulator training (3 sessions over 7 months), together with clinical endoscopic training resulted in objective improvement in the performance by fellows of all 4 endoscopic hemostatic techniques				Moderate
Maiss J, 2006	Training with simulator vs not simulator	RCT	35	NA	Simulator+ clinical endoscopic training	clinical endoscopic training only	significantly superior ratings for group with simulator in the various hemostatic techniques considered			The results of this study may stimulate the reflection about the introduction of practical training sessions in the training schedule for gastroenterologists. It is not clear whether the skills acquired in these studies were sustained for a longer time	moderate
Maiss J, 2006	1–day training course with simulator	Prospective trial	32 fellows from different states (USA and France)	NA	1–day training course with simulator		A highly significant improvement was observed in the assessment of all four endoscopic hemostatic techniques in each group and for every technique after 1 day of intensive training			Concerns for certain techniques requiring repeated training to allow the trainee to reach a maximum level of skills, or how long the expertise achieved is sustained.	Low
Matthes K, 2005	TTT for simulator	Prospective	5 tutors instructed 7 endoscopist that then conducted a workshop for 8 fellows in 4 hemostasis techniques	NA	1–day training course with simulator		Tutors trained in this manner can provide a similar educational experience with objective improvement in trainee skill to experts who have conducted many hands-on workshops			Only by expanding the number of available tutors can simulator-based workshops be integrated into standard endoscopy education and promote uniformity of training.	Low

Kanno T, 2023	novel simulator called "Medical Rising STAR-Ulcer type" to practice endoscopic hemostasis with hemoclips and coagulation graspers	Prospective	50 trainees	NA	simulation-based training program		to evaluate the reproducibility of the clinical difficulty of this model and the effectiveness of simulation- based training for clipping hemostasis	The hemostasis success rate of the trainees significantly increased after instruction. Trainee self-perceived proficiency and confidence significantly improved after simulation-based training	The success rate for ulcers in the upper body of the stomach (59%), a high-difficulty site, was significantly lower than that for ulcers in the antrum, even after feedback and instruction.	did not attempt to directly measure hemostasis success rates in real patients Did not evaluate the long-term retention of skills or their application in actual clinical practice single-arm study Small sample size only two types of bleeding sites	Moderate
Kalmovisit S, 2024	Novel simulator Varix Trainer model 1 (VTM1) created for trainees to safely practice basic endoscope manipulation skills.	Prospective	23 novice endoscopists+ 18 second-year trainees + 13 expert endoscopists	NA	They were asked to point with the endoscope tip to 20 numbers in the model as quickly as possible using tor-que, single-hand small/large wheel manipulation (SHSW), and retroflexion techniques. Their mean times (t20) were compared to determine if the model could distinguish different levels of expertise		Experts had faster t20 than second-year trainees, who were faster than novices, for all three techniques			The VTM1 distinguished varying levels of expertise for all techniques, suggesting that it is a valid tool for assessing endoscope manipulation skill. the training tool, the Varix Trainer model 1, is inexpensive, reusable, simple, lightweight, and foldable so that it is easily transportable. This means that it could potentially be widely available for training	Moderate
Camus M, 2013	Live animal model for training in endoscopic hemostasis	Pilot study	6 six animals + 10 endoscopic experts assessed the similarity of this pig model to human bleeding ulcers + 46 fellows for the training	NA			to validate a live animal model of bleeding ulcers for training in endoscopic hemostasis.	The training significantly improved the endoscopic skills of the 46 fellows in all hemostatic techniques	The live porcine model of bleeding ulcers was demonstrated to be realistic, reproducible, time efficient, and easy to perform	It is difficult to widespread to all fellows for training	Low

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Martinek J, 2011	Training with ex vivo animal model	Randomized single blind study	31 fellows	NA	2 full days of a hands-on course + standard practice vs standard practice alone	standard practice only	To assess the effectiveness of training by using an ex vivo animal gastric model on the performance of two therapeutic procedures—hemostasis and treatment of perforation	The number of physicians who carried out a successful hemostasis procedure increased significantly in the group with training		The cost-benefit effect of such training has never been investigated The evaluation of clinical procedures in our study was limited because of the retrospective self-assessment of the participants	Low
Chandrasekhara V, 2019	Dedicated APC training (Quick APC Training Test) on an in vivo model	Pilot study	14 fellows	NA	Dedicated APC training	No training	to determine if a Quick APC Training Test (QAPCTT) can improve performance and assess proficiency with this modality.	100% of fellows were comfortable with generator settings and APC equipment after the course compared to only 21% on the pre-test questionnaire. Those deemed technically proficient on the post-course QAPCTT required significantly less time for the task of making a square and had significantly fewer inadvertent mucosal touchdowns		Small sample size Experts not blinded results are based on an immediate post-test and not future APC procedures	Low
Allo G, 2024	A learning curve was created by plotting the number of previously performed oesophagogastroduodenoscopies with signs of recent haemorrhage against the treatment failure rate	Retrospective	787 cases	66	Number of urgent procedures		insufficient data exist on the necessary number of emergency endoscopies needed to achieve competency in haemostatic interventions.	Endoscopists with experience of <10 emergency procedures had higher treatment failure rates compared with endoscopists with >51 emergency oesophagogastroduodenoscopies performed or consultants	minimum number of 20 oesophagogastroduodenoscopies with signs of recent haemorrhage is necessary before endoscopists should be considered proficient to perform emergency procedures independently. Endoscopists might be considered as advanced-qualified experts in managing UGIB after a minimum of 50 haemostatic procedure performed.	retrospective and monocentric design unable to clarify to which extent a supervising endoscopist supported the main endoscopist during the procedure not able to analyse the impact of experience level on timing of endoscopy and its influence on patients' outcomes	Low

Luo X, 2023	TTT early gastric cancer	Retrospective multi-centre	123,416 upper GI endoscopy analized 44 trainees from 17 hospitals	NA	the training was carried out 8 times in one year. Clinical records one year before (“2016”), during (“2017”), and after (“2018”) the course were collected.		To improve the diagnosis of early gastric cancer	The early gastric cancer detection rate (EDR) was 0.101% in 2016, which significantly increased to 0.338% in 2018 (p = 0.015). The early gastric cancer ratio (ECR, ratio of newly detected EGCs to all newly detected gastric cancers) in 2016 was 8.440%, which consistently increased to 11.853% and 19.778% in 2017 and 2018 (p = 0.006), respectively		Focused on EGC, but it can be replied on endoscopic haemorragic urgencies an in general on global training	Low
Suhail F, 2024	Sex differences in ergonomic during training	Survey	236 fellows (113 women)				To line out sex differences	Female fellows reported on average smaller hand sizes and shorter heights. More female fellows reported endoscopic equipment was not ergonomically optimized for their use. Additionally, more female fellows voiced preference for same-gender teachers and access to dial extenders and well-fitting lead aprons. High rates of post-endoscopy pain were reported by both sexes, with significantly more women experiencing neck and shoulder pain		Urgent need for formal ergonomic training for trainees and trainers with consideration of stature and hand size to enhance safety, comfort, and equity in the training and practice of endoscopy. Endoscopy teachers should receive training on how to effectively teach proper endoscopic ergo-nomic techniques while being cognizant of the trainee’s physical stature and hand size. Formal endoscopic ergonomic training should be mandatory for both trainees and trainers because over half of trainees in this study reported no formal ergonomic training	Low

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Q 12:What are the minimal requirement for a center to offer training in MUGIB?

Statements:

ESGE recommends the minimum desirable standards detailed in the following list be met by endoscopist units offering training for MUGIB.

Evidence-based discussion text

(i) Written and/or electronic pre-procedure pathways should exist to facilitate the assessment of patients with co-morbidity prior to urgent EGDS
(ii) Written local pre-procedure pathways should exist to direct the correct dosing of anticoagulant for patients prior to urgent EGDS based on international consensus guidelines
(iii) Units should have anesthesiologic assistance to manage UGIB
(iv) All necessary equipment (for anesthesiologist and endoscopist) should be available before to start the procedure. Equipment checklist should be available and used within the unit to ensure this is the case.
(v) The equipment should be updated according to the technological innovation
(vi) Formal updates for all the staff (endoscopists and nurses) should be provided
(vii) Image and/or video capture equipment for urgent EGDS and the ability to record these in electronic reporting systems should be available
(viii) There should be on-site access to support services (surgery, interventional radiology) in the event of persistent bleeding or rebleeding after endoscopy, or other complications or a structured pathway should exist for transfer.

Scientific societies have arbitrarily set the minimum required threshold at 10-25 GI bleeding procedures, but there is no scientific evidence [1].

