GASTROENTEROLOGY 2004;126:1463–1473

American Gastroenterological Association Technical Review on the Diagnosis and Treatment of Hemorrhoids

This literature review and the recommendations therein were prepared for the American Gastroenterological Association Clinical Practice Committee. The paper was approved by the Committee on January 8, 2004, and by the AGA Governing Board on February 13, 2004.

Hemorrhoids are a common condition, but their true prevalence is unknown. Most patients and many physicians tend to attribute any anorectal symptom to hemorrhoids. Furthermore, anal cushions are normal structural components of the anal canal that are present from infancy.[1] Despite their confusing epidemiology, it is important for gastroenterologists, surgeons, and primary care physicians alike to be able to accurately diagnose hemorrhoids and offer a rational, effective treatment plan.

Materials and Methods

We performed a literature search for all English-language articles dealing with hemorrhoids published from 1990 to 2002. Databases searched included MEDLINE, PreMEDLINE, the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effectiveness, the American College of Physicians Journal Club, and the Cochrane Central Registry of Controlled Trials. Additional references were obtained from the bibliographies of selected articles. We selected pertinent studies emphasizing randomized controlled trials to formulate this technical review.

Etiology and Pathophysiology

Hemorrhoids are found in the subepithelial space of the anal canal. They consist of connective tissue cushions surrounding the direct arteriovenous communications between the terminal branches of the superior rectal arteries and the superior, inferior, and middle rectal veins.[1] Anal subepithelial smooth muscle arises from the conjoined longitudinal muscle layer, passes through the internal anal sphincter, and inserts into the subepithelial vascular space. There, the smooth muscle suspends and contributes to the bulk of the hemorrhoidal cushions.[1,2] The cushions contribute approximately 15%–20% of the resting anal pressure.[3] Perhaps more importantly, they serve as a conformable plug to ensure complete closure of the anal canal. Most people have 3 of these cushions, but cadaver studies have shown that the so-called typical right anterior, right posterior, and left lateral configuration of the cushions occurs only 19% of the time.[1]

Symptoms attributed to hemorrhoids include bleeding, protrusion, itching, and pain.[4,5] For the most part, external hemorrhoids are asymptomatic unless they become thrombosed, in which case they present as an acutely painful perianal lump. Persisting skin tags after resolution of the thrombosis can lead to problems with hygiene and secondary irritation.

Most hemorrhoidal symptoms arise from enlarged internal hemorrhoids. Abnormal swelling of the anal cushions, stretching of the suspensory muscles, and dilation of the submucosal arteriovenous plexus result in the prolapse of upper anal and lower rectal tissue through the anal canal. This tissue is easily traumatized, leading to bleeding. The blood is typically bright red due to the arterial oxygen tension caused by arteriovenous communications within the anal cushions.[5,6] Prolapse of the rectal mucosa leads to deposition of mucus on the perianal skin, causing itchiness and discomfort.

The pathogenesis of the enlarged, prolapsing cushions is unknown. Many clinicians believe that inadequate fiber intake, prolonged sitting on the toilet, and chronic straining at stool contribute to the development of symptomatic hemorrhoids, yet rigorous proof of such beliefs is lacking. Other factors have also been proposed, including constipation, diarrhea, pregnancy, and family history.[5] None of these have been rigorously proven, although 0.2% of pregnant women require urgent hemorrhoidectomy for incarcerated prolapsed hemorrhoids.[7]

Multiple studies have shown elevated anal resting pressure in patients with hemorrhoids when compared with controls[5]; voluntary contraction pressure is unchanged. Whether the elevated resting pressure is caused by or due to enlarged hemorrhoids is unknown, but resting tone becomes normal after hemorrhoidectomy.[8] Ultraslow pressure waves are more common in patients

Abbreviation used in this paper: MPFF, micronized, purified flavonoid fraction.

