

Curriculum for optical diagnosis of esophageal neoplasia and precursor lesions: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement



Authors

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published online 2025

Bibliography

Endoscopy

DOI 10.1055/a-2662-7978

ISSN 0013-726X

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This article is published by Thieme.

Georg Thieme Verlag KG, Oswald-Hesse-Straße 50, 70469 Stuttgart, Germany

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MAIN STATEMENTS

Pre-adoption

Endoscopists performing upper gastrointestinal (UGI) endoscopy should train to recognize the appearance of early esophageal cancer and its precursor lesions, for Barrett neoplasia and for squamous neoplasia, to improve detection rates.

Every endoscopist should have achieved competency in UGI endoscopy before commencing training in optical diagnosis in the UGI tract, and this requires personal experience of 300 UGI endoscopies and meeting the ESGE quality measures for UGI endoscopy.

Training

Endoscopists should undertake interactive training courses to improve diagnostic accuracy for esophageal preneoplastic and neoplastic lesions.

Endoscopists should train with the Barrett's Oesophagus-Related Neoplasia (BORN) module to improve detection and delineation for early Barrett's esophagus-related neoplasia.

Endoscopists should train in using the Prague classification to describe the circumferential and maximal extent of Barrett epithelium above the gastroesophageal junction.

Endoscopists should train in using the Paris classification to describe suspected neoplastic lesions within both Barrett and squamous epithelium.

Endoscopists should train in using virtual chromoendoscopy to assess both mucosal and vascular patterns in potentially neoplastic lesions in Barrett epithelium as being regular or irregular.

When using acetic acid chromoendoscopy for Barrett's esophagus inspection, endoscopists should be familiar with the appearance of neoplastic lesions by assessing loss of aceto-whitening and mucosal surface patterns.

Endoscopists should train in using the Japanese Esophageal Society (JES) classification to describe esophageal squamous cell lesions, to estimate the likelihood of and degree of dysplasia, and in the case of squamous cell cancer, the invasion depth.

SCOPE AND PURPOSE

This Position Statement of the European Society of Gastrointestinal Endoscopy (ESGE) aims to guide general gastroenterologists to optimize their skills in optical diagnosis of esophageal neoplasia and precursor lesions during upper gastrointestinal endoscopy. It provides good practice statements for a European core training curriculum for detection and classification of such lesions both for Barrett's esophagus-related and esophageal squamous cell neoplasia.