A proposal for the minimal requirement for a service may be the following:

- Expert physicians following ESGE recommendation on training
- Turn-over of young endoscopist to maintain the teaching competence

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- Service for urgent endoscopy (from emergency department and other wards), surgery and radiology (radiology not necessarily in the same hospital, but in a defined and shared network).
- Updated knowledge (physician, nurses and anesthesiologist) and technological availability

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Q13: Is access to a multidisciplinary team required when training for UGIB?

P: patients with UGIB

I: access to connecting specialties

C: no access to connecting specialties

O: successful, safe hemostasis

Statements:

There is currently limited evidence on the role of multidisciplinary teams in both the training of doctors and the management of upper gastrointestinal bleeding, though some findings suggest potential benefits for patient outcomes; therefore, ESGE suggests that gastroenterologists in training be included in multidisciplinary team discussions for these cases to enhance both patient outcomes and trainees' learning and management skills.

Evidence-based discussion text

In many setting, multidisciplinary team care is likely to improve the prognosis of patients through the collaboration of different specialists.

Multidisciplinary treatment is crucial since risk of rebleeding after endoscopic haemostasis which is up to 20-30% and may require alternative treatments such as angiographic embolization or surgery[1].

In 2021, a Chinese retrospective cohort study compared cirrhotic patients with UGIB receiving traditional care to those receiving multidisciplinary team care in the same hospital [2]. Despite patients in multidisciplinary team group showed higher values of Child-Pugh and MELD scores, this study proved multidisciplinary treatment (MDT) as a protective factor for rebleeding (37.6% vs 20.0%, p=0.02) and mortality (35.6% vs 19.0%, p = 0.01) within 1 year. Furthermore, these patients showed less depression and better quality of life compared to those in the traditional group.

Another retrospective study compared 30 patients with severe UGIB treated with traditional consultation in 2018, and 26 patients receiving multidisciplinary treatment in 2019 [3]. The length of intensive care unit stay and hospital stay in the MDT group were significantly shorter (days: 10.04 vs 13.27, and 3.50 vs 4.70 respectively, both $p < 0.05$). In addition, rebleeding rate and blood transfusion volume were lower than those in the traditional group (rebleeding rate of 15.38% vs. 43.33%, blood transfusion volume units: 5.54 vs. 7.71, all $p < 0.05$).

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Author, publication year	Study Type	Study objective	Participants (n)/ Settings	Intervention	Comparisons	Outcomes	Main Results	Conclusion	Quality assessment High/mod/ low quality
Wang *et al.*, 2021	retrospective cohort study	To evaluate cirrhotic patients with UGIB receiving traditional care or multi-disciplinary team care (MDTC) between July 2015 and December 2019	206 cirrhotic patients with UGIB, with 101 patients in the traditional care group and 105 patients in the MDTC group	In the MDTC group, a nursing-led multidisciplinary team was set up comprising of 1 digestive disease specialized nurse, 2 digestive disease attending physicians, 1 psychological consultant, a clinical dietitian, normal nurses, and postgraduate volunteer. A symposium was held once per week to exchange experiences and problems, with several senior physicians invited to evaluate and improve the work of the team	In the traditional care group, patients were admitted to the intensive care unit for close observation and medication treatment after endoscopic procedures, until their condition was stable. Patients received routine nursing care	The primary outcomes were mortality and the incidence of rebleeding within 1 year. Quality of life was the secondary Outcome, assessed according to the EQ-5D-5L within 4 weeks after discharge. The EQ-5D-5L was designed to assess 5 dimensions, including mobility, self-care, usual activities, pain and discomfort, and anxiety and depression	Compared with the traditional care group, patients in the MDTC group had significantly higher Child-Pugh scores and MELD scores (Child-Pugh score: 6.9±2.2 vs. 7.7±2.5, P=0.02; MELD score: 4.8±2.8 vs. 5.8±3.6, P=0.04) No significant difference in antibiotic prophylaxis and blood transfusions were seen between the 2 groups Patients in the MDTC group had a lower incidence of rebleeding within 1 year than the traditional care group (37.6% vs 20.0%, P=0.02) 1-year mortality in the MDTC group was significantly lower than in the traditional care group (35.6% vs 19.0%, P=0.01). After adjustment by multivariable logistic regression, MDTC was identified as a protective factor for rebleeding, and higher MELD score and more required units of packed RBCs were associated with a higher incidence of rebleeding. According to EQ-5D-5L, patients in the MDTC group felt less discomfort and depression (both P<0.01), and overall quality of life was significantly higher (P=0.02).	MDTC could not only reduce mortality and the incidence of rebleeding, but also improve the quality of life of enrolled patients and relieve their anxiety	

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Zhang *and Yan, 2020*	Retrospective study	To compare the difference of clinical effects between multidisciplinary treatment (MDT) mode and traditional consultation mode in diagnosis and treatment of patients with UGIB	56 patients with dangerous UGIB admitted to the department of emergency and critical care medicine of Yichang Central People's Hospital	30 patients treated in traditional consultation group, from January 2018 to December 2018	26 patients treated in in MDT group, from January 2019 to December 2019	Recovery time of vital signs, length of intensive care unit stay, length of hospital stay, medical expenses, rebleeding rate, surgical operation rate, amount of blood transfusion, hospital mortality, clinical total efficiency between the two groups	The recovery time of vital signs, length of ICU stay, and length of hospital stay in the MDT group were significantly shorter than those in the traditional consultation group (days: 1.62±1.30 vs. 2.20±0.93, 10.04±2.82 vs. 13.27±2.86, 3.50±1.63 vs. 4.70±2.17, both $P < 0.05$) Medical expenses, rebleeding rate and blood transfusion volume were lower than those in the traditional consultation group [medical expenses (ten thousand Yuan): 6.40±3.07 vs. 8.56±4.07, rebleeding rate: 15.38% (4/26) vs. 43.33% (13/30), blood transfusion volume (U): 5.54±3.20 vs. 7.71±3.83, all $P < 0.05$] The clinical total efficiency in the MDT group was significantly higher than that in the traditional consultation group (88.5% vs. 80.0%, $P < 0.05$) No significant difference in the surgical operation rate and hospital mortality	Compared with traditional consultation, MDT care can significantly shorten the recovery time of vital signs, the length of ICU stay, the length of hospital stay, and it can reduce blood transfusions, medical expense and rebleeding risk of patients UGIB However, with no significant difference in surgical operation rate and hospital mortality	

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Q14: How can you standardize training in hemostasis outside an Emergency hospital?

Statements:

Since training in hemostasis is limited outside emergency hospitals, the ESGE recommends a dedicated training period in high-volume centers or participation in endoscopy bleeding courses that include simulation-based training.

Evidence-based discussion

Access to UGIB is limited outside Emergency hospitals. Doctors working in rural areas often lack access to other specialties and high-volume cases. Surveys revealed how doctors in rural areas may feel the need to receive adequate training in endoscopic procedures, particularly UGIB [2, 1].

A first solution could be with simulator training, which provides the opportunity to practice without the risk of patient harm and time limitations[3]. Various models have been developed, using ex-vivo organs or artificial components. A recent study demonstrated how these models are effective in improving technical skills and confidence in trainees, with significant increase in hemostasis success rate after training (64% vs. 86%, $P < 0.05$)[4]. This alternative training has also demonstrated to be more effective than clinical education alone, especially during gastrointestinal fellowship[5]. For this reason, simulator training may be an effective alternative solution for endoscopists working outside Emergency hospitals and in rural areas.

Another solution could be made by introduction of dedicated short-time training in high-volume centers, with possible certificated courses and national certification processes to assure competency. In United Kingdom, the first national gastroenterology trainee survey regarding UGIB training was conducted in 2020, with a total of 181 questionnaires collected. Overall, nearly 90% of trainers aimed for additional hemostasis training, with 82% supporting the role of a national standardised course and certification [6].

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Author, publication year	Study Type	Study objective	Participants (n)/ Settings	Intervention	Comparisons	Outcomes	Main Results	Conclusion	Quality assessment High/mod/ low quality
Kanno et al., 2024	Prospective education study	To evaluate the reproducibility of a novel simulator to practice endoscopic hemostasis, and to evaluate the effectiveness of simulation-based training for clipping hemostasis	50 gastroenterology residents from tertiary referral University hospitals in Japan and Canada between February 2019 and August 2020	Mini-lecture with instructions and real-time feedback	Mechanical simulator for endoscopic hemostasis reproducing spurting bleeding from artificial vessels, with one bleeding ulcer in the antrum and one in the upper body of the posterior wall of the stomach. Further individual instructions by two endoscopy experts during simulator-based educational program.	Primary outcome: success rate for clipping hemostasis Other outcomes: identification of factors associated with difficulty of hemostasis, trainees' subjective assessment scores	The hemostasis success rate significantly increased after instruction (64% vs. 86%, P <0.05) The success rate for ulcers in the upper body of the stomach was significantly lower than that for ulcers in the antrum, even after feedback and instruction (58% vs 86%, P <0.01) Trainee self-perceived proficiency and confidence significantly improved after simulation-based training (P <0.05)	The simulation-based training model can be a valuable tool for improving technical skills and confidence in trainees learning to perform endoscopic hemostasis.	

