Communication from the ASGE Standards of Practice Committee

GUIDELINE

# The role of endoscopy in Barrett's esophagus and other premalignant conditions of the esophagus

*This is one of a series of statements discussing the use of GI endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy prepared this text. In preparing this guideline, a search of the medical literature was performed using PubMed. Additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When limited or no data exist from well-designed prospective trials, emphasis is given to results of large series and reports from recognized experts. Guidelines for appropriate use of endoscopy are based on a critical review of the available data and expert consensus at the time the guidelines are drafted. Further controlled clinical studies may be needed to clarify aspects of this guideline. This guideline may be revised as necessary to account for changes in technology, new data, or other aspects of clinical practice. The recommendations were based on reviewed studies and were graded on the strength of the supporting evidence (Table 1).[1] The strength of individual recommendations is based on both the aggregate evidence quality and an assessment of the anticipated benefits and harms. Weaker recommendations are indicated by phrases such as "we suggest," whereas stronger recommendations are typically stated as "we recommend."*

*This guideline is intended to be an educational device to provide information that may assist endoscopists in providing care to patients. This guideline is not a rule and should not be construed as establishing a legal standard of care or as encouraging, advocating, requiring, or discouraging any particular treatment. Clinical decisions in any particular case involve a complex analysis of the patient's condition and available courses of action. Therefore, clinical considerations may lead an endoscopist to take a course of action that varies from these guidelines.*

Endoscopy plays an important role in the diagnosis and management of premalignant conditions of the esophagus. Early recognition of premalignant conditions provides an opportunity to prevent esophageal cancer or to diagnose it at an early stage. This guideline discusses the role of endoscopy in the management of premalignant conditions of the esophagus. The primary condition addressed will be Barrett's esophagus (BE), the only known precursor of adenocarcinoma of the esophagus, but the guideline also covers the role of endoscopy as it applies to the neoplastic potential of achalasia, aerodigestive cancers, tylosis, and caustic injuries, which have been suggested to be risk factors for squamous cell carcinoma. Discussion of other rare conditions such as esophageal GI stromal cell tumors, granular cell tumors, adenomatous polyps, and papillomas is outside the scope of this guideline.


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## BARRETT'S ESOPHAGUS

### Diagnosis of BE

BE has been defined in the United States by the presence of specialized intestinal metaplasia of the tubular esophagus and is recognized as a precursor lesion to esophageal adenocarcinoma (EAC). The development of BE is believed to be a reparative response to reflux-induced damage to the native squamous epithelium, with subsequent replacement with a metaplastic intestinalized epithelium, BE. Metaplastic BE is associated with increased cellular proliferation and turnover that may result in progression to dysplasia. Early studies reported up a 30- to 40-fold increased risk of the development of EAC,[2] but estimates of the risk of EAC associated with BE have been steadily decreasing in more recent, better controlled trials. In a recent population-based cohort study, the presence of BE conferred a relative risk of EAC of 11.3 over that of the general population (95% CI, 8.8-14.4).[3] Although some caution should be exercised in the interpretation of this analysis because of its retrospective nature and relatively short mean follow-up period of 5 years, these findings are consistent with the trend of decreasing risk estimates observed in multiple other studies over the past 5 to 10 years,[4-9] although the optimal prospective study has not been conducted.

BE is histologically graded as nondysplastic (NDBE), indeterminate-grade dysplasia (IGD), low-grade dysplasia (LGD), high-grade dysplasia (HGD), intramucosal carcinoma (IMC), or invasive EAC.[10] Management recommendations for BE typically do not include the approach to or management of IGD. IGD is considered by pathology experts to be an interim diagnosis, typically encountered in the presence of significant inflammation or ulceration or

**TABLE 1. GRADE system for rating the quality of evidence for guidelines**

| Quality of evidence | Definition | Symbol |
|---|---|---|
| High quality | Further research is very unlikely to change our confidence in the estimate of effect. | ⊕⊕⊕⊕ |
| Moderate quality | Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. | ⊕⊕⊕ |
| Low quality | Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. | ⊕⊕ |
| Very low quality | Any estimate of effect is very uncertain. | ⊕ |