0016-5085/04/$30.00
doi:10.1053/S0016-5085(04)00355-5

with hemorrhoids, but the significance of the waves is uncertain.[9]

Epidemiology

The epidemiology of hemorrhoids has been studied using a number of approaches, each of which has shortcomings. Accordingly, the data must be interpreted with caution. Population-based surveys rely on self-reporting of a condition with symptoms that are nonspecific; moreover, a physician observer does not validate these supposed diagnoses. Hospital discharge data are more reliable in this regard but still remain imperfect; it is likely that most patients with a diagnosis of hemorrhoids at discharge have not in fact undergone a directed anorectal examination. Similar criticism may be leveled at physician visit data; a complete evaluation, including anoscopy, cannot be assumed to have taken place, particularly if the data are from primary care providers. Hospital-based proctoscopy studies show prevalence rates of up to 86%,[10] even though many of their patients are asymptomatic.

Despite these caveats, the community-wide prevalence of hemorrhoids in the United States is reported to be 4.4%, with a peak prevalence occurring between 45 and 65 years of age.[11] Increased prevalence rates are associated with higher socioeconomic status, but this association may reflect differences in health-seeking behavior rather than true prevalence.[11] Population-based surveys suggest that the prevalence of hemorrhoids decreased in both the United States and United Kingdom during the second half of the 20th century.[12] Hemorrhoids are frequently seen in patients with spinal cord injury.[13,14]

Evaluation and Classification

For many patients, the presence of any anorectal symptom is indicative of hemorrhoids. Physicians should not make the same assumption. Hemorrhoids are, in fact, frequently the cause of common symptoms such as bleeding, a lump, itching, or pain. However, when hemorrhoids are simply assumed to be the cause, other pathology is too often overlooked. Prolapsing hemorrhoids may cause anal itching, but itching is just as likely to be due to inadequate hygiene, minor incontinence, or perianal dermatitis. Pain associated with a palpable lump is the hallmark of a thrombosed external hemorrhoid, but anal fissure and perianal abscess are equally common causes of anal pain and, in particular, painful defecation. A precise patient history and a careful physical examination are essential for accurate diagnosis; neither should be omitted when a patient has anorectal symptoms.

Bleeding is the most common presenting symptom of hemorrhoids. The blood is typically bright red and may frequently drip or squirt into the toilet bowl. Darker blood and blood mixed in the stool suggest a more proximal source of bleeding. However, because physicians' predictions are not reliable in the evaluation of hematochezia,[15] exclusive reliance on patients' descriptions of bleeding is unwise; further investigation is warranted. Current practice guidelines from both the American Society for Gastrointestinal Endoscopy and the Society for Surgery of the Alimentary Tract advocate a minimum of anoscopy and flexible sigmoidoscopy for bright-red rectal bleeding.[16,17] Complete colonic evaluation by colonoscopy or air-contrast barium enema is indicated when the bleeding is atypical for hemorrhoids, when no source is evident on anorectal examination, or when the patient has significant risk factors for colonic neoplasia. The decision to pursue further evaluation also depends on the patient's age and general medical condition.[16] Hemorrhoids alone do not cause a positive result with a stool guaiac test,[18,19] so fecal occult blood should not be attributed to hemorrhoids until the colon is adequately evaluated. Anemia due to hemorrhoidal disease is rare (0.5 patients/100,000 population) and responds to hemorrhoidectomy.[20]

Because symptoms caused by other conditions are frequently attributed to hemorrhoids, a careful anorectal evaluation is warranted for any patient who reports hemorrhoids. External examination will enable the discovery of pathology such as perianal abscess or anal fistula. The cardinal symptom of anal fissure is postdefecatory pain, but anal fissure also frequently causes minor rectal bleeding. Anal fissure is best seen with eversion of the anal canal by opposing traction with the thumbs. Any skin tags, thrombosed external hemorrhoids, mixed hemorrhoids, and incarcerated rectal mucosal prolapse will be evident on external examination. Internal hemorrhoids and associated rectal mucosal prolapse are best evaluated through an anoscope with an adequate light source.

