# The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Hemorrhoids

Alexander T. Hawkins, M.D., M.P.H.[1] • Bradley R. Davis, M.D.[2]
Anuradha R. Bhama, M.D.[3] • Sandy H. Fang, M.D.[4] • Aaron J. Dawes, M.D., Ph.D.[5]
Daniel L. Feingold, M.D.[6] • Amy L. Lightner, M.D.[7] • Ian M. Paquette, M.D.[8]

On behalf of the Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons
1 Division of General Surgery, Section of Colon and Rectal Surgery, Vanderbilt University, Nashville, Tennessee
2 Department of Surgery, Carolinas Medical Center, Charlotte, North Carolina
3 Department of Colorectal Surgery, Cleveland Clinic Foundation, Digestive Disease and Surgery Institute, Cleveland, Ohio
4 Division of Gastrointestinal and General Surgery, Department of Surgery, Oregon Health and Sciences University, Portland, Oregon
5 Department of Surgery, Section of Colon and Rectal Surgery, Stanford University School of Medicine, Stanford, California
6 Division of Colon and Rectal Surgery, Department of Surgery, Rutgers University, New Brunswick, New Jersey
7 Scripps Clinic Medical Group, Department of Surgery, La Jolla, California
8 Department of Surgery Section of Colon and Rectal Surgery, University of Cincinnati, Cincinnati, Ohio



The American Society of Colon and Rectal Surgeons (ASCRS) is dedicated to ensuring high-quality patient care by advancing the science, prevention, and management of disorders and diseases of the colon, rectum, and anus. The Clinical Practice Guidelines Committee is composed of society members who have been chosen because they have demonstrated expertise in the specialty of colon and rectal surgery. This committee was created to lead international efforts in defining quality care for conditions related to the colon, rectum, and anus and develop clinical practice guidelines based on the best available evidence. Although not proscriptive, these guidelines provide information based on which decisions can be made and do not dictate a specific form of treatment. These guidelines are intended for the use by all practitioners, health care workers, and patients who desire information on the management of the conditions addressed by the topics covered in these guidelines. These guidelines should not be deemed inclusive of all proper methods of care nor exclusive of methods of care reasonably directed toward obtaining the same results. The ultimate judgment regarding the propriety of any specific procedure must be made by the physician considering all the circumstances presented by the individual patient.

## STATEMENT OF THE PROBLEM

Hemorrhoids are vascular structures that arise from a channel of arteriovenous connective tissues and drain into the superior and inferior hemorrhoidal veins. Although hemorrhoids are categorized as external or internal based on their relationship with the dentate line, they communicate with one another and often coexist. Symptoms related to hemorrhoids are very common in the Western hemisphere and other industrialized societies. Although published estimates of prevalence vary,[1] hemorrhoidal disease represents one of the most common medical and surgical disease processes encountered in the United States, resulting in more than 2.2 million outpatient evaluations per year.[2] Many diverse symptoms may be, correctly or incorrectly, attributed to hemorrhoids by both patients and referring physicians. As a result, it is important to identify symptomatic hemorrhoids as the underlying source of the anorectal report and to have a clear understanding of the

CME Earn continuing medical education (CME) credit online at cme.lww.com. This activity has been approved for AMA PRA category 1 credit.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text, and links to the digital files are provided in the HTML and PDF versions of this article on the journal's website (www.dcrjournal.com).

**Funding/Support:** None reported.

**Financial Disclosure:** None reported.

**Correspondence:** Ian M. Paquette, M.D., University of Cincinnati College of Medicine Surgery (Colon and Rectal), 2123 Auburn Ave #524, Cincinnati, OH 45219. E-mail: ian.m.paquette@gmail.com

Dis Colon Rectum 2024; 67: 614–623
DOI: 10.1097/DCR.0000000000003276

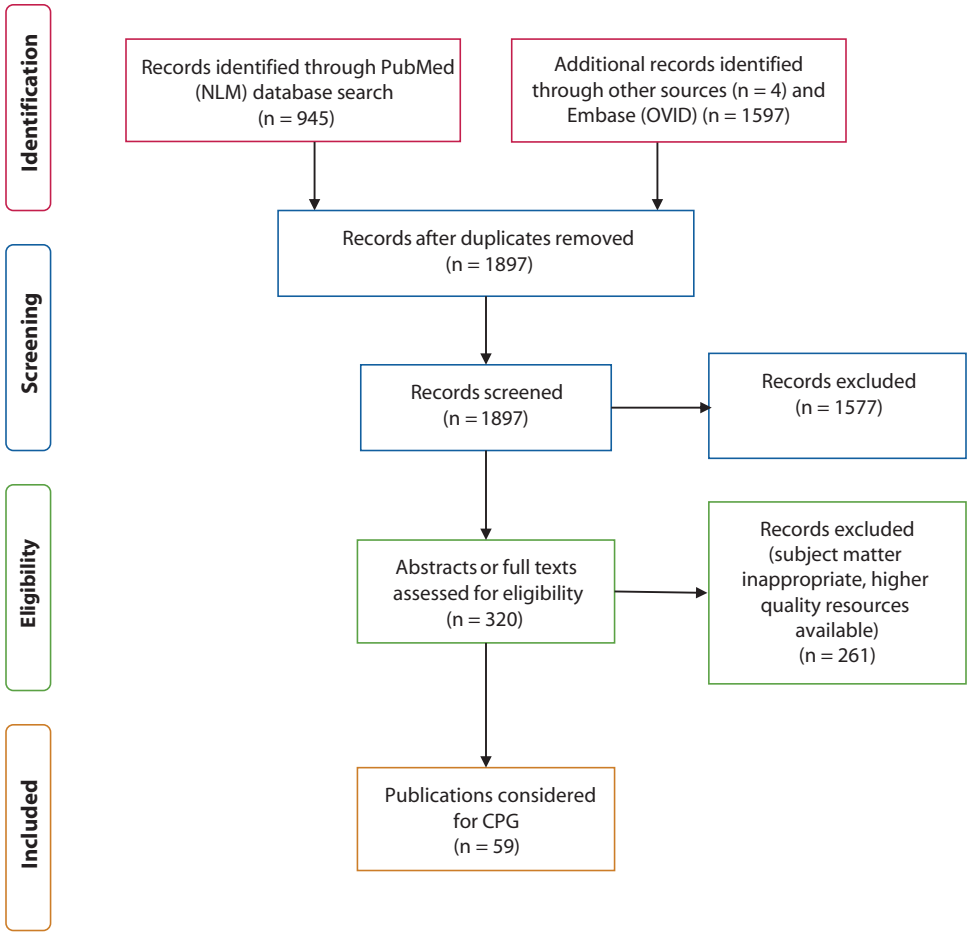


**FIGURE 1.** Preferred Reporting Items for Systematic Reviews and Meta-Analysis literature search flow chart. CPG = clinical practice guideline; NLM = National Library of Medicine.

evaluation and management of this disease process. These guidelines address diagnostic and therapeutic modalities in the management of hemorrhoidal disease.

