Communication from the ASGE Standards of Practice Committee

SOCIETY DOCUMENT

ASGE American Society for Gastrointestinal Endoscopy

American Society for Gastrointestinal Endoscopy guideline on endoscopic management of benign and malignant colonic strictures CME

Prepared by: ASGE Standards of Practice Committee

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(footnotes appear on last page of article)

INTRODUCTION

Endoscopy plays an essential role in the management of malignant colonic obstruction, which occurs in about 10% of patients with colorectal cancer (CRC) and may also result from metastatic or extracolonic malignancies (ECMs).[1,2] In addition, endoscopy plays an important role in treating benign colonic strictures caused by Crohn's disease (CD), postsurgical anastomosis, and diverticulitis.[3,4] In 2010, the American Society for Gastrointestinal Endoscopy (ASGE) published Standards of Practice (SOP) guidelines on the "Role of endoscopy in the management of patients with known and suspected colonic obstruction and pseudo-obstruction."[5] More recently, in 2019, the ASGE released another guideline on the "Role of endoscopy in the management of acute colonic pseudo-obstruction and colonic volvulus," which excluded recommendations on the treatment of colonic obstruction.[6] Because the ASGE last published recommendations on the role of endoscopy to treat colonic obstruction, there have been numerous studies published on this, thus making an updated ASGE guideline document on the role of endoscopy to treat both benign and malignant colorectal strictures necessary.

The goal of this guideline is to provide evidence-based recommendations, using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) framework, focusing on 5 specific sections: (1) initial assessment including best practices for endoscopic assessment, biopsy, and tattooing, (2) management of malignant colonic obstruction from potentially resectable CRC, (3) management of malignant colonic obstruction from unresectable CRC, (4) management of malignant colonic obstruction from extracolonic malignancy (MCO-ECM), and (5) management of benign colonic strictures.

METHODS

This document was prepared by the SOP Committee of the ASGE and was carried out in accordance with the ASGE Clinical Practice Guideline development policy while following the GRADE framework and recommendations.[7,8]

Clinically important outcomes within the context of malignant and benign colonic stricture were proposed a priori by the lead guideline authors and SOP chair and were refined and finalized by all members of the SOP committee.

These outcomes included mortality, permanent stoma, primary anastomosis, cancer recurrence, postoperative adverse events, quality of life, clinical success, and technical success. With these outcomes in mind, this guideline aimed to answer the following comparative questions using the GRADE process:

1. In patients with colonic obstruction from highly suspected or confirmed CRC that appears surgically resectable, is endoscopic self-expandable metal stent (SEMS) placement as a bridge to elective surgery superior to emergency surgery without SEMS placement?
2. In patients with colonic obstruction from highly suspected or confirmed CRC that is deemed not curable by a surgical resection, is palliative endoscopic SEMS superior to palliative surgery?
3. In patients with colonic obstruction from CRC undergoing colonic stent placement, is endoscopically uncovered SEMS placement superior to covered SEMS placement?
4. In patients with MCO-ECM, is endoscopic SEMS placement superior to palliative surgical decompression?
5. In patients with symptomatic benign noninflammatory colonic stricture, is endoscopic SEMS placement superior to endoscopic balloon dilation (EBD)?
6. In patients with symptomatic benign noninflammatory colonic stricture, is endoscopic stricturotomy (ES) superior to EBD?

In addition to the aforementioned GRADE-based questions, we also aimed to answer the following questions through an extensive review of the literature and panel consensus, but without using the full GRADE methodology:

1. In patients with a symptomatic colorectal stricture, what noninvasive testing is necessary to inform management?
2. In patients with a newly diagnosed colorectal stricture, how is an optimal endoscopic examination performed?
3. In patients with a colorectal stricture, what are the best practice recommendations to obtain high-quality biopsy specimens?
4. In patients with a colonic stricture who need marking for subsequent surgical management, how is an adequate endoscopic tattoo placed?
5. In patients with a colonic stricture undergoing EBD, stent placement, or stricturotomy, what are the best practice recommendations to perform these procedures?

We used the following definitions for this guideline:

- Asymptomatic colorectal stricture: narrowing of the colonic lumen that does not cause symptoms and is incidentally found on endoscopic examination or cross-sectional images.
- Symptomatic colorectal stricture: narrowing of the colonic lumen of variable severity that causes symptoms of partial or complete colonic obstruction, often accompanied by diffuse upstream bowel dilation of variable degree.
- Partial colonic obstruction: colorectal stricture presenting with subacute to chronic constipation, bloating, cramping, vomiting, and/or abdominal distension, while maintaining the ability to pass gas and stools.
- Complete colonic obstruction: colorectal stricture presenting with acute symptoms of abdominal distention, nausea, vomiting, and/or abdominal pain, typically associated with inability to pass stools and/or gas. Fever, tachycardia, and hypotension can also occur if ischemia, gangrene, perforation, or sepsis develops.

Full details of search design and execution, data extraction, data analysis, evidence synthesis, GRADE panel process, certainty of the evidence, and other considerations for each Population, Intervention, Comparator, Outcomes of interest (PICO) question are provided in the supplementary detailed methods, Supplementary Table 1: PICO questions, available online at www.giejournal.org. Forrest plots for each comparison can be found in Supplementary Figures 1-26 (available online at www.giejournal.org).

EXTERNAL REVIEW

The guideline was reviewed by the *Gastrointestinal Endoscopy* Editorial Board, Sustainable Endoscopy Task Force, and ASGE Governing Board and made available for public comment on the ASGE website for 30 days between September 11 and October 11, 2025.

INITIAL ASSESSMENT

Preprocedural assessment

The initial clinical evaluation should focus on clinical symptoms and signs that may suggest the need for emergency surgery. These symptoms include diffuse abdominal tenderness with peritoneal signs on examination, hemodynamic instability, and/or laboratory findings consistent with sepsis and lactic acidosis. Cross-sectional imaging with either contrast-enhanced CT or magnetic resonance imaging of the abdomen and pelvis should be used to assess the site of obstruction, degree of upstream bowel dilation, and suspected etiology (if previously unknown).[9,10] Stricture characteristics include number, location, length, severity, as well as the presence of an associated mass, inflammation, and abscess. Location of colonic obstruction can be classified as left (when it occurs from the rectum to the splenic flexure) or right (if present between the cecum and the transverse colon). Factors that reduce technical success with endoscopic management include long length of the stricture, right-sided colonic location, sharp angulation, multifocality, deep ulceration, or associated inflammation.[11-13] Surgical consultation should be obtained in all cases of partial and complete colonic obstruction for multidisciplinary management. Signs of impending perforation, such as pneumatosis coli and bowel wall ischemia, or perforation with free air, are contraindications for colonoscopy and suggest the need for emergency surgery.

Procedure considerations

Once the decision is made for endoscopic evaluation or management of colonic stricture, water enemas may be used if there are signs of complete colonic obstruction.[14] Full oral bowel preparation may be administered in cases of partial obstruction. Monitored anesthesia care or moderate sedation suffices for most patients with partial colonic obstruction, whereas general anesthesia is strongly preferred for complete obstruction or for critically ill patients. Fluoroscopy is necessary if the plan is for stent placement and can also be helpful for EBD of severe strictures. If planning stent placement, a therapeutic endoscope or adult colonoscope is generally used, although there are select stent deployment devices that are compatible with a pediatric colonoscope. Newer, smaller-diameter upper endoscopes with large working channels to accommodate through-the-scope stent devices have also been recently released and could be used. Air insufflation should be avoided. When inserting the endoscope, it is important to advance it predominantly using waterjet irrigation for visualization of the lumen to minimize carbon dioxide insufflation. The reason for this is to mitigate the risk of introducing gas proximal to the stricture into a "closed-loop" system, which, in an already distended colon, can put the patient at increased risk of proximal perforation.

Endoscopic assessment of colonic stricture

Once the endoscope reaches the stricture, photo documentation is mandatory. The endoscopist should carefully determine whether the stricture can be traversed, which can provide information on the diameter and severity of the stricture. If the stricture cannot be traversed and fluoroscopy is available, an extraction balloon catheter and contrast injection can be used to better delineate the stricture. The endoscopist should use endoscopic and fluoroscopic tools to estimate the diameter, length, and location of the stricture, including distance from the anal verge. It is important to characterize the stricture as fibrotic, inflammatory, ulcerated, anastomotic, or associated with a mass or diverticulum.

