

Establishing quality standards for white light upper gastrointestinal endoscopy in Singapore: Consensus statements from the Gastroenterological Society of Singapore

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ABSTRACT

Introduction: Oesophago-gastro-duodenoscopy (OGD) is the gold standard for evaluating upper gastrointestinal (UGI) symptoms. However, the quality of endoscopic examinations varies widely. This paper, initiated by the Gastroenterological Society of Singapore (GESS), aims to standardise best practices and enhance OGD procedure quality in Singapore.

Methods: A core group of 6 experienced gastroenterologists conducted a comprehensive literature review, referencing established international guidelines. They developed preliminary statements, which underwent 2 rounds of formal voting by a broader group of consultant-level gastroenterologists. Statements were reviewed, modified and re-evaluated using the Delphi process, and assigned levels of evidence and recommendation using the US Preventive Services Task Force model. The threshold for acceptance of statements was agreed to be 80% or higher.

Results: Twenty consensus statements were finalised, covering pre-requisite, pre-procedure, intra-procedure and post-procedure quality indicators.

Conclusion: The GESS consensus statements provide recommendations for institutions in Singapore to establish quality standards for white light UGI endoscopy, facilitating high-quality, safe and accurate endoscopic care.

Keywords: consensus guideline, endoscopy practice standard, Gastroenterological Society of Singapore, oesophago-gastro-duodenoscopy, upper gastrointestinal symptoms

CLINICAL IMPACT

What is New

- This consensus provides a unified set of quality standards for performing white light upper gastrointestinal (UGI) endoscopy in Singapore, guiding institutions to establish standardised best practices for OGD, ensuring high quality, safe and accurate endoscopic care.
- It can also reduce variability in practice and can potentially improve clinical outcomes.

Clinical Implications

- The consensus may serve as a benchmark for auditing and continuous quality improvement in endoscopy services across Singapore, potentially aiding future healthcare policies and research directions.

mucosa, facilitates tissue sampling and allows for therapeutic interventions when necessary.¹

Advances in technology over the past few decades have improved endoscopic image resolution significantly, resulting in high-resolution white light endoscopy.² Enhanced endoscopic imaging has led to better detection and characterisation of gastric lesions, as well as improved accuracy in delineating margins prior to resection.³ As the capabilities of advanced endoscopy continue to grow, enhancing the quality of routine endoscopic procedures is a crucial step in achieving high-quality, safe, accurate, patient-centred and accessible endoscopic care.

Although technical skills can be acquired through repetitive learning and proctorship,^{1,4,5} the actual execution of a high-quality examination varies

INTRODUCTION

Oesophago-gastro-duodenoscopy (OGD) is the gold standard for examining upper gastrointestinal (UGI) symptoms. It enables direct visualisation of the

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significantly. Thus, this study aims to standardise best practices across the field and enhance the overall quality of OGD procedures in Singapore.

METHODS

The Gastroenterological Society of Singapore (GESS) initiated the formation of a core group comprising 6 experienced gastroenterologists from public and private practice in Singapore. The core group nominated senior gastroenterologists and experienced peers as part of the voting panel. Voters were encouraged to discuss and seek input from their colleagues in this area prior to voting, and this included additional input from non-voting gastroenterologists, surgeons, nurses and pathologists in relevant aspects. The population, intervention, comparator, outcome (PICO) framework was used to create focused clinical questions that are relevant to quality in upper GI endoscopy practice. A computerised literature search was performed using PubMed, Embase and the Cochrane Library up to 2025 to identify relevant research papers, conference abstracts and existing guidelines. Searches were limited to articles published in English and focused on terms with “quality in endoscopy,” “quality in OGD” and “quality in EGD.” Bibliographies and references were also reviewed.

Relevant guidelines were identified and filtered for relevance, particularly the following key publications: American Society for Gastrointestinal Endoscopy (ASGE)’s *Quality Indicators for GI Endoscopic Procedures* (2015),⁶ *Quality Indicators for Upper GI Endoscopy* (2025),⁷ British Society of Gastroenterology and Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland (BSG/AUGIS)’s *Position Statement: Quality Standards in Upper Gastrointestinal Endoscopy* (2017),¹ and European Society of Gastrointestinal Endoscopy (ESGE)’s *Performance Measures for Upper Gastrointestinal Endoscopy* (2016).⁸ Based on these documents, 20 preliminary statements were developed.

These 20 statements underwent 2 rounds of formal voting. The voting process was conducted via email, involving a broader group of endoscopists of at least consultant level, practicing in both public healthcare institutions and private hospitals across Singapore. A total of 27 voters and 30 voters responded in the first and second rounds, respectively.

Voters assigned rated each statement using a 5-point scale (a = accept completely, b = accept with some reservation, c = accept with major reservation, d = reject with reservation, e = reject completely), with ≥80% agreement (either a or b votes) required for inclusion. Each statement was assigned a relevant level of evidence and recommendation, following the model established by the US Preventive Services Task Force (USPSTF) (Table 1).⁹ The authors

collectively agreed that it was easier to adopt the USPSTF framework during the grading of recommendations, as one of the key references was aligned to a similar framework applied to the PICO-derived statements that are pertinent to the Singapore setting. If consensus was not achieved, statements were reviewed, modified and re-evaluated using the Delphi process, until there was sufficient agreement to either include or discard the statement. In cases where a strong recommendation has been made despite weak evidence, this has been arrived at via expert consensus based on a pragmatic approach, when it is very certain that benefits outweigh risks and by referencing international guidelines (Fig. 1).