## METHODOLOGY

These guidelines were built on the previous ASCRS "Clinical Practice Guidelines for the Management of Hemorrhoids," published in 2018.[3] A comprehensive search was conducted in PubMed (National Library of Medicine), Embase (Ovid), and Cochrane Library (Wiley) for English language studies, including adult subjects published from January 1, 2017, to August 1, 2023. The search strategy was developed in conjunction with a health sciences research librarian and used a combination of subject headings and keywords to identify primary literature on hemorrhoids. Please see Appendix 1 at http://links.lww.com/DCR/C324 for the full search strategy. The initial search generated 2546 eligible studies, and after removing 649 duplicates, 1897 studies were screened for initial inclusion. Abstracts were screened for relevance, leaving 320 studies that underwent full-text review by 5 coauthors, with all conflicts resolved by the first author. Following full-text review, 261 studies were excluded and 59 studies were included in the final article (Fig. 1). Abstract and full-text screening was performed using Covidence systematic review software.[4]

## CERTAINTY OF EVIDENCE

The final grade of recommendation and level of evidence for each statement were determined using the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) system.[5] The certainty of evidence reflects the extent of our confidence in the estimates of effect. Evidence from randomized controlled trials (RCTs) start as high certainty and evidence from observational studies start as low certainty. For each outcome, the evidence is graded as high, moderate, low, or very low (Table 1). Recommendations are influenced by considering risk of bias, inconsistency, indirectness, imprecision, and publication bias. The certainty of evidence based on observational studies can be rated up when there is a large magnitude of effect or dose–response relationship.

**TABLE 1. Interpretation of strong and conditional recommendations using the GRADE approach**

| *Evaluation* | *Description* |
|---|---|
| Recommendation | |
| Strong | Most individuals should receive the intervention. Formal decision aids are not likely to be needed to help individuals make decisions consistent with their values and preferences. |
| Conditional | Different choices will be appropriate for individual patients, consistent with their values and preferences. Use shared decision-making. Decision aids may be useful in helping patients make decisions consistent with their individual risks, values, and preferences. |
| GRADE certainty rankings | |
| High | The authors are confident that the true effect is similar to the estimated effect. |
| Moderate | The authors believe that the true effect is probably close to the estimated effect. |
| Low | The true effect might be markedly different from the estimated effect. |
| Very low | The true effect is probably markedly different from the estimated effect. |

GRADE = Grading of Recommendations, Assessments, Development, and Evaluation.



As per GRADE methodology, recommendations are labeled as "strong" or "conditional." Current recommendations are summarized in Table 2. When agreement was incomplete regarding the evidence base or treatment guideline, consensus from the committee chair, vice chair, and 2 assigned reviewers determined the outcome. Recommendations formulated by the subcommittee were reviewed by the entire Clinical Practice Guidelines Committee. The submission was then approved by the ASCRS Executive Council and peer-reviewed in *Diseases of the Colon & Rectum*. Each ASCRS Clinical Practice Guideline is generally updated approximately every 5 years. No funding was received for preparing this guideline, and the authors have declared no competing interests related to this material. This guideline conforms to the Appraisal of Guidelines for Research and Evaluation checklist.

## EVALUATION

**1. A disease-specific history and physical examination should be performed, emphasizing the degree and duration of symptoms and risk factors. Strength of recommendation: strong based on low-quality evidence.**

The diagnosis of hemorrhoids is typically clinical. This starts with a focused medical history identifying symptoms suggestive of hemorrhoidal disease and risk factors, such as constipation, followed by a focused physical examination.[6] The cardinal sign of internal hemorrhoids is painless bleeding with bowel movements; patients may also complain of intermittent tissue protrusion. External hemorrhoids may be difficult to clean, resulting in prolonged contact of fecal material with the perianal skin and local irritation. Thrombosed external hemorrhoids present as painful, nonreducible lumps at the anal verge. History should

**TABLE 2.** Summary and strength of GRADE recommendations

| *Grade* | *Summary* | *Recommendation strength* | *GRADE quality of evidence* |
|---|---|---|---|
| 1 | A disease-specific history and physical examination should be performed, emphasizing the degree and duration of symptoms and risk factors. | Strong | Low |
| 2 | Complete endoscopic evaluation of the colon is indicated in select patients with symptomatic hemorrhoids and rectal bleeding. | Conditional | Low |
| 3 | Dietary and behavioral modifications are the primary first-line therapies for patients with symptomatic hemorrhoidal disease. | Strong | Moderate |
| 4 | Medical therapy for hemorrhoids, while heterogeneous, carries minimal harm and has the potential for symptomatic relief. | Conditional | Low |
| 5 | Most patients with symptomatic grade I or II hemorrhoids and select patients with grade III hemorrhoids refractory to conservative treatment can be effectively treated with office-based procedures. Hemorrhoid banding is considered the most effective office-based treatment. | Strong | Moderate |
| 6 | Select patients with thrombosed external hemorrhoids may benefit from early surgical excision. | Conditional | Low |
| 7 | Excisional hemorrhoidectomy should typically be offered to select patients with external hemorrhoids or patients with symptomatic combined internal and external hemorrhoids (grades III–IV). | Strong | High |
| 8 | Doppler-guided hemorrhoid artery ligation may be used for patients with internal hemorrhoids. Compared with excisional hemorrhoidectomy, this approach may result in decreased pain but increased recurrence rates. | Conditional | Moderate |
| 9 | Stapled hemorrhoidopexy is not routinely recommended as a first-line surgical treatment for internal hemorrhoids given its marginal efficacy and significant risk profile. | Conditional | Moderate |