Endoscopic biopsies

If there is no prior diagnosis of cancer, endoscopists should inspect the area with white-light high-definition endoscopy and virtual chromoendoscopy. If there is an area suspicious for neoplasm or if the stricture is related to inflammatory bowel disease (IBD), about 6 targeted biopsy specimens should be obtained.[15,16] If the stricture is anastomotic, biopsies will generally not be helpful unless there is endoscopic concern for disease recurrence (eg, malignancy and IBD). If the stricture is related to a diverticulum, biopsies inside the diverticulum should be avoided because of the risk of perforation.[17]

Endoscopic tattooing

Tattoos are placed to mark lesions for subsequent surgical management. For colonic strictures, tattoos should be considered for suspected or confirmed malignancy if colonic stent placement is not performed, or for symptomatic strictures of any etiology if endoscopic treatment is not feasible. There is no need to tattoo lesions in the cecum or distal rectum.[18] Once the decision is made to tattoo an area, carbon black is the preferred permanent tattoo and is commercially available.[19]

The tattoo should be placed 3 to 5 cm distal to the lesion and in 2 to 4 quadrants, nearly touching each other along the colonic circumference to ensure visualization during surgery.[18] If the stricture is traversable and long, a proximal tattoo should be considered at a similar distance and number of quadrants, where feasible. The goal when tattooing is to confine the tattoo to the submucosal layer. For this, the needle is inserted tangentially and then lifted toward the center of the lumen. A small injection of saline solution or tattoo should be first injected to confirm that the needle is in the submucosa by observing a submucosal bleb.[20] Once a submucosal location of the needle is confirmed, the area can be tattooed with 0.75 to 1 mL of carbon black.[18] These steps should be repeated for every area that is tattooed. A common error is placing the needle too deep and injecting the tattoo in the peritoneal cavity or extracolonic tissue, which can cause adverse events, or may prevent accurate localization of the target lesion during surgery.[21] The location of the tattoo in relation to the stricture should be documented in the endoscopy report and supported by an endoscopic photograph.

MANAGEMENT STRATEGY

Colonic obstruction caused by potentially resectable CRC

Recommendation: In patients with colonic obstruction from highly suspected or confirmed CRC that appears surgically resectable, the ASGE suggests endoscopic placement of a colonic stent, when feasible, as a bridge to surgery (BTS) over emergency surgery without stent placement (conditional recommendation or low quality of evidence).

For this question, we conducted a meta-analysis of 8 unique randomized controlled trials (RCTs) totaling 665 patients that compared colonic stent as a BTS versus emergency surgery.[22-29] A previous meta-analysis, which included 7 of these 8 RCTs, was updated.[30] Of these RCTs, 5 were conducted in Europe, 2 in Asia, and 1 in Africa. All studies enrolled adults with symptomatic left-sided colonic obstruction (from the splenic flexure to the rectosigmoid region) and used uncovered metal stents. The studies included patients with potentially resectable tumors. None of the studies required confirmatory histopathology for enrollment and interventions. The studies excluded patients with a mass <8 cm from the anal verge, unresectable cancer, ischemia, perforation, or peritonitis. Five studies reported

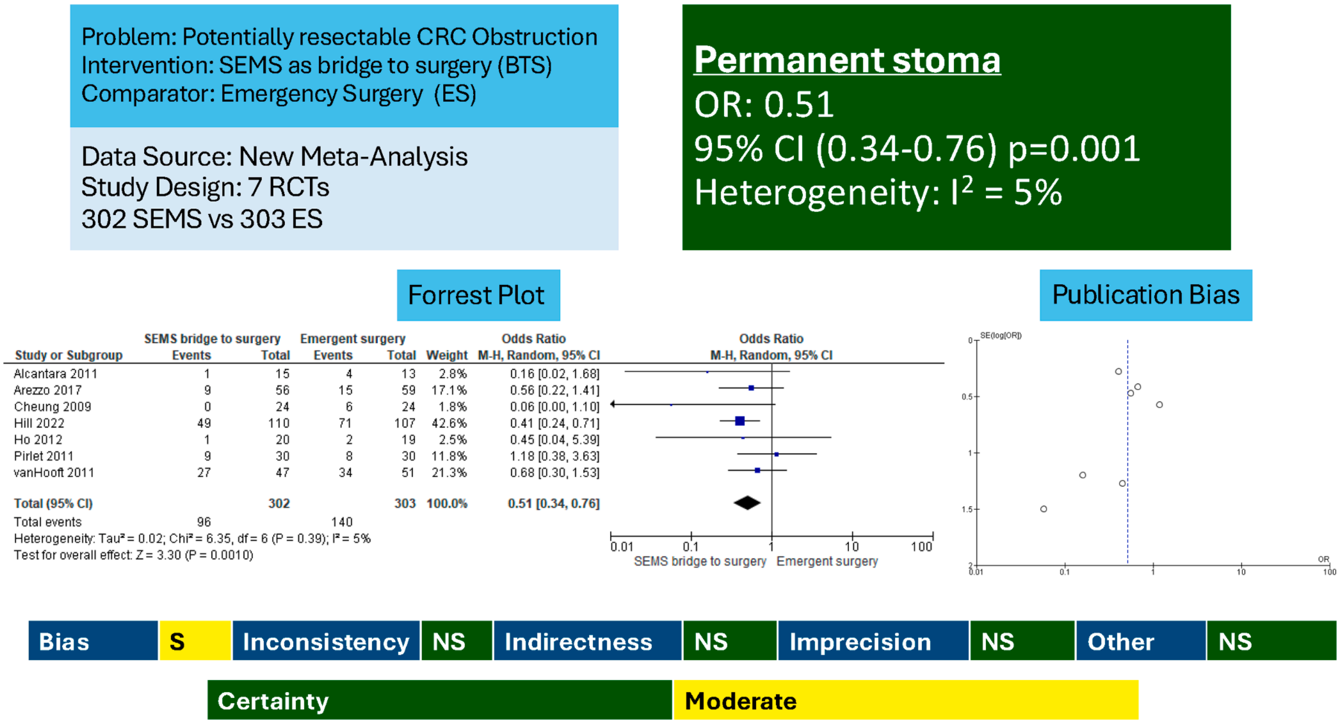

Figure 1. Permanent stoma of endoscopic SEMS as a bridge to elective surgery versus emergency surgery without SEMS for colonic obstruction from surgically resectable colorectal cancer. *SEMS,* Self-expandable metal stent.

using an uncovered metal stent, whereas 3 studies did not mention the type of stent used.

When compared with emergency surgery, endoscopic placement of a colonic stent as a BTS significantly increased primary surgical anastomosis (7 RCTs; odds ratio [OR], 2.35; 95% CI, 1.47-3.76; $I^2 = 0\%$), reduced postoperative adverse events (8 RCTs; OR, 0.44; 95% CI, 0.23-0.85; $I^2 = 70\%$), and decreased the need for permanent stoma (7 RCTs; OR, 0.51; 95% CI, 0.34-0.76; $I^2 = 5\%$; Fig. 1). In addition, colonic stent placement as BTS was associated with 84% higher risk of cancer recurrence (6 RCTs; OR, 1.84; 95% CI, 1.05-3.22; $I^2 = 42\%$; Fig. 2). However, this association had a fragility index of 2, which means that if 2 patients' outcomes changed from an event to a nonevent, the difference would be statistically nonsignificant. There was no statistical difference between emergent surgery and BTS in 60-day mortality (6 RCTs; OR, 0.93; 95% CI, 0.49-1.79; $I^2 = 0\%$) and 3-year overall survival (4 RCTs; OR, 1.66; 95% CI, 0.93-2.96; $I^2 = 0\%$). One RCT found no differences in quality of life between the 2 interventions. The results of our updated meta-analysis and the GRADE assessment for each of the outcomes are summarized in Table 1.

Important considerations

Cancer recurrence. The panel discussed that although cancer recurrence was an important outcome, the evidence for this outcome was very low, including variable follow-up duration and radiologic surveillance for each patient. Even if the risk of cancer recurrence is truly increased, it does not seem to be associated with a higher risk of 3-year mortality as demonstrated in our meta-analysis. The hypothesis for this increased risk of cancer recurrence is the possibility of microperforation resulting from colonic stent placement and potential lymphovascular seeding from tumor cells, which does not occur with emergent surgery. This potential increased risk of cancer recurrence should be discussed with patients when deciding between BTS and emergent surgery and contrasted with the significant reduction in having a permanent stoma with a colonic stent as BTS. However, the panel recognizes that this discussion can be a challenging task for patients facing a medical emergency such as colonic obstruction.