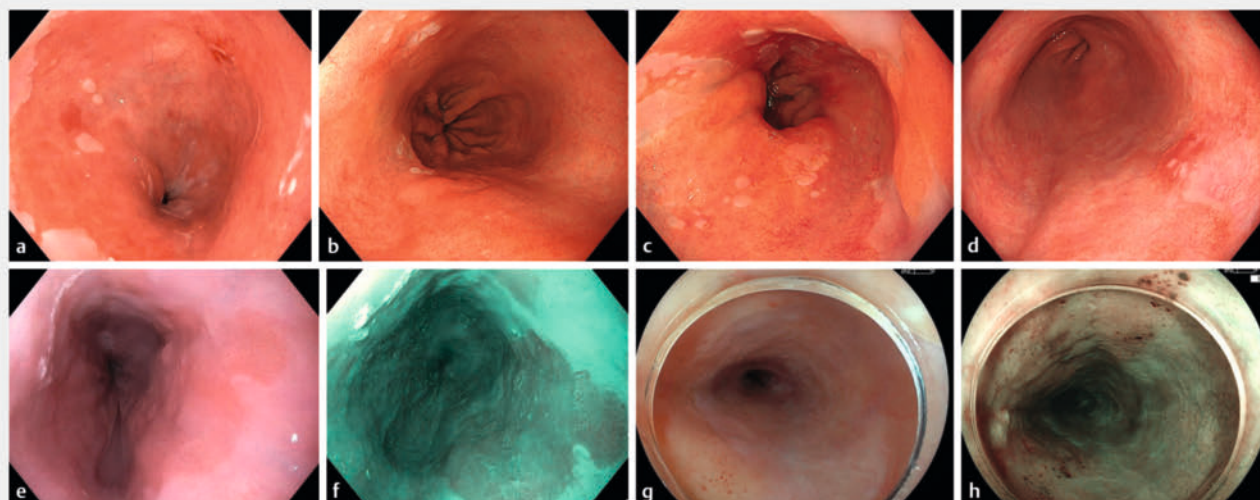
Background

In 2020 the ESGE Position Statement *Curriculum for optical diagnosis training in Europe* by Dekker et al. was published [1]. Based on expert opinion this defined minimum numbers of neoplastic lesions that endoscopists should assess in order to become competent in optical diagnosis and to maintain proficiency. However, those thresholds may be more appropriate for endoscopists who perform endoscopic treatment of esophageal neoplastic lesions, and thus see more high risk patients with an initially higher likelihood of neoplasia in their esophagus. Given the relatively low incidence of early esophageal neoplasia, both Barrett-related as well as squamous cell neoplasia, the recommended thresholds may be impossible to achieve for most general endoscopists performing UGI endoscopy. The aim of this Position Statement was therefore to offer guidance to

ABBREVIATIONS

BING	Barrett's International NBI Group
BLI	blue-light imaging
BLINC	Blue-Light Imaging for Barrett's Neoplasia Classification
BORN	Barrett's Oesophagus-Related Neoplasia (project)
ESGE	European Society of Gastrointestinal Endoscopy
IPCL	intrapapillary capillary loop
IWGCO	International Working Group for the Classification of Oesophagitis
JES	Japan Esophageal Society
NBI	narrow-band imaging
PICO	population/patients, intervention, comparator, outcome
PREDICT	Portsmouth acetic acid classification
UGI	upper gastrointestinal

general gastroenterologists on how to start training in optical diagnosis and what to focus on. Furthermore, the working group for the current document felt that merely providing statements would be meaningless if we could not offer readers the possibility to train their optical diagnosis skills. Therefore, in conjunction with support from the ESGE Governing Board and resources from the ESGE Academy, this document will serve as



► **Fig. 1** Examples of subtle early esophageal neoplasia that can be easily missed if not recognized to be malignant or premalignant. **a** Early cancer in Barrett's esophagus, Paris type 0-IIb (flat type), at the 1 o'clock position. **b** Early cancer in Barrett's esophagus, Paris type 0-IIa-IIb (slightly elevated and flat), from 5 to 7 o'clock. **c** Early cancer in Barrett's esophagus, Paris type 0-IIa (slightly elevated), from 2 to 5 o'clock. **d** Early cancer in Barrett's esophagus, Paris type 0-IIb-IIc (flat and slightly depressed), from 3 to 4 o'clock. **e** High grade dysplasia of the squamous epithelium, recognized as a darker red area in white-light endoscopy, Paris type 0-IIb (flat) from 1 to 6 o'clock; and **f** corresponding image with narrow-band imaging (NBI) showing a brownish discoloration from 2 to 7 o'clock. **g** Squamous cell cancer, Paris type 0-IIb (flat type) extending from 6 to 1 o'clock, seen as slightly more reddish area with white-light endoscopy, and **h** corresponding image with blue-light imaging (BLI).

a structure for training modules that will be available on the ESGE Academy in the future.

The good practice statements presented are based on available evidence and consensus among endoscopists considered to be experts in the optical diagnosis of esophageal neoplasia and its precursor lesions.