RESULTS

The final 20 consensus statements are summarised in Table 2, each accompanied by its classification of recommendation, quality of evidence, and proportion of the voting agreement. The statements are divided into the following categories: (1) pre-requisite, (2) pre-procedure, (3) intra-procedure and (4) post-procedure quality indicators.

DISCUSSION

Pre-requisite

Statement 1: Only an endoscopist with appropriate training and the relevant competency should independently perform OGD.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

Competency is defined as the essential level of skill, knowledge and experience required to perform a task or procedure safely and proficiently.¹⁰ This standard is typically set by authoritative bodies, such as the ASGE, BSG/AUGIS, ESGE, American College of Gastroenterology, the American Board of Surgery, and the Society of American Gastrointestinal and Endoscopic Surgeons. Consequently, the criteria for competency may differ based on specialty, indication, procedure and geographic location. Most institutions now adopt these competency definitions as the basis for their local credentialing standards.

In Singapore, the Gastroenterology Residency Advisory Committee has determined the following criteria for gastroenterologists to be able to perform OGD independently: (1) perform at least 200 OGD procedures and (2) complete his/her gastroenterology senior residency training with adequate number of satisfactory directly observed procedures for OGD during residency and be recognised as a gastroenterology specialist by the Specialists Accreditation Board.

Table 1. Quality of evidence, classification of recommendation and voting on recommendation.

I	Evidence obtained from at least 1 properly randomised controlled trial.
II-1	Evidence obtained from well-designed controlled trials without randomisation.
II-2	Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
II-3	Evidence obtained from comparison between times or places with or without intervention. Dramatic results in uncontrolled experiments could also be included in this category.
III	Opinion of respected authorities, based on clinical experience, descriptive studies or report of expert committees.
Classification of recommendation	
A	There is good evidence to support the recommendation.
B	There is fair evidence to support the recommendation.
C	There is poor evidence to support the recommendation, but recommendations may be made on other grounds.
D	There is fair evidence to refute the recommendation.
E	There is good evidence to refute the recommendation.

Adapted from Berg AO, Allan JD. Introducing the third US Preventive Services Task Force. *Am J Prev Med* 2001;20:3-4.

While not a universal standard, the BSG/AUGIS guidance recommended an annual minimum of 100 upper GI endoscopies per operator based on weak evidence. The authors perceived that the minimum OGD numbers needed to maintain proficiency varies between an experienced and a budding endoscopist. As such this may not translate to a meaningful benchmark in the Singapore setting, and hence no definite recommendation was made for minimum OGD numbers per year to maintain high-quality examination.

Pre-procedure

Statement 2: All upper gastrointestinal endoscopies performed should have an appropriate indication that should be documented.

Level of agreement: 100%

Quality of evidence: II

Classification of recommendation: A

Studies have demonstrated that conducting OGD and colonoscopy for appropriate indications significantly increases the probability of clinically relevant diagnoses.^{11,12}

The aim of this quality indicator is to minimise the number of procedures without appropriate indications. The appropriate indications for UGI endoscopy are listed in Table 3, adapted from various clinical guidelines.¹³⁻¹⁸

Statement 3: Informed consent should be obtained and fully documented by the procedurist or a medical professional who is deemed by the

procedurist to have adequate knowledge to fully explain the procedure.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