Risk of stent-related perforation. This is a risk inherent to colonic stent placement that does not occur with emergent surgery; therefore, this was not included in our meta-analysis or GRADE assessment of outcomes. However, it was considered in the development of these guideline recommendations. In the RCT by van Hooft et al[28] included in our meta-analysis, the overall risk of perforation during colonic stent placement was 13% (9% stent related and 4% procedure related). In addition, microperforation was detected intraoperatively in 7% of patients. In a meta-analysis of 4086 patients undergoing colonic stents, the risk of perforation in malignant obstruction was 7.5%, with most events occurring in the first few days after stent insertion.[31] Although the risk of perforation is higher than with other endoscopic

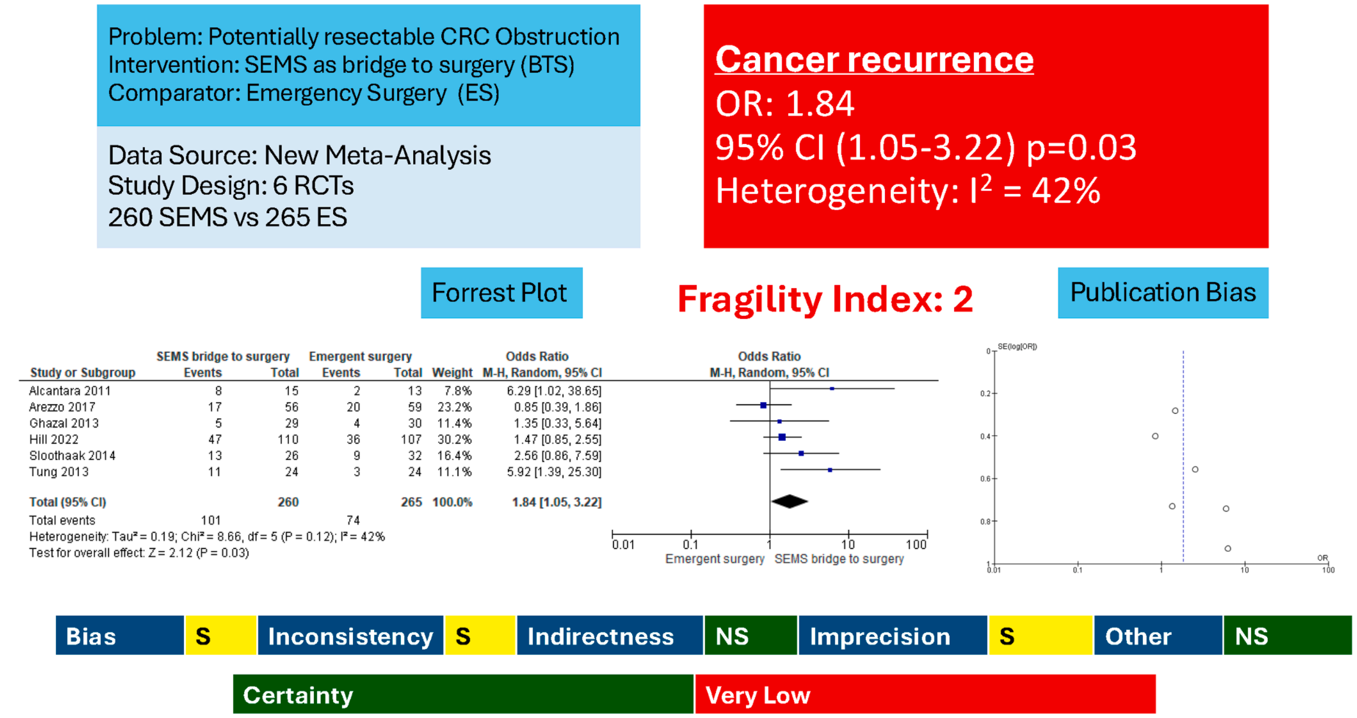

Figure 2. Cancer recurrence of endoscopic SEMS as a bridge to elective surgery versus emergency surgery without SEMS for colonic obstruction from surgically resectable colorectal cancer. *SEMS,* Self-expandable metal stent.

TABLE 1. Summary of the evidence comparing colonic stent as a bridge to surgery versus emergency surgery in patients with colonic obstruction because of potentially resectable colorectal cancer

Outcome	Data/study	Effect measure	95% CI	Certainty	Judgment
60-d mortality	6 RCTs	OR, 0.93	0.49-1.79	Low	Neither
3-y survival	4 RCTs	OR, 1.66	0.93-2.96	Low	Neither
Permanent stoma	7 RCTs	OR, 0.51	0.34-0.76	Moderate	Favors colonic stent as BTS
Primary anastomosis	7 RCTs	OR, 2.35	1.47-3.76	Low	Favors colonic stent as BTS
Cancer recurrence (%)	6 RCTs	OR, 1.84	1.05-3.22	Very Low	Favors emergency surgery
Postoperative adverse events	8 RCTs	OR, 0.44	0.23-0.85	Low	Favors colonic stent as BTS
Quality of life	1 RCT	–	$P = .36$	Very low	Neither

–, Incomputable; *BTS*, bridge to surgery; *OR*, odds ratio; *RCT*, randomized controlled trial.

procedures, management would be similar to that of patients who did not receive a colonic stent (emergent surgery). The potential added risk of tumor seeding and cancer recurrence associated with a perforation should be acknowledged and discussed with patients during informed consent, as previously noted.

Stent placement in the right-sided colon. Placement of colonic stents as BTS in the right-sided colon is technically more challenging and less feasible than for left-sided colonic obstruction, and as a result, published RCTs excluded patients with right-sided CRC-related obstruction. In a meta-analysis of 7 observational studies ($n = 5136$) comparing BTS and emergent surgery for right-sided malignant colonic obstruction, BTS was associated with lower postoperative adverse events and mortality than emergent surgery.[32]

Placement of stent without histopathologic diagnosis. Although a histopathologic diagnosis is preferred, it is not always available, and the decision often needs to be guided by the degree of radiologic suspicion for malignancy. All the RCTs included in our meta-analysis included patients in whom confirmatory histopathology was not required for inclusion.

Detection of synchronous lesions. Colonic decompression with a colonic stent provides the opportunity for preoperative staging workup that is often not possible with emergent surgery. After staging workup, colonic stent placement can aid in the detection of synchronous lesions proximal to the obstruction. This can be achieved by performing a complete colonoscopy through the SEMS or obtaining CT or MR colonography as desired by oncology or colorectal surgery teams.[33,34]

In summary, endoscopic placement of colonic stent as BTS in patients with colonic obstruction from potentially resectable CRC provides significantly higher odds of primary anastomosis at the time of surgery, lower rates for permanent stoma, and fewer postoperative adverse events than emergent surgery, while having similar 60-day mortality, 3-year survival, and quality of life. Although placement of a colonic stent was associated with higher cancer recurrence, in balancing the desirable and undesirable effects of the intervention and given the very low quality of evidence for cancer recurrence, the panel made a conditional recommendation to use a colonic stent in patients with colonic obstruction from potentially resectable CRC. However, for patients who place more value on the risk of potential cancer recurrence compared with the need for permanent ostomy, it may be appropriate to proceed with emergent surgery. The panel recognizes that colonic stent placement as a BTS is contraindicated in a subset of patients and may not be technically feasible in all patients.

Colonic obstruction caused by unresectable CRC

Recommendation: In patients with colonic obstruction from highly suspected or confirmed CRC that is deemed not curable by a surgical resection, the ASGE suggests endoscopic placement of a palliative colonic stent over palliative surgery. In patients currently receiving or who may receive bevacizumab, the ASGE suggests shared decision-making with surgeons, oncologists, and patients, when deciding between a colonic stent or palliative surgery (conditional recommendation or very low quality of evidence).

There was a prior meta-analysis of 4 RCTs published in 2018, which we updated to guide our recommendations.[35] Our systematic review yielded 5 unique RCTs ($n = 158$)[36-40] conducted in Europe ($n = 4$) and Asia ($n = 1$), with 3 additional studies from these RCTs reporting post hoc analyses and secondary end points.[41-43] Given the limited sample size of the population included in RCTs, we also included 12 observational studies ($n = 1435$), of which 5 were conducted in Asia, 3 in the United States, 2 in Europe, and 2 in Australia.[44-55] All 17 unique studies enrolled adults with suspected or confirmed CRC who were deemed not eligible for a curable surgical resection given metastatic disease. Most studies included both left- and right-sided colonic locations ($n = 11$), whereas the other 6 were limited to left-sided colonic obstruction. The type of surgery was also variable across studies: 12 used either colostomy or resection per the preference of the surgeon, 4 used colostomy only, and 1 used surgical resection without colostomy. All studies excluded patients with luminal perforation or ischemia, low performance status, or American Society of Anesthesiologists physical status IV or V.

In a meta-analysis of RCTs and observational studies, placement of a palliative colonic stent reduced the need for permanent ostomy (12 studies; OR, 0.15; 95% CI, 0.08-0.28; $I^2 = 61\%$), decreased adverse events (14 studies; OR, 0.56; 95% CI, 0.36-0.89; $I^2 = 56\%$), and shortened the length of hospital stay (5 studies [all RCTs]; mean difference, −4.85 days; 95% CI, −6.02 to −3.68; $I^2 = 56\%$) compared with palliative surgery, whereas it found no difference in 30-day mortality (16 studies; OR, 0.60; 95% CI, 0.30-1.18; $I^2 = 44\%$). In a sensitivity analysis of only RCTs, similar findings were noticed in the directionality of results for permanent ostomy, length of hospital stay, and 30-day mortality. However, RCTs showed no statistical difference in the risk of adverse events between colonic stent and palliative surgery (5 RCTs; OR, 3.25; 95% CI, 0.47-22.32; $I^2 = 76\%$), whereas observational studies found a reduction of adverse events with colonic stents (9 studies; OR, 0.44; 95% CI, 0.36-0.89; $I^2 = 2\%$). Results for the updated meta-analysis are summarized in Table 2.