Maiss et al., 2006	Prospective two-armed randomized trial	To evaluate whether repeated simulator training in endoscopic hemostasis may led to superior performances compared with traditional education programs	35 French Gastroenterology fellows in their third year of fellowship from 25 French universities Fellows were randomized into group A (n = 17, only clinical education) and group B (n = 18, additional 3 simulator trainings)	3 standardized intensive hands-on training using hemostasis simulator by expert endoscopists, with instructors training two to three fellows in 60-min blocks. Detailed feedback of fellows' performance from tutors and review of common mistakes	Evaluation in four endoscopic techniques performed in the simulator for (i) manual skills, (ii) injection and coagulation, (iii) clip application and (iv) variceal ligation. Skills rated by expert tutors using a 10-point visual ordinal scale	Differences in the learning curve for 4 endoscopic techniques for endoscopic hemostasis	Group A exhibited a significant progress in performance in only two out of four disciplines (manual skills, injection and coagulation). Successful hemostasis significantly improved only in "injection and coagulation" (8% vs 46%, P = 0.025) with no significant changes for successful hemostasis in the other techniques. The mean performance time decreased significantly in two out of four disciplines (manual skills, variceal ligation). Group B exhibited a significant increase in performance scores and significant decrease in performance time in all techniques. Successful hemostasis increased significantly from 8% to 100% for injection and coagulation (P = 0.001) and from 8% to 75% for clip application (P = 0.005). The hemostasis rate for variceal ligation showed a non-significant increase from 63% to 83% (P = 0.180). In the blinded final evaluation, group B was faster in two out of four disciplines, and successful hemostasis in the simulator was achieved more frequently by group B.	Complementary trainings (three workshops in 7 months) in endoscopic hemostasis using a hemostasis simulator improved skills compared with a solely clinical education.	

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Q15: *How is competence in MUGIB defined? Are there KPIs?*

***Statements*:**

1. Domain: Competence in managing UGI bleeding (MUGIB) should be defined as the ability to independently assess the need for and carry out successful and safe procedures, with optimal clinical outcome and good patient satisfaction across a range of case difficulties and clinical contexts.
2. Domain: Performance measure: No current standard defined

Evidence-based discussion

Domain: Definition and assessment of trainee competence for managing UGI bleeding (MUGIB)

Competence for managing UGI bleeding is defined in all cases when the performing endoscopist can undertake effective and safe procedures, recognizing the importance of patient experience and the range of case complexity and contexts. The American Society for Gastrointestinal Endoscopy (ASGE) defines competence as the minimum level of skill, knowledge, and/or expertise derived through training and experience that is required to perform a task or procedure safely and proficiently [1]. We recommend that endoscopists performing emergency endoscopy for UGI bleeding should have adequate knowledge of all hemostasis modalities (contact or noncontact thermal therapy, mechanical therapy, or injection of a sclerosing agent, each as monotherapy or in combination with epinephrine injection and other modalities, such as hemostatic powders, gels, forceps or EUS delivered coils) that can be used for managing these cases, as this information can be important in more difficult and complex situations. As a rule, it is recommended that endoscopists use the equipment that they feel comfortable with, and those where adequate training has been achieved. Still, knowledge about the total available armamentarium, including even complementary modalities, such as interventional radiology and surgery is ideal to pursue the optional modality for more difficult/complex scenarios.

Domain: Key Performance Measures for management of UGI bleeding (MUGIB)

Absence of any evidence that could lead to performance measures development for managing UGI bleeding according to the established multistep quality initiative process for methodology [2], prevented us from setting any performance measures. A

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recommendation regarding the definition of successful hemostasis achievement or application of standardized modality would need to be based on an established firm definition of successful hemostasis with optimal clinical outcomes; still, such data are unavailable. The working group anticipates that forthcoming studies will be able to clarify whether such a concept does apply to UGI bleeding endoscopy.

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Q16: *What is the adequate number of procedures needed before evaluation of competence or certification?*

***Statements*:**

A minimum procedure volume of upper gastrointestinal bleeding (UGIB) endoscopies should be available to endoscopists to ensure that they could have the opportunity to achieve competence in management of these cases. Although the number of UGIB endoscopies could serve as a surrogate marker of competence, it should be outlined that in isolation it remains an inexact means to demonstrate competence. Endoscopists are likely to need to have performed at least 20 esophagogastroduodenoscopies (EGDs) with signs of recent hemorrhage before they may be able to demonstrate proficiency in performing emergency procedures independently.

1. ESGE suggests a minimum number of 20 esophagogastroduodenoscopies (EGDs) with signs of recent hemorrhage, before endoscopists may demonstrate proficiency in performing emergency procedures independently. (Weak recommendation, low quality of evidence).

Evidence-based discussion

Procedure volume has been consistently incorporated in training programs of various basic (gastroscopy and colonoscopy) as well as advanced endoscopic procedures i.e., endoscopic retrograde cholangiopancreatography (ERCP) or endoscopic ultrasound (EUS) as a surrogate marker of competence with several lines of evidence supporting the notion that endoscopists' experience of the procedure due to systematic training is inextricably linked to competence. Management of UGIB poses additional challenges for endoscopists in terms of accurate patient assessment, application of medical and hemostatic procedures and real-time decision-making during life-threatening emergencies, hence educating endoscopists in the field of UGIB is of paramount importance.

Still, education remains suboptimal as only 60% of final year gastroenterology trainees expressed confidence in managing UGIB in a survey from the UK, with 82% of the respondents desiring additional training. To make things even more conflicting, most of trainees report a serious lack of exposure to hemostatic procedures, while almost one fifth (18.6%) of certified gastroenterologists report total lack of exposure to any type of endotherapy [3]. Furthermore, it should be highlighted that current established guidelines for UGIB do

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not provide any specific recommendation on this issue [4-6]. Despite this, it would be of great value for endoscopy training program directors as well as the trainees themselves the knowledge about the potential number of procedures needed where competence is likely to be attained.

Two studies have set out to investigate the requisite number of procedures needed before evaluation of competence. In a prospective study from Italy, performance of “experienced” compared to “less experienced” endoscopists in managing non-variceal UGIB was evaluated, with patients undergoing EGD by endoscopists with >100 emergency procedures presenting lower rebleeding rates and transfusion requirements compared to patients treated by endoscopists with 40–70 emergency procedures [7]. These results are in line with another recent retrospective study, where an association of lower experience and higher treatment failure rates was also noted [8]. However, in the abovementioned study authors went a step further by establishing a learning curve. The curve displays that a first decline in endoscopic treatment failure rates after at least nine (n=9) EGDs with stigmata of recent hemorrhage (SRH) is notable (39.1%), reaching the first plateau between 20 and 50 EGDs. A second decline is reported after 51 EGDs (33.1%) followed by another plateau phase up to 100 procedures, suggesting that endoscopists might be considered as advanced-qualified experts in managing UGIB after a minimum of 50 hemostatic procedures. Endoscopists with <10 emergency procedures had higher treatment failure rates compared to endoscopists with >51 emergency EGDs (p=0.039) or consultants (p=0.041), showing a clear-cut inverse association between treatment failure rates and growing experience.

ESGE therefore suggests that an endoscopist may be likely to require a procedure volume of a minimum of 20 cases before initial competence can be expected, bearing in mind that competence must be better evidenced than by case numbers alone. This suggested number of procedures should be considered for training programs as only the first hint regarding an absolute minimum case volume that endoscopists need to be exposed, after which competence assessment may be considered. Still, this under no circumstances can guarantee that necessary skills have been obtained as endoscopists neither learn at the same speed nor participate in procedures of similar difficulty level. While real world evidence indicate that it may be quite difficult to achieve even these numbers of procedures in everyday clinical practice, a remarkable decline over time in trainee experience in UGIB endoscopy is evident (76% vs. 15%; p<0.001 compared to 1996), raising doubts in a significant proportion (23%, 57/245) about competence in managing UGIB endoscopy by completion of specialty training [9]. This topic is likely to grow in importance, perhaps as forthcoming studies strengthen the notion that

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quality of endoscopy training assessment in management of UGIB should not base exclusively on procedure volume but to move on from a volume-based to a value-based model, strategy that seems to be indeed the case for training in new technologies in advanced endoscopy [10].

Q17: *Is standardized formative/summative assessment of performance required?*

***Statements*:** An endoscopist should undergo a formal summative assessment process prior to commencing independent practice in managing UGI cases.

