



Home and office treatment of symptomatic hemorrhoids

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INTRODUCTION

Hemorrhoids are collections of submucosal, fibrovascular, arteriovenous sinusoids that are part of the normal anorectum [1]. In epidemiologic studies conducted in Korea, England, and Austria, between 14 and 39 percent of the population had hemorrhoids; however, many were without symptoms [2-4]. Hemorrhoids without any symptoms do not require treatment.

By contrast, an estimated 10 million people in the United States complained of hemorrhoids, corresponding to a prevalence of 4.4 percent [5]. The most common complaint associated with hemorrhoidal disease is painless rectal bleeding during defecation with or without tissue prolapse. Other typical symptoms include anal pruritus or pain and a lump at the anal verge due to thrombosis or strangulation [2]. (See "[Hemorrhoids: Clinical manifestations and diagnosis](#)", section on 'Clinical manifestations'.)

Those presenting for symptomatic hemorrhoids probably represent a group with relatively severe disease. Because a large variety of over-the-counter products are available and marketed for the treatment of hemorrhoids, patients often self-diagnose and self-treat before seeking medical attention. Incidentally, the quality of information about hemorrhoids on the internet is highly variable, and a significant proportion of websites assessed are poorly informed (40 percent in one study [6]).

Several options are available for the treatment of symptomatic hemorrhoids, and most patients with low-grade internal hemorrhoids will have relief with home-based conservative treatment or office-based procedures that are reviewed in this topic. Surgery is indicated for low-grade

hemorrhoids that are refractory to home- or office-based treatments, high-grade hemorrhoids, and complicated hemorrhoids. Surgical treatment of hemorrhoids is reviewed separately. (See ["Surgical treatment of hemorrhoidal disease"](#).)

CLASSIFICATION OF HEMORRHOIDS

Hemorrhoids are classified relative to their relationship to the dentate line ([figure 1](#)):

- **Internal** hemorrhoids are proximal to or above the dentate line. Tissues above the dentate line receive visceral innervation, which is less sensitive to pain and irritation. Thus, internal hemorrhoids are amenable to a variety of office-based procedures that can be carried out with minimal or no anesthesia. Internal hemorrhoids are further subclassified into four grades based on the degree of prolapse from the anal canal ([figure 2](#)).
 - **External** hemorrhoids are distal to or below the dentate line, where tissues are innervated somatically, and therefore are more sensitive to pain and irritation. As a result, symptomatic external hemorrhoids that are refractory to conservative management are generally treated surgically under anesthesia, with the exception of small, acutely thrombosed external hemorrhoids, which can sometimes be treated in the office.
 - **Mixed** internal and external hemorrhoids straddle the dentate line and are generally treated in the same way as are external hemorrhoids.
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TREATMENT APPROACHES BY SYMPTOMS

Patients generally complain of hemorrhoids for one of four symptoms:

Irritation or pruritus — Irritation or pruritus from internal or external hemorrhoids (no bleeding or thrombosis) can be treated with a variety of analgesic creams, [hydrocortisone](#) suppositories, and warm sitz baths ([table 1](#)). These treatments, particularly hydrocortisone, should not be used for longer than one week, since side effects may occur, such as contact dermatitis with analgesic creams or mucosal atrophy with steroid creams [7,8]. If there is no improvement after one week, other nonsteroidal creams can be tried. (See '[Medications for symptomatic relief](#)' below.)

Bleeding hemorrhoids — External hemorrhoids generally do not bleed, unless a patient has spontaneously evacuated a thrombosed hemorrhoid; it is usually self-limited. Treatment of bleeding hemorrhoids is initially conservative, such as with dietary modification or external

creams (see '[Conservative treatment for all patients](#)' below). Persistently bleeding internal hemorrhoids can be treated using office-based procedures (eg, rubber band ligation). For external hemorrhoids, the only alternative is surgery since external hemorrhoids are not amenable to banding. (See '[Office-based procedures for symptomatic hemorrhoids](#)' below.)

Thrombosed hemorrhoids — Thrombosis is usually associated with pain. Organization and resorption of clot occurs within several days following thrombosis of internal or external hemorrhoids, lessening the degree of pain. Conservative treatment of thrombosed hemorrhoids is usually sufficient. Exceptions include those with severe pain and thrombosed external hemorrhoids and the rare case of concomitant thrombosis of external and internal hemorrhoids (sometimes seen after childbirth). It is important to appreciate that thrombosis of grade III and IV internal hemorrhoids usually persists after the conservative therapies outlined above and may require definitive treatment. (See "[Surgical treatment of hemorrhoidal disease](#)", section on '[Thrombosed external hemorrhoids](#)'.)

Prolapsed internal hemorrhoids — Internal hemorrhoids are graded from I to IV ([figure 2](#)). As the grade becomes worse, there is a greater benefit to office-based procedures or surgery. For grade III hemorrhoids, one can first try rubber band ligation, which is often successful after one or two applications (see '[Office-based procedures for symptomatic hemorrhoids](#)' below). If the rubber band ligation is not effective, then surgery is recommended. For grade IV hemorrhoids, surgery is the best treatment. (See "[Surgical treatment of hemorrhoidal disease](#)", section on '[Indications](#)'.)

CONSERVATIVE TREATMENT FOR ALL PATIENTS

The initial treatment approach to most patients with new-onset symptomatic hemorrhoids is conservative, consisting of dietary/lifestyle modification and topical or oral medications to relieve symptoms ([table 1](#)). Conservative treatment is successful for most patients and can be continued for as long as the patient wishes.

Dietary and lifestyle modification — There is strong evidence from multiple randomized trials that increased fiber intake improves symptoms of hemorrhoid bleeding and mild prolapse [9]. The other recommendations for dietary and lifestyle modifications are based on common sense rather than data.

- Patients should ingest 20 to 30 g of insoluble fiber per day ([table 2](#)) and drink plenty of water (1.5 to 2 liters per day). Both are necessary to produce regular, soft stools, which

reduce straining at defecation. It could take six weeks to fully realize the beneficial effect of fiber [10].

Many commercially available fiber supplements are available to reduce constipation. Many contain either [psyllium](#) or [methylcellulose](#). Neither has been shown to have a particular advantage over the other in treating hemorrhoidal disease. For patients who are unwilling to take fiber supplements, a detailed listing of the fiber content of various foods can be helpful ([table 2](#)). Because fiber has other salutary effects, is safe to use, and may help to prevent recurrence, we recommend augmentation of fiber in the diet indefinitely.

Adding fiber to the diet is beneficial for patients with bleeding [9,11]. A 2005 Cochrane meta-analysis of seven trials found that fiber supplementation decreased hemorrhoid bleeding (risk reduction [RR] 0.50, 95% CI 0.28-0.68) and overall symptoms (eg, prolapse, pain, or itch; RR 0.47, 95% CI 0.32-0.68) [9].

In an illustrative study, supplementation with [psyllium](#) for six weeks was associated with improvement in bleeding compared with untreated controls [10]. In a later trial, 50 patients with bleeding internal hemorrhoids were randomly assigned to receive either a