

Quality standards and performance measures: steps to high quality diagnostic endoscopy

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Quality improvement in many medical practices has been the important issue; upper gastrointestinal (GI) endoscopy is no exception. Increasing use of gastrointestinal endoscopy, particularly for cancer screening highlights the need for endoscopy facilities to review the quality of the service they offer (1). The main purpose of the screening upper GI endoscopy is to enhance the detection of and diagnostic accuracy for early upper GI cancer and make GI cancer-related mortality lower.

North-Eastern Asian countries, where prevalence of gastric cancer remains high, the population-based screening of gastric cancer using endoscopy has been conducted under governmental support in Japan and Korea. Recently, reduction of gastric cancer mortality was documented in Japan and Korea, after conducting population-based gastric cancer screening for several years (2-5). To improve the endoscopic quality of national cancer screening program, the Korean Society of Gastrointestinal Endoscopy (KSGE) has performed the National Endoscopy Quality Improvement Program since 2009 (6).

American Society of Gastrointestinal Endoscopy (ASGE) updated the quality indicators of EGD (esophagogastroduodenoscopy) in 2015. For upper GI endoscopy, the proposed quality measures are predominantly process measures of endoscopic procedures (7,8), however, if the outcome measures will be the detection of upper GI malignancy or premalignant lesions, the

performance measures influencing outcome is lack, and supporting evidence is weak. The European Society of Gastrointestinal Endoscopy (ESGE) and United European Gastroenterology (UEG) guideline suggested six key and five minor performance measures (9,10). The key performance measures are (I) fasting instructions prior to UGI endoscopy; (II) documentation of procedure duration; (III) accurate photo documentation; (IV) application of standardized terminology; (V) application of Seattle protocol in Barrett's esophagus; and (VI) registration of complications after therapeutic upper GI endoscopy. More recently, British Society of Gastroenterology (BSG) and Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland (AUGIS) announced the first position statement, setting out the minimum standards in diagnostic EGDs (11). They suggested key performance indicators of endoscopy as adequate photo documentation, adequate mucosal visualization and reporting the quality of mucosal visualization, etc. It is also suggested that the inspection time during a diagnostic endoscopy should be recorded for surveillance procedures, such as Barrett's and gastric atrophy/intestinal metaplasia surveillance. We will make a short discussion about the quality indicators.

Competency of endoscopists

Endoscopy procedures should be done by qualified endoscopists. The BSG/AUGIS guideline working

group agreed that 100 procedures should be measured to assess the performance measure (11). However, the numbers of endoscopy means minimum requirement. Additional endoscopic training is necessary to enhance the outcome of endoscopy or colonoscopy. The ASGE has its own training and credentialing guidelines that establish basic principles of competency for endoscopy, colonoscopy, endoscopic ultrasonography and endoscopic retrograde cholangiopancreatography (12). The KSGE training regulations of endoscopy subspecialty recommend minimum of 1,000 EGDs and minimum of 30 therapeutic EGDs during training period (13). The National Endoscopy Quality Improvement Program in Korea recommends screening endoscopy will be done by specially trained endoscopists or experienced endoscopists who have performed minimum of 500 EGDs (6).

Volume of endoscopy to maintain competency

To be able to maintain the ability to perform a high-quality examination, endoscopy should be 100 performed regularly. British guideline proposes that endoscopists should aim for a minimum of EGDs performed each year (11). There is no evidence to support a specific minimum number of procedures required to maintain proficiency in endoscopy once an individual is deemed competent. The KSGE guideline required the continuous medical education in the field of the endoscopy instead of annual minimum volume of endoscopy to maintain competency.

Inspection time

Withdrawal time of colonoscopy is an important performance indicator. Recently Park *et al.* demonstrated that the observation time is an important quality indicator in EGD. In that study, endoscopists were classified into the fast *vs.* slow endoscopists groups. The mean duration time was 2 minutes 38 seconds for the fast endoscopists group, and 3 minutes 25 seconds for the slow endoscopists group. Even approximately a minute difference in observation times significantly affected the detection rate of gastric adenoma or cancer (0.17% *vs.* 0.25%) (14). Teh *et al.* used a cut-off time of ≥ 7 min per endoscopy, Slow endoscopists detect two times as many high risk gastric lesions (intestinal metaplasia, gastric atrophy, gastric dysplasia, or cancer) and three times as many dysplastic lesions and gastric cancers (15). Longer inspection would be more important in the examination of high risk patients who have premalignant

lesions such as gastric intestinal metaplasia or Barrett's esophagus.

Photo documentations of relevant anatomical landmarks and any detected lesions

Photo documentation of all anatomical landmarks is a proof of an adequate and complete procedure. The ESGE recommended to take images of a minimum of eight anatomical landmarks. Two pictures of esophagus, four pictures of stomach and two pictures of duodenum (16) the countries where gastric cancer is prevalent adopted an more rigorous photo documentation. The Japanese Society of Gastroenterological Cancer Screening recommends a protocol whereby 20 images of the stomach are recorded. Picture points are arranged according to the order of the procedure, and three or four pictures are acquired in the upper corpus, lower corpus and antrum. This systematic screening protocol for the stomach ensures a meticulous and systematic examination of the whole gastric mucosa (17). The Korean guideline of Gastroenterological Cancer Screening recommends the minimum eight pictures of landmarks except the lesion.

The disease specific quality indicators

The disease specific quality indicators suggested by BSG/AUGIS guidelines are for enhancing pathological diagnosis in premalignant conditions or certain disease conditions. For example, in case of Barrett's esophagus, (I) description using the Paris classification, (II) classifying length of a Barrett's segment using the Prague classification and (III) taking biopsies in accordance with the Seattle protocol. Other quality indicators are (IV) biopsies of esophagus to rule out eosinophilic esophagitis in those esophagitis in those presenting with dysphagia/food impaction, (V) biopsies and follow up of esophageal ulcers in atypical appearance, (VI) biopsies and follow up in case of gastric ulcer, (VII) adequate description of gastric polyp, (VIII) biopsies from antrum and body in case of gastric premalignant lesion, gastric atrophy or intestinal metaplasia, (IX) separate biopsies from the gastric antrum, gastric body and duodenum if coeliac serology is positive, where iron deficiency anemia is being investigated, (X) test and treatment of *H. pylori* in case of gastric or duodenal ulcers, and (XI) a minimum of four biopsies from the duodenal bulb and second part of the duodenum where coeliac disease is suspected,

ASGE recommended a high-priority subset of the key performance indicators which all upper gastrointestinal endoscopists should do, based on their clinical relevance and importance (7,8). (I) Endoscopic treatment for bleeding ulcers or ulcers with nonbleeding visible vessels; (II) test of *H. pylori* for gastric or duodenal ulcers; (III) use of prophylactic antibiotics in patients with cirrhosis with acute upper GI bleeding who undergo EGD; and (IV) use of proton pump inhibitors for suspected peptic ulcer bleeding (7,8).

Reducing procedure variation and following the standard is very important in endoscopic procedures. To improve the quality, performance measurement is essential, and the development of robust, consensus- and evidence-based key performance measures is the first step. Future research will be aim to determine feasibility of those measure in clinical practice and enhancing the diagnostic quality. We hope to set the standard of procedures and keeping the guideline would influence on patient outcomes.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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