Adapted from Guyatt et al.[1]

when technical issues related to biopsy specimens preclude a definitive diagnosis of dysplasia. This diagnosis requires clarification after aggressive medical therapy of esophageal inflammation or additional specimen processing or pathology consultation.[10] BE has a characteristic appearance endoscopically, described as a salmon or pink color in contrast to the light gray appearance of esophageal squamous mucosa, but it should be emphasized that histologic examination of esophageal biopsy samples is required to confirm the diagnosis of BE.

The sensitivity of white-light endoscopy alone for the detection and diagnosis of BE ranges from 80% to 90%.[11-13] During endoscopy, special attention and targeted biopsies should be focused on lesions such as nodules, ulcers, and other mucosal irregularities because these lesions are more likely to demonstrate dysplasia or cancer. Adjuncts to white-light endoscopy used to improve the sensitivity for the detection of BE and dysplastic BE include chromoendoscopy, electrical enhanced imaging, magnification, and confocal endoscopy. These techniques are still in development and are discussed in detail elsewhere.[14,15]

Risk factors for BE and EAC include male sex, white race, age older than 50 years, family history of BE, increased duration of reflux symptoms, smoking, and obesity.[16-18] Endoscopic *screening* for BE is controversial because no randomized, controlled trials (RCTs) have demonstrated a decrease in mortality, either in general or from EAC, as a result of screening.[19-21] Because of the lack of RCT evidence of the efficacy of screening, some have used models in an attempt to establish a rationale for screening for BE. One such cost-effectiveness model of EGD screening of 50-year-old white men with GERD, with surveillance reserved for those with dysplastic BE, demonstrated $10,440/quality-adjusted life-year saved with screening compared with no screening or surveillance.[22] The cost-effectiveness of traditional EGD is limited by the associated costs of the procedure and sedation. Screening modalities other than sedated EGD include esophageal capsule endoscopy (ECE) and unsedated transnasal endoscopy. A meta-analysis of ECE compared with EGD for diagnosing BE showed pooled sensitivities of 77% and 86%, respectively, by using EGD and/or histologically-confirmed intestinal metaplasia as the reference.[23] The authors concluded that the sensitivity and specificity of ECE were moderate and insufficient to recommend ECE over EGD as a screening test. A Markov model of 50-year-old men with chronic GERD undergoing screening with either EGD or ECE suggested that EGD was the preferred screening modality, but did not take patient preference into account.[24] A randomized, blinded study evaluating unsedated transnasal endoscopy versus traditional EGD demonstrated comparable rates of NDBE detection and preference for transnasal endoscopy by study volunteers.[25] There are no data to support screening of the general population or of patients with a solitary risk factor for BE. Additionally, repeat endoscopy has a low yield for detecting BE in previously screened patients with normal findings. A review of the Clinical Outcomes Research Initiative National Endoscopic Database identified 24,406 patients who had undergone 2 endoscopies in a 5-year period. Suspected BE, based on the endoscopic appearance, was found in 2.4% of patients who did not have BE when their initial endoscopy was performed.[26] Suspected BE was identified significantly more often among patients for whom the follow-up EGD indication was reflux compared with those with another indication (5% vs 1.6%, $P < .0001$) and among those with previous esophagitis compared with those without previous esophagitis (9.9% vs 1.8%, $P < .0001$). A prospective study followed 100 subjects who underwent EGD for a variety of indications with neither histologic nor endoscopic evidence of BE.[27] At a mean of 38 months of follow-up, all subjects had undergone repeat EGD and only 1 subject had confirmed BE. Once identified, a variety of endoscopic management options are available for patients with BE, based on the presence and grade of BE-associated dysplasia (Table 2). Despite pathology confirmation and consensus regarding the presence of dysplasia on specific biopsy specimens, there is the potential for variability with respect to the pathologic grades and natural history of BE-associated dysplasia in individual patients.