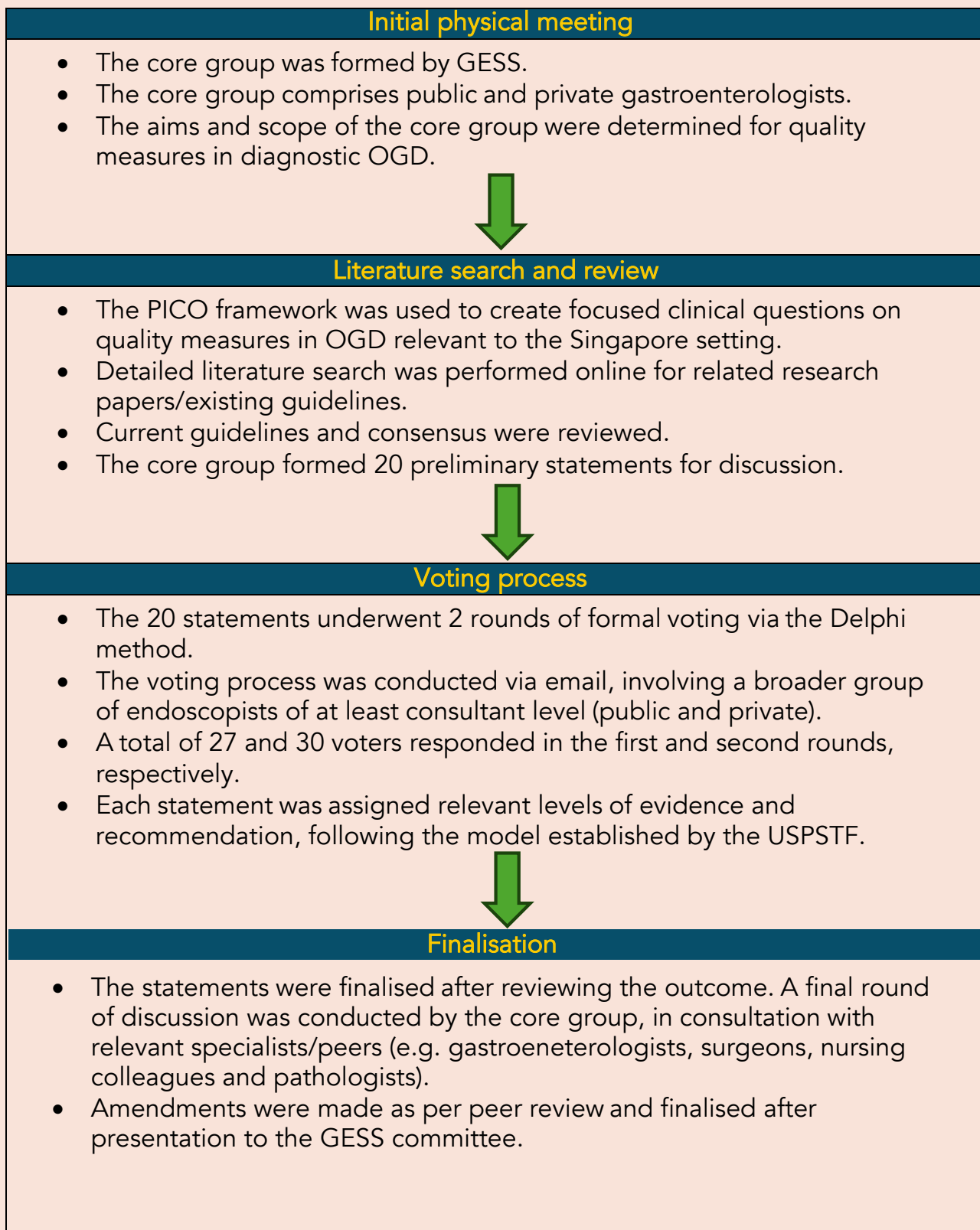
Informed consent is essential to respect patient autonomy, provide relevant information for decision-making and allows the opportunity for questions, which enhances understanding and confidence in the healthcare team.^{6,7} Notably, risk assessment is included as part of obtaining informed consent.

The ASGE guidelines on informed consent in endoscopy recommend the endoscopist to obtain consent personally. Under limited resources, a trained medical professional with adequate knowledge to explain the endoscopic procedure may obtain consent.⁷ For more complex procedures, it is recommended that the procedurist or relevant healthcare team involved in the procedure counsel and obtain informed consent whenever possible.

Consent may be supplemented by anatomic diagrams, brochures and videos and by information provided by nurses and other assistants. A consent form designed specifically for a particular procedure that contains all the essential elements of consent may facilitate a full discussion with the patient.^{1,6,7,19}

Taking consent from patients with diminished mental capacity must take into account the patients' residual or fluctuating cognitive ability. If patients can demonstrably understand, retain and use information and explanations to make clear and consistent decisions and communicate them in a coherent

Fig. 1. Flow chart of the statement development process.



GESS: Gastroenterological Society of Singapore; OGD: oesophago-gastro-duodenoscopy; PICO: population, intervention, comparator, outcome; USPSTF: United States Preventive Services Task Force

Table 2. Summary of consensus statements.

Statement	Classification of recommendation	Quality of evidence	Level of agreement
Pre-requisite			
1. Only an endoscopist with appropriate training and the relevant competency should independently perform OGD.	A	III	100%
Pre-procedure			
2. All upper gastrointestinal endoscopies performed should have an appropriate indication that should be documented.	A	II	100%
3. Informed consent should be ideally obtained and fully documented by the procedurist or a medical professional who is deemed by the procedurist to have adequate knowledge to fully explain the procedure.	A	III	100%
4. Patients should be assessed for fitness to undergo a diagnostic OGD.	B	III	93.3%
5. Team pause or time out is to be conducted and documented. A safety checklist should be completed before starting an OGD.	A	III	100%
6. An appropriate time slot should be allocated depending on procedure indications and patient characteristics.	B	II	93.3%
Intra-procedure			
7. Normal endoscopic examination should include a minimal of 10 photos consisting of the following anatomical landmarks: upper oesophagus and lower oesophagus, GE junction, fundus, corpus/body, incisura, antrum, pylorus, D1 and D2.	C	III	93.3%
8. Standardised terminology is encouraged for relevant findings and documentation (e.g. Los Angeles classification for erosive esophagitis, Prague classification for Barrett's oesophagus, Forrest classification for bleeding ulcers).	A	III	96.7%
9. In patients who have not undergone evaluation of <i>Helicobacter pylori</i> status before, this should be screened during gastroscopy by performing rapid urease test or histology.	A	III	93.3%
10. In patients who have clinically relevant gastric cancer risks, at least 2 biopsies from the antrum and 2 biopsies from the corpus should be taken for histology to exclude intestinal metaplasia.	C	III	80%
11. Patients should be monitored during sedation at an appropriate time interval, with the relevant information documented.	A	III	100%
12. The doses and routes of administration of all medications used, including reversal agents, during the procedure are to be documented.	A	III	100%
13. All endoscopies should be performed with high-definition video endoscopy systems, with the ability to capture images and take biopsies.	A	II-3	96.6%
14. All endoscopy units should have an internationally accepted guideline and policy on sedation.	B	III	96.7%
15. Adequate mucosal visualisation should be achieved by a combination of adequate air insufflation, flushing and aspiration and the use of mucosal cleansing techniques.	A	III	100%
16. A malignant-looking lesion should be described and photo documented, with biopsies taken for histology.	A	II-2	86.7%
Post-procedure			
17. All endoscopy units should have pre-determined discharge criteria and should provide patients with post-discharge instructions.	A	III	100%
18. Follow-up management plan should be specified.	A	III	96.7%
19. All adverse events related to the procedure should be documented.	A	III	100%
20. All endoscopy units should have a system to monitor for post-procedure and late adverse events occurrence.	C	III	90%