Portal hypertension can cause varices of the anal canal. These varices are distinct from hemorrhoids and should not be considered a cause of hemorrhoids.[21,22] In fact, patients with portal hypertension and varices do not have an increased incidence of hemorrhoids.[22] Variceal bleeding should not be considered the same as hemorrhoidal bleeding, so standard hemorrhoidal treatments should not be used. Rectal variceal bleeding is best treated by correction of the underlying portal hypertension; transjugular intrahepatic portosystemic shunts have been successfully used in the treatment of refractory bleeding.[23] If local therapy is necessary, oversewing of the varices

rather than attempted excision is the procedure of choice. There are a few case reports of injection sclerotherapy for bleeding rectal varices,[24,25] but the overall success rate of this approach is unknown.

The evaluation of patients with hemorrhoids should include an assessment of their symptoms. As mentioned previously, the presence, quantity, and frequency of bleeding are important. The presence, timing, and reducibility of prolapsed tissue help to classify the extent of the hemorrhoids and dictate therapeutic options. The effect of the hemorrhoids on hygiene is a factor when deciding on operative treatment. Anal pain is generally not associated with hemorrhoids unless thrombosis has occurred. Thus, anal pain suggests other pathology and mandates closer investigation. As many as 20% of patients with hemorrhoids have concomitant anal fissures.[26] New-onset anal pain in the absence of a visible source suggests the possibility of a small intersphincteric abscess.

Hemorrhoids are defined as internal or external according to their position relative to the dentate line. External hemorrhoids become symptomatic only when thrombosed or when skin tags are so large that hygiene is impossible. Thrombosed external hemorrhoids are common. Such patients present with acute-onset anal pain and a palpable perianal lump. Thrombosed external hemorrhoids occasionally bleed when local pressure causes erosion through the overlying skin. Thrombosed internal hemorrhoids are far less common; typical symptoms include pain, pressure, bleeding, mucus production, and an inability to reduce spontaneously prolapsing tissue.

Symptoms of internal hemorrhoids include bleeding and protrusion. Prolapsed hemorrhoids are a cause of soiling and mucus discharge, and both lead to secondary pruritus ani. Advanced prolapsed hemorrhoids may become incarcerated and strangulated.

Most colorectal surgeons use the grading system published in 1985 by Banov et al.[27] Internal hemorrhoids that bleed but do not prolapse are designated as first-degree hemorrhoids. Those that prolapse and reduce spontaneously (with or without bleeding) are second-degree hemorrhoids. Prolapsed hemorrhoids that require reduction are third-degree hemorrhoids. Prolapsed internal hemorrhoids that cannot be reduced are fourth-degree hemorrhoids; they usually include both internal and external components and are confluent from skin tag to inner anal canal. Acutely thrombosed, incarcerated internal hemorrhoids and incarcerated, thrombosed hemorrhoids involving circumferential rectal mucosal prolapse are also fourth-degree hemorrhoids.

Accurate classification is important for both assessing the reported efficacy of various hemorrhoidal treatments and selecting the optimal treatment for an individual patient. The American Society of Colon and Rectal Surgeons uses the Banov classification in its practice parameters for the treatment of hemorrhoids. However, a descriptive system is sometimes more useful than one based on symptoms because of the range in severity within each grade. Large third-degree hemorrhoids may only be treatable with excision, for example, if they extend to the dentate line, if chronic prolapse has caused epithelial changes, or if the volume of tissue is simply too large to be managed nonoperatively. Smaller third-degree hemorrhoids, in contrast, may be readily treatable by nonoperative methods.

Medical Treatment

Few recent studies concern either the prevention or the medical management of hemorrhoids. The almost-universal recommendations are to add dietary fiber and to avoid straining at stool. One double-blind, placebo-controlled trial showed that the use of psyllium reduced hemorrhoidal bleeding and painful defecation,[28] but other studies of fiber have shown less impressive or insignificant results.[29–31] Because diarrhea exacerbates hemorrhoidal symptoms, controlling it with fiber, antimotility agents, and specific treatment of any underlying cause will likely be of benefit.