Important consideration

Use of vascular endothelial growth factor (VEGF) inhibitors. The panel discussed that the combination of chemotherapy and bevacizumab (a VEGF inhibitor) is one of the first-line and subsequent treatment lines for patients with unresectable CRC that results in greater progression-free and overall survival.[56-58] Although none of the appraised evidence in this PICO question directly evaluated the effects of bevacizumab with colonic stent placement, this VEGF inhibitor has been associated with an increased risk of GI perforation and potentially of colonic stent–related perforation.[59] A meta-analysis published over a decade ago found that in patients receiving bevacizumab, the risk of colonic stent–related perforation was 12.7%, which was significantly greater than those receiving chemotherapy without bevacizumab (7%).[31] However, more recent observational studies with a larger number of patients receiving bevacizumab have shown a similar risk of colonic stent–related perforation with or without bevacizumab.[60,61] Although there is still debate about this association, the panel recognized the potential risk of colonic stent–related perforation in patients receiving bevacizumab, and the subsequent increased risk of mortality and dehiscence in patients with bevacizumab who undergo emergent surgery for perforation.[62]

After considering the benefits and harms, as well as the very low quality of the evidence, the panel made a conditional recommendation in favor of using palliative colonic stents for patients with colonic obstruction secondary to unresectable CRC. This decision was primarily driven by a reduction in the need for permanent ostomy, decreased adverse events, and shorter hospital stay with colonic

TABLE 2. Summary of the evidence comparing palliative colonic stent versus palliative surgery in patients with colonic obstruction from colorectal cancer that is deemed not curable by a surgical resection

Outcome	Data/study	Effect measure	95% CI	Certainty	Judgment
30-d mortality	5 RCTs and 11 observational	OR, 0.60	0.30-1.18	Very low	Neither
Permanent stoma	4 RCTs and 8 observational	OR, 0.15	0.08-0.28	Very low	Favors colonic stent
Adverse events	5 RCTs and 9 observational	OR, 0.56	0.36-0.89	Very low	Favors colonic stent
Length of stay	5 RCTs	MD, −4.85 d	−6.02 to −3.68	Very low	Favors colonic stent

MD, Mean difference; *OR*, odds ratio; *RCT*, randomized controlled trial.

TABLE 3. Summary of the evidence comparing palliative colonic stent in patients with malignant colonic obstruction from extracolonic malignancy versus MCO-ICM

Outcome	Data/study	Effect measure	95% CI	Certainty	Judgment
Clinical failure	8 observational	OR, 2.88	1.58-5.25	Very low	Favors colonic stent in MCO-ICM
Adverse events	7 observational	OR, 1.26	0.81-1.96	Very low	Neither
Technical failure	8 observational	OR, 2.92	1.13-5.54	Very low	Favors colonic stent in MCO-ICM

MCO-ICM, Malignant colonic obstruction from intracolonic malignancy; *OR*, odds ratio.

stents than with surgery. However, in patients receiving or planned to be receiving bevacizumab, the panel suggested using shared decision-making with the patient, surgeon, and oncologist to decide between a palliative colonic stent or surgery, given the potential increased risk of colonic stent–related perforation with bevacizumab. In patients in whom a colonic stent is not technically feasible or fails clinically, a palliative surgical approach should then be used.

Malignant colonic obstruction from extracolonic malignancy

Recommendation: In patients with colonic obstruction from ECM, the ASGE suggests guiding the decision between stent placement or surgery based on the specific tumor biology and multidisciplinary discussion. Stent placement is feasible in this setting; however, it has a higher risk of clinical and technical failure than intraluminal malignancy, and this should be openly discussed with patients for shared decision-making (conditional recommendation or very low quality of evidence).

A variety of ECMs can cause colonic obstruction, including ovarian cancer, prostate cancer, peritoneal carcinomatosis, and lymphoma. In our systematic review, we found no studies directly comparing colonic stents with surgery in patients with MCO-ECM. Assuming that most patients would require a colonic stent in this clinical scenario because they have advanced disease stage, short life expectancy, and are not ideal candidates for surgical resection or diversion, we used indirect evidence comparing colonic stent placement for patients with MCO-ECM and malignant colonic obstruction from intracolonic malignancy (MCO-ICM). This indirect evidence consisted of 8 nonrandomized comparative studies that were recently compiled in a published meta-analysis of 1048 patients comparing colonic stent placement for patients with ECM ($n = 416$) and intracolonic malignancy (ICM) ($n = 632$).[63-71] The majority of the obstructions in these studies were located in the rectosigmoid region. We used this published meta-analysis to inform this question.[64]

When single-arm proportional meta-analysis was used, colonic stent placement for ECM had technical success of 89% (95% CI, 83-96), clinical success of 74% (95% CI, 63-86), and adverse events of 29% (95% CI, 16-42). Compared with ICM, colonic stents for ECM were more likely to result in clinical failure (8 studies; OR, 2.88; 95% CI, 1.58-5.25; $I^2 = 73\%$) and technical failure (8 studies; OR, 2.92; 95% CI, 1.13-5.54; $I^2 = 68\%$). Reasons for technical failure included stricture angulation, inability to advance the guidewire past the stricture, difficulty advancing the stent delivery system across a redundant sigmoid colon, and stent malpositioning. There was no significant difference in adverse events (7 studies; OR, 1.26; 95% CI, 0.81-1.96; $I^2 = 73\%$). Specifically, there was no difference in risk of perforation (7 studies; OR, 1.96; 95% CI, 0.74-5.19; $I^2 = 41\%$), stent migration, tumor ingrowth, need for endoscopic reinterventions, or need for surgery between ECM and ICM.[64] Results for the meta-analysis are summarized in Table 3.

Important considerations

Performance status and quality of life. Patients with MCO-ECM often have a poor performance status and are considered unfit for surgery. Even if they are eligible for surgery, surgical management for these patients typically involves a diverting ostomy rather than sur-

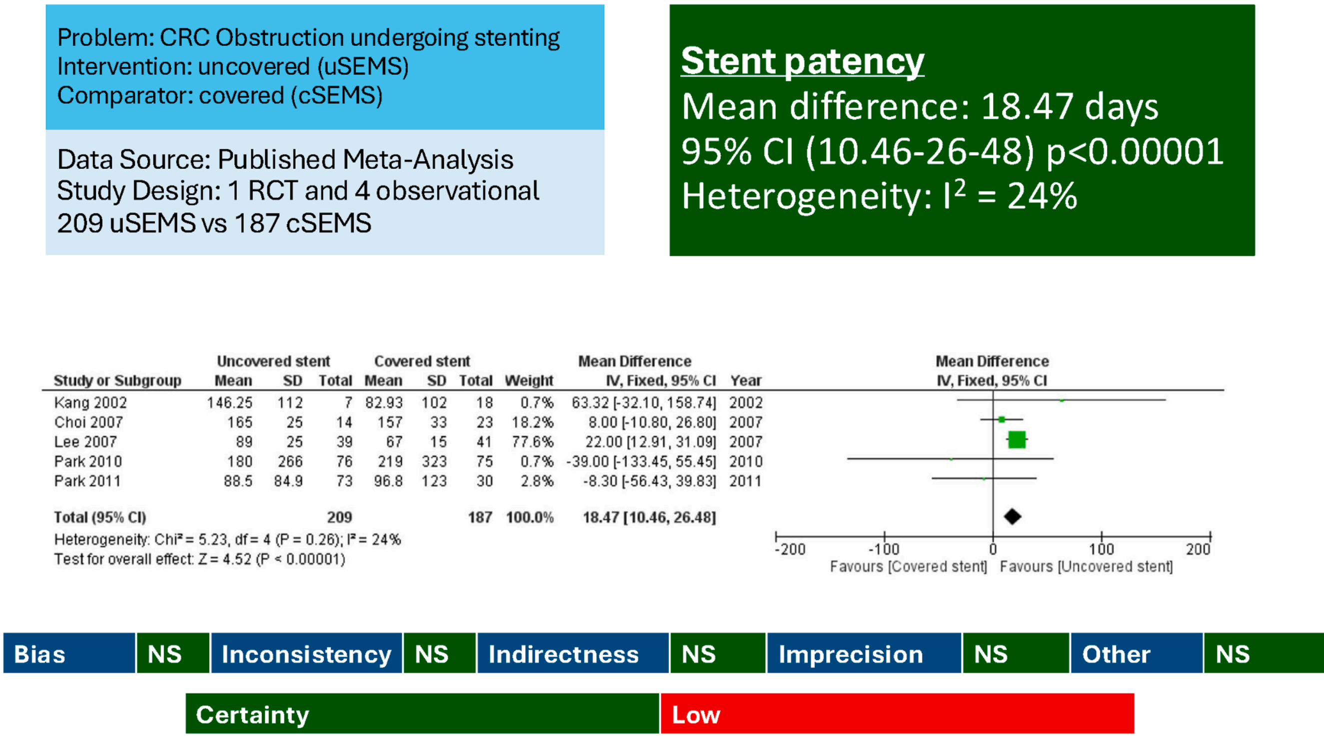

Figure 3. Stent patency of covered and uncovered self-expandable metal stent for malignant colonic obstruction from colorectal cancer.

gical resection, which has a notable impact on the patient's quality of life and may not align with their values and preferences. Although we did not find studies directly comparing surgery with colonic stent placement for MCO-ECM, we found indirect evidence supporting that colonic stents are feasible for this patient population and result in similar adverse events as colonic SEMSs placed for MCO-ICM. However, colonic stent placement for MCO-ECM is associated with lower technical and clinical success than SEMS placement for MCO-ICM, which should be discussed with patients when deciding between SEMS placement and surgery for MCO-ECM.