GE: gastroesophageal; OGD: oesophago-gastro-duodenoscopy

Table 3. OGD indications (not exhaustive).

1.	Upper abdominal symptoms that persist despite an appropriate trial of therapy
2.	Upper abdominal symptoms associated with other symptoms or signs suggesting serious organic disease (e.g. anorexia and weight loss) or in patients aged >45 years. Age cut-off varies in different geographical regions. ¹⁷
3.	Dysphagia or odynophagia
4.	Oesophageal reflux symptoms that are persistent or recurrent despite appropriate therapy
5.	Persistent vomiting of unknown cause
6.	Other diseases in which the presence of upper gastrointestinal pathology might modify other planned management. Examples include patients who have a history of ulcer or gastrointestinal bleeding who are scheduled for organ transplantation, long-term anticoagulation, or chronic nonsteroidal anti-inflammatory drug therapy for arthritis and those with cancer of the head and neck
7.	Familial adenomatous polyposis syndromes
8.	For confirmation and specific histologic diagnosis of radiologically demonstrated lesions: • Suspected neoplastic lesion; • Gastric or oesophageal ulcer; • Upper tract stricture or obstruction
9.	Gastrointestinal bleeding • In patients with active or recent bleeding • For presumed chronic blood loss and for iron deficiency anaemia when the clinical situation suggests an upper gastrointestinal source or when colonoscopy result is negative
10.	When sampling of tissue or fluid is indicated
11.	In patients with suspected portal hypertension to document or treat oesophageal varices
12.	To assess acute injury after caustic ingestion
13.	Treatment of bleeding lesions, such as ulcers, tumours, vascular abnormalities (e.g. electrocoagulation, heater probe, laser photocoagulation or injection therapy)
14.	Banding or sclerotherapy of varices
15.	Removal of foreign bodies
16.	Removal of selected polypoid lesions
17.	Placement of feeding or drainage tubes
18.	Dilation of stenotic lesions
19.	Management of achalasia (e.g. botulinum toxin, balloon dilation, peroral endoscopic myotomy)
20.	Palliative treatment of stenosing neoplasms (e.g. laser, multipolar electrocoagulation, stent placement)
21.	Endoscopic therapy for intestinal metaplasia (e.g. dysplasia in BO)
22.	Intraoperative evaluation of anatomic reconstructions typical of modern foregut surgery (e.g. evaluation of anastomotic leak and patency, fundoplication formation, pouch configuration during bariatric surgery)
23.	Management of operative adverse events (e.g. dilation of anastomotic strictures, stenting of anastomotic disruption, fistula or leak in selected circumstances)
24.	Surveillance for malignancy in patients with premalignant conditions (i.e. gastric intestinal metaplasia, BO)

BO: Barrett's oesophagus; OGD: oesophago-gastro-duodenoscopy

manner, the physician must obtain consent from the patients themselves. If patients have such diminished mental capacity that they cannot give consent, one must obtain consent from persons with the legal authority to make such medical decisions for them unless such persons are not contactable within reasonable time depending on the urgency of the situation. Otherwise, one must proceed according to the best judgement of patients' best interests.¹⁹

In emergency situations, a physician may proceed with treatment without consent when patients are not capable of giving consent and where he/she deems treatment is necessary in patients' best interests.¹⁹

Despite it being standard practice that consent for minors is taken from parents or legal guardians, the physician must consider the opinions of minors who are able to understand and decide for themselves.¹⁹

One must respect patients' right to refuse consent for tests, treatments or procedures, except when it is evident that their judgement is impaired or their mental capacity is so diminished that they cannot make choices about their own care.¹⁹

Some patients, such as those with dementia, psychiatric or neurological disorders, may show fluctuating mental capacity. The fact that a person is able to retain the information relevant to a decision, albeit for a short period only, does not prevent him from being regarded as lacking capacity. Decision-making capacity should be assessed at the particular time when consent is to be taken. If capacity is assessed to be present at the time of consent, such consent is valid.¹⁹ For details on consent in medical practice and various circumstances in the Singapore context, please refer to the Singapore Medical Council (SMC)'s *Ethical Code and Ethical Guidelines 2016 Edition*²⁰ and Ministry of Health's *Workgroup to Review the Taking of Informed Consent and SMC Disciplinary Process 2019*.