GRADE = Grading of Recommendations, Assessments, Development, and Evaluation.

focus on the extent, severity, and duration of symptoms including bleeding, prolapse, issues with perineal hygiene, and presence or absence of perianal pain. Fiber intake and bowel habits, including frequency, consistency, and ease of evacuation, should also be reviewed because constipation predisposes patients to hemorrhoidal disease.[6,7] Previous therapeutic interventions should be reviewed as well. Physical examination should include visual inspection of the anus, both at rest and while straining. External hemorrhoids may be appreciated at this point. Digital rectal examination should be performed to rule out other anorectal pathology and evaluate the sphincter tone. Anoscopy can be considered to assess the hemorrhoidal anatomy and rule out other pathology of the anal canal.

**2. Complete endoscopic evaluation of the colon is indicated in select patients with symptomatic hemorrhoids and rectal bleeding. Strength of recommendation: conditional based on low-quality evidence.**

Rectal bleeding should not automatically be attributed to hemorrhoids. Although hemorrhoidal disease is the most common reason for hematochezia, other colorectal disease processes, such as colorectal cancer, IBD, other colitides, diverticular disease, and angiodysplasia, can also result in blood per rectum.[8] Although the vast majority of patients with hematochezia will not have colorectal cancer, rectal bleeding attributed to hemorrhoids represents the most often missed opportunity to establish a cancer diagnosis.[9] Obtaining a thorough personal and family history and performing an adequate physical examination will identify high-risk patients requiring more extensive evaluation. Prior endoscopy records should be reviewed when available. Patients should undergo a colonoscopy when no obvious source of anorectal bleeding is observed or associated abdominal symptoms, such as abdominal pain, distention, new onset constipation, or progressive constipation, are reported at the initial evaluation.[10] Patients who continue to experience hematochezia after otherwise successful hemorrhoid treatment should undergo further investigation to elucidate the source of bleeding. Similarly, patients due for colorectal cancer screening as per consensus guidelines should be counseled appropriately.[11]

## MEDICAL TREATMENT

**3. Dietary and behavioral modifications are the primary first-line therapies for patients with symptomatic hemorrhoidal disease. Strength of recommendation: strong based on moderate-quality evidence.**

Constipation and abnormal bowel habits (eg, straining, prolonged sitting, frequent bowel movements) can play a significant role in patients with symptomatic hemorrhoids.[6,7] A systematic review of 17 case-controlled and 2 cohort studies demonstrated that patients with hemorrhoids had a significantly higher prevalence of constipation compared to controls (OR 2.09; 95% CI, 1.27–3.44).[12] Increased fiber and fluid intake should be recommended to all patients with hemorrhoids because of the reported improvement in mild-to-moderate prolapse and bleeding per rectum.[13–15] In a Cochrane review of 7 RCTs (n = 378) comparing fiber to a nonfiber control, the risk of having persistent symptoms decreased by 53% in the fiber group (relative risk [RR] 0.47; 95% CI, 0.32–0.68) versus nonfiber group. The fiber group also showed a significant reduction in bleeding (RR 0.50; 95% CI, 0.28–0.89) but had limited improvement in prolapse, pain, and itching.[16] Patients should also be counseled about proper bowel habits, such as avoiding straining and limiting time on the commode, because these behaviors have been associated with higher rates of symptomatic hemorrhoids.[12,17,18]

**4. Medical therapy for hemorrhoids, while heterogeneous, carries minimal harm and has the potential for symptomatic relief. Strength of recommendation: conditional based on low-quality evidence.**

Medical therapy for hemorrhoids includes a variety of topical agents comprising creams, ointments, foams, and suppositories. The majority of these are available over the counter, although some require a prescription. There are limited data to guide the use of these medications, including hydrocortisone, phenylephrine, pramoxine, and witch hazel. A small prospective observational study of 88 pregnant patients demonstrated that combined hydrocortisone acetate 1% and pramoxine hydrochloride 1% foam provided effective symptom control for hemorrhoid-related pain, pruritus, and swelling in late pregnancy even after correcting for a potential placebo effect ($p < 0.001$).[19] Of note, this compound was found to be safe in late pregnancy without any adverse fetal effects.[20] Although topical application of ointments containing anesthetic, steroid, emollient, and antiseptic is commonly used, prolonged use can cause allergic reactions or sensitization, and there is no evidence to support their long-term utility.

Phlebotonics are a heterogenous class of drugs consisting of plant extracts (ie, flavonoids) and synthetic compounds (ie, calcium dobesilate), which can be used to treat both acute and chronic hemorrhoidal disease. Although their mechanism of action has not been established, phlebotonics are associated with strengthening blood vessel walls, increasing venous tone, increasing lymphatic drainage, and normalizing capillary permeability. A Cochrane review of 24 RCTs (n = 2334) comparing phlebotonics versus placebo described a beneficial effect on pruritus (OR 0.23; 95% CI, 0.07–0.79), bleeding (OR 0.12; 95% CI, 0.04–0.37), discharge and leakage (OR 0.12; 95% CI, 0.04–0.42), and overall symptom improvement (OR 15.99; 95% CI, 5.97–42.84). As expected, given the usual painless nature of hemorrhoids, no benefit was observed regarding pain (OR 0.11; 95% CI, 0.01–1.11).[21]

## OFFICE TREATMENT

**5. Most patients with symptomatic grade I or II hemorrhoids and select patients with grade III hemorrhoids refractory to conservative treatment can be effectively treated with office-based procedures. Hemorrhoid banding is considered the most effective office-based treatment. Strength of recommendation: strong based on moderate-quality evidence.**