Introduction

The prognosis of patients with esophageal cancer strongly depends on the stage at which the disease is diagnosed [2]. Patients diagnosed with T1 esophageal cancer can often be treated with curative endoscopic resection [3,4,5,6]. Furthermore, diagnosis of dysplastic esophageal changes offers the possibility to prophylactically treat patients in order to prevent progression to esophageal cancer [5,6]. Early esophageal cancer or its precursor lesions are mostly asymptomatic, and these conditions are either diagnosed in high risk patients undergoing surveillance endoscopies (e.g. Barrett's esophagus surveillance), or as an incidental finding in patients undergoing upper gastrointestinal (UGI) endoscopy for another indication. In patients undergoing surveillance endoscopy the endoscopist should be focused on the detection of esophageal neoplasia, but even then, recognizing early neoplastic lesions may be challenging as their often subtle appearance and relatively low incidence means that most endoscopists are unfamiliar with their appearance (► **Fig. 1**). In patients undergoing UGI endoscopy for another indication, esophageal lesions may be easily missed, since detailed inspection of the esophagus and detection of neoplasia are not the goal of the procedure. Reports

exist on patients presenting with esophageal cancer who had endoscopy without identification of any lesions suspicious for neoplasia in 3–36 months preceding the diagnosis [7, 8]. These studies also demonstrate that these patients often initially presented without alarm symptoms, and that abnormalities were described yet probably not recognized as neoplastic or preneoplastic [7, 8].

To optimize detection of early esophageal cancer and its precursor lesions, all endoscopists performing UGI endoscopy should adhere to the quality standards for UGI endoscopy as recommended by the ESGE Quality Improvement Initiative [9]. Furthermore, all endoscopists performing UGI endoscopy should be trained in recognizing and subsequently classifying early esophageal cancer and precursor lesions, both for Barrett esophagus-related and for squamous cell neoplasia.

Aims

The aim of this Position Statement is to establish practical guidance for training in order to optimize optical diagnosis of esophageal cancer and its precursor lesions, based on currently published evidence and knowledge. This document focuses on how endoscopists in general practice can train to improve their lesion detection skills and their ability to classify lesions as being neoplastic or not.

Methods

This curriculum was developed through a Delphi consensus method among European experts in optical diagnosis. As Chair of the ESGE Curricula working group, T.C.T. invited R.P. and B.W. to be section chairs for the training curriculum in optical diagnosis and treatment of esophageal cancer and precursor lesions. After a call for participants in November 2021, R.P. and B.W. selected the members, based on curriculum considerations, optical diagnosis and endoscopic treatment experience, publications, and motivation. During a virtual kick-off meeting in March 2022, all members were introduced to the methodology, and subtopics for training in optical diagnosis and endoscopic treatment were selected. For each subtopic a PICO (population/patient, intervention, comparator, outcome) approach was used to identify relevant literature, taking into account the standard structure for ESGE curricula: pre-adoption, training, autonomous implementation, and assessment of proficiency. Given a lack of direct evidence for most subtopics, it was decided to formulate “good practice statements” (GPSs) based on available literature and experience of the working group members. GPSs were made for each subtopic and these were discussed during a second virtual meeting in September 2022. Following this discussion, the GPSs were adapted and put through a first Delphi voting round in December 2023. Based on the outcomes of this Delphi round, the GPSs were further adapted if necessary, and put through a second Delphi round. GPSs were accepted if all working group members had voted and >80% agreement was reached.

In parallel, the section chairs and curriculum chair discussed plans to develop training material for the ESGE Academy, in order to present a curriculum that would not only provide theoretical statements, but also offer concrete training options.

Good practice statements

Pre-adoption

RECOMMENDATION

Endoscopists performing upper gastrointestinal (UGI) endoscopy should train to recognize the appearance of early esophageal cancer and its precursor lesions, for Barrett neoplasia and for squamous neoplasia, to improve detection rates.