Evidence-based discussion

ESGE proposes that the national legislature responsible for accreditation in endoscopy undertakes a formal assessment of endoscopists prior to independent UGIB management practice. This process should include an independent review to determine that the procedure numbers and potential performance measures have been attained. This process can also review whether an endoscopist has undertaken formal training courses and their progress in formative assessment when these have been brought into national training programs. Accreditation bodies should also consider a summative assessment, whereby an endoscopist is observed undertaking UGIB cases by independent assessors as a further robust test of competence beyond training experience and performance measures.

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Q18: *Is there a validated tool for assessing competence in MUGIB?*

***Statements*:** Competence assessment in managing UGIB cases should consider technical skills, as well as cognitive and integrative skills. Currently, there are no sufficient data to recommend application of a formal assessment tool (e. g. Direct Observation of Procedural Skills [DOPS]) during endoscopic training of UGIB that will allow the track acquisition of competence and to support endoscopist feedback.

Evidence-based discussion

Competence in endoscopic management of UGIB includes technical as well as cognitive and integrative skills acquisition. Therefore, the respective training programs should include assessment of the following parameters [11,12]. Technical skills include the ability to maneuver the endoscope effectively (safe intubation, scope navigation, tip control) and obtaining the optimal position for applying hemostasis modalities; it also involves knowledge of all the technical requirements of each technical modality. Cognitive skills include knowledge and capability to understand the potential diseases, indications, procedures, risks, benefits, and alternatives and management of antiplatelet agents and anticoagulants. Finally, integrative skills involve the capability to transform the knowledge into clinical decisions regarding the appropriate management of these patients.

Assessment holds the pivotal role in establishing an endoscopist's competence. Ideally, assessment should be evaluated by using a formal tool that allows to assess endoscopic skills by providing a framework for experts to observe, assess and provide feedback on a procedure. A number of openly available and validated assessments tools are currently recommended for other endoscopic procedures (e. g. Direct Observation of Procedural Skills [DOPS], the EUS and ERCP Skills Assessment Tool [TEESAT]) with several lines of evidence supporting their validity and reliability [13-15]. In a similar manner, a modified version of the DOPS (UGIB-DOPS) - specifically addressing the aspects of therapeutic endoscopic management related to UGIB - has been developed aiming to improve training and is openly available for use [16]. The tool's defined assessment criteria facilitated structured feedback with the overall grade awarded providing accurate reflection of the trainee's current competence; however, evidence supporting its role in the process of formative

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summative assessment remains scant [17]. In this context, a structured, formal tool, or criteria with which to assess and provide feedback for the specific generic and endoscopic skills required for effective management of UGIB remains to be defined.

Q19: *Is a volume of cases/year required to maintain competence in MUGIB?*

***Statements*:** Attainment of competence in endoscopic management of UGIB cases is a career-long process and it is suggested that endoscopists continue a period of mentored practice with an experienced colleague once they have reached competence.

Evidence-based discussion

Reaching the standards defined in the previous sections should not be regarded by endoscopists as the end of the learning process, rather than a checkpoint at which independent practice can start. Since evidence to support a recommendation regarding the potential volume of cases/year required to maintain competence are absent, ESGE proposes a mentoring period by a more experienced colleague at least for endoscopists starting to practice independently and particularly for challenging cases. It is also advisable for newly independent endoscopists to continue tracking records of their performed cases to document that they retain acceptable endoscopic treatment success rates as part of a regular assessment process. Although no evidence to support a recommendation as to how long the mentoring period should last is available, while the caseload can be variable, a period of at least 6 months seems reasonable.

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Q20: *Which pathways for referral to complementary specialties should be available when practicing independently?*

***Statements*:** Significant efforts must be devoted to establishing a multidisciplinary collaboration with multiple complementary healthcare professionals, including emergency physicians, surgeons, interventional radiologists, and intensivists when practicing independently. Cross-specialty collaboration ensures optimal communication, decisions and ultimately outcomes of patients with UGIB bleeding.

Evidence-based discussion

Endoscopic management of UGIB can be a challenging and cumbersome task that may often require involvement of multiple other healthcare professionals. In the UGIB context, fostering cross-specialty collaboration is of paramount importance, as such a collaboration may facilitate communication among healthcare professionals, promoting an individualized approach to the patients that is advantageous for healthcare facilities, interventional endoscopists, patients, and communities [18]. Development of critical pathways may enable a standardized approach to optimal treatment practices within institutions and networks as evidence accumulates for new treatments and management strategies. This may also allow a redefinition of the roles of team members, including endoscopists, critical care physicians, interventional radiologists, and surgeons. For this purpose, a structured template to guide providers in communicating key information in electronic referrals is an evidence-based practice and should be also envisaged to healthcare facilities [19].

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Appendix 2s. Delphi process

Round 1: 12th May 2025

Statements:

1. Before commencing hands-on UGIB training, trainees should have thorough knowledge of: pathology, vascular anatomy, technical use of devices, clinical care pathways, and all relevant components of pre, intra and post procedural patient care. (agreement: 100%)

2. Preadoption technical skills for management of UGIB training include adequate scope handling, intubation technique, washing and suctioning of residue, mucosal examination, and handling of accessories. (agreement:100%)

3. Preadoption technical skills required for training in the management of UGIB should be assessed individually based on a competency framework and not solely on numerical thresholds. (agreement: 100%)

4. The integrative skills required for the management of UGIB do not essentially differ from those needed in other endoscopic procedures and should include adequate situational awareness, collaboration, team leadership, and patient communication in order to ensure short and long-term goals. (agreement: 100%)

5. The trainee should reach minimum recommended standards for key performance indicators in upper gastrointestinal endoscopy before starting training in the management of UGIB. (agreement:73%)

6. Attendance of at least one half-day training session on a dedicated simulator that provides GI bleeding training early on during training for management of UGIB is recommended. (agreement: 79%)

7. Trainees should be supervised directly and carefully during UGIB training for a minimum of 20 procedures with endoscopic stigmata of recent hemorrhage in order to prevent failure of hemostasis and ensure adequate trainee skill acquisition. (agreement: 94%)

8. Trainers should take into account pre-endoscopic and intraprocedural factors predicting outcome, technical complexity, or risk of hemostatic failure when deciding appropriateness and degree of trainee involvement in case management. (agreement: 100%)

9. The trainee should first master common techniques such as injection of adrenaline, band ligation, thermal probes, and through-the-scope clips before more technically demanding or less frequently used modalities such as cap-mounted clips or injection of sclerosing agents. (agreement:78%)

10. ESGE recommends that trainers use “successful hemostasis” defined as the absence of any further bleeding (persistent or recurrent bleeding) as the goal of training in the management of UGIB. (agreement: 83%)

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11. Patients with recurrent bleeding should be treated by experienced endoscopists or by a trainee under their direct supervision due to higher risk of failure of conventional endoscopic treatment. (agreement: 100%)

12. Trainers who are teaching management of UGIB should fulfil the same standards as any trainer of basic endoscopy procedures. (agreement: 89%)

13. Trainees should be exposed to multidisciplinary team discussions and care pathways for failed endoscopic treatment of UGI bleeding. (agreement: 100%)

14. Since case volumes may be limited outside emergency hospitals, short-term immersive training periods in centers with high-volume caseloads of UGIB to ensure sufficient exposure is suggested. (agreement: 100%)

15. Competency in managing UGI bleeding is defined as the ability to assess the need for endoscopy, plan, and carry out successful hemostasis. (agreement: 94%)

16. ESGE suggests that a trainee should manage a minimum number of 30 cases with signs of recent hemorrhage before evaluation of competence in management of upper GI bleed. (agreement: 78%)

17. UGIB-DOPS is suggested as a formative assessment tool during training to track acquisition of competence and support feedback. (agreement: 83%)

18. A formal summative assessment of competence in MUGIB in the process of credentialing at the end of training is recommended. (agreement: 78%)

19. Endoscopists should continue a period of tracking results and mentored practice with an experienced colleague for at least 6 months after achieving competence in managing UGIB. (agreement: 94%)

20. Any endoscopist responsible for management of acute UGIB should have access to or referral pathways for connecting specialties (including emergency physicians, surgeons, interventional radiologists) when practicing independently. (agreement: 94%)

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Round 2: 25th August 2025

Statements:

1. Before commencing hands-on UGIB training, trainees should have thorough knowledge of: pathology, vascular anatomy, technical use of devices, clinical care pathways, and all relevant components of pre, intra and post procedural patient care. (agreement: 100%)

2. Preadoption technical skills for management of UGIB training include adequate scope handling, intubation technique, washing and suctioning of residue, mucosal examination, and handling of accessories. (agreement: 100%)