### Rubber Band Ligation

Rubber band ligation (RBL) is performed by placing an elastic band proximal to the dentate line to strangulate the hemorrhoidal column. This, in turn, fixes mucosa to submucosa, alleviating mucosal prolapse. In a 2005 Cochrane review of 3 RCTs (n = 202), surgical hemorrhoidectomy was associated with increased pain (RR 1.94; 95% CI, 1.62–2.33) and complications (RR 6.32; 95% CI, 1.15–34.89) compared with RBL.[22] A meta-analysis comparing RBL to other office-based therapies found that RBL was significantly better than sclerotherapy with regard to treatment response and was no different in terms of complication rates ($p = 0.35$). Patients treated with sclerotherapy ($p = 0.031$) or infrared coagulation (IRC; $p = 0.0014$) were more likely to require further therapy than those treated with RBL, although pain was greater after RBL ($p = 0.03$ vs sclerotherapy; $p < 0.0001$ vs IRC).[23]

A single-center retrospective study of 2635 patients evaluating RBL in grade I to IV hemorrhoids found that 86.7% of patients were asymptomatic at their 8-week follow-up visit; 22.5% of patients had complications, of whom 16.1% had pain and 2.8% had mild to significant bleeding. At a 2-year follow-up, 15.5% of patients reported symptomatic recurrence and underwent repeat RBL (66.9%) or surgical hemorrhoidectomy (33.1%).[24] In addition, 2 cost-analysis studies performed in the United States and United Kingdom have shown RBL to be cost-effective compared to surgical treatments, including excisional hemorrhoidectomy (EH) and hemorrhoid artery ligation (HAL).[25,26]

Perineal sepsis, a very rare but severe complication of RBL, is manifested by fever, severe anal pain, difficulty with micturition, fecal incontinence, and nausea/emesis. Broad-spectrum antibiotics and urgent examination under anesthesia are indicated in these patients. Severe bleeding is another rare (~1%) major complication of RBL.[27] At about 10 to 14 days, rubber bands slough off the hemorrhoid mucosa, leaving an ulcer, which can lead to hemorrhage. A 2017 systematic review suggested that both anticoagulation and antiplatelet therapy may increase the risk of massive bleeding postprocedure.[28] However, a recent retrospective case-controlled cohort study of 82 patients undergoing 153 bandings in the setting of clopidogrel bisulfate observed no significant difference in the number of bleeding events, per band placed, in the clopidogrel group versus the nonclopidogrel group (3.7% vs 2.7%; $p = 0.73$).[29] However, this study was limited by its retrospective nature and inability to capture all bleeding events. The risk of bleeding should be weighed against the risk of thrombotic events in these patients, and clinicians should consider, when possible, pausing antiplatelet and anticoagulation therapy. The timing of when to hold these medications and when to resume them is unclear because of limitations in the literature. In selected patients who have been given anticoagulant, alternative treatment, such as injection sclerotherapy, can be considered.

### Injection Sclerotherapy

Injection sclerotherapy consists of local infiltration of sclerosing agents, which leads to inflammation and fibrosis of the hemorrhoidal tissue with scarring and subsequent fixation of mucosa to submucosa. A 5% phenol solution in almond or vegetable oil is the most commonly used sclerosant and has been used for decades. Alternatives may include sodium tetradecyl sulfate, polidocanol foam, and aluminum potassium sulfate and tannic acid. A 2017 systematic review of 5 RCTs (n = 412) evaluating injection sclerotherapy described resolution of bleeding in 69% to 88% of patients with grade I hemorrhoids and resolution of grade II hemorrhoidal prolapse in 90% to 100% of patients. Postprocedure pain occurred in 24% to 49% of patients and bleeding occurred in 0.90% to 6% of patients. Recurrence of bleeding occurred in 1.5% to 29% of patients and recurrent prolapse occurred in 16% of patients.[28]

A recent nonblinded, single-center, RCT (n = 120) evaluating polidocanol foam sclerotherapy (PFS) versus RBL in patients with grade I to III hemorrhoids showed equivalent therapeutic success (93.3% PFS vs 85% RBL; $p = 0.14$). Recurrence rates were significantly lower in the PFS group (16.1% vs 41.2%; $p = 0.004$), and recurrences after RBL or PFS were either treated with the other therapy (PFS or RBL, respectively) or surgery. Complications were more frequent in the RBL group (30% RBL vs 10% PFS; $p = 0.01$) and were mostly minor.[30] Another prospective single-center study evaluating 2000 patients who received PFS reported 98% resolution of symptoms at a 4-week follow-up. There were 10.5% of the patients taking anticoagulant or dual antiplatelet therapy at the time of sclerosis, of whom 2 patients had clinically significant bleeding, requiring hospital admission, blood transfusion, or suspension of anticoagulant therapy. Another 0.5% of patients had postprocedure complications requiring surgery from thrombosis (0.4%) and perianal abscess (0.1%).[31] Similar results were reported in a multicenter, open-label, single-arm phase II trial involving 10 tertiary referral centers, including 183 patients.[32] The 1-year success rate of overall improvement of symptoms (ie, bleeding) with PFS was 95.6%.

### *Infrared Coagulation*

IRC consists of the application of infrared energy to hemorrhoidal tissue to achieve necrosis and subsequent fixation for the treatment of bleeding and tissue prolapse. In a 2017 systematic review of 4 RCTs (n = 339) evaluating IRC, 1 RCT reported resolution of bleeding in 78% of patients with grade I hemorrhoids, 52% of patients with grade II hemorrhoids, and 22% of patients with grade III hemorrhoids. Postprocedure pain ranged from 16% to 100% and postprocedure bleeding ranged from 15% to 44%.[28] Another RCT of 133 patients comparing IRC with RBL reported long-term (>1 year) satisfaction rates of 80% in the IRC group and 82% in the RBL group ($p = 0.39$).[33] However, pain after treatment was more common and more severe after RBL (visual analog scale [VAS] 5.5 ± 3.7) than IRC (VAS 3.3 ± 3.3; $p = 0.018$).[33] A 2022 meta-analysis of 9 RCTs comparing IRC to RBL amplified these findings; no significant difference was found between coagulation and RBL in terms of efficacy, postoperative prolapse, recurrence, and postoperative urine retention. Patients undergoing RBL had worse postoperative pain and less postoperative bleeding than patients undergoing IRC.[34]

## *URGENT/EMERGENT MANAGEMENT*

**6. Select patients with thrombosed external hemorrhoids may benefit from early surgical excision. Strength of recommendation: conditional based on low-quality evidence.**