Statement 4: Patients should be assessed for fitness to undergo a diagnostic OGD.

Level of agreement: 93.3%

Quality of evidence: III

Classification of recommendation: B

Patients should undergo a pre-procedure assessment, including a health history and physical examination, which should be documented by either the procedurist or a medical professional who is deemed competent by the procedurist. In the context of an open-access OGD, the procedurist is expected to obtain a brief history and perform relevant physical examination before the procedure whenever possible.

The history should focus on procedure indications and conditions affecting performance and safety,

particularly sedation-related issues such as organ abnormalities, prior sedation/adverse events, medication allergies, current medications and substance use.^{6,7} Should changes to antiplatelet or anticoagulant therapy be indicated, these should be documented and communicated to the patient.¹

The timing and nature of patients' last oral intake should also be recorded. Although data on fasting and aspiration risk are limited, generally, patients are required to stop oral intake for at least 6 hours before endoscopy. The American Society of Anesthesiologists guidelines recommend ceasing clear liquids for 2 hours, milk for 6 hours, light meals for 6 hours and fatty meals for 8 hours before sedation. Patients with gastroparesis or achalasia may need longer fasting. Essential medications, including bowel preparation, can be taken before procedures.²¹

Statement 5: Team pause or time out is to be conducted and documented. A safety checklist should be completed before starting an OGD.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

Before administering sedation or inserting the endoscope, the endoscopy team pauses to confirm the patient's identity and procedure type, as well as to go through a safety checklist, which should be recorded.^{1,6,7}

While there is no standardised endoscopy safety checklist, the BSG/AUGIS recommends verifying the following:¹ (1) patient identifiers (name/hospital number/date of birth), (2) drug allergies, (3) medications/conditions that may preclude any interventions (anticoagulants), (4) significant comorbidities, (5) patient understanding of proposed test and (6) completed consent form.

The checklist should ensure, at minimum, correct patient, procedure, procedurist and drug allergy. This process confirms the correct patient and procedure, allows reassessment of relevant data, and informs the team of the planned procedure and any potential deviations requiring special equipment.^{6,7}

Statement 6: An appropriate time slot should be allocated depending on procedure indications and patient characteristics.

Level of agreement: 93.3%

Quality of evidence: II

Classification of recommendation: B

The authors acknowledge that the duration of an OGD varies based on the indication, pathology and patient factors. For instance, certain clinical indications, such as the surveillance of premalignant conditions,

necessitate thorough inspection and may require advanced imaging, thus extending the procedure time.²² The BSG/AUGIS recommends a slot of a minimum of 20 minutes for standard diagnostic endoscopy, increasing as appropriate for surveillance or high-risk conditions.¹

The authors recommend the mouth in-out time to be at least 7 minutes, in line with the ESGE and BSG guidelines.^{1,8} A retrospective observational study in Singapore reported that endoscopists who took more than 7 minutes on average for an OGD had a three-fold increase in the diagnosis of gastric cancer and dysplasia compared to those who completed the procedure in less than 7 minutes.²² Other studies have also shown that a longer endoscopy time is associated with increased detection of neoplastic lesions and high-grade dysplasia, compared with shorter endoscopy time.^{23,24} A minimum inspection time of 7 minutes was also associated with the detection of Barrett's oesophagus (BO).²³

Intra-procedure

Statement 7: Normal endoscopic examination should include a minimum of 10 photos consisting of the following anatomical landmarks: proximal/mid oesophagus, distal oesophagus, oesophagogastric junction, gastric cardia/fundus, gastric body (forward), gastric body (retroflexed), incisura, gastric antrum/pylorus, duodenal bulb (D1) and duodenum second portion (D2).

Level of agreement: 93.3%

Quality of evidence: III

Classification of recommendation: C

Photo documentation of important anatomic landmarks (Fig. 2) and pathology is widely recommended.^{1,6,7} It enhances patient understanding, facilitates physician consultations, allows precise comparisons during repeat procedures, and serves as a legal record. While there is no direct evidence supporting its benefits, photo documentation intuitively promotes thorough mucosal inspection and cleansing, ensuring complete examinations.^{1,6,7,8}

All societies endorse good and adequate photo documentation. The ESGE recommends a minimum of 10 photos in a normal UGI examination. The authors agree that this standard should be adopted in Singapore. These standard anatomical landmarks include proximal/mid oesophagus (15–30 cm from incisors), distal oesophagus (distal to 30 cm from incisors), squamocolumnar junction and diaphragm indentation, cardia and fundus (retroflexed view), gastric body (forward view) and gastric body (retroflexed view), incisura (partial retroflexed view), gastric antrum/pylorus, duodenal bulb and second

part of duodenum.^{1,7,8} The emphasis on photo documentation during OGD is also supported by another study in the Singapore context.²⁵ This excludes surgically altered anatomy. The Asian consensus on standards of diagnostic upper endoscopy for neoplasia suggests systematic endoscopic mapping of the entire oesophagus and stomach to enhance the detection rate of superficial UGI neoplasms, and recommends taking at least 20–22 images, based on cited studies.^{26–29}

Statement 8: Standardised terminology is encouraged for relevant findings and documentation (e.g. Los Angeles classification for erosive oesophagitis, Prague classification for Barrett's oesophagus, Forrest classification for bleeding ulcers).