3. Preadoption technical skills required for training in the management of UGIB should be assessed individually based on a competency framework and not solely on numerical thresholds. (agreement: 100%)

4. The integrative skills required for the management of UGIB do not essentially differ from those needed in other endoscopic procedures and should include adequate situational awareness, collaboration, team leadership, and patient communication in order to ensure short and long-term goals. (agreement: 100%)

5. The trainee should reach minimum recommended standards for key performance indicators in upper gastrointestinal endoscopy before starting training in the management of UGIB. (agreement: 100%)

6. Attendance of at least one half-day training session on a dedicated simulator that provides GI bleeding training at the beginning of training for management of UGIB is advised. (agreement: 100%)

7. Trainees should be supervised directly and carefully during UGIB training for a minimum of 20 procedures with endoscopic stigmata of recent hemorrhage in order to prevent failure of hemostasis and ensure adequate trainee skill acquisition. (agreement: 95%)

8. Trainers should take into account pre-endoscopic and intraprocedural factors predicting outcome, technical complexity, or risk of hemostatic failure when deciding appropriateness and degree of trainee involvement in case management. (agreement: 100%)

9. During their training, trainees should be exposed to all hemostatic modalities, as per ESGE guideline recommendations and the opportunities for teaching arising from the specifics of each UGIB case. (agreement: 95%)

10. Trainers should use “successful hemostasis”, defined as the absence of any further bleeding (persistent or recurrent bleeding), as the ultimate goal of training in the endoscopic management of UGIB. (agreement: 89%)

11. Patients with recurrent bleeding should be treated by experienced endoscopists or by a trainee under their direct supervision due to higher risk of failure of conventional endoscopic treatment. (agreement: 100%)

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12. Trainers who are teaching management of UGIB should fulfil the same standards as any trainer of basic endoscopy procedures. (agreement: 89%)

13. Trainees should be exposed to multidisciplinary team discussions and care pathways for failed endoscopic treatment of UGI bleeding. (agreement: 100%)

14. Training centers with limited UGIB case volumes are encouraged to offer short-term immersive training in centers with high-volume caseloads of UGIB in order to ensure sufficient exposure for trainees. (agreement: 95%)

15. Competency in managing UGI bleeding is defined as the ability to assess the need for endoscopy, plan, and carry out successful hemostasis. (agreement: 95%)

16. Trainees should manage an indicative number of 30 cases in which successful hemostasis is achieved before evaluation of competence in management of upper GI bleeding. (agreement: 95%)

17. UGIB-CAT is advised as a formative assessment tool during training to track acquisition of competence and provide trainee feedback. (agreement: 95%)

18. Trainees should undergo a formal summative assessment of competence in managing UGIB during their training. (agreement: 100%)

19. Endoscopists should continue a period of tracking results and mentored practice with an experienced colleague for at least 6 months after achieving competence in managing UGIB. (agreement: 89%)

20. As trainees move to independent practice, they should have established access to or referral pathways for key supporting involved in the management of acute UGIB specialties (including emergency medicine, surgery, and interventional radiology). (agreement: 95%)

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Appendix 3s. UGIB-CAT

Competency Assessment Tools for Variceal and Non-Variceal Upper Gastrointestinal Bleeding (UGIB-CAT-NV and UGIB-CAT-V)

Overview

The UGIB-CAT provides structured assessment of endoscopist competency in managing upper gastrointestinal bleeding. This tool translates ESGE Guidelines into practical assessment frameworks for both non-variceal and variceal hemorrhage.

Methodology

The development of the Upper GI Bleeding Competency Assessment Tool (UGIB-CAT) followed the same structured framework established in previous documents of the European Society of Gastrointestinal Endoscopy (ESGE) and encompassed: tool development, validation, and implementation planning across a multi-phase process.

Phase 1: Preliminary Literature Review

A preliminary literature search was conducted across MEDLINE, EMBASE, and Cochrane databases to identify existing competency assessment tools for upper gastrointestinal bleeding management. The search strategy employed terms including "upper gastrointestinal bleeding," "competency assessment," "endoscopy training," "variceal hemorrhage," and "peptic ulcer bleeding." While several general endoscopic assessment tools were identified (e.g., DOPS), none comprehensively addressed both non-variceal and variceal upper GI bleeding with the granularity required to capture guideline-specific technical competencies. This gap justified the development of a bespoke assessment tool aligned with contemporary ESGE guidelines.

Phase 2: Establishment of the Competency Framework

Evidence Base Selection

The UGIB-CAT was constructed using the following ESGE documents:

- ESGE Guideline on Non-variceal Upper GI Hemorrhage (2021) - Gralnek IM et al., Endoscopy 2021;53(3):300-332
- ESGE Guideline on Variceal Hemorrhage (2022) - Gralnek IM et al., Endoscopy 2022;54(11):1094-1120
- Baveno VII Consensus (2022) - de Franchis R et al., J Hepatol 2022;76(4):959-974

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Guideline Analysis

Each guideline underwent systematic review to identify recommendations with direct implications for procedural competency. Recommendations were categorized by strength of evidence (strong vs. weak recommendations) and mapped to observable endoscopic behaviors. This process yielded 17 core competency statements for non-variceal bleeding and 21 statements for variceal hemorrhage.

Phase 3: Statement Selection and Adaptation for Assessment

Domain Organization

Competency statements were organized into temporal procedural domains reflecting the natural workflow of UGIB management:

Non-Variceal UGIB (4 domains):
1. Pre-Management (risk stratification, timing, patient optimization)
2. Field Control (irrigation, suctioning, position optimization)
3. Hemostasis (technique selection, execution, verification)
4. Follow-up (surveillance, pharmacotherapy, documentation)

Variceal UGIB (6 domains):
1. Pre-Management (prophylaxis indication, pharmacotherapy timing)
2. Field Control (visualization strategies, suctioning techniques)
3. Endoscopic Band Ligation (technical execution, safety)
4. Gastric Varices (classification, cyanoacrylate technique)
5. Rescue & TIPS (timing recognition, balloon tamponade)
6. Follow-up (surveillance intervals, secondary prophylaxis)

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Multi-Domain Integration

Each statement was classified across three assessment dimensions:
• Cognitive/Decision-Making Skills: Risk stratification, lesion classification (Forrest, GPGE), hemostasis strategy selection, rescue therapy timing

• Technical (Practical) Skills: Manual dexterity, instrument handling, procedural execution (e.g., band ligation technique, injection therapy precision)
• Integrative Skills: Situational awareness, case prioritization, equipment selection, endoscope navigation

Assessment Modality Determination

Each competency statement was designated as evaluable through:
• Video-based assessment: Observable technical actions (e.g., dual therapy execution, band placement technique)
• Live assessment only: Real-time decisions requiring knowledge of patient parameters not captured on video (e.g., antibiotic prophylaxis timing, pre-endoscopy resuscitation)
• Both modalities: Statements assessable in either context (e.g., visual field optimization, lesion identification)
This classification enables flexible implementation across different training contexts, supporting both real-time clinical assessment and structured video-based review sessions.

Phase 4: Expert Review and Consensus Process

Expert Panel Composition

The UGIB-CAT underwent content validation by an international expert panel comprising:
• Lynn Debels
• David Tate

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Validation Process

Expert reviewers evaluated:
1. Content Validity: Completeness of guideline coverage, absence of critical omissions
2. Face Validity: Clarity of statement wording, feasibility of assessment
3. Descriptor Adequacy: Appropriateness of 5-point scale anchors for each statement

Reviewers provided free-text feedback on statement clarity and suggested modifications to performance descriptors. Statements achieving unanimous expert agreement were retained unchanged; those with divergent opinions were refined through iterative discussion until consensus was reached.

Common Statement Identification

Seven competency statements were identified as applicable to both non-variceal and variceal bleeding with technique-specific variations (denoted by "C" marker in the tool). These statements address universal principles (e.g., field visualization, lesion assessment, dual therapy when indicated) while accommodating modality-specific technical nuances.

Phase 5: Scoring Rubric Development

Scale Selection

A 5-point Likert scale was adopted (1 = Very Poor, 2 = Poor, 3 = Satisfactory, 4 = Good, 5 = Very Good) based on established precedent in endoscopic competency assessment and cognitive load considerations for real-time scoring.