There are few studies on external hemorrhoid thrombosis (EHT). Surgery may be superior to nonoperative treatment, but there is no evidence regarding the optimal time period for nonoperative management.[35] Although most patients treated nonoperatively will experience eventual resolution of their symptoms, excision of thrombosed external hemorrhoids may result in faster symptom resolution, reduced recurrence, and longer remission intervals. A series of 150 patients randomly assigned to topical application of 0.2% nitroglycerin, incision and evacuation of thrombus, or hemorrhoid excision found a significant reduction in pain with excision of hemorrhoid compared with topical glyceryl trinitrate ($p < 0.001$) or thrombectomy ($p < 0.01$) on day 4.[36] There was no difference in symptomatic relief between the treatment groups at 1-month follow-up, but at 1 year, the recurrence rate was significantly lower after excision versus thrombectomy ($p < 0.05$) or topical glyceryl trinitrate ($p < 0.05$), as was the rate of reintervention.[36] In a retrospective review of 231 patients who underwent treatment for EHT, 48.5% were treated surgically, of whom 97.3% underwent excision of the thrombosed hemorrhoid or thrombectomy. The remaining 51.5% of patients were treated with dietary modifications, stool softeners, oral and topical analgesics, and sitz baths. The time to resolution of the presenting symptoms (eg, pain, bleeding, lump) was significantly shorter in the surgically managed group (3.9 vs 24 days; $p < 0.001$).[37] In another retrospective review of nonoperative management of 504 consecutive patients presenting with EHT, the median time to symptom improvement was 5 days (range, 1–23 days), and the median time to complete resolution of symptoms was 8 days (range, 1–45 days).[38]

## *OPERATIVE TREATMENT*

### *Excisional Hemorrhoidectomy*

**7. Excisional hemorrhoidectomy should typically be offered to select patients with external hemorrhoids or patients with symptomatic combined internal and external hemorrhoids (grades III–IV). Strength of recommendation: strong based on high-quality evidence.**

Surgical excision of hemorrhoids remains an effective approach for patients who fail, cannot tolerate, or are not candidates for office-based procedures for internal hemorrhoids or who have concomitant external hemorrhoidal disease. An open or closed excisional hemorrhoidectomy (EH) can be performed with a variety of surgical devices. In a meta-analysis of 11 RCTs comparing open versus closed hemorrhoidectomy (n = 1326), the closed approach was associated with decreased postoperative pain, faster wound healing, and decreased risk of postoperative bleeding.[39] Postoperative complications, hemorrhoid recurrence, and infectious complications were similar between the 2 approaches. In a meta-analysis of 5 studies (n = 318), the use of a bipolar energy device was found to be faster, cause less postoperative pain, and have comparable rates of postoperative complications compared to a closed hemorrhoidectomy using electrocautery.[40] Ultrasonic shears were associated with earlier return to work, decreased postoperative pain, and fewer postoperative complications in a meta-analysis of 8 studies (n = 468) compared to closed hemorrhoidectomy using electrocautery.[41] When ultrasonic shears and electrocautery were compared in an RCT of 60 patients undergoing closed hemorrhoidectomy, postoperative pain scores were similar and there were no differences in clinical outcomes.[42] The added cost of advanced energy devices should be weighed against the potential clinical benefits in this setting.

Serious complications after surgical hemorrhoidectomy are rare, with the most common being postprocedural hemorrhage (1%–2% in most large series).[39] Acute urinary retention has been reported to occur in 1% to 15% of cases and is the most common reason for delayed discharge from an ambulatory setting.[43] The risk of acute urinary retention may be mitigated by decreasing the volume of intravenous fluids administered to <750 mL and using adequate analgesia.[44] Long-term complications can include anal stricture and incontinence.

### *Doppler-Guided HAL*

**8. Doppler-guided hemorrhoid artery ligation may be used for patients with internal hemorrhoids. Compared with excisional hemorrhoidectomy, this approach may result in decreased pain but increased recurrence rates. Strength of recommendation: conditional based on moderate-quality evidence.**

Doppler-guided/assisted HAL uses an anoscope fashioned with a Doppler probe to identify each hemorrhoid artery to allow for directed suture ligation. Potential benefits are the lack of tissue excision and potentially less pain. HAL has been combined with mucopexy for patients with symptomatic hemorrhoidal prolapse. In general, prospective studies using HAL have demonstrated favorable short-term results.[45] A systematic review evaluating 28 studies, including 2904 patients with grades I to IV hemorrhoids, demonstrated a recurrence rate ranging between 3% and 60% (pooled recurrence rate 17.5%; the highest rates were reported for grade IV hemorrhoids). Postoperative oral analgesia was required in 0% to 38% of patients. Postoperative complication rates were low, with an overall bleeding rate of 5% and an overall reintervention rate of 6.4%. The operative time ranged from 19 to 35 minutes.[46] Another retrospective series of 1000 consecutive patients undergoing HAL at a single institution reported an overall complication rate of 6.8%, including tenesmus (3.1%), urinary retention (2.3%), and bleeding (1.4%). After a median follow-up of 36 months, the recurrence rate was 9.5%, and 7% underwent a subsequent surgical procedure for hemorrhoidal disease.[47]

HAL has been compared to multiple other treatments with varying results. In an RCT comparing RBL to HAL for the treatment of grade II and III hemorrhoids (n = 372), the 1-year recurrence rates were 49% in the RBL group and 30% in the HAL group (OR 2.23; 95% CI, 1.42–3.51). More patients in the RBL group required additional procedures to alleviate symptoms (32% in the RBL group vs 14% in the HAL group; $p < 0.001$). Recurrence rates, symptom scores, complications, quality of life, and continence scores were similar between the 2 groups, although patients had more pain in the early postoperative period after HAL than after RBL. HAL was also more expensive and lacked cost-effectiveness compared with RBL in terms of incremental cost per quality-adjusted life-year.[48]