Agreement 100%

To prevent missing of cancers and of neoplasia during UGI endoscopy, all endoscopists performing UGI endoscopies should train to recognize early esophageal cancer and precursor lesions. This offers patients the best chance to receive minimally invasive endoscopic treatment, either curative resection in the case of cancer, or prophylactic treatment to prevent progression to cancer in the case of high grade or low grade dysplasia [6, 7]. In some cases, where immediate treatment is not necessary, this may lead to stricter surveillance of patients to

enable timely treatment in the case of progression. To increase detection rates for early esophageal neoplasia, it is important for endoscopists to familiarize themselves with the appearance of these lesions, and to use a structured approach to assess lesions when detected during routine upper endoscopies or during dedicated surveillance endoscopies in patients at risk.

RECOMMENDATION

Every endoscopist should have achieved competency in upper gastrointestinal (UGI) endoscopy before commencing training in optical diagnosis in the UGI tract, and this requires personal experience of 300 UGI endoscopies and meeting the ESGE quality measures for UGI endoscopy.

Agreement 96%

Sufficient technical proficiency in performing a standard UGI endoscopy is a prerequisite before commencing training in optical diagnosis. The number of UGI endoscopies needed to achieve technical competence is uncertain and probably highly variable. Data on the exact number of UGI endoscopies required to achieve competency are scarce. One study demonstrated that trainees attained a 95% completion rate (i.e., passage into the duodenum without physical assistance) at 187 procedures [10]. On average, it takes GI fellows only 150 procedures to simply drive the scope adequately, but 200–250 procedures to achieve minimum competence in the remaining cognitive and motor skills [10, 11]. Since recognizing esophageal lesions and subsequently assessing them properly requires the skills of cleaning the mucosa, steering the endoscope, and obtaining a stable endoscope position without needing an assistant, higher numbers may be required to properly train in the optical diagnosis of esophageal lesions. The working group therefore recommends a personal experience of at least 300 UGI endoscopies to focus on achieving technical proficiency, before focusing on training in optical diagnosis.

Additionally, ESGE has presented a short list of key performance measures for UGI endoscopy [9]. Because optical diagnosis requires high quality endoscopy, it is recommended that endoscopists training in optical diagnosis adhere to these performance measures. For UGI endoscopy, a procedure time of ≥ 7 minutes and an inspection time of ≥ 1 minute/cm of the length of the circumferential Barrett epithelium are recommended. To assess performance measures, a total of 100 consecutive procedures should be used, or all procedures if fewer than 100 have been performed [9].

Training

RECOMMENDATION

Endoscopists should undertake interactive training courses to improve diagnostic accuracy for esophageal preneoplastic and neoplastic lesions.

Agreement 96%

RECOMMENDATION

Endoscopists should train with the Barrett's Oesophagus-Related Neoplasia (BORN) module to improve detection and delineation for early Barrett's esophagus-related neoplasia.

Agreement 91.7%

No evidence-based data are available on when proficiency in optical diagnosis is reached. In other documents it has been suggested, based on expert opinion, that 20 prospectively assessed esophageal Barrett-related and squamous cell lesions should be correctly identified, and that diagnosis of 20 neoplastic Barrett lesions and 10 squamous cell lesions per year is required to maintain proficiency [1]. Whereas this may be feasible for endoscopists working in expert centers, most general endoscopists will not be able to reach these thresholds given the low incidence of these conditions. Furthermore, this approach is limited by the caveat that, by definition, one cannot score the number of missed lesions.

Therefore, interactive training courses that allow endoscopists to assess a large number of neoplastic lesions, and get feedback on their findings, appear to be the most suitable tool to improve diagnostic accuracy for esophageal (pre)neoplastic lesions.

Although studies have described training programs that improve detection rates for Barrett-associated and squamous cell neoplasia, most of these training programs are not widely available, nor easily accessible for the general endoscopist [12, 13].

The Barrett Oesophagus-Related Neoplasia (BORN) module is the only validated, video-based online interactive training tool for detection and delineation of early Barrett-related neoplasia. Training with the module significantly increased detection and delineation scores over the course of 4 training batches [14]. The training program is available for free online (<https://mediamotor.academy/born/index.php>).