After appraising all the body and quality of the evidence, the panel concluded that there is insufficient evidence to recommend colonic stent placement or surgery in patients with MCO-ECM. The panel recognized that colonic stent placement is a viable option for patients with MCO-ECM, but it is less technically feasible and clinically successful than colonic SEMS placement for CRC. Thus, the panel made a conditional recommendation in favor of individualizing the treatment of MCO-ECM, guided by specific tumor biology, life expectancy, stricture characteristics, available resources, multidisciplinary discussion, and patient preference. If the prognosis and future management plan are unknown, a multidisciplinary discussion would help guide the decision.

Selection of SEMS type for malignant colonic obstruction

Recommendation: In patients with colonic obstruction from CRC undergoing endoscopic placement of a colonic stent, the ASGE suggests using uncovered SEMSs over covered SEMSs (conditional recommendation or very low quality of evidence).

To address this question, we used data from a published meta-analysis of 1 RCT and 9 observational studies totaling 753 patients.[72] The studies were published between 1998 and 2014, with no newer studies found in our systematic review. All the studies compared uncovered versus covered SEMSs in patients with colonic obstruction from CRC. Six studies included patients undergoing stent placement for either BTS or palliative indications, whereas 3 studies included only patients receiving palliative stent placement, and 1 study included patients receiving stent as BTS. Stents were of variable shape (cylindrical, dumbbell, bamboo).

Compared with covered stents, uncovered SEMSs resulted in longer stent patency (5 studies; mean difference, 18.5 days; 95% CI, 10.5-26.5; $I^2 = 24\%$; Fig. 3), lower need for stent reinsertion (5 studies; OR, 0.38; 95% CI, 0.17-0.86; $I^2 = 0\%$), and fewer adverse events (9 studies; OR,

TABLE 4. Summary of the evidence comparing covered versus uncovered metal stents in patients with colorectal cancer obstruction undergoing colonic stent placement

Outcome	Data/study	Effect measure	95% CI	Certainty	Judgment
Clinical success	1 RCT and 4 observational	OR, 1.03	0.98-1.08	Very low	Neither
Stent patency	1 RCT and 4 observational	MD, 19 d	11-48 d	Low	Favors uncovered metal stent
Need for stent-reinsertion	1 RCT and 4 observational	OR, 0.38	0.17-0.86	Very low	Favors uncovered metal stent
Adverse events	1 RCT and 8 observational	OR, 0.57	0.44-0.74	Low	Favors uncovered metal stent
Technical success	5 RCTs and 7 observational	OR, 1.02	0.99-1.04	Very low	Neither

MD, Mean difference; *OR*, odds ratio; *RCT*, randomized controlled trial.

0.57; 95% CI, 0.44-0.74; $I^2 = 50\%$). There was no difference between uncovered and covered SEMSs on clinical and technical success. There were no reported data on mortality. Results for the meta-analysis are summarized in Table 4.

Important considerations

Type of SEMSs for MCO-ECM. The studies included in our meta-analysis did not include patients with MCO-ECM. If the colonic obstruction is due to a type of malignancy potentially curable with chemotherapy or radiation (eg, lymphoma), an uncovered SEMS is not a good option because this can result in tissue ingrowth and increase difficulties for removal. If the type of malignancy causing colonic obstruction has an unfavorable prognosis (eg, peritoneal carcinomatosis) and the patient is not a good surgical candidate, an uncovered metal stent would be reasonable.

Availability of covered SEMSs. Covered colon stents are not currently approved by the Food and Drug Administration or commercially available in the United States. Most of the data for covered stents are from abroad or off-label use, which limits its applicability in the United States.

In summary, based on low to very low quality of evidence, and after considering all desirable and undesirable effects, the panel made a conditional recommendation in favor of using uncovered SEMSs instead of covered SEMSs in patients with colonic obstruction from CRC. The panel discussed that the major advantage of uncovered over covered SEMSs is their lower risk of stent migration, which reflects on longer stent patency and a lower number of reinterventions with uncovered SEMSs. Because novel covered SEMS designs with lower risk of stent migration are developed and studied, this recommendation may change. It is important to highlight that uncovered SEMSs should be reserved for colonic obstruction with confirmed or highly suspected malignancy, whereas they should be used cautiously in other circumstances because uncovered SEMSs can become permanently embedded in the colon because of tissue ingrowth.

Symptomatic benign colonic stricture

Endoscopic metallic stents versus endoscopic balloon dilation

Recommendations:

- In patients with symptomatic benign noninflammatory colonic stricture, the ASGE suggests the use of EBD over endoscopic stent placement as a first-line therapy
- Endoscopic stent placement with fully covered metal stents may be considered for benign colonic strictures that failed EBD after multidisciplinary evaluation.
- In patients with anastomotic colonic strictures of <15-mm length that are refractory to EBD, the ASGE suggests the use of lumen-apposing metal stents (conditional recommendation or very low quality of evidence).

A systematic review was conducted, resulting in 513 titles, of which 65 were retrieved for full-text review. Of these, 3 studies directly compared SEMSs with EBD in different populations. One of these studies was a multicenter RCT from 19 hospitals in Spain comparing fully covered SEMSs ($n = 39$) and EBD ($n = 41$) for patients with CD with obstructive symptoms from predominantly fibrotic strictures.[4] The other 2 studies used a retrospective design. One of these directly compared SEMSs ($n = 14$) and EBD ($n = 36$) for benign colorectal strictures from various causes, of which anastomotic was the most common for both groups, followed by radiation, ischemia, and IBD.[73] The third study compared LAMSs ($n = 11$) and EBD ($n = 18$) for patients with left-sided colorectal anastomotic strictures.[74] The majority of the strictures in this study (89.7%) were 10 mm or shorter in length.

Given the limited comparative evidence, we also selected 17 single-arm studies reporting on the efficacy or safety of EBD alone (12 studies; $n = 480$)[75-85] or SEMS alone (5 studies; $n = 751$)[86-90] for benign colonic strictures. Studies with fewer than 10 patients were not eligible. Using these data, we conducted a proportional meta-analysis to evaluate

TABLE 5. Summary of the evidence comparing colonic stents versus EBD in patients with benign colonic stricture

Outcome	Data/study	EBD pooled (95% CI)	Colonic stent pooled (95% CI)	*P* value	Certainty	Judgment
Clinical success	17 observational	88% (85-91)	56% (45-66)	<.01	Very low	Favors EBD
Adverse events	16 observational	4% (3-6)	39% (29-50)	<.01	Very low	Favors EBD
Stent migration	5 observational	–	28% (18-39)	–	Very low	Favors EBD

–, Incomputable; *EBD*, endoscopic balloon dilation.

clinical success and adverse events with EBD and SEMSs for benign colonic strictures. In the 5 studies using stents, fully covered SEMSs were used in 2 studies, fully covered SEMSs and uncovered SEMSs in 1 study, plastic stents and fully covered SEMSs in 1 study, and biodegradable stents in 1 study.[86-90]

Overall benign colorectal stricture

In the only study comparing SEMSs and EBD for benign colorectal strictures ($n = 50$), there was no significant difference in clinical success (SEMS 88% vs EBD 89%; $P = .99$), recurrent reobstruction (57% vs 54%; $P = .99$), or technical success (94% vs 99%; $P = .37$).[73] The duration of luminal patency was significantly shorter with SEMSs than with EBD (2.0 ± 0.6 vs 65.5 ± 13.3 months; $P = .03$); however, the duration of follow-up was shorter in the SEMS group (0.3 vs 10 months). In the SEMS group, stent migration occurred in 31% of cases. In the EBD group, perforation and fistula occurred during 2 (3%) and 1 (1.5%) of the sessions, respectively. Both adverse events were treated conservatively.