A systematic review of 16 RCTs, including 554 patients, that compared HAL to stapled hemorrhoidopexy (SH) for the treatment of grade II to IV hemorrhoids found that average pain scores were lower in the HAL group compared to the SH groups (2.0 vs 3.3; $p = 0.002$). However, patients in the HAL group had significantly higher recurrence rates (13.2%) compared to the SH group (6.9%; OR 1.93; 95% CI, 1.07–3.51).[49] There were no differences in postoperative complications, time to return to work, or patient satisfaction. Another RCT comparing HAL versus SH in 393 patients with grade II or III hemorrhoids at 22 French hospitals found that patients in the HAL group reported lower pain scores in the second week after surgery than patients in the SH group (1.3 vs 1.9; $p = 0.01$), although there was no difference in analgesic requirements (37% vs 44%; $p = 0.17$). Recurrence rates were higher in the HAL group than the SH group 6 months after surgery (25.1% vs 13.8%; $p = 0.049$). There were no differences between the 2 groups in terms of pain, analgesic requirement, quality of life, or patient satisfaction 12 months after surgery.[45]

In a multicenter RCT of 80 patients comparing HAL to EH for the treatment of grade III and IV hemorrhoids, more patients in the EH group continued to require non–steroidal anti-inflammatory drug pain medications during the second postoperative week than in the HAL group (87.8% vs 53.8%; $p = 0.002$).[50] The groups had no differences in postoperative complications, time to return to work, or patient satisfaction. At 2 years after surgery, there remained no differences in recurrence, complications, quality of life, or patient satisfaction between the groups.[51] A separate RCT of 98 patients, also comparing HAL to EH, found no difference in the symptom score at a 1-year follow-up between the groups, but the HAL group had a significantly higher rate of recurrent prolapse 1 year postoperatively (59% vs 31%; $p = 0.008$).[52]

**9. Stapled hemorrhoidepexy is not routinely recommended as a first-line surgical treatment for internal hemorrhoids given its marginal efficacy and significant risk profile. Strength of recommendation: conditional based on moderate-quality evidence.**

SH uses a circular stapling device to create a mucosa-to-mucosa anastomosis by excising the submucosa proximal to the dentate resulting in cephalad fixation of the anal cushions and interruption of the feeding arteries. Although effective for prolapsing internal hemorrhoids, it does not address external hemorrhoids. Early cohort and small nonrandomized trials reported that SH had reduced pain and resulted in faster recovery compared to EH. In a trial of 777 patients randomly assigned to either SH or EH, patients undergoing SH had less pain and better quality of life ($p = 0.02$) within the first 6 weeks after surgery. However, the EH group had significantly fewer recurrent symptoms (OR 2.96; 95% CI, 2.02–4.32), lower rates of tenesmus and incontinence ($p = 0.01$), and a higher quality of life at 24 months after surgery compared to the SH group ($p = 0.03$).[53] A Cochrane review demonstrated that patients with SH were significantly more likely to have recurrent hemorrhoids compared to those who underwent EH (12 trials, 955 patients; OR 3.22; 95% CI, 1.59–6.51).[54] Furthermore, a significantly higher proportion of patients who underwent SH complained of symptomatic prolapse at all time points (13 studies, 1191 patients; OR 2.65; 95% CI, 1.45–4.85). Patients undergoing SH were also more likely to require

additional operative procedures compared to those who underwent EH (8 studies, 553 patients; OR 2.75; 95% CI, 1.31–5.77). When all symptoms were considered, patients undergoing EH surgery were more likely to be asymptomatic in follow-up (12 trials, 1097 patients; OR 0.59; CI, 0.40–0.88).[54] In another systematic review of 98 studies including 7827 participants undergoing all surgical techniques for the operative treatment of hemorrhoids, recurrence of hemorrhoidal symptoms was significantly more common after SH than after excisional operations (OR 2.62; 95% CI, 1.83–3.75).[55] Similarly, a retrospective series of 86 patients undergoing SH for grade 3 hemorrhoidal prolapse with a 10-year follow-up reported that 39% had recurrent hemorrhoidal prolapse, 8% reported gas leakage, and 68% reported satisfaction.[56] Another retrospective series of 194 patients reported similar long-term recurrence of 41% at 12 years but had an overall impaired continence rate of 39%. Despite this, patient satisfaction was still good in 81% of cases.[57]

In addition to the outcomes reported above, SH is associated with several unique complications, including rectovaginal fistulas and staple line bleeding and strictures. A systematic review of 784 articles, including a total of 14,232 patients who underwent SH, found a median complication rate of 16.1% with 5 mortalities documented.[58] Between 2000 and 2009, there were 40 published cases of rectal perforation in the literature after SH. Thirty-five patients required a laparotomy with fecal diversion and 1 patient was treated by low anterior resection. Despite surgical treatment and resuscitation, there were still 4 deaths.[59]

## ACKNOWLEDGMENT

The authors thank Rachel L. Walden, M.L.I.S., of Vanderbilt University, Annette and Irwin Eskind Biomedical Library, for their help with the literature search and assistance with Covidence.