Over-the-counter topical agents and suppositories have become equally ubiquitous in the empirical treatment of hemorrhoidal symptoms, but data supporting their use are lacking. Topical analgesics may bring symptomatic relief of local pain and itching. Corticosteroid creams may ameliorate local perianal inflammation, but no data suggest that they actually reduce hemorrhoidal swelling, bleeding, or protrusion. Long-term use of high-potency corticosteroid creams is deleterious and should be avoided. In one prospective series, nitroglycerin ointment relieved pain due to thrombosed external hemorrhoids, presumably by decreasing anal tone.[32]

Several studies have assessed the use of oral micronized, purified flavonoid fraction (MPFF) (Daflon; Servier Laboratories, Neuilly-Sur-Seine, France). Flavonoids increase venous tone, lymphatic drainage, and capillary resistance and normalize capillary permeability. Two placebo-controlled trials showed symptomatic improvement with use of MPFF,[33,34] but results were inconsistent when MPFF and fiber were combined. Ho et al. reported that a combination of MPFF and fiber led to faster relief of hemorrhoidal bleeding than either fiber and rubber band ligation or fiber alone.[35] In contrast, Thanapong-

sathorn et al. compared fiber with and without MPFF in a double-blind trial and found similar improvement at 14 days.[36] MPFF has not been approved for use in the United States by the Food and Drug Administration.

Nonoperative Treatment

Several methods that do not involve surgical excision are available to treat patients with hemorrhoids. These procedures are usually performed in the office setting and do not require anesthesia. Although nonexcisional, they all function as ablative by thrombosis, sclerosis, or necrosis of the mucosal portion of the hemorrhoidal complex.

Sclerotherapy

Sclerotherapy is one of the oldest forms of nonoperative treatment; it was first described in 1869 by Morgan in Dublin. It is reserved for first- or second-degree hemorrhoids. A submucosal injection of 5 mL of 5% phenol in oil, 5% quinine and urea, or hypertonic (23.4%) salt solution at the base of the hemorrhoidal complex causes thrombosis of vessels, sclerosis of connective tissue, and shrinkage and fixation of overlying mucosa. Sclerotherapy requires no anesthesia and takes only minutes to perform through an anoscope.[37] Khoury et al. performed a prospective trial of patients with first- or second-degree hemorrhoids who had initially been treated with medical therapy.[38] In that trial, sclerotherapy improved or cured 89.9% of the patients, with no difference between single or multiple injections. In contrast, Senapati and Nicholls performed a randomized controlled trial and found no difference in bleeding rates at 6 months following sclerotherapy with bulk laxatives or bulk laxatives alone.[39] Even though sclerotherapy is minimally invasive, it can cause complications. Pain is variably reported in 12%–70% of patients.[37,40,41] Impotence,[42] urinary retention, and abscess[26] have also been reported. In one study, hemorrhoidal symptoms recurred in about 30% of patients 4 years after initially successful sclerotherapy.[37]

Cryotherapy

Cryotherapy has been advocated as a technique for destroying enlarged internal hemorrhoids. Initial reports were enthusiastic[43]; however, the technique is relatively time consuming, and subsequent reports have shown disappointing results.[44] Smith et al. performed a trial comparing cryotherapy with closed hemorrhoidectomy on different hemorrhoids in the same patient.[45] The cryotherapy site was associated with prolonged pain, foul-smelling discharge, and a greater need for additional therapy. Cryotherapy is now only rarely used for the treatment of patients with hemorrhoids.