In a proportional meta-analysis of 17 single-arm studies, SEMSs resulted in lower clinical success (56%; [95% CI, 45-66] vs 88% [95% CI, 85-91]) and higher adverse events (39% [95% CI, 29-50] vs 4% [95% CI, 3-6]) than EBD. The adverse events in the SEMS group were driven by stent migration risk of 28% (95% CI, 18-39). In the EBD group, the risk of perforation was 1% (95% CI, 0-2). Results for the meta-analysis are summarized in Table 5.

Crohn's disease

In 1 RCT comparing SEMSs and EBD in patients with predominantly fibrotic CD, fully covered SEMSs resulted in lower clinical success at 1 year (51% vs 80%; $P = .006$) and a similar rate of adverse events (8% vs 5%).[4] One case of perforation occurred in each of the groups. Stent migration occurred in 97% of patients with SEMSs, although only 2 of 39 patients were considered to have an adverse event given proximal migration. Technical success was higher with SEMSs (92% vs 76%; $P < .05$).

Anastomotic stricture

In the only study comparing LAMSs and EBD for benign left-sided colorectal anastomotic strictures, there was no significant difference in technical success, clinical success, stricture recurrence, or adverse events.[74] However, there was a nonsignificant trend toward fewer procedures using LAMSs than EBD (2.4 vs 3.3; $P = .06$). The rate of LAMS migration was 46% in this cohort.

Diverticulitis-related stricture

There are no studies comparing SEMSs and EBD for diverticulitis-related stricture. In a systematic review of case series, 66 patients had SEMSs for diverticulitis ($n = 66$), of which 40 had SEMSs as a BTS, with 52% rate of adverse events (perforation, reobstruction, stent migration), but 43% avoided a stoma.[3] Surgery was performed at a median time of 14 days. In a retrospective study of 21 patients who underwent SEMS for diverticulitis-related sigmoid obstruction, 17 had it as BTS, and 4 patients received it as destination therapy because of poor general condition.[91] All stents were fully covered, except 2 that were uncovered in the BTS group, and 1 stent migrated. No perforations occurred. All patients in the BTS had a segmental resection with primary anastomosis at a time interval of 1 month from SEMS placement, and none required a stoma.

Important considerations

Costs and availability. The resources and expertise required to insert colonic stents involve largely more costs than performing EBD. EBD is less costly and more widely available than SEMSs. When 2024 Medicare data are used, the costs of flexible sigmoidoscopy with balloon dilation range between $612 and $1124, and with stent placement range between $4016 and $5430. No formal cost-effectiveness studies have been conducted.

Inflammatory colorectal stricture. For inflammatory colorectal strictures, the evidence comparing EBD and SEMSs is absent. In patients with active IBD and colorectal stricture, medical therapy is mandatory. For patients with acute diverticulitis–related stricture, SEMS placement is a feasible option either as a BTS or as a palliative intervention if the patient is not a surgical candidate. The decision of placing a SEMS in this patient population must be taken after multidisciplinary discussion with the colorectal surgery team. When placed as a BTS, surgical intervention should be performed within 7 to 10 days of stent placement as the risk of stent migration and adverse events increases afterward.[92] Colonic SEMS placement should be avoided if there is a pericolic abscess because this can increase the risk of periprocedural adverse events.

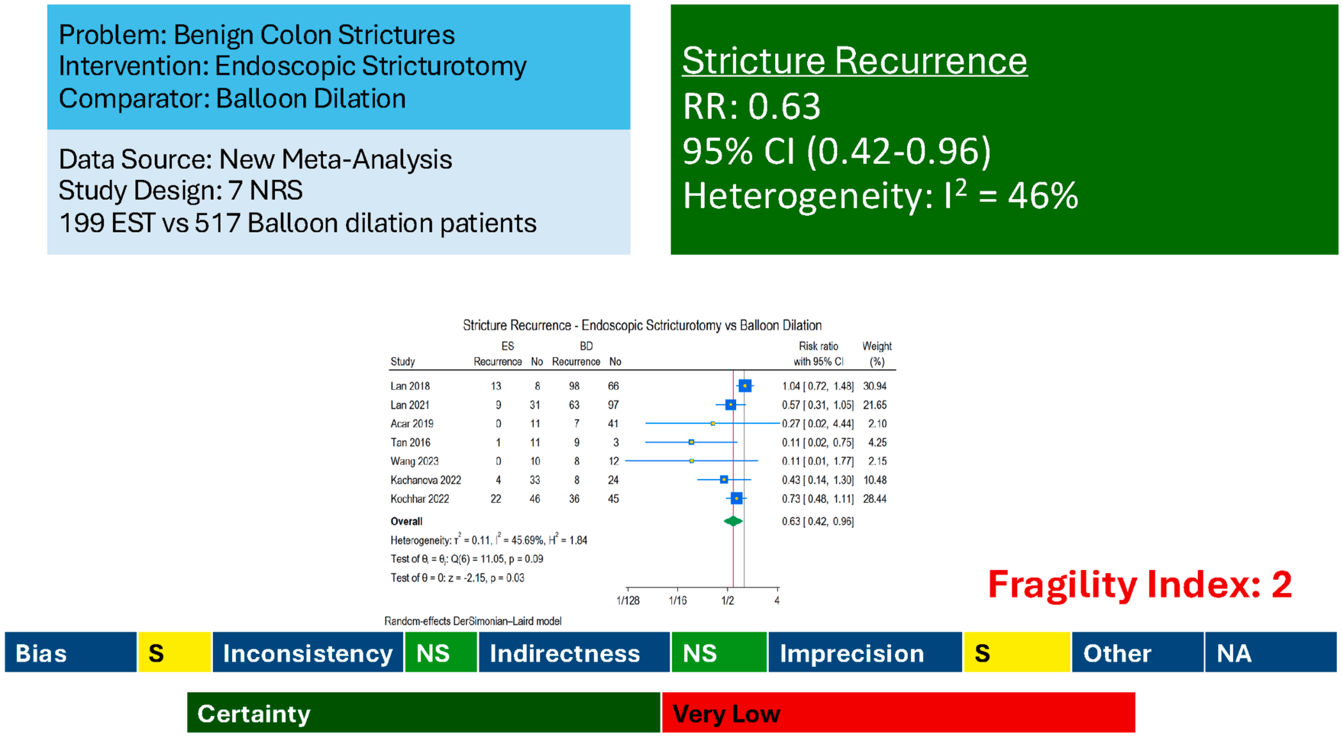

Figure 4. Stricture recurrence after endoscopic stricturotomy and endoscopic balloon dilation for benign colonic stricture.

LAMSs. LAMSs can be used for short (<15 mm in length) postsurgical anastomotic strictures and potentially other benign-colonic strictures, when EBD has failed technically or clinically. Although the design of LAMSs with bilateral flanges hypothetically reduces the risk of stent migration, the rate of stent migration with LAMSs is still disappointing (46%).[74,93] Although the current evidence does not support the use of LAMSs as first-line therapy for colorectal anastomotic stricture, future evidence in this area may change this recommendation.

In summary, using very low quality of evidence, the ASGE suggests using EBD over SEMSs as first-line therapy for benign noninflammatory colorectal strictures with symptoms of colonic obstruction. Although SEMS placement is not superior to EBD, placement of a fully covered SEMS is a feasible treatment option for benign colonic strictures. However, the main problem with this approach is stent migration, which can decrease the efficacy of this technique despite using tissue anchoring methods (eg, clips, suturing). The panel recognized that the decision of placing a SEMS and the type of SEMS needs to be individualized based on stricture etiology and characteristics, prior EBD attempts, and multidisciplinary discussion. Fully covered SEMSs can be considered after failed EBD as an alternative technique for symptomatic benign colonic stricture, including CD or long anastomotic strictures.

Endoscopic stricturotomy versus endoscopic balloon dilation

Recommendation: In patients with symptomatic benign noninflammatory colonic strictures, the ASGE suggests using EBD over ES as first-line therapy. ES can be considered for short (<3 cm) benign colonic strictures refractory to EBD when technical expertise is available (conditional recommendation or very low quality of evidence).

We conducted a systematic review that yielded 180 titles and abstracts. We selected 7 nonrandomized studies comparing ES to EBD, totaling 716 patients (199 in the ES arm and 516 in the EBD arm).[75,94-99] Of these, 3 studies were from the United States, 2 from China, 1 from Russia, and 1 from Turkey. Full-text manuscripts were available for 6 studies, whereas 1 was found in abstract form.[94] Four studies included patients with anastomotic or IBD-related strictures, and 3 studies included only patients with IBD. The follow-up duration was significantly longer for the EBD arm than for the ES arm (10 [95% CI, 9.6-10.3] vs 6.2 [95% CI, 6.0-6.6] months).