## Surveillance of NDBE

The primary purpose of surveillance of BE is to identify incident dysplasia and early EAC. Because the risk of EAC varies based on the grade of dysplasia, surveillance guidelines also vary depending on histology. Surveillance in

**TABLE 2. Endoscopic management strategies for Barrett's esophagus**

| Histology | Intervention options |
|---|---|
| NDBE | Consider no surveillance.<br>If surveillance is elected, perform EGD every 3 to 5 years with 4-quadrant biopsies every 2 cm.<br>Consider endoscopic ablation in select cases. |
| IGD | Clarify presence and grade of dysplasia with expert GI pathologist.<br>Increase antisecretory therapy to eliminate esophageal inflammation.<br>Repeat EGD and biopsy to clarify dysplasia status. |
| LGD | Confirm with expert GI pathologist.<br>Repeat EGD in 6 months to confirm LGD.<br>Surveillance EGD every year, 4-quadrant biopsies every 1 to 2 cm.<br>Consider endoscopic resection or ablation. |
| HGD | Confirm with expert GI pathologist.<br>Consider surveillance EGD every 3 months in select patients, 4-quadrant biopsies every 1 cm.<br>Consider endoscopic resection or RFA ablation.<br>Consider EUS for local staging and lymphadenopathy.<br>Consider surgical consultation. |

*NDBE*, Nondysplastic Barrett's esophagus; *IGD*, indeterminate for dysplasia; *LGD*, low-grade dysplasia; *HGD*, high-grade dysplasia; *RFA*, radiofrequency ablation.

patients with NDBE is also controversial, primarily because screening will detect prevalent neoplasia, whereas surveillance will only detect incident cases. It is maintained that screening results in higher rates of neoplasia detection compared with surveillance. Systematic surveillance of all BE patients has not been shown to be cost-effective, and no RCTs have been conducted to compare surveillance with the natural history of BE. Rates of progression from NDBE to EAC are estimated to be as high as 0.6% per year[28] or as low as 0.12% per year.[3] A recent multicenter study showed a rate of progression to EAC of 0.27% per year and a rate of progression to HGD of 0.48% per year.[29] In this study, 97.1% of patients with NDBE were cancer free at 10 years. A recent population-based study showed the incidence of HGD and EAC in patients with BE to be 0.38% per year.[4] Sharma et al[30] found that half of patients who developed HGD or EAC demonstrated only NDBE on a previous biopsy, suggesting that not all cases of EAC develop in a stepwise fashion from NDBE to LGD to HGD and then to EAC. Nevertheless, studies of patients whose EAC was detected through surveillance EGD have consistently demonstrated improved survival over patients whose EAC was not detected through surveillance, although this observation likely represents lead time bias.[19,31,32] Biopsy protocols for NDBE surveillance have been published.[33] For patients with NDBE, 4-quadrant biopsies every 2 cm with large-capacity forceps performed every 3 to 5 years is commonly recommended, although not evidence based. A recent study demonstrated similar rates of adequate specimens with large-capacity forceps (2.8 mm) compared with jumbo forceps (3.2 mm).[34]

Recently, endoscopic ablation has been proposed as an alternative to surveillance for NDBE. Although ablation is expensive, it could be considered if it obviates the need for surveillance. A multicenter study of radiofrequency ablation (RFA) of NDBE achieved complete eradication of BE in 98.4% of patients at 2.5 years and 92% at 5 years, with no patients progressing past NDBE during follow-up.[35] Endoscopic ablation therapy as an alternative to surveillance of NDBE has been suggested to be cost-effective in a cost-utility model[36] and may be a preferred management option in select patients with NDBE, such as those with a family history of EAC.[37] Additional research evaluating this management strategy is eagerly awaited. The development of biomarkers to identify patients at high risk of dysplasia would likely change the need for surveillance or ablation and is an area of ongoing research.[38]