Rubber Band Ligation

Rubber band ligation relies on the tight encirclement of redundant mucosa, connective tissue, and blood vessels in the hemorrhoidal complex. The encirclement must be well proximal (at least 2 cm) to the dentate line. Placement of the band too far distally leads to immediate, usually severe pain due to the presence of somatic sensory nerve afferents that are absent above the anal transition zone. Internal hemorrhoid ligation can be performed in the office setting with one of several commercially available instruments, including devices that use suction to draw the redundant tissue into the applicator to make the procedure a one-person effort.[46] No anesthesia is required. The resulting scar fixes the connective tissue to the rectal wall and resolves the prolapse. Endoscopic variceal ligators have also been shown to be effective tools for hemorrhoid ligation.[47]

Rubber band ligation is most commonly used for first-, second-, or third-degree hemorrhoids. Some authorities recommend it for fourth-degree hemorrhoids after operative reduction of the incarcerated prolapse.[48] Up to 3 hemorrhoids can be banded in a single session,[49–51] although many authorities prefer to limit treatment to 1 or 2 columns at a time. Like the other nonoperative treatments, rubber band ligation does not address the external hemorrhoid component. Success rates vary, depending on the degree of hemorrhoids treated, length of follow-up, and criteria for success.[37,47,49,52–60] Wrobleski et al. reported that 80% of their patients improved and 69% were symptom-free at a mean follow-up of 5 years.[61] Steinberg et al. reported 89% patient satisfaction at a similar follow-up interval, but only 44% of their patients were symptom-free.[62] The recurrence rate may be as high as 68% at 4 or 5 years of follow-up,[37,56,58,59] but symptoms usually respond to repeat ligation; only 10% of such patients require excisional hemorrhoidectomy.[56,59]

The most common complication of rubber band ligation is pain, which is reported in 5%–60% of treated patients.[51,63–65] Pain following the procedure tends to be relatively minor and almost always can be satisfactorily managed with sitz baths and over-the-counter analgesics. Other complications, such as abscess, urinary retention, band slippage, prolapse and thrombosis of adjacent hemorrhoids, and minor bleeding from the ulcer, occur in $<5\%$ of patients.[52] Severe bleeding occasionally requires intervention when the eschar from the band sloughs, usually 1–2 weeks after treatment. Necrotizing pelvic sepsis is a rare complication of rubber band ligation.[66,67]

The clinical triad of severe pain, high fever, and urinary retention suggests the diagnosis. Such patients require emergency examination under anesthesia, with radical debridement of all necrotic tissue. The risk of necrotizing pelvic infection is increased in immunocompromised patients, including those with uncontrolled acquired immunodeficiency syndrome, neutropenia, and severe diabetes mellitus.[68]

Bipolar Diathermy, Direct-Current Electrotherapy, and Infrared Photocoagulation

These techniques all rely on the coagulation, occlusion, and obliteration or sclerosis of the hemorrhoidal vascular pedicle above the level of the anal transition zone. The area of tissue damage sloughs, leaving an ulcer that eventually forms fibrotic tissue at the treatment site.

Bipolar diathermy or cautery is applied in 1-second pulses of 20 W until the underlying tissue coagulates (often <30 seconds).[69,70] About 12% of patients experience pain, bleeding, fissure, or spasm of the internal sphincter.[69,70] Multiple applications to the same site are often required, especially for second- and third-degree hemorrhoids (up to 3 per site).[71] The depth of injury from bipolar cautery is 2.2 mm and does not increase with multiple applications at the same site.[71] Bipolar cautery has been used to treat first-, second-, and third-degree internal hemorrhoids; success rates (defined by relief of bleeding) range from 88% to 100% in randomized trials.[69–73] It does not eliminate prolapsing tissue, and up to 20% of patients will require excisional hemorrhoidectomy.[71,73]

Direct-current electrotherapy requires the prolonged (up to 14 minutes) application of 110-V direct current (up to 15 mA) to the base of the hemorrhoidal complex well above the anal transition zone.[70,72–76] Current and time requirements increase for higher-grade hemorrhoids. Multiple treatments to the same site are required in up to 30% of patients.[74] Even though multiple sites can be treated in one setting with minimal pain, the technique has not been widely accepted because of the lengthy treatment time and the limited control of prolapse in higher-grade hemorrhoids (only a 44% success rate).[76] However, in several randomized trials using adequate levels of current (16 mA) and prolonged treatment times (10 minutes), bleeding was controlled in 88% of patients with first-, second-, or third-degree hemorrhoids.[70,72] Complications included pain (33%), ulcer formation (4%), and bleeding (10%).[72,75]