Level of agreement: 96.7%

Quality of evidence: III

Classification of recommendation: A

The use of standardised terminology is in line with recommendations from established guidelines.^{1,6,7} The Minimal Standard Terminology was created by the World Endoscopy Organization to facilitate this standardisation of gastrointestinal endoscopy terminology.³⁰

Statement 9: In patients who have not undergone evaluation of *Helicobacter pylori* status before, this should be screened during gastroscopy by performing rapid urease test or histology.

Level of agreement: 93.3%

Quality of evidence: III

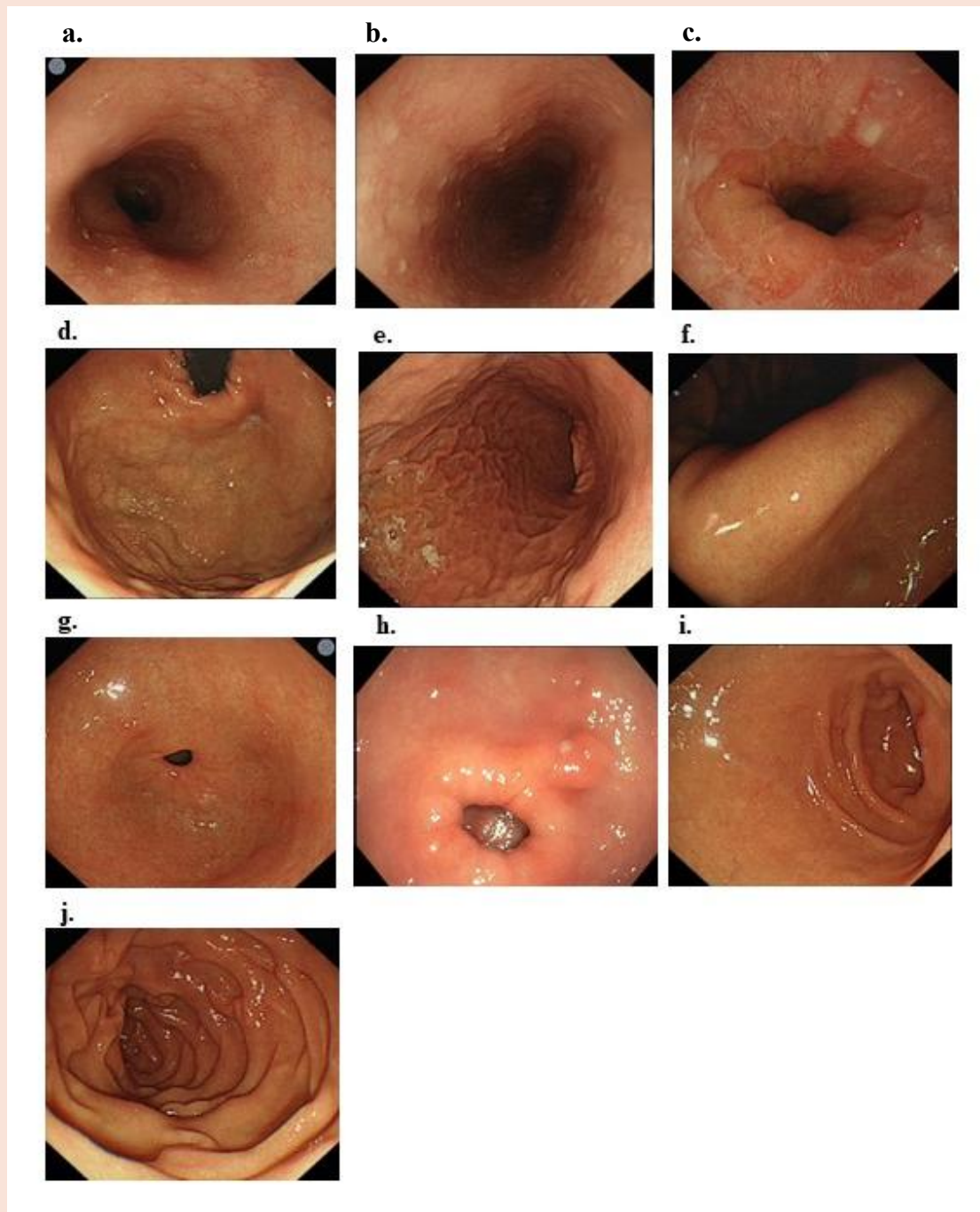
Classification of recommendation: A

Various studies have shown that the elimination of *H. pylori* reduces risk of cancer.^{31,32} A systematic review and meta-analysis linked the eradication of *H. pylori* infection with a reduced incidence of gastric cancer. The benefits of eradication vary with baseline gastric cancer incidence but apply to all levels of baseline risk.³²