The working group will work on interactive training courses for esophageal neoplasia that will be available on the ESGE Academy.

Endoscopic classifications

There are several different classifications available to describe endoscopic findings during UGI endoscopy, for example to describe length of Barrett's esophagus, to distinguish benign from neoplastic lesions, or to assess the invasion depth of a le-

sion. Next to the potentially clinically relevant implications of employing classifications, their use has several other advantages. First, it results in a more uniform way of reporting endoscopic findings; this makes communication about findings easier, and enables comparison with findings from previous endoscopies. In addition, the use of classifications motivates the endoscopist to assess endoscopic findings in a structured manner, which generally results in longer and more attentive inspection.

RECOMMENDATION

Endoscopists should train in using the Prague classification to describe the circumferential and maximum extent of Barrett epithelium above the gastroesophageal junction.

Agreement 100%

The Prague classification is used to describe the circumferential (C) and maximum (M) extent of columnar-lined epithelium above the gastroesophageal junction [15]. The Prague classification has been validated in several studies and is easy to use after standardized teaching [16, 17]. Several studies have shown that the longer the Barrett segment, the greater the risk of progression to cancer [18, 19, 20]. For that reason, most guidelines, including the ESGE guidelines on Barrett's esophagus, have specified different surveillance intervals for different lengths of the Barrett's esophagus mucosa [4]. Thus, the Prague classification has great value in the daily management of patients with Barrett's esophagus. Information and teaching material on the Prague classification are available on the website of the International Working Group for the Classification of Oesophagitis (IWGCO), who initiated the development of the Prague Barrett's C&M criteria (<https://iwgco.net/prague-barretts-cm-criteria/>).

RECOMMENDATION

Endoscopists should train in using the Paris classification to describe suspected neoplastic lesions within both Barrett and squamous epithelium.

Agreement 100%

The Paris classification is a further development of the Borrmann classification, which is used to describe advanced gastric cancer in levels type 1–4 (type 5 was later added for unclassifiable advanced carcinomas) [21]. The Paris classification was created to describe superficial changes (type 0) in the esophagus, stomach, and colon. Type 0 is in turn divided into three subtypes, 0-I which describes elevated lesions, 0-II which describes flat or almost flat lesions, and 0-III which describes excavated lesions. Type 0-I can be further divided into 0-Ip and 0-Is for polypoid and sessile lesions respectively. Type 0-II can

be further divided into 0-IIa which describes slightly elevated lesions (<2.5 mm for Barrett and <1.2 mm for squamous lesions), 0-IIb which are flat and 0-IIc which are slightly excavated. The Paris classification correlates with the invasion depth of a lesion, and can therefore be used to assess if a lesion is potentially amenable to endoscopic resection [21, 22, 23]. The appearance of the lesion may also guide the choice to perform endoscopic mucosal resection or endoscopic submucosal dissection [24].

RECOMMENDATION

Endoscopists should train in using virtual chromoendoscopy to assess both mucosal and vascular patterns in potentially neoplastic lesions in Barrett epithelium as being regular or irregular.

Agreement 100%

RECOMMENDATION

When using acetic acid chromoendoscopy during Barrett's esophagus inspection, endoscopists should be familiar with the appearance of neoplastic lesions by assessing loss of aceto-whitening and mucosal surface patterns.

Agreement 89.4%

When Barrett's esophagus surveillance is performed, the ESGE Guideline for Barrett's esophagus diagnosis and management suggests the use of chromoendoscopy (acetic acid and/or virtual chromoendoscopy) in addition to high resolution white-light endoscopy, despite low quality of evidence [5].

For virtual chromoendoscopy, narrow-band imaging (NBI), blue-light imaging (BLI) and i-SCAN digital contrast (I-SCAN) are most widely applied. Their main additional value is that, when they are used in conjunction with near-focus or magnification endoscopy, the mucosal and vascular patterns can be assessed in detail.