Compared with EBD, ES was associated with a lower risk of stricture recurrence (7 studies; risk ratio [RR], 0.63; 95% CI, 0.42-0.96; I^2 = 46%; fragility index of 2; Fig. 4). Furthermore, when conducting time-adjusted analysis of this outcome, the difference between EBD and ES was no longer

TABLE 6. Summary of the evidence comparing endoscopic stricturotomy versus endoscopic balloon dilation (EBD) in patients with benign colonic stricture

Outcome	Data/study	Effect measure	95% CI	Certainty	Judgment
Clinical success	6 observational	RR, 1.00	0.95-1.04	Very low	Neither
Recurrence	7 observational	RR, 0.63	0.42-0.96	Very low	Favors stricturotomy
Recurrence (time to event)	6 observational	IRR, 1.42	0.29-6.97	Very low	Neither
Rate of surgery	3 observational	RR, 1.85	0.59-5.85	Very low	Neither
Adverse events	7 observational	RR, 3.95	1.69-9.24	Very low	Favors EBD
Bleeding	3 observational	RR, 14.08	3.14-63.05	Very low	Favors EBD
Perforation	3 observational	RR, 0.69	0.09-5.39	Very low	Neither
Technical success	7 observational	RR, 1.00	0.98-1.02	Very low	Neither

EBD, Endoscopic balloon dilation; *IRR*, incidence rate ratio; *RR*, risk ratio.

present (6 studies; incidence rate ratio, 1.42; 95% CI, 0.29-6.97; $I^2 = 66\%$). When evaluating undesirable effects, the risk of adverse events was significantly higher with ES than with EBD (7 studies; RR, 3.95; 95% CI, 1.69-9.24; $I^2 = 0\%$; fragility index = 3). This increased risk with ES was primarily driven by postprocedural bleeding (3 studies; RR, 14.08; 95% CI, 3.14-63.05; $I^2 = 0\%$), with no difference between ES and EBD in the risk for perforation (2 studies; RR, 0.69; 95% CI, 0.09-5.39; $I^2 = 0\%$). There was no significant difference in technical success, clinical success, or rate of surgery after endotherapy between ES and EBD. Results for the meta-analysis are summarized in Table 6.

In summary, in patients with benign colonic stricture, ES reduces the risk of stricture recurrence at the cost of increasing the risk of postprocedure bleeding, without other differences in desirable or undesirable events. However, the reduced risk of stricture recurrence with ES was possibly related to shorter follow-up duration in this treatment arm. To adjust for different follow-up durations, a time-to-event analysis was also conducted, which showed no differences between ES and EBD in stricture recurrence. Considering the very low quality of the evidence, the panel made a conditional recommendation in favor of using EBD over ES as first-line therapy for the treatment of benign colonic strictures. The panel proposed that ES should be considered for benign colonic strictures when (1) the length is <3 cm; (2) the stricture is refractory to EBD; and (3) technical expertise is available. Future studies are needed to delineate which patients with benign colonic stricture have a high risk of clinical failure to EBD and who may benefit from ES as first-line therapy.

BEST PRACTICE ADVICE FOR ENDOSCOPIC INTERVENTIONS

Because the evidence is limited regarding the optimal techniques for balloon dilation, stent placement, and stricturotomy, a rigorous appraisal through GRADE methodology was not possible for these aspects. Therefore, the following best practices were developed on the basis of a thorough review of the literature and panel consensus to guide the application of these techniques in clinical practice.

Endoscopic balloon dilation

When planning EBD, the informed consent process should include the likely need for multiple procedures over time. Once the decision is made to proceed with EBD, the initial balloon diameter selection should be guided by the estimated initial diameter of the stricture.[100] The length of the balloon is usually set at 5.5 to 8 cm. If the stricture is longer than the longest appropriate balloon available, overlapping serial dilation may need to be performed. The insertion of the balloon catheter depends on the position of the endoscope or colonoscope and the severity of the stricture. If the stricture is traversable, the endoscope should first cross the stricture, followed by introduction of the balloon sheath into the lumen, and then withdrawal of the endoscope until the balloon is positioned across the stricture. If the stricture cannot be traversed with the endoscope but the upstream colon can be seen, the balloon sheath can be passed with or without a wire across the stricture, and the balloon positioned across the stricture. If the stricture cannot be traversed with the endoscope and the upstream colon is not well seen, wire passage under endoscopic—and ideally fluoroscopic—guidance is first required, followed by passage of the balloon across the stricture over the wire.[100] If the balloon length is longer than the stricture, the balloon should be centered across the stricture.

After the balloon has been properly positioned, it is inflated with water. If fluoroscopy is used, contrast can be added to the balloon. Once the desired initial diameter is reached, the duration of dilation is not standardized, but keeping the balloon inflated for 30 to 60 seconds is common practice. Often, the endoscopist needs to hold back-tension on the catheter while the balloon is being inflated to prevent proximal migration. When using balloons that expand to multiple sizes, the balloon can be left inflated and upsized to the next diameter if there is no tension with the prior dilation. However, if there was tension with the prior balloon size or the maximal balloon diameter has been reached, the balloon is deflated, and the mucosa is inspected for tears, bleeding, perforation, or stricture improvement.[101] If there is no evidence for treatment effect (eg, tear and stricture improvement), additional EBD with upsized diameters should be performed until a treatment effect can be safely reached. If the stricture was initially not traversable, an attempt should be made to traverse the stricture with the endoscope and document if the stricture was traversable or not at the end of the procedure. The treatment goal should be dilation up to 18 to 20 mm, which is often not attainable during the first procedure.[102] If the treatment goal is not reached, a repeated procedure should be planned in 1 to 4 weeks, with 1 to 2 weeks for severe strictures and 3 to 4 weeks for mild to moderate strictures.[101]

Endoscopic SEMS placement

After placement of the SEMS is determined, the informed consent process should include individualized discussion of risks and benefits based on the specific indication. Details on technical success, clinical success, possible need for emergency surgery for clinical or technical failure and adverse event, and procedural adverse events must be explained to the patient. For malignant stricture, technical success is 96%, and clinical success is 99%.[103] This is lower for stricture of ECM (technical success: 89%; clinical success: 74%).[64] For benign stricture, these are lower, with technical success of 94% and clinical success of 88% (data from our meta-analysis). The overall risk of adverse events with colonic SEMSs placed for malignant colonic obstruction is 24%.[103] This includes the risk of perforation (stent-induced 5% and procedure-related 3%), stent migration (7%), stent occlusion (8%), and ulceration (2%).[103] The risk of adverse events with colonic SEMS placement is higher with benign strictures, with a risk of perforation of 18%.[31] Although perforation often requires surgical management, the other adverse events can be managed with endoscopic methods.[104] One relative contraindication for colonic SEMS placement includes rectal strictures with their distal end located within 5 cm from the anal verge because of the risk of pain and incontinence.[105] Colonic SEMS placement is contraindicated when there are signs of ischemia, perforation, or peritonitis.

Equipment for endoscopic SEMS placement includes an extraction balloon catheter, a long wire (0.035″ or 0.025″), fluoroscopy, water-soluble contrast, and an endoscope compatible with the stent deployment system available in the unit. Endoscopic SEMS placement in the colon should ideally be done using through-the-scope SEMSs. Uncovered metal stents should generally be avoided in patients with malignant strictures from etiologies potentially curable with chemotherapy or radiation (eg, lymphoma) and in patients with benign colonic strictures. Because fully covered colonic SEMSs are not commercially available in the United States, off-label use of fully covered esophageal SEMSs is an alternative when a covered metal stent is selected.[106] There are various SEMS diameter options that range from 18 to 30 mm, which can be decided based on the healthy lumen diameter of the area to be treated. The length of the SEMS should be chosen to ensure that there will be at least 2 cm on each side of the stricture.

For stent placement, the first step involves advancing a wire across the stricture and coiling it in the upstream colon. Then, the stent can be advanced across the stricture and deployed under fluoroscopic guidance, ensuring that the proximal end of the stent terminates at least 2 cm proximal to the stricture. Finally, the distal end is deployed under endoscopic view, ensuring that this is ending at least 2 cm from the stricture end and at least 2 cm upstream of the anal verge to reduce the risk of tenesmus and pain. Immediate stool passage through the stent is a sign that confirms transluminal placement. Balloon dilation of the stent is unnecessary and may increase the risk of perforation.[31,103] After stent placement, diet can be advanced as tolerated to a maximum of low residue diet, and laxatives should be titrated to keep stools soft.

LAMS placement

LAMSs are available in different lengths and diameters. For colonic strictures, LAMS diameters of 15 and 20 mm and lengths of 10 and 15 mm are the ones most used. LAMS placement is rarely possible in the right-sided colon because of insufficient catheter length for use with adult colonoscopes. Equipment for LAMS placement includes a therapeutic gastroscope, a long wire, and possibly fluoroscopy.[107] When deploying the LAMS, the distal flange should be located at least 2 cm from the anal verge to reduce the risk of tenesmus and pain. To provide immediate symptom relief after LAMS placement, balloon dilation of the LAMS to its maximal diameter can be considered after deployment.[107] Because these stents are fully covered and placed for temporary stricture remodeling, stent removal or exchange can be performed at 2 to 3 months.[74] Postprocedure recommendations for diet and stool softeners are the same as for colonic SEMSs.