Infrared photocoagulation focuses infrared radiation from a tungsten-halogen lamp via a polymer probe tip. The probe tip must touch the hemorrhoidal tissue at its base; 0.5- to 2-second pulses of energy are delivered to the area.[71] Multiple (2–6) hemorrhoids can be treated at one time.[37] The depth of tissue injury after one treatment is about 2.5 mm, and the penetration increases with subsequent treatment at the same site.[71] According to 2 randomized studies, hemorrhoidal bleeding was successfully controlled in 67%–96% of patients with first- or second-degree hemorrhoids.[37,71] Complications, including pain and bleeding, are uncommon.

Each method of nonoperative treatment described has its proponents. Randomized controlled trials have compared each method with one or more of the others, yet no single study has compared all 5 (sclerotherapy, rubber band ligation, bipolar diathermy, direct-current electrotherapy, and infrared photocoagulation). A meta-analysis by Johanson and Rimm examined 5 trials involving 862 patients with first- or second-degree hemorrhoids who underwent infrared photocoagulation, sclerotherapy, or rubber band ligation.[77] Rubber band ligation was more effective than sclerotherapy, and patients treated with rubber band ligation required fewer additional treatments than those treated with sclerotherapy or infrared photocoagulation. However, rubber band ligation was associated with a significantly higher incidence of pain than the other 2 treatments. Thus, Johanson and Rimm favored infrared photocoagulation as the nonoperative treatment of choice.

MacRae et al. performed a similar meta-analysis covering 23 studies that compared rubber band ligation, infrared photocoagulation, sclerotherapy, hemorrhoidectomy, and manual dilation of the anus for patients with first-, second-, or third-degree hemorrhoids.[78] Like Johanson and Rimm, they found that rubber band ligation was more effective than sclerotherapy, less likely to require additional therapy than either sclerotherapy or infrared photocoagulation, and more likely to cause pain. Despite these identical findings, MacRae et al. concluded that rubber band ligation was the initial procedure of choice for first-, second-, and third-degree hemorrhoids because of its higher rate of efficacy.

Surgical Treatment

Surgical hemorrhoidectomy is the most effective treatment for hemorrhoids overall and for third-degree hemorrhoids in particular.[78] Recurrence following a properly performed hemorrhoidectomy is uncommon.[79] However, nonoperative techniques are preferred when feasible in the first instance because surgery is associated with more pain and complications.[78] Hemorrhoidectomy techniques include excising internal and external components in 1–3 quadrants around the anal canal,[80,81]

suturing or banding the internal hemorrhoids and excising the external component,[48] or performing a circular excision of the internal hemorrhoids and prolapsing rectal mucosa proximal to the dentate line.[82–84]

Anal dilatation has been advocated as a nonexcisional operation for hemorrhoids,[85] and this approach has had some acceptance in European centers. However, anal endosonography has shown sphincter injuries associated with anal dilatation,[86] and several clinical series have reported high rates of associated incontinence.[87] Konsten and Baeten reported long-term follow-up (median, 17 years) results of a randomized prospective trial of hemorrhoidectomy versus anal dilatation; 52% of patients who underwent anal dilatation had impaired continence at the time of follow-up.[88] Furthermore, anal dilatation has a higher failure rate than operative hemorrhoidectomy in prospective randomized trials.[88,89] Because of the risk of incontinence, most authorities now advocate abandoning this approach to the treatment of patients with hemorrhoids.