## Surveillance of BE with LGD

The natural history of BE with LGD is unknown, but available data indicate that LGD carries a slightly higher risk of progression to EAC rather than NDBE. The diagnosis of LGD should be confirmed by an expert GI pathologist because the rate of progression of LGD may be higher in situations in which 2 expert GI pathologists agree on the diagnosis. A large Dutch cohort study demonstrated a rate of progression from LGD to EAC of 0.77% per year.[39] A recent meta-analysis found similar rates of progression in studies of patients in surveillance programs: 0.7% per year in the United Kingdom, 0.7% per year in the United States, and 0.8% per year in Europe.[40] LGD was not an independent predictor of higher rates of progression in this meta-analysis. A multicenter outcomes study also failed to link LGD progression to HGD.[41] The American Gastroenterological Association and American College of Gastroenterology still advocate biannual to annual surveillance for patients with LGD.[42,43] Published biopsy protocols involving LGD typically follow the Seattle protocol (see the following) with targeted plus 4-quadrant biopsies every 1 to 2 cm along the length of the BE.[41,44]

Some experts advocate endoscopic ablation of BE in the setting of LGD, given the unpredictable natural history of LGD, the cumulative risk of the development of EAC, and the lack of cost-effectiveness data regarding surveillance of LGD. A recent multicenter, sham-controlled trial of RFA achieved complete eradication of dysplasia in 90.5% of patients and complete eradication of BE in 81% of patients with LGD with 2-year follow-up data demonstrating complete eradication of dysplasia and BE in 98% of patients.[45] The annual rate of neoplastic progression in this

study was 1 per 73 patient-years; however, no subjects (sham or ablation) progressed from LGD to cancer.[46] It should be noted that the length of follow-up was short and the development of cancer would not have been expected in this cohort. Comprehensive large studies in this population will be challenging because of the requisite long-term follow-up. Ablation as an alternative to surveillance should be considered and discussed with these patients. There are scant published clinical data available to direct surveillance protocols after successful ablation of LGD; therefore, surveillance strategies after endoscopic ablation of LGD should be individualized.[47]

## Surveillance of BE with HGD

The purpose of surveillance in patients with HGD is to detect foci of IMC or EAC. A biopsy demonstrating HGD requires review and confirmation by a second expert GI pathologist. One of the most widely recognized surveillance strategies is the Seattle protocol,[48] which involves targeted biopsies of mucosal abnormalities, such as nodules and ulcers, plus 4-quadrant biopsies obtained every 1 cm by using large-capacity forceps for the length of the BE segment. With the use of this protocol, no unsuspected invasive cancer has been demonstrated in their cohort.[48] A less intensive protocol that uses 4-quadrant biopsies every 1 to 2 cm with regular- or large-capacity forceps found a similar rate of missed cancers compared with the Seattle protocol in patients with HGD undergoing esophagectomy.[49] Because safe and effective methods of endoscopic treatment of HGD and early EAC have emerged, continued surveillance of BE with HGD should be offered only to patients unfit or unwilling to undergo operative or ablative therapy.

## Endoscopic management of BE with dysplasia

Endoscopic therapy has evolved as a safe and effective method of treating dysplastic BE and IMC. Endoscopic therapy can be divided into therapies that ablate dysplastic mucosa and techniques that resect dysplastic mucosa. A key element of the endoscopic therapy of dysplasia is that re-epithelialization of squamous mucosa can only be achieved in an acid-suppressed environment; thus, the use of antisecretory agents or antireflux surgery is a necessary adjunct to these techniques. Compared with esophagectomy, endoscopic ablative therapy is associated with decreased procedure-related complications.[50] Careful consideration, however, is required to determine the optimal approach to individual patients with dysplastic BE.