Stricturotomy

ES involves opening or removal of strictured tissue by electroincision, using radial, horizontal, and/or circumferential cuts.[96-99] The technique is not standardized and requires significant training, experience, and surgical backup. Prestricturotomy dilation can be considered. Devices such as a needle knife catheter or insulated tip knives suitable for ESD have been used. Electrosurgical generators are set to cutting settings with a monopolar high-frequency, 2-stage cutting cycle followed by a coagulation cycle.[108] This technique can be considered for strictures shorter than 3 cm, refractory to EBD, nonangulated, and fibrotic, such as those caused by IBD, postsurgical anastomosis, or, rarely, extensive endoscopic resection.[108,109]

SUSTAINABILITY PERSPECTIVE

This guideline was reviewed by the ASGE's Sustainable Endoscopy Task Force. As with all GI conditions, the best interests of the individual patient should be prioritized over sustainability concerns. However, when there is a choice of suitable management options, the ASGE recommends that clinicians consider environmental impact in their decision-making. In general, a practice that follows evidence-based guidelines represents a sustainable practice because it not only provides high-quality and essential care but also reduces unnecessary tests and interventions. Specific to this guideline, the ASGE suggests the following sustainability best practices:

1. Avoiding low-yield procedures and duplicative testing when possible (eg, combine diagnostic and therapeutic colonoscopy when possible and avoid taking biopsy samples of an anastomotic stricture if it will not change mana gement).
2. Avoiding use of stents in scenarios without a clear established clinical benefit (eg, multifocal colonic obstruction from ECM and initial management of benign colonic stricture when dilation is a viable option).
3. Minimizing waste from endoscopic stents, which are costly and carry a substantial carbon footprint (eg, confirm correct size or length before opening and adopt inventory practices to reduce expired products).

FUTURE DIRECTIONS

There are several areas in need of more data to inform the role of endoscopy in the management of colorectal strictures. Future studies should address the following:

1. **Risk of recurrent cancer when placing colonic stents as BTS in patients with CRC:** although we found that stent placement increased the risk of recurrent malignancy compared with emergent surgery, the certainty of the evidence for this outcome was very low. Longer follow-up data that include disease-specific survival would be important to better understand the prevalence of recurrent malignancy and the effect of this in patient outcomes. Because patients survive longer with new therapies, a confirmed increased risk of recurrent cancer would affect the recommendations we make for colonic stent placement as BTS.
2. **Stent design:** improvements in uncovered metal stent design may improve the efficacy of colonic stents in the right-sided colon or ECM. Although uncovered stents are currently preferred for malignant colonic obstruction, future improvements in the design of covered metal stents dedicated to the colon may reduce the risk of migration and improve their efficacy for malignant indications. This may also improve the efficacy of covered metallic stents for benign indications. Such stent design improvements are awaited and may change the directionality of some of the recommendations in this guideline.
3. **Risk of colonic stent–related perforation with bevacizumab:** there is a need for high-quality studies that can clarify whether bevacizumab increases the risk of perforation when placing a colonic stent or not. Our guideline suggests that when considering a colonic stent in the setting of bevacizumab, the endoscopist should carefully discuss the pros and cons with the surgeon, oncologist, and the patient, with an emphasis on the potential risk of perforation and complicated surgical management in this scenario. If future studies prove that the risk of perforation with bevacizumab is not significantly increased, this would change our position on how we recommend colonic stents in the palliative setting of malignant colonic obstruction.
4. **Colonic stent placement for colonic obstruction from ECM:** the data evaluating colonic stent placement for ECMs are very low, and there are no studies comparing this approach to surgery. Moreover, the number of etiologies causing ECMs is very diverse, and data to guide the management of each specific etiology would be helpful to tailor patient needs. This remains a topic for further research and assessment of practice patterns and outcomes by tumor etiology.
5. **Stricturotomy for benign colorectal strictures:** this appears to be a helpful technique for short benign colonic strictures. Although this document suggests that using EBD over stricturotomy as first-line therapy in these situations, this was due to the increased risk of bleeding with stricturotomy and unclear advantages in treatment efficacy. Future studies need to better define the efficacy of this technique in comparison to or in addition to EBD and stent placement. The use of hemostatic agents that may prevent the use of bleeding in these situations should be further investigated. There is also a need for more standardization, training, and dissemination on the use of stricturotomy before this can be more widely used.
6. **LAMSs for short benign colorectal strictures:** larger studies are needed to elucidate whether the LAMS is superior to EBD in reducing the number of procedures required to achieve stricture resolution and mitigating adverse events. At present, there are concerns with stent migration, so future LAMS design modifications or additional tissue anchoring methods may also help ameliorate this risk. The consequences of LAMS migration in the setting of an improved stricture also need to be further established because they may not be as clinically relevant as migration in the upper GI tract.
7. **EUS-guided colocostomy:** this procedure uses a linear echoendoscope and a LAMS to create a colocolonic anastomosis. Limited case reports and series have shown both technical and clinical success of this technique in the management of colonic obstruction caused by malignant and

benign etiologies.[110,111] Future studies are needed to systematically compare the efficacy and safety of this approach with the current standard of care, and to better define the clinical settings in which this novel technique would be most appropriate before considering its routine use in practice.

CONCLUSIONS

Uncovered colonic metal stents are suggested for malignant colonic obstruction either as a BTS or for palliative indications. Caution is suggested for patients receiving bevacizumab in whom a colonic stent is being considered. EBD is still first-line therapy for the treatment of benign colonic strictures. However, lumen-apposing stents and stricturotomy are good alternatives for short benign colonic strictures that are refractory to balloon dilation.

GUIDELINE UPDATE

American Society for Gastrointestinal Endoscopy (ASGE) guidelines are reviewed for updates approximately every 5 years, or in the event that new data may influence a recommendation. Updates follow the same ASGE guideline development process.

DISCLOSURE

The following authors disclosed financial relationships: J.D. Machicado: Advisory board for Amgen. S. Ngamruengphong: Consultant for Boston Scientific Corporation, Olympus, Neptune Medical, and Fujifilm. C. Lee: Stockholder in AbbVie, Inc, Intuitive Surgical, and Moderna, Inc. G.S. Kochhar: Advisory board for GIE Medical; consultant for Boston Scientific Corporation, Pentax Endoscopy, Takeda Pharma, and ExacT Sciences; consultant and advisory board member for Olympus Endoscopy; speaker and advisory board member for Eli Lily; stockholder in DigBi Health. W. Abidi: Consultant for Ambu Medical and Boston Scientific Corporation; research support from Morphic Medical. N. Cosgrove: Consultant for Olympus and Boston Scientific Corporation. N. Forbes: Consultant for Boston Scientific Corporation. N.B. Marya: Consultant for Boston Scientific Corporation. B.J. Qumseya: Consultant for Medtronic, Inc and Assertio Management, LLC; speaker for Castle Biosciences. M.D. Rice: Consultant for Medtronic. M. Saumoy: Consultant for Entersense. S.K. Singla: Consultant for Boston Scientific Corporation. C.W. Teshima: Speaker and consultant for Boston Scientific Corporation; consultant for Olympus; speaker for Medtronic. N.C. Thosani: Consultant for PENTAX of America, Inc, Boston Scientific Corporation, and Ambu; royalties from UpToDate; ownership in ROSEAId. All other authors disclosed no financial relationships. No outside funding was received to support the development of this guideline.

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Abbreviations: ASGE, American Society for Gastrointestinal Endoscopy; BTS, bridge to surgery; CD, Crohn's disease; CRC, colorectal cancer; EBD, endoscopic balloon dilation; ECM, extracolonic malignancy; ES, endoscopic stricturotomy; GRADE, Grading of Recommendations Assessment, Development and Evaluation; IBD, inflammatory bowel disease; ICM, intracolonic malignancy; LAMS, lumen-apposing metal stent; MCO-ECM, malignant colonic obstruction from extracolonic malignancy; MCO-ICM, malignant colonic obstruction from intracolonic malignancy; OR, odds ratio; PICO, Population, Intervention, Comparator, Outcomes of interest; RCTs, randomized controlled trials; RR, risk ratio; SEMS, self-expandable metal stent; SOP, Standards of Practice; VEGF, vascular endothelial growth factor.

This guideline document was prepared by the Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy using the best available scientific evidence and considering a multitude of variables, including, but not limited to, adverse events, patients' values, and cost implications. The purpose of these guidelines is to provide the best practice recommendations that may help standardize patient care, improve patient outcomes, and reduce variability in practice. We recognize that clinical decision-making is complex. Guidelines, therefore, are not a substitute for a clinician's judgment. Such judgments may, at times, seem contradictory to our guidance because of many factors that are impossible to fully consider by guideline developers. Any clinical decisions should be based on the clinician's experience, local expertise, resource availability, and patient values and preferences.

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