## REFERENCES

1. Wald A, Bharucha AE, Cosman BC, Whitehead WE. ACG clinical guideline: management of benign anorectal disorders. *Am J Gastroenterol*. 2014;109:1141–1157; quiz 1058.
2. Peery AF, Crockett SD, Barritt AS, et al. Burden of gastrointestinal, liver, and pancreatic diseases in the United States. *Gastroenterology*. 2015;149:1731–1741.e3.
3. Davis BR, Lee-Kong SA, Migaly J, Feingold DL, Steele SR. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of hemorrhoids. *Dis Colon Rectum*. 2018;61:284–292.
4. Covidence. Covidence systematic review software. Melbourne, Australia: Veritas Health Innovation; 2022. https://www.covidence.org/.
5. Guyatt G, Oxman AD, Akl EA, et al. GRADE guidelines: 1. Introduction—GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol*. 2011;64:383–394.
6. Arora G, Mannalithara A, Mithal A, Triadafilopoulos G, Singh G. Concurrent conditions in patients with chronic constipation: a population-based study. *PLoS One*. 2012;7:e42910.
7. Peery AF, Sandler RS, Galanko JA, et al. Risk factors for hemorrhoids on screening colonoscopy. *PLoS One*. 2015;10:e0139100.
8. Gralnek IM, Ron-Tal Fisher O, Holub JL, Eisen GM. The role of colonoscopy in evaluating hematochezia: a population-based study in a large consortium of endoscopy practices. *Gastrointest Endosc*. 2013;77:410–418.
9. Siminoff LA, Rogers HL, Harris-Haywood S. Missed opportunities for the diagnosis of colorectal cancer. *Biomed Res Int*. 2015;2015:285096.
10. Pasha SF, Shergill A, Acosta RD, et al; ASGE Standards of Practice Committee. The role of endoscopy in the patient with lower GI bleeding. *Gastrointest Endosc*. 2014;79:875–885.
11. Rex DK, Boland CR, Dominitz JA, et al. Colorectal cancer screening: recommendations for physicians and patients from the U.S. Multi-Society Task Force on colorectal cancer. *Am J Gastroenterol*. 2017;112:1016–1030.
12. Kalkdijk J, Broens P, Ten Broek R, et al. Functional constipation in patients with hemorrhoids: a systematic review and meta-analysis. *Eur J Gastroenterol Hepatol*. 2022;34:813–822.
13. De Schepper H, Coremans G, Denis MA, et al. Belgian consensus guideline on the management of hemorrhoidal disease. *Acta Gastroenterol Belg*. 2021;84:101–120.
14. Gallo G, Martellucci J, Sturiale A, et al. Consensus Statement of the Italian Society of Colorectal Surgery (SICCR): management and treatment of hemorrhoidal disease. *Tech Coloproctol*. 2020;24:145–164.
15. van Tol RR, Kleijnen J, Watson AJM, et al. European Society of ColoProctology: guideline for haemorrhoidal disease. *Colorectal Dis*. 2020;22:650–662.
16. Alonso-Coello P, Guyatt G, Heels-Ansdell D, et al. Laxatives for the treatment of hemorrhoids. *Cochrane Database Syst Rev*. 2005;2005:CD004649.
17. Johannsson HO, Graf W, Påhlman L. Bowel habits in hemorrhoid patients and normal subjects. *Am J Gastroenterol*. 2005;100:401–406.
18. Garg P, Singh P. Adequate dietary fiber supplement along with TONE concept can help avoid surgery in most patients with advanced hemorrhoids. *Minerva Gastroenterol Dietol*. 2017;01:01.
19. Vohra S, Akoury H, Bernstein P, et al. The effectiveness of Proctofoam-HC for treatment of hemorrhoids in late pregnancy. *J Obstet Gynaecol Can*. 2009;31:654–659.
20. Ebrahimi N, Vohra S, Gedeon C, et al. The fetal safety of hydrocortisone-pramoxine (Proctofoam-HC) for the treatment of hemorrhoids in late pregnancy. *J Obstet Gynaecol Can*. 2011;33:153–158.
21. Perera N, Liolitsa D, Iype S, et al. Phlebotonics for haemorrhoids. *Cochrane Database Syst Rev*. 2012;(8):CD004322.
22. Shanmugam V, Thaha MA, Rabindranath KS, Campbell KL, Steele RJ, Loudon MA. Rubber band ligation versus excisional haemorrhoidectomy for haemorrhoids. *Cochrane Database Syst Rev*. 2005;2005:CD005034.
23. MacRae HM, McLeod RS. Comparison of hemorrhoidal treatment modalities. A meta-analysis. *Dis Colon Rectum*. 1995;38:687–694.
24. Komporozos V, Ziozia V, Komporozou A, Stravodimos G, Kolinioti A, Papazoglou A. Rubber band ligation of symptomatic