Anchor Point Definition

For each competency statement, performance descriptors were developed to define:
• Minimum Standard (Score 3 - Satisfactory): Baseline competency expected for safe independent practice under indirect supervision
• Excellence (Score 5 - Very Good): Expert-level performance demonstrating efficiency, anticipation of complications, and optimal technique
• Deficiency (Score 1-2): Performance requiring intervention or representing patient safety concerns

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Percentage Score Calculation

Overall competency is expressed as:
- Raw Score: Sum of individual statement scores
- Maximum Possible Score: 85 (Non-Variceal), 105 (Variceal)
- Percentage Score: (Raw Score / Maximum Score) × 100

Performance Thresholds

Evidence-informed cutoffs were established:
- ≥85%: Readiness for indirect supervision (independent practice with senior backup)
- 70-84%: Competent with targeted coaching needs
- 50-69%: Developing competency requiring direct supervision
- <50%: Fundamental deficiencies requiring structured remediation

These thresholds align with competency progression frameworks used in gastrointestinal endoscopy fellowship programs.

Phase 6: Procedure Difficulty Stratification

The UGIB-CAT acknowledges heterogeneity in case complexity through integration with established difficulty classification systems:

Non-Variceal Bleeding

- Forrest Classification (Ia-III): Active arterial bleeding (Ia) represents highest difficulty; clean-based ulcer (III) represents lowest
- Lesion Factors: Size (>2cm), location (posterior duodenal wall, lesser curve), vessel visibility
- Patient Factors: Hemodynamic instability, rebleeding presentations, antithrombotic therapy

Variceal Bleeding

- GPGE Classification (GOV1, GOV2, IGV1, IGV2): Gastric varices (especially IGV1) represent higher technical complexity
- Bleeding Activity: Active spurting vs. oozing vs. stigmata of recent hemorrhage
- Prior Treatment: Primary vs. secondary prophylaxis vs. rescue therapy scenarios

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Assessment Strategy

Trainees should be assessed across a spectrum of difficulty levels before summative competency determination. Suggested minimum case mix:
- 5 assessments for non-variceal UGIB (including ≥2 Forrest Ia/Ib cases)
- 5 assessments for variceal bleeding (including ≥1 gastric variceal case)

Phase 7: Digital Platform Development (Planned)

Platform Requirements

To facilitate widespread implementation, the UGIB-CAT is designed for integration into digital learning management systems (e.g., ESGE Academy) with the following specifications:

Core Functionality:
- Form-based data entry with dropdown menus for each competency statement
- Trainer-trainee relationship management (assignment of assessments)
- Case metadata capture (Forrest classification, lesion characteristics, rebleeding status)
- Automated score calculation and threshold-based feedback generation

Dashboard Analytics:
- Individual trainee progress tracking across multiple assessments
- Performance trending by domain (identifying specific competency gaps)
- Difficulty-stratified analysis (performance correlation with case complexity)
- Inter-trainee and inter-institutional benchmarking capabilities

Data Export:
- Standardized reporting for credentialing portfolios
- Aggregate data extraction for educational research
- Quality improvement metric integration

Phase 8: Validation and Reliability Testing (Future Directions)

Following the ESGE Position Statement framework, the UGIB-CAT will undergo multi-stage validation:

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Construct Validity

Hypothesis: Expert endoscopists will achieve significantly higher UGIB-CAT scores than trainees when assessed on identical case videos.
- Methodology: Generalized Linear Mixed Models (GLMM) with experience level as fixed effect, rater and case difficulty as random effects
- Success Criterion: Significant effect of experience level ($p < 0.05$) with large effect size (Cohen's $d > 0.8$)

Criterion Validity

Hypothesis: Higher UGIB-CAT scores correlate with improved clinical outcomes (hemostasis rates, rebleeding rates, procedure time).
- Methodology: GLMM with CAT scores predicting key performance indicators (KPIs); ROC curve analysis
- Success Criterion: AUC > 0.80 for predicting successful hemostasis without rebleeding

Inter-Rater Reliability

Hypothesis: Multiple assessors will demonstrate substantial agreement when scoring the same procedures.
- Methodology: Intraclass Correlation Coefficient (ICC 2,k) using two-way random-effects model across ≥3 raters and ≥30 cases
- Success Criterion: ICC ≥ 0.75 (indicating excellent reliability)

Test-Retest Reliability

Hypothesis: Assessors will demonstrate consistent scoring when re-evaluating the same cases after a washout period.
- Methodology: Paired assessment with 4-week interval; Bland-Altman analysis
- Success Criterion: <10% mean difference, narrow limits of agreement

Feasibility and Acceptability

Post-implementation surveys will assess:
- Time to complete assessment (target: <5 minutes)
- Perceived clarity of competency statements
- Utility for providing actionable feedback
- Trainer and trainee satisfaction (target: ≥4/5 mean rating)

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Phase 9: Implementation and Continuous Quality Improvement

Integration into Training Programs

The UGIB-CAT is designed for incorporation into gastroenterology fellowship curricula and advanced endoscopy training programs through:

- Mandatory assessment at defined training milestones (6-month intervals)
- Video-based group review sessions for formative feedback
- Integration with simulation training (ex-vivo models, virtual reality)
- Portfolio documentation for credentialing applications

Artificial Intelligence Integration (Future)

The standardized structure enables future AI-assisted assessment:

- Automated recognition of procedural steps from video
- Real-time scoring suggestions for technical domains
- Natural language processing of procedure reports for cognitive domain assessment
- Machine learning models trained on expert-labeled cases to enhance objectivity

Iterative Refinement

The UGIB-CAT will undergo periodic revision based on:

- Updated guideline publications (ESGE, ASGE, Baveno consensus)
- User feedback from multi-center implementation
- Validation study findings revealing ambiguous or unreliable statements
- Emerging evidence on competency-outcome correlations

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Limitations and Considerations

Scope Boundaries

The UGIB-CAT specifically addresses endoscopic hemostasis techniques and does not comprehensively assess:
- Pre-endoscopy resuscitation protocols (outside endoscopist control)
- Complex decision-making in multi-morbid patients (requires full clinical context)
- Rare scenarios (Dieulafoy lesions, aorto-enteric fistulas) not addressed in guidelines

Generalizability

While based on European guidelines, the tool is designed for international applicability with recognition that:
- Resource-limited settings may lack certain devices (hemostatic powders, over-the-scope clips)
- Regional practice variations exist (e.g., preference for sclerotherapy in some regions)
- Local adaptation may be required for specific healthcare contexts

Assessment Context

Video-based assessment cannot fully capture:
- Real-time clinical reasoning communicated verbally during procedures
- Teamwork and communication with nursing staff
- Physical ergonomics and patient safety behaviors (consent process, timeout procedures)

Hybrid assessment approaches combining live observation and video review are recommended for comprehensive competency evaluation.

Primary References

(1) Gralnek IM et al. ESGE Guideline – Non-variceal UGIH 2021. Endoscopy 2021;53(3):300-332.

(1) Gralnek IM et al. ESGE Guideline – Variceal hemorrhage 2022. Endoscopy 2022;54(11):1094-1120.

(2) de Franchis R et al. Baveno VII. J Hepatol 2022;76(4):959-974.

C = Identical competency statement in both NV-UGIB and V-UGIB CATs

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Part 1: Non-Variceal Upper GI Bleeding

17 competency statements across 4 domains:

Domain 1: Pre-Management (1-4)
Domain 2: Field Control (5-7)
Domain 3: Hemostasis (8-13)
Domain 4: Follow-up (14-17)

# & Statement	Key Elements	Scoring Guidance	Guideline
1. Risk Stratification & Timing	• Glasgow-Blatchford Score (GBS) documentation • Early endoscopy planning (≤24 hours for high-risk patients) • Safe discharge planning for low-risk patients (GBS 0-1)	1: No risk stratification or inappropriate timing 3: Risk assessed but timing decision suboptimal 5: GBS documented, appropriate timing selected	ESGE #2-4 (1)
2. Transfusion Strategy (C)	• Restrictive transfusion threshold (Hb ≤7 g/dL) • Higher threshold for cardiovascular disease (Hb ≤8-10 g/dL) • Avoidance of over-transfusion	1: Liberal transfusion strategy 3: Transfusion given but threshold not clearly justified 5: Restrictive strategy applied appropriately	ESGE #6 (1)
3. Antiplatelet/Anticoagulant Management	• Appropriate continuation/interruption of antiplatelet therapy • Anticoagulant reversal only if truly indicated • Plan for resumption post-hemostasis • Not delaying endoscopy for reversal	1: Unnecessary interruption or delayed endoscopy 3: Plan present but not optimally individualized 5: Evidence-based plan balancing bleeding and thrombotic risk	ESGE #15-18 (1)
4. Airway & Preparation (C)	• Avoiding routine nasogastric tube (NGT) placement • Selective use of IV erythromycin (250mg, 30-120 min pre-procedure) • Avoiding routine intubation except when truly indicated • Appropriate aspiration risk assessment	1: Routine NGT/intubation or failure to use erythromycin 3: Some unnecessary interventions but no harm 5: Selective, evidence-based use	ESGE #7, #10-12 (1)
5. Visualization Strategy (C)	• Rapid field clearing with high-flow irrigation • Use of transparent cap for displacement of blood/clot • Patient positioning (gravity-assisted) for blood pooling • Water immersion or under-saline view techniques • Image enhancement (NBI, BLI, LCI)	1: Poor visualization compromising lesion identification 3: Adequate visualization but missed opportunities 5: Systematic use of multiple techniques including positioning	ESGE #2 (1)