Indications for surgical hemorrhoidectomy include hemorrhoids too extensive for nonoperative management, failure of nonoperative management, patient preference, and concomitant conditions (such as fissure or fistula) that require surgery. About 5%–10% of patients, usually those with third- or fourth-degree hemorrhoids, need surgical hemorrhoidectomy.[4,26]

Surgical hemorrhoidectomy can be performed with either open or closed techniques. In the Milligan-Morgan hemorrhoidectomy, widely used in the United Kingdom, the internal and external components of each hemorrhoid are excised and the skin is left open in a 3-leaf clover pattern that heals secondarily for 4–8 weeks.[80] In the Ferguson hemorrhoidectomy, each hemorrhoid component is excised and the wounds are closed primarily.[81]

Four randomized trials have studied open versus closed hemorrhoidectomy.[90–93] Three of these trials showed no difference in postoperative pain.[90–92] Differences in healing times were not consistent between trials. One randomized trial showed decreased pain and a more rapid return to work following submucosal (partially closed) versus Milligan-Morgan hemorrhoidectomy.[94]

Postoperative pain remains the major drawback of excisional hemorrhoidectomy. Narcotic analgesics are generally required, and recent studies show that most patients do not return to work for 2–4 weeks following surgery.[95–100] Several trials have assessed the effect of excision techniques on postoperative pain.[101–112] Randomized trials have shown no difference in pain scores between diathermy and scissors hemorrhoidectomy,[101,111,112] although the oral pain medication requirement was less in the diathermy groups.[101,111] Early reports suggested that laser hemorrhoidectomy was associated with decreased postoperative pain,[102,103] but a randomized trial of the Nd:YAG laser versus cold scalpel excision for closed hemorrhoidectomy did not detect any difference in postoperative pain or analgesic use.[104] In fact, the trial found that laser hemorrhoidectomy was associated with impaired wound healing and higher cost. Four randomized controlled trials evaluating the ultrasonically activated scalpel showed conflicting results with respect to postoperative pain.[105–108] Two small randomized trials suggested a possible minor advantage with a bipolar diathermy device (LigaSure; Valleylab, Boulder, CO), but pain scores themselves did not differ significantly.[109,110]

Other strategies to reduce pain have included limiting the incision,[113] suturing only the vascular pedicle without an incision,[114] using a lateral internal sphincterotomy in conjunction with an external hemorrhoidectomy,[115] administering metronidazole,[116] injecting local anesthetics at the operative site,[117–119] and using drugs such as anal sphincter relaxants,[120] anxiolytics, parasympathomimetics (to avoid urinary retention),[121] and topical nitroglycerin.[122] However, each strategy has had limited or mixed results.

The complications of hemorrhoidectomy are usually minor but occur with significant frequency.[26] These complications include urinary retention (2%–36%),[26,102,104,123–128] bleeding (0.03%–6%),[26,103,104,123,124,126–129] anal stenosis (0%–6%),[82,83,101–103,123,127,129] infection (0.5%–5.5%),[26,104,123,125,128] and incontinence (2%–12%).[82,83,123] Sphincter defects have been documented (by ultrasonography and anal manometry) in up to 12% of patients after hemorrhoidectomy.[89,130–133] The use of excessive retraction with extensive dilation of the anal canal is probably responsible for sphincter injury and incontinence.[87,89,134] Lateral internal sphincterotomy has been suggested as an adjunct to hemorrhoid excision, but randomized studies have not confirmed its usefulness. In fact, these studies have actually shown an increase in incontinence.[89]

Emergency hemorrhoidectomy for incarcerated, gangrenous hemorrhoids can be performed safely, with results comparable to those obtained after elective hemorrhoidectomy.[129] A randomized trial of the Milligan-Morgan hemorrhoidectomy versus incision and rubber band ligation for acute strangulated hemorrhoids showed that both techniques can be performed safely; early recovery was slightly improved after incision and ligation.[48]

In 1998, Longo introduced an alternative approach to conventional hemorrhoidectomy by modifying the circu-

lar stapling device commonly used for low rectal anastomoses.[135] Stapled hemorrhoidectomy (also called, among other names, stapled anopexy, prolapsectomy, or circumferential mucosectomy) removes a ring of redundant rectal mucosa above the anal canal and proximal to the hemorrhoids themselves. The goal is to resuspend the prolapsing hemorrhoidal tissue back within the anal canal as well as to interrupt the arterial inflow that traverses the excised segment. In contrast to conventional hemorrhoidectomy, skin tags and enlarged external hemorrhoids are not removed using the stapled technique.