Moreover, a prospective, double-blind randomised trial found that patients with early gastric cancer who received *H. pylori* treatment had lower rates of metachronous gastric cancer (hazard ratio 0.50; 95% confidence interval (CI) 0.26–0.94; $P=0.03$), and more improvement from baseline in the grade of gastric corpus atrophy than patients who received placebo ($P<0.001$).³³

Statement 10: In patients who have clinically relevant gastric cancer risks, at least 2 biopsies from the antrum and 2 biopsies from the corpus should be taken for histology to exclude intestinal metaplasia.

Fig. 2. Sample photo documentation of anatomical landmarks.



(A) proximal/mid oesophagus; (B) distal oesophagus; (C) gastro-oesophageal junction; (D) fundus; (E) body; (F) incisura; (G) antrum; (H) pylorus; (I) duodenal bulb; (J) duodenum second portion

Level of agreement: 80%

Quality of evidence: III

Classification of recommendation: C

This recommendation is consistent with the ESGE 2016, BSG 2017 and ASGE 2025 guidelines.^{1,6,7} This statement excludes the utilisation of imaging-enhanced endoscopy (IEE) techniques (e.g. narrow

band imaging, Fujinon intelligence chromoendoscopy [Fujinon Corporation, Japan], linked colour imaging, blue light imaging, i-scan and optical enhancement).

The BSG guidelines on the diagnosis and management of patients at risk of gastric adenocarcinoma recommend that patients with image-enhanced features of chronic atrophic gastritis should undergo biopsies for confirmation, targeting mucosal sites

within Sydney protocol areas where enhanced imaging reveals gastric intestinal metaplasia. A baseline endoscopy with biopsies is advised for individuals aged 50 years and older with laboratory evidence of pernicious anaemia, defined by vitamin B12 deficiency and positive gastric parietal cell or intrinsic factor antibodies. Since gastric adenocarcinoma affects the corpus in pernicious anaemia, biopsies should be taken from the greater and lesser curves.³⁴

Statement 11: Patients should be monitored during sedation at an appropriate time interval, with the relevant information documented.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

Cardiopulmonary unplanned events (CUE) related to conscious sedation constitute a major proportion of GI endoscopy-associated complications. A retrospective review of a US national database found that the rates of CUE with OGD, colonoscopy, endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound were 0.6%, 1.1%, 2.1%, and 0.9%, respectively.³⁵

As numerous studies have documented sedation-related cardiopulmonary complications, it is good clinical practice to monitor patients appropriately during sedation. The authors recommend continuous pulse oximetry and continuous heart rate monitoring with blood pressure every 5 minutes.³⁵

Statement 12: The doses and routes of administration of all medications used, including reversal agents, during the procedure are to be documented.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

Endoscopy units should adhere to pre-existing safe sedation guidelines to ensure sedation is given, factoring a patient's age, comorbidities, allergy status, together with appropriate monitoring.¹ Any instance requiring the use of naloxone, flumazenil or ventilation due to oversedation should be documented and investigated.^{1,7,8}

Statement 13: All endoscopies should be performed with high-definition video endoscopy systems, with the ability to capture images and take biopsies.

Level of agreement: 96.6%

Quality of evidence: II-3

Classification of recommendation: A

The BSG/AUGIS recommends that all diagnostic OGDs should use high-definition endoscopes and

include equipment for clear mucosal views and histological sample acquisition.¹

In a retrospective cohort study of patients with non-dysplastic BO undergoing routine surveillance, high definition was superior to standard definition white light endoscopy in targeted detection of all dysplastic lesions (odds ratio [OR] 3.27, 95% CI 1.27–8.40) as well as overall dysplasia detected on both random and target biopsies (OR 2.36, 95% CI 1.50–3.72).²

Statement 14: All endoscopy units should have an internationally accepted guideline and policy on sedation.

Level of agreement: 96.7%

Quality of evidence: III

Classification of recommendation: B

All endoscopy units are strongly encouraged to adopt an internationally accepted guideline and policy on sedation, which may be adapted to the Singapore context. Notably, 2 Singapore consensus guidelines have been recently published by the Academy of Medicine, Singapore, adapting international standards.^{36,37} These are the *Guidelines on Safe Sedation Practice for Non-Anaesthesiologists in Medical & Dental Clinics, Stand-Alone Ambulatory Surgical Centres, and Stand-Alone Endoscopy Suites in Singapore*³⁶ and the *Clinical Guideline on the Use of Sedation by Non-Anaesthesiologists During Gastrointestinal Endoscopy in the Hospital Setting*.³⁷ Only medical practitioners who are qualified by education, training and/or accreditation as per institutional policies and procedures to administer moderate sedation shall administer the sedation or supervise a registered nurse to administer the sedation. The sedationist must have adequate and specific training in safe administration of sedation, monitoring of patients under sedation, management of complications arising from sedation and proper documentation of sedation.³⁶ All staff involved in sedation including the procedurist shall be trained and shall maintain currency in Basic Cardiac Life Support.³⁶ The authors fully endorse these guidelines.