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# & Statement	Key Elements	Scoring Guidance	Guideline
6. Tamponade & Localization (C)	• Using scope tip or cap to tamponade ulcer/lesion while maintaining contact • Precise localization of bleeding point or visible vessel • Stable positioning to enable therapeutic intervention • Firm pressure for non-variceal lesions	1: Failed tamponade or unable to localize 3: Some tamponade but unstable localization 5: Effective tamponade with stable target for therapy	ESGE #3 (1)
7. Clot Management	• Safe clot removal with snare/irrigation when needed • Exposing underlying stigmata (visible vessel, adherent clot) • Assessing necessity vs. risk of clot removal • Forrest classification accuracy	1: Inappropriate clot removal causing rebleeding 3: Clot removed but technique suboptimal 5: Judicious clot removal exposing stigmata safely	ESGE #9 (1)
8. Injection of Adrenaline	• Using adrenaline only as part of combination therapy (never monotherapy) • Recognizing adrenaline's role as adjunct • 4-quadrant technique with appropriate volumes	1: Adrenaline monotherapy 3: Adrenaline used but plan for definitive therapy unclear 5: Adrenaline used appropriately as adjunct only	ESGE #13a (1)
9. Contact Thermal	• Heater probe or bipolar electrocoagulation • Coaptive coagulation (pressure + energy) • Appropriate power settings • Multiple applications if needed	1: Wrong device or unsafe settings 3: Acceptable device but settings not optimized 5: Optimal device and settings for lesion type	ESGE #13b (1)
10. Through-the-Scope Clip	• Capturing visible vessel or adherent clot base • Confirming complete closure of vessel lumen • Adequate jaw opening and tissue capture	1: Clip misplaced or vessel not captured 3: Clip applied but vessel closure incomplete 5: Precise vessel targeting with complete closure	ESGE #14 (1)
11. Recognizing TTS Clip Limitations	• Recognizing when TTS clips are suboptimal (large vessel >2mm, fibrotic ulcer) • Appropriate escalation to OTSC or alternative therapy • Not persisting with TTS clips when failing	1: Persists with TTS clips despite repeated failure 3: Eventually escalates after unnecessary attempts 5: Early recognition with appropriate escalation	ESGE #14, #17 (1)
12. Cap-Mounted Clip (OTSC)	• OTSC as first-line for large vessels (>2mm), fibrotic ulcers • Appropriate OTSC type and size selection • Optimal positioning with lesion centered • Full tissue capture before release	1: OTSC not used when indicated 3: OTSC used but only after TTS clip failure 5: OTSC selected proactively	ESGE #17 (1)
13. Other Hemostatic Modalities	• Hemostatic powder for diffuse/refractory bleeding • Hemostatic forceps with appropriate settings • APC for non-arterial oozing • Use as rescue when standard therapy fails	1: Inappropriate use or poor technique 3: Used but application suboptimal 5: Appropriate rescue therapy with good technique	ESGE #18-19 (1)
14. Confirmation & Documentation (C)	• Irrigate and inspect lesion after hemostasis • Stress-test to ensure durability • Document Forrest classification, devices used, settings • High-quality photos pre- and post-treatment	1: No confirmation or minimal documentation 3: Adequate documentation but incomplete stress-testing 5: Thorough confirmation with comprehensive documentation	ESGE #3 (1)

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# & Statement	Key Elements	Scoring Guidance	Guideline
15. Pharmacotherapy	• High-dose PPI: 80mg IV bolus + 8mg/h infusion × 72 hours • Transition to oral PPI after 72 hours • Continue PPI for appropriate duration (≥4-8 weeks)	1: No PPI or inappropriate dosing 3: PPI given but dose/duration suboptimal 5: Correct high-dose PPI regimen initiated	ESGE #1-2 (1)
16. Rebleed Plan (C)	• Clear clinical triggers for escalation • Repeat endoscopy as first-line for rebleeding • Transcatheter arterial embolization (TAE) for failure • Surgery as final rescue • Multidisciplinary discussion	1: No rebleed plan 3: Plan present but not clearly communicated 5: Comprehensive escalation pathway documented	ESGE #3-5 (1)
17. H. pylori & Antithrombotic Management	• H. pylori testing at index endoscopy • Retesting if initial test negative • Eradication therapy with confirmation • Structured antiplatelet/anticoagulant resumption (1-3 days) • PPI co-therapy with antithrombotics	1: No H. pylori testing or unsafe antithrombotic management 3: Testing done but follow-up plan incomplete 5: Complete H. pylori and antithrombotic plan	ESGE #7-12 (1)

Score Interpretation

Score	Interpretation	Recommendation
≥85%	Indirect supervision	Independent on routine NV-UGIB
70-84%	Targeted coaching	Review lowest-scoring domains
<70%	Direct supervision	Structured training; simulation

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General Scoring Rubric

All competency statements use the following standardized 5-point scale:

Score	Level	Description
5	Very Good	Exemplary performance. All guideline elements met with optimal technique. Demonstrates mastery and ability to teach others.
4	Good	Competent performance with minor areas for improvement. All critical elements met. Safe and effective.
3	Adequate	Acceptable performance meeting minimum standards. Some guideline elements missed but no patient harm. Requires supervision.
2	Poor	Below acceptable standard. Significant guideline deviations or technical errors. Potential for patient harm. Needs direct supervision.
1	Very Poor	Unacceptable performance. Major guideline violations or unsafe practice. Patient harm occurred or likely. Requires immediate remediation.

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Part 2: Variceal Upper GI Bleeding

21 competency statements across 6 domains:

Domain 1: Pre-Management (1-5)
Domain 2: Field Control (6-8)
Domain 3: Endoscopic Band Ligation (9-12)
Domain 4: Gastric Varices (13-14)
Domain 5: Rescue & TIPS (15-18)
Domain 6: Follow-up (19-21)

# & Statement	Key Elements	Scoring Guidance	Guideline
1. Risk Stratification & Triage	• Document liver disease severity (Child-Pugh/MELD) • Identify high-risk features (Child-Pugh C ≤13, active bleeding) • Complete risk stratification at presentation	1 (Very Poor): No risk assessment performed 2 (Poor): Incomplete risk assessment 3 (Adequate): Basic stratification without complete scoring 4 (Good): Good stratification with minor gaps 5 (Very Good): Complete stratification with Child-Pugh/MELD documented	ESGE #4 (1,2)
2. Vasoactive Therapy Initiation	• Immediate initiation (terlipressin/octreotide/somatostatin) • Planned 5-day duration • No delay in administration	1 (Very Poor): No vasoactive therapy or significant delay 2 (Poor): Delayed initiation 3 (Adequate): Initiated but timing suboptimal 4 (Good): Prompt initiation with minor delays 5 (Very Good): Immediate initiation with planned duration	ESGE #5 (1)
3. Antibiotic Prophylaxis	• Initiate at presentation (ceftriaxone 1g IV daily × 7 days preferred) • Immediate appropriate antibiotic choice • Documented duration	1 (Very Poor): No antibiotic prophylaxis 2 (Poor): Wrong choice or significant delay 3 (Adequate): Appropriate antibiotic but delayed 4 (Good): Timely initiation with minor issues 5 (Very Good): Immediate appropriate antibiotic with clear plan	ESGE #6 (1)
4. Transfusion Strategy in Cirrhosis (C)	• Restrictive RBC transfusion (Hb ≤7 g/dL; target 7-9 g/dL) • Avoid routine platelet/FFP transfusion • Document transfusion rationale	1 (Very Poor): Liberal transfusion strategy 2 (Poor): Inappropriate thresholds 3 (Adequate): Transfusion given but threshold not optimal 4 (Good): Restrictive strategy with minor deviations 5 (Very Good): Restrictive strategy with target 7-9 g/dL	ESGE #3 (1)