The Barrett's International NBI Group (BING) has developed and validated an NBI classification system to facilitate the identification of dysplasia and cancer in columnar-lined epithelium in the mucosa [25]. In this classification, the mucosal pattern is characterized as either "regular" or "irregular," by assessing whether the mucosa is circular, ridged/villous or tubular ("regular"), or if patterns are absent or irregular ("irregular"). The vascular pattern is assessed by judging whether the blood vessels are situated regularly between mucosal ridges and show normal, long, branching patterns, or if they are focally or diffusely distributed and do not follow the normal architecture of the mucosa. The study was conducted only on still images and with an expert panel assessing the images.

When using BLI, the Blue Light Imaging for Barrett's Neoplasia Classification (BLINC) can be applied. This starts with color, looking at any area of focal darkness. When that is found, the

pits and vessels in that area can be evaluated, starting with type, followed by distribution and density. Any disturbance in distribution and density of mucosal pits and vessels leads to a diagnosis of neoplasia [26].

I-SCAN in combination with magnification and acetic acid to assess mucosal and vascular pattern, using an I-SCAN classification system, has also been studied; it was found to detect Barrett dysplasia in clinical practice with good accuracy [27].

However, none of these classifications have been properly externally validated and no studies are available on the usefulness of these classifications in routine UGI endoscopy.

Although the publications on the BING, BLINC, and I-SCAN classifications provide images that are helpful for becoming acquainted with regular and irregular mucosal and vascular patterns in neoplastic lesions [25, 26, 27], the clinical application of these classifications may prove to be complicated.

Based on the experience of the working group, assessment of potentially neoplastic lesions should be kept simple: mucosal and vascular patterns should be assessed as either regular or irregular when using magnification endoscopy in conjunction with NBI, BLI, or I-SCAN, without the need to refer to specific classifications. This may guide the endoscopist in obtaining targeted biopsies.

Acetic acid chromoendoscopy can be used for lesion detection during Barrett's esophagus surveillance. When using acetic acid chromoendoscopy, endoscopists should be familiar with the appearance of neoplastic lesions by assessing loss of aceto-whitening and mucosal surface patterns. For this, the PREDICT (Portsmouth acetic acid classification) system can be used, a validated classification developed to improve neoplasia detection when using acetic acid chromoendoscopy [28]. The use of acetic acid chromoendoscopy, however, requires training as demonstrated by Chedgy et al.; the online training and testing module they developed improved performance of endoscopists [29]. However, the module is not available on the internet.

RECOMMENDATION

Endoscopists should train in using the Japan Esophageal Society (JES) classification to describe esophageal squamous cell lesions, to estimate the likelihood of and degree of dysplasia, and in the case of squamous cell cancer, the invasion depth.

Agreement 100%

When assessing early squamous cell cancer or dysplastic precursor lesions, virtual chromoendoscopy using NBI/BLI/I-SCAN optical enhancement with magnification is advised to assess changes in the microvascular pattern. The appearance of the intrapapillary capillary loops (IPCLs) and presence of avascular areas correlate with dysplasia and cancer invasion depth. The Japan Esophageal Society (JES) has developed a classification system for IPCLs and avascular areas that facilitates endoscopist assessment of dysplasia and of invasion depth of

superficial esophageal squamous cell carcinomas [30]. Type A IPCLs correspond to normal mucosa, while type B1, B2, and B3 IPCLs correspond to an increasing degree of neoplasia development and deeper growth into the mucosa and further down into the submucosa. The diameters of avascular areas (small, medium, and large) surrounded by specific B-type vessels also correlate to certain invasion depths. The JES classification can therefore be used to assess whether a patient is eligible for endoscopic treatment.

When seen using virtual chromoendoscopy, dysplastic areas show a brownish discoloration (► **Fig. 1**), a feature that may help to identify dysplastic areas in the squamous epithelium of the esophagus [31]. Switching to NBI/BLI/I-SCAN optical enhancement when pulling back the endoscope at the end of gastroscopy, may therefore be a convenient tool to increase detection of squamous dysplasia that may be easily overlooked with white-light endoscopy.