hemorrhoids: an old solution to an everyday problem. *Int J Colorectal Dis*. 2021;36:1723–1729.
25. Alshreef A, Wailoo AJ, Brown SR, et al. Cost-effectiveness of haemorrhoidal artery ligation versus rubber band ligation for the treatment of grade II-III haemorrhoids: analysis using evidence from the HubBLe trial. *PharmacoEcon Open*. 2017;1:175–184.
26. Coughlin OP, Wright ME, Thorson AG, Ternent CA. Hemorrhoid banding: a cost-effectiveness analysis. *Dis Colon Rectum*. 2019;62:1085–1094.
27. Bat L, Melzer E, Koler M, Dreznick Z, Shemesh E. Complications of rubber band ligation of symptomatic internal hemorrhoids. *Dis Colon Rectum*. 1993;36:287–290.
28. Cocorullo G, Tutino R, Falco N, et al. The non-surgical management for hemorrhoidal disease: a systematic review. *G Chir*. 2017;38:5–14.
29. Hite N, Klinger AL, Miller P, et al. Clopidogrel bisulfate (Plavix) does not increase bleeding complications in patients undergoing rubber band ligation for symptomatic hemorrhoids. *J Surg Res*. 2018;229:230–233.
30. Salgueiro P, Garrido M, Santos RG, Pedroto I, Castro-Poças FM. Polidocanol foam sclerotherapy versus rubber band ligation in hemorrhoidal disease grades I/II/III: randomized trial. *Dis Colon Rectum*. 2022;65:e718–e727.
31. Fernandes V, Fonseca J. Polidocanol foam injected at high doses with intravenous needle: the (almost) perfect treatment of symptomatic internal hemorrhoids. *GE Port J Gastroenterol*. 2019;26:169–175.
32. Gallo G, Pietroletti R, Novelli E, et al. A multicentre, open-label, single-arm phase II trial of the efficacy and safety of sclerotherapy using 3% polidocanol foam to treat second-degree haemorrhoids (SCLEROFOAM). *Tech Coloproctol*. 2022;26:627–636.
33. Poen AC, Felt-Bersma RJ, Cuesta MA, Devillé W, Meuwissen SG. A randomized controlled trial of rubber band ligation versus infra-red coagulation in the treatment of internal haemorrhoids. *Eur J Gastroenterol Hepatol*. 2000;12:535–539.
34. Ding Z, Xuan J, Tang G, et al. Rubber band ligation versus coagulation for the treatment of haemorrhoids: a meta-analysis of randomised controlled trials. *Postgrad Med J*. 2023;99:946–953.
35. Chan KK, Arthur JD. External haemorrhoidal thrombosis: evidence for current management. *Tech Coloproctol*. 2013;17:21–25.
36. Cavcić J, Turcić J, Martinac P, Mestrović T, Mladina R, Pezerović-Panijan R. Comparison of topically applied 0.2% glyceryl trinitrate ointment, incision and excision in the treatment of perianal thrombosis. *Dig Liver Dis*. 2001;33:335–340.
37. Greenspon J, Williams SB, Young HA, Orkin BA. Thrombosed external hemorrhoids: outcome after conservative or surgical management. *Dis Colon Rectum*. 2004;47:1493–1498.
38. Alldinger I, Poschinski Z, Ganzera S, Helmes C. Perianal thrombosis: no need for surgery. *Langenbecks Arch Surg*. 2022;407:1251–1256.
39. Bhatti MI, Sajid MS, Baig MK. Milligan-Morgan (open) versus Ferguson haemorrhoidectomy (closed): a systematic review and meta-analysis of published randomized, controlled trials. *World J Surg*. 2016;40:1509–1519.
40. Xu L, Chen H, Lin G, Ge Q. Ligasure versus Ferguson hemorrhoidectomy in the treatment of hemorrhoids: a meta-analysis of randomized control trials. *Surg Laparosc Endosc Percutan Tech*. 2015;25:106–110.
41. Mushaya CD, Caleo PJ, Bartlett L, Buettner PG, Ho YH. Harmonic scalpel compared with conventional excisional haemorrhoidectomy: a meta-analysis of randomized controlled trials. *Tech Coloproctol*. 2014;18:1009–1016.
42. Tsunoda A, Sada H, Sugimoto T, et al. Randomized controlled trial of bipolar diathermy vs ultrasonic scalpel for closed hemorrhoidectomy. *World J Gastrointest Surg*. 2011;3:147–152.
43. Vinson-Bonnet B, Higuero T, Faucheron JL, Senejoux A, Pigot F, Siproudhis L. Ambulatory haemorrhoidal surgery: systematic literature review and qualitative analysis. *Int J Colorectal Dis*. 2015;30:437–445.
44. Toyonaga T, Matsushima M, Sogawa N, et al. Postoperative urinary retention after surgery for benign anorectal disease: potential risk factors and strategy for prevention. *Int J Colorectal Dis*. 2006;21:676–682.
45. Lehur PA, Didnée AS, Faucheron JL, et al; LigaLongo Study Group. Cost-effectiveness of new surgical treatments for hemorrhoidal disease: a multicentre randomized controlled trial comparing transanal Doppler-guided hemorrhoidal artery ligation with mucopexy and circular stapled hemorrhoidopexy. *Ann Surg*. 2016;264:710–716.
46. Pucher PH, Sodergren MH, Lord AC, Darzi A, Ziprin P. Clinical outcome following Doppler-guided haemorrhoidal artery ligation: a systematic review. *Colorectal Dis*. 2013;15:e284–e294.
47. Ratto C, Campennì P, Papeo F, Donisi L, Litta F, Parello A. Transanal hemorrhoidal dearterialization (THD) for hemorrhoidal disease: a single-center study on 1000 consecutive cases and a review of the literature. *Tech Coloproctol*. 2017;21:953–962.
48. Brown SR, Tiernan JP, Watson AJM, et al; HubBLe Study team. Haemorrhoidal artery ligation versus rubber band ligation for the management of symptomatic second-degree and third-degree haemorrhoids (HubBLe): a multicentre, open-label, randomised controlled trial. *Lancet*. 2016;388:356–364.
49. Emile SH, Elfeki H, Sakr A, Shalaby M. Transanal hemorrhoidal dearterialization (THD) versus stapled hemorrhoidopexy (SH) in treatment of internal hemorrhoids: a systematic review and meta-analysis of randomized clinical trials. *Int J Colorectal Dis*. 2019;34:1–11.
50. Trenti L, Biondo S, Kreisler Moreno E, et al; THDLIGA-RCT Study Group. Short-term outcomes of transanal hemorrhoidal dearterialization with mucopexy versus vessel-sealing device hemorrhoidectomy for grade III to IV hemorrhoids: a prospective randomized multicenter trial. *Dis Colon Rectum*. 2019;62:988–996.
51. Trenti L, Biondo S, Espin-Basany E, et al; THDLIGA-RCT Study Group. Transanal hemorrhoidal dearterialization with mucopexy versus vessel-sealing device hemorrhoidectomy for grade III to IV hemorrhoids: long-term outcomes from the THDLIGA randomized controlled trial. *Dis Colon Rectum*. 2023;66:e818–e825.
52. Rørvik HD, Campos AH, Styr K, et al. Minimal open hemorrhoidectomy versus transanal hemorrhoidal dearterialization: the effect on symptoms: an open-label randomized controlled trial. *Dis Colon Rectum*. 2020;63:655–667.
53. Watson AJ, Hudson J, Wood J, et al; eTHoS study group. Comparison of stapled haemorrhoidopexy with traditional excisional surgery for haemorrhoidal disease (eTHoS): a pragmatic, multicentre, randomised controlled trial. *Lancet*. 2016;388:2375–2385.

54. Lumb KJ, Colquhoun PH, Malthaner RA, Jayaraman S. Stapled versus conventional surgery for hemorrhoids. *Cochrane Database Syst Rev*. 2006;2006:CD005393.
55. Simillis C, Thoukididou SN, Slesser AA, Rasheed S, Tan E, Tekkis PP. Systematic review and network meta-analysis comparing clinical outcomes and effectiveness of surgical treatments for haemorrhoids. *Br J Surg*. 2015;102:1603–1618.
56. Bellio G, Pasquali A, Schiano di Visconte M. Stapled hemorrhoidopexy: results at 10-year follow-up. *Dis Colon Rectum*. 2018;61:491–498.
57. Sturiale A, Fabiani B, Menconi C, et al. Long-term results after stapled hemorrhoidopexy: a survey study with mean follow-up of 12 years. *Tech Coloproctol*. 2018;22:689–696.
58. Porrett LJ, Porrett JK, Ho YH. Documented complications of staple hemorrhoidopexy: a systematic review. *Int Surg*. 2015;100:44–57.
59. Faucheron JL, Voirin D, Abba J. Rectal perforation with life-threatening peritonitis following stapled haemorrhoidopexy. *Br J Surg*. 2012;99:746–753.