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# & Statement	Key Elements	Scoring Guidance	Guideline
5. Pre-Endoscopy Preparation (C)	• Selective erythromycin use (250mg IV 30-120 min pre) • Avoid routine NGT placement • Timing endoscopy ≤12 hours • Prepare EBL kit before procedure	1 (Very Poor): Delays or inadequate preparation 2 (Poor): Multiple preparation issues 3 (Adequate): Acceptable timing but prep suboptimal 4 (Good): Good preparation with minor gaps 5 (Very Good): Optimal timing with complete EBL kit preparation	ESGE #7-8 (1)
6. Field Clearing (C)	• Rapid field clearing using careful high-flow irrigation • Transparent cap deployment for variceal wall visualization • Where available, use of adjuncts such as Red dichromatic imaging (RDI) for varix identification	1 (Very Poor): Unable to clear field adequately 2 (Poor): Poor visualization compromising assessment 3 (Adequate): Basic clearing but missed RDI opportunities 4 (Good): Good field control with cap and irrigation 5 (Very Good): Systematic clearing optimized for varices	ESGE (1)
7. Varix Identification	• Accurate identification of bleeding source (esophageal vs. gastric varices) • Grade varix size appropriately • Document high-risk stigmata (red wale marks, cherry-red spots)	1 (Very Poor): Wrong bleeding source identified 2 (Poor): Incomplete or inaccurate identification 3 (Adequate): Basic identification without complete grading 4 (Good): Accurate identification with minor documentation gaps 5 (Very Good): Accurate identification with complete grading and stigmata	ESGE (1)
8. Tamponade for Varices (C)	• Safe scope tip/cap tamponade technique for variceal bleeding • Maintain stable localization of bleeding varix • Gentle technique respecting thin variceal wall • Avoid excessive pressure to prevent rupture	1 (Very Poor): Unsafe tamponade causing variceal injury 2 (Poor): Unstable or inadequate variceal control 3 (Adequate): Adequate tamponade but gentleness concerns 4 (Good): Safe effective tamponade with minor issues 5 (Very Good): Gentle, effective technique with stable varix localization	ESGE (1)
9. EBL Device Setup	• Select appropriate multi-band device • Complete verified setup before intubation • Check all bands are loaded properly • Test firing mechanism	1 (Very Poor): Device malfunction or improper setup 2 (Poor): Setup issues requiring troubleshooting 3 (Adequate): Functional setup but not verified 4 (Good): Good setup with minor issues 5 (Very Good): Optimal verified setup before procedure	ESGE #9 (1)
10. EBL Band Deployment	• Deploy bands systematically (distal to proximal, spiral pattern) • Treat bleeding point first • Complete varix capture before firing • Appropriate number of bands	1 (Very Poor): Poor targeting or systematic failure 2 (Poor): Inconsistent band placement 3 (Adequate): Adequate banding but not systematic 4 (Good): Good systematic approach with minor issues 5 (Very Good): Systematic deployment with complete varix capture	ESGE #9 (1)
11. EBL Confirmation (C)	• Confirm hemostasis after banding • Document number of bands deployed • Recognize when EBL is insufficient • Comprehensive photo documentation	1 (Very Poor): Unrecognized ongoing bleeding 2 (Poor): Incomplete confirmation or documentation 3 (Adequate): Basic confirmation but incomplete documentation 4 (Good): Good confirmation with minor documentation gaps 5 (Very Good): Confirmed hemostasis with comprehensive documentation	ESGE #9 (1)

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# & Statement	Key Elements	Scoring Guidance	Guideline
12. EBL Complication Avoidance	• Avoid deep ulceration from excessive banding • Avoid banding non-variceal tissue • Minimize esophageal trauma • Recognize complications early	1 (Very Poor): Major complication occurred 2 (Poor): Significant trauma or inappropriate banding 3 (Adequate): Minor trauma but no major complications 4 (Good): Safe technique with minimal issues 5 (Very Good): Safe technique avoiding all complications	ESGE #9 (1)
13. Cyanoacrylate Indication	• Correctly indicate cyanoacrylate for cardiofundal varices (GOV2, IGV1) • Prepare glue/lipiodol mixture appropriately • Understand when cyanoacrylate preferred over EBL	1 (Very Poor): Wrong indication or no preparation 2 (Poor): Suboptimal indication or preparation 3 (Adequate): Correct indication but preparation issues 4 (Good): Good indication with minor preparation gaps 5 (Very Good): Correct indication with optimal preparation	ESGE #12 (1)
14. Cyanoacrylate Technique	• Intravariceal injection with appropriate volume (0.5-1.0 mL) • Rapid catheter withdrawal after injection • Avoid embolization complications • Flush with sterile water	1 (Very Poor): Failed injection or embolization 2 (Poor): Suboptimal technique with complications 3 (Adequate): Successful injection but technique not ideal 4 (Good): Good technique with minor issues 5 (Very Good): Safe precise technique avoiding complications	ESGE #12 (1)
15. SEMS Deployment	• Deploy esophageal SEMS correctly when EBL fails • Recognize SEMS superiority over balloon tamponade • Proper positioning and deployment technique • Bridge to TIPS within 24-48 hours	1 (Very Poor): Failed deployment or wrong device choice 2 (Poor): SEMS deployed with significant issues 3 (Adequate): Successful deployment but not optimal 4 (Good): Good deployment with minor issues 5 (Very Good): Successful deployment as bridge to TIPS	ESGE #14 (1)
16. Rescue TIPS Recognition	• Recognize endoscopic failure early (persistent bleeding after 2 attempts) • Initiate rescue TIPS discussion promptly • Avoid futile repeated endoscopic attempts	1 (Very Poor): Futile repeated attempts without escalation 2 (Poor): Delayed recognition of failure 3 (Adequate): Eventually recognizes failure but delayed 4 (Good): Timely recognition with minor delays 5 (Very Good): Early recognition with immediate escalation	ESGE #11 (1)
17. Pre-emptive TIPS Identification	• Identify high-risk patients for pre-emptive TIPS (Child-Pugh C ≤13 or B with active bleeding) • Calculate Child-Pugh score accurately • Document risk features clearly	1 (Very Poor): Fails to identify high-risk patients 2 (Poor): Incomplete risk identification 3 (Adequate): Identifies risk but calculation incomplete 4 (Good): Good identification with minor gaps 5 (Very Good): Accurate identification with complete Child-Pugh score	ESGE #10 (1,2)
18. Pre-emptive TIPS Consultation	• Consult IR for pre-emptive TIPS within 72h (preferably 24h) • Clear communication of high-risk features • Document TIPS plan in medical record	1 (Very Poor): No consultation or significant delay 2 (Poor): Delayed or incomplete consultation 3 (Adequate): Consultation within 72h but not optimal timing 4 (Good): Good consultation with minor delays 5 (Very Good): Immediate consultation within 24h with clear TIPS plan	ESGE #10 (1,2)

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# & Statement	Key Elements	Scoring Guidance	Guideline
19. Pharmacotherapy Continuation	• Continue vasoactive therapy (up to 5 days) post-hemostasis • Continue antibiotics (7 days total) • Document therapy duration clearly	1 (Very Poor): Premature discontinuation 2 (Poor): Incomplete therapy duration 3 (Adequate): Therapy continued but documentation incomplete 4 (Good): Appropriate continuation with minor gaps 5 (Very Good): Appropriate continuation with clear documentation	ESGE #5 (1)
20. Secondary Prophylaxis	• Plan repeat EBL at 1-4 week intervals until eradication • Initiate non-selective beta-blocker (NSBB) • Combination therapy (EBL + NSBB) for optimal prophylaxis	1 (Very Poor): No secondary prophylaxis plan 2 (Poor): Incomplete prophylaxis plan 3 (Adequate): Basic plan but not comprehensive 4 (Good): Good plan with minor gaps 5 (Very Good): Comprehensive plan with EBL schedule + NSBB	ESGE #15-16 (1)
21. Rebleeding Plan (C)	• Document rebleeding triggers clearly • Escalation pathway: repeat endoscopy → interventional (TAE/TIPS) → surgical • Patient/family education on warning signs • Multidisciplinary coordination	1 (Very Poor): No rebleeding plan documented 2 (Poor): Incomplete or unclear plan 3 (Adequate): Basic plan without patient education 4 (Good): Good plan with minor gaps in communication 5 (Very Good): Comprehensive plan with clear escalation and education	ESGE #11 (1)

Score Interpretation

Score	Interpretation	Recommendation
≥85%	Indirect supervision	Independent on routine V-UGIB
70-84%	Targeted coaching	Review lowest-scoring domains
<70%	Direct supervision	Structured training; simulation

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General Scoring Rubric

All competency statements use the following standardized 5-point scale:

Score	Level	Description
5	Very Good	Exemplary performance. All guideline elements met with optimal technique. Demonstrates mastery and ability to teach others.
4	Good	Competent performance with minor areas for improvement. All critical elements met. Safe and effective.
3	Adequate	Acceptable performance meeting minimum standards. Some guideline elements missed but no patient harm. Requires supervision.
2	Poor	Below acceptable standard. Significant guideline deviations or technical errors. Potential for patient harm. Needs direct supervision.
1	Very Poor	Unacceptable performance. Major guideline violations or unsafe practice. Patient harm occurred or likely. Requires immediate remediation.

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