Statement 15: Adequate mucosal visualisation should be achieved by a combination of adequate air insufflation, flushing and aspiration and the use of mucosal cleansing techniques.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

Clear mucosal views can be achieved by aspirating debris and flushing water through the endoscope's accessory channel. Adding mucolytic and defoaming agents like simethicone, N-acetylcysteine, or pronase disperses bubbles and mucus.¹

A systematic review and meta-analysis found that regular use of premedication with mucolytic agents prior to routine OGD is associated with improved total mucosal visibility score, with a mean difference of -2.69 in total mucosal visibility score between pooled mucolytic agents and control.³⁸

Statement 16: A malignant-looking lesion should be described and photo documented, with biopsies taken for histology.

Level of agreement: 86.7%

Quality of evidence: II-2

Classification of recommendation: A

Evidence on the optimal number of biopsies is limited. A prospective trial by Graham et al. found that 7 biopsy specimens yielded the correct diagnosis in all patients.³⁹ A subsequent study by Lai et al. found that 6 biopsy specimens likely yield a 100% diagnosis in oesophageal carcinoma cases.⁴⁰

The standard practice is to obtain at least 6 biopsies of the lesion. This number is appropriate for diagnosing malignancy promptly and aligns with biopsy protocols for other gastrointestinal pathologies. Additional tissue may be needed for further tests, such as HER2, to guide treatment options.¹

However, fewer biopsies may be taken in certain circumstances, such as patients on anticoagulants or with bleeding disorders, or based on lesion characteristics, such as a small lesion or high bleeding risk. Notably, for early malignancy amenable to endoscopic resection, multiple biopsies may induce fibrosis, rendering endoscopic resection more difficult.^{40,41} Thus, in early-stage lesions, fewer biopsies may be appropriate.^{40,41}

Post-procedure

Statement 17: All endoscopy units should have pre-determined discharge criteria and should provide patients with post-discharge instructions.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

All endoscopy units should have a written policy outlining the criteria patients must meet before discharge. These will include, but not limited to, completed procedure documentation, documented post-procedure monitoring chart, post-procedure instructions given to patients (including advice to contact endoscopy centre or to go the emergency department if unwell), follow-up appointment with physicians if any. Documentation confirming that patients have met these criteria should be completed.^{6,7}

Statement 18: Follow-up management plan should be specified.

Level of agreement: 96.7%

Quality of evidence: III

Classification of recommendation: A

Follow-up medical appointments will be required for all patients. If biopsy samples have been obtained, the management plan for the patient and notification of this plan to the referring physician should be documented.^{6,7}

Statement 19: All adverse events related to the procedure should be documented.

Level of agreement: 100%

Quality of evidence: III

Classification of recommendation: A

OGD typically carries a low risk of adverse events, in the range of 1 in 200 to 1 in 10,000, and mortality rates ranging from none to 1 in 2000.⁴² Periprocedural adverse events vary from mild, such as transient hypoxemia or self-limited bleeding, to serious, such as cardiopulmonary arrest, perforation and infection.⁴²

Documenting adverse events facilitates early recognition and prompt intervention, thereby minimising associated morbidity and mortality. Additionally, it enables a thorough review process, which serves to educate endoscopists, reduces the risk of future adverse events, and enhances the overall quality of endoscopy procedures.

Statement 20: All endoscopy units should have a system to monitor for post-procedure and late adverse events occurrence.

Level of agreement: 90%

Quality of evidence: III

Classification of recommendation: C

While the majority agreed with this statement, some reservations were expressed. There is concern about the fragmentation of healthcare systems, where adverse events might not be effectively captured if patients seek follow-up care between private centres and public institutions after procedures like polypectomy. Additionally, the implementation of such a monitoring system may not be cost-effective, given the low risk of delayed complications for most patients. Some believe that monitoring should be left to the procedurist's discretion, based on the specifics of the procedure. For example, for more complex endoscopic procedures like ERCP, a monitoring system, such as physician-directed telephone calls, could help guide a significant number of patients to appropriate follow-up care for their medical concerns.

CONCLUSION

This study presents recommendations by evidence-based consensus that can be used for OGD. It is acknowledged that practice may vary according to patient needs, resource availability and limitations of the institution of practice. Endoscopy units may adapt these recommendations to define appropriate quality indicators, which can then be measured and reported if required. These recommendations are not meant to restrict or govern OGD in upper GI practice for endoscopists, but it is anticipated that implementing the above recommendations will enhance the quality of OGD, optimise patient outcomes and reduce healthcare burden in Singapore.

Supplementary material

Annex S1. World Endoscopy Organization Minimal Standard Terminology (WEO MST 3.0).

Ethics statement

Not applicable, as no patient information or medical data were assessed at all during this study.

Declaration

The GESS has received an unrestricted educational grant from Olympus to organise meetings for the development of this consensus manuscript. The authors declare there are no conflicts of interest and no affiliations with or involvement in any organisation or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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