Eight randomized controlled trials have now studied stapled versus conventional hemorrhoidectomy.[95–100,136,137] All 8 showed decreased pain in the stapled groups, and 6 also showed a more rapid return to normal activities.[95–100] Complication, impaired continence, and recurrence rates were comparable between stapled and conventional groups. The disposable stapler adds cost to the operation, but some of this is recouped by shorter operating times[95–97,99,137] and length of stay[95,97,136] in countries in which patients are routinely hospitalized. A systematic review of stapled hemorrhoidectomy concluded that the procedure was as safe as conventional hemorrhoidectomy and was associated with shorter operating time, convalescence, and postoperative disability. Efficacy of the technique compared with conventional hemorrhoidectomy could not be determined due to a paucity of long-term data.[138]

Despite these promising results, several important caveats regarding stapled hemorrhoidectomy remain. One randomized trial was suspended when 5 of 22 patients developed pain and fecal urgency that persisted for up to 15 months,[139] yet no other group has reported similar findings. Several serious complications have been reported after stapled hemorrhoidectomy, including rectal perforation,[140] retroperitoneal sepsis,[141] and pelvic sepsis.[142,143] The true incidence of such complications remains unknown, but their common denominator may be excision of full-thickness rectal wall rather than mucosa and submucosa only.[144] Smooth muscle fibers have been detected in a variable percentage of stapled hemorrhoidectomy specimens,[96,97,99,100,137] although such fibers have also been detected following conventional hemorrhoidectomy.[96,137] One histologic study suggested that at least some of those fibers were from the internal anal sphincter rather than the more proximal rectal wall.[144] Of potentially more functional consequence, fragmentation of the internal sphincter was noted in 14% of patients who underwent stapled hemorrhoidectomy using the standard 37-mm anal dilator.[145]

Patients with other diseases in addition to hemorrhoids pose special risks. Infection with human immunodeficiency virus does not contraindicate hemorrhoidectomy,[146] but patients who are severely immunocompromised because of acquired immunodeficiency syndrome are at high risk for complications.[147] Crohn's disease of the intestine does not seem to contraindicate hemorrhoidectomy; in a Ferguson Clinic series, only 1 of 17 patients developed anal disease (follow-up, 12 years).[148] However, patients with anorectal Crohn's disease or Crohn's proctitis have a substantial risk of local complications that can be severe enough to require proctectomy.[149]

Conclusions

Hemorrhoids are a common condition with symptoms that include bleeding, protrusion, and itching. Because other conditions can lead to identical symptoms, a directed physical examination, including anoscopy and proctosigmoidoscopy, should be performed. Care depends on the extent of hemorrhoidal disease. First-degree hemorrhoids can be treated with medical management alone or with one of several nonoperative outpatient therapies. Second-degree and relatively small and third-degree hemorrhoids can be treated with nonoperative therapy. Surgery is generally reserved for the minority of patients who have large third-degree or fourth-degree hemorrhoids, acutely incarcerated and thrombosed hemorrhoids, hemorrhoids with an extensive and symptomatic external component, or patients who have undergone less aggressive therapy with poor results.

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The Clinical Practice Committee acknowledges the following individuals whose critiques of this review paper provided valuable guidance to the authors: Jeffrey L. Barnett, M.D., Peter Carne, M.D., Gary R. Lichtenstein, M.D., and John H. Pemberton, M.D. The authors thank Pamela Barnard, M.S.L.S., for literature search assistance, Mary E. Knatterud, Ph.D., for editorial help, and Alexandra A. Broek for help with preparation of the manuscript.