Conclusion and Discussion

The aim of this Position Statement is to offer guidance on how to train in optical diagnosis and what classification to focus on. In addition, the current working group felt that merely providing statements would be meaningless if we could not offer readers the possibility to train their optical diagnosis skills. Therefore, in conjunction with support from the ESGE Governing Board and resources from the ESGE Academy, this document will serve as a structure for training modules that will be available on the ESGE Academy. This may also offer possibilities for research and certification.

Although the working group discussed “assessment of proficiency” as part of the curriculum, it was difficult to come up with statements on this topic. This is mainly because, in clinical practice, there will only be histological feedback on the lesions that are detected and not on possibly missed lesions. As a surrogate, assessment of proficiency could be done in the future by using online testing modules.

ESGE has recently published a Position Statement on the expected value of artificial intelligence (AI) in gastrointestinal endoscopy [32]. It is anticipated that AI will improve the quality of routine endoscopy, mainly by raising routine practice to expert level performance. Although pilot studies in this field are promising, emphasis must remain on basic endoscopy quality standards. And in the advent of the launch of commercial devices, training in lesion recognition and characterization of early cancer and precursor lesions remains relevant.

Disclaimer

The legal disclaimer for ESGE guidelines applies to this Position Statement [33].

Acknowledgements

The authors would like to thank Dr. Oliver Pech, Krankenhaus Barmherzige Brüder Regensburg, Germany, and Dr. David Graham, University College London Hospital, UK, for their

reviews of the manuscript. They are grateful to the additional participants in the voting rounds: Prof. Michael Vieth, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; Dr. Francisco Baldaque-Silva, Karolinska Institute, Sweden, and ULS Matosinhos, Portugal; Dr. Stefan Schlosser, Vivomed-Gastroenterology Bern, Switzerland; Dr. Efstratios Alexandridis, Bristol Royal Infirmary, University Hospital Bristol, UK; Dr. Roberto Valente, Umeå University Hospital, Sweden; and Dr. Frederic Prat, Beaujon Hospital and Paris-Cité University, France.

Competing interests

M. Barret has been paid for endoscopy training sessions by Olympus (Jan 2023–Dec 2024) and for teaching interventions by Medtronic (Jan 2020–Dec 2024). J.J. Bergman has received consultancy and speaker's fees from Olympus Tokyo (2015, ongoing) and speaker's fees from Fujifilm (2017–2019) and Pentax Endoscopy (2019, ongoing); his department has received research support training programs from Olympus Tokyo (2019–2023), Fujifilm (2017–2019), and Pentax Endoscopy (2019–2020). R. Bisschops has received grants/research support, speaker's fee/honoraria from Pentax, Fujifilm, Olympus, and Medtronic (2019, ongoing); his department has received support from Pentax, Fujifilm, and Medtronic (2019, ongoing). P. Elbe has received a lecture fee from Medtronic (Jan 2025). M. Hollenbach has received honoraria from Fujifilm for lectures and expert panel membership (2018–2023). R. Maselli has provided consultancy to Fujifilm, Erbe, Olympus, and Pentax (2019, ongoing). R.E. Pouw has received a speaker fee from Pentax (2023) and honoraria for service from Fujifilm and Olympus (2024). S. Seewald has received fees from Olympus for presentations and consultancy (2008, ongoing). B.L.A.M. Weusten has received fees for consultancy and lectures from Pentax (2018, ongoing); his department has received financial support for research from Pentax (2018, ongoing). E. Coron, P. Dewint, F.L. Dumoulin, W. Januszewicz, V. Lorenzo-Zúñiga, A. Manolakis, A. Parro-Blanco, T.C. Tham, and V. Yakovenko declare no competing interests.

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