Before endoscopic therapy, EUS-guided FNA should be considered in select cases of HGD and IMC.[51] The Seattle experience indicates that this may not be necessary, and many BE experts do not use EUS in patients with flat mucosa and HGD only on biopsy. However, some still advocate EUS based on a study in which it resulted in a change in management strategies in as many as 20% of patients by detecting unrecognized malignant lymphadenopathy.[52] One should be aware of data that demonstrate EUS to be inaccurate in some cases, with EMR found to be superior to EUS for local T staging.[53,54] Patients with T1b dysplasia are at increased risk of failing endoscopic ablative or resection techniques.[55,56] Therefore, EMR of nodular or dysplastic BE should be performed to determine depth of involvement of dysplasia before considering endoscopic therapy.

**Endoscopic ablation.** Ablative techniques must balance effective elimination of all dysplastic mucosa with the possibility of damaging deeper esophageal layers, which can result in short- and long-term complications. Photodynamic therapy (PDT) using 5-aminolevulinic acid or porfimer sodium as photosensitizing agents has been used effectively to eliminate HGD (77% over 5 years) and early EAC.[57] Disadvantages of this technique include the inability to eliminate NDBE, skin photosensitivity for as long as 1 month, and stricture formation rates of approximately 30%.[57,58] PDT has been less commonly used for dysplasia since the emergence of RFA.

RFA involves direct application of radiofrequency energy to the esophageal mucosa. A multicenter, sham-controlled trial of RFA for LGD and HGD demonstrated complete eradication of BE in 90.5% of patients with LGD and in 81% of patients with HGD, with significantly lower rates of cancer among patients in the treatment arm compared with control subjects (1.2% vs 9.3%, $P = .045$), although these differences were numerically small and may be the result of type I error.[45] In this study, 3 serious adverse events occurred related to RFA treatment (2 cases of chest pain and 1 GI hemorrhage), and the rate of esophageal stricture formation was 6%. A subset of this study population followed for 3 years achieved complete eradication of dysplasia in 98% and complete eradication of BE in 91%, with stricture formation in 7.6%. Chest pain or discomfort is fairly common after RFA treatment, but generally subsides after 1 week.[46] A recent systematic review examined the frequency of subsquamous intestinal metaplasia after ablation and estimated this histologic finding to be present in 0.9% of patients treated with RFA and 14.2% treated with PDT, although the reports included in this review were limited with respect to their description of both adequacy and timing of sampling, and some included patients with NDBE.[59] Another recent report highlighted the need for continued surveillance in patients with BE-associated dysplasia after apparently successful RFA. In this case series, 3 patients with dysplasia (1 with a history of surgically resected esophageal carcinoma and 2 with HGD) were found to have subsquamous neoplasia (2 adenocarcinomas and 1 HGD) after RFA. Although there are no current consensus recommendations, these authors recommend surveillance every 3 months for the first year after ablation, every 6 months for the next year, and then annually.[60]

Cryotherapy is an ablative technique that causes cellular destruction by using freeze-thaw cycles. During endos-

copy, a spray catheter is passed through the working channel of the endoscope and either liquid nitrogen or carbon dioxide is applied to the dysplastic area. A case series demonstrated HGD eradication rates of 97%, with an 87% rate of eradication of all dysplasia and a 57% rate of eradication of all BE with cryotherapy.[61] Significant complications are uncommon with this technique, but 1 case of perforation has been reported.[62]

**EMR/endoscopic submucosal dissection.** EMR and endoscopic submucosal dissection (ESD) are endoscopic techniques designed to remove targeted superficial tissue of the GI tract (EMR) or large en bloc strips of mucosa (ESD).[63] EMR is indicated for shorter segment dysplastic BE, nodular dysplasia, superficial (T1a) EAC, and esophageal squamous cell carcinoma (ESC). ESD can be used in similar situations and may be preferred for extensive areas of dysplasia or IMC. A distinct advantage of EMR/ESD over ablative therapy is the availability of large tissue specimens for pathologic examination and cancer staging. There are a variety of methods used to remove the target mucosa via EMR/ESD. Detailed discussions of these techniques can be reviewed elsewhere.[63] EMR as an eradication technique for HGD and EAC is successful in 91% to 98% of T1a cancers.[64-66] Residual or recurrent BE is at risk of neoplastic progression, supporting ongoing surveillance or completion eradication. Eradication of all BE by either further EMR or additional ablation techniques will reduce the risk of subsequent HGD or EAC.[46,67] Long-term studies of the durability of EMR for maintaining re-epithelialization with neosquamous mucosa are lacking; thus, ongoing surveillance is advocated. Complications of EMR include bleeding, perforation, and stricture formation. Delayed bleeding is rare, but immediate bleeding can occur in 10% of patients and appears to primarily depend on EMR technique.[52,66,68] Perforation is reported in less than 3% to 7% of patients at high-volume centers.[65,69,70] Rates of stricture formation vary depending on the circumference and length of mucosa removed by EMR, but can occur in 17% to 37%.[67] Most strictures can be managed by endoscopic dilation. ESD is more commonly performed in Asian countries compared with the United States and Europe. Reports of ESD for EAC at the gastroesophageal junction showed 100% en bloc resection rates and 80% curative resection rates. In 1 study of EMR compared with ESD in patients with large (≥20 mm) ESC, EMR was associated with a statistically significant higher local recurrence rate than ESD (23.91% vs 3.13%, $P = .041$), suggesting that ESD, where available, is the preferred technique for large lesions.[71]

## MISCELLANEOUS PREMALIGNANT CONDITIONS

### Achalasia

Achalasia is defined as the loss of lower esophageal motility in conjunction with the failure of the lower esophageal sphincter to relax. This condition has a prevalence of approximately 10 per 100,000 and has a peak incidence in the seventh decade. Most patients with achalasia will present with dysphagia to solids and liquids, and as many as 60% may also present with chest pain, GERD symptoms, or weight loss. ESC is 16- to 33-fold more common in patients with achalasia than in the general population[72,73] and can develop years after the diagnosis of achalasia.[72,74,75] The etiology of the association between achalasia and ESC is poorly understood. Although EGD cannot be used alone to definitively diagnose achalasia, endoscopic evaluation of the esophagus and stomach should be performed during the initial diagnostic evaluation to ensure the absence of a malignancy causing the symptoms (pseudoachalasia) or of ESC-complicating achalasia. Although some advocate occasional surveillance endoscopies for patients with achalasia,[73,76-80] surveillance strategies have failed to demonstrate improved survival and therefore cannot be recommended based on current evidence. The approach to the management of the symptoms of achalasia is beyond the scope of this review and can be found elsewhere.[81]

### History of upper aerodigestive cancer

The incidence of synchronous or metachronous malignancies of the esophagus in the setting of upper airway squamous cell carcinoma range from 3.2% to 14%.[82,83] No studies have demonstrated cost-effectiveness or improvement in survival through screening for esophageal cancer in patients with aerodigestive diseases. Despite this lack of data, some advocate routine endoscopy in patients with upper airway squamous cell carcinoma,[82,83] despite the absence of sufficient evidence to suggest an overall benefit.

### Tylosis

Tylosis is a rare autosomal dominant genetic disorder characterized by hyperkeratosis of the palms and feet. The genetic basis for the abnormality has been linked to the down-regulation of a cytoglobin gene on chromosome 17 locus q25, and the association with esophageal cancer has been recognized since the 1950s. The estimated lifetime risk of esophageal cancer in patients with tylosis is approximately 40% for patients with American pedigrees and 92% for those with British pedigrees.[84] Screening for esophageal carcinoma should occur at 30 years of age or at the onset of recognition of the disease and should be performed every 1 to 3 years.[63,85]

### Caustic injury

Patients who have sustained a caustic injury of the esophagus are at increased risk of the development of esophageal cancer compared with the general population. A history of a caustic injury is evident in 1% to 4% of all esophageal cancers,[86-88] but no histologic predominance (ESC vs EAC) has been reported. Most of these patients have ingested lye, although sporadic case reports have demonstrated the development of esophageal carcinoma in patients who have in-

gested acidic substances.[88] The time period between the initial insult and the development of esophageal carcinoma can range from 10 to 71 years.[77,88] It is currently recommended that screening for esophageal carcinoma should begin approximately 10 to 20 years after the insult, and previous guidelines suggested a 2- to 3-year interval for surveillance, although this has not been studied in a prospective manner.[63,89] The cost-effectiveness of screening for esophageal cancer in patients with a history of a caustic injury has not been studied.

## RECOMMENDATIONS

1. We suggest that endoscopic screening for BE can be considered in select patients with multiple risk factors for BE and EAC, but patients should be informed that there is insufficient evidence to affirm that this practice prevents cancer or prolongs life. ⊕○○○
2. We recommend no further endoscopic screening for BE after a screening examination with negative findings. ⊕⊕⊕○
3. We recommend against a surveillance EGD 1 year after the initial diagnosis of NDBE. ⊕⊕⊕○
4. We suggest that if patients with NDBE are enrolled in an EGD surveillance program, a surveillance EGD should be performed no more frequently than every 3 to 5 years, with white-light endoscopy and targeted plus 4-quadrant biopsies at every 2 cm of suspected BE. ⊕⊕○○
5. We suggest that only patients with BE who are candidates for therapy if dysplasia is identified be enrolled in EGD surveillance programs. ⊕○○○
6. We suggest that patients with a diagnosis of BE IGD undergo additional evaluation to clarify the diagnosis. This may include additional pathology review, dose escalation of antisecretory therapy to eliminate confounding esophageal inflammation, and/or a repeat EGD and biopsy. ⊕⊕○○
7. We recommend that an expert GI pathologist confirm the diagnosis of LGD and/or HGD. ⊕⊕⊕○
8. We suggest that patients with LGD undergo a repeat endoscopy within 6 months to confirm the diagnosis, then annual surveillance endoscopy using a standard biopsy protocol. ⊕⊕○○
9. We suggest that ablation be considered in select patients with LGD. Appropriate surveillance intervals after ablation are unknown. ⊕⊕○○
10. We recommend that endoscopic resection of nodular dysplastic BE be performed to determine the stage of dysplasia before considering other ablative endoscopic therapy. ⊕⊕⊕○
11. We suggest that local staging with EUS ± FNA is an option in select patients being considered for endoscopic ablative therapy. ⊕○○○
12. We recommend that eradication with endoscopic resection or RFA be considered for flat HGD in select cases because of its superior efficacy (compared with surveillance) and side effect profile (compared with esophagectomy). ⊕⊕⊕○
13. We recommend against routine endoscopic surveillance in achalasia. ⊕⊕⊕○
14. We recommend against endoscopic routine screening in patients with aerodigestive cancer. ⊕⊕⊕○
15. We suggest that screening for esophageal carcinoma begin at age 30 in patients with tylosis. Surveillance intervals should be every 1 to 3 years. ⊕⊕○○
16. We suggest that screening for esophageal carcinoma begin approximately 10 to 20 years after caustic injury and performed every 2 to 3 years. ⊕⊕○○

## DISCLOSURE

*The following authors disclosed financial relationships relevant to this publication: Dr Fisher is a consultant to Epigenomics Inc, Dr Fanelli is the owner of New Wave Surgical Inc, and Dr Chathadi is on the Speakers' Bureau of Boston Scientific. The other authors disclosed no financial relationships relevant to this publication.*

*Abbreviations: BE, Barrett's esophagus; EAC, esophageal adenocarcinoma; ECE, esophageal capsule endoscopy; ESC, esophageal squamous cell carcinoma; ESD, endoscopic submucosal dissection; IGD, indeterminate-grade dysplasia; HGD, high-grade dysplasia; IMC, intramucosal carcinoma; LGD, low-grade dysplasia; NDBE, nondysplastic Barrett's esophagus; PDT, photodynamic therapy; RCT, randomized, controlled trial; RFA, radiofrequency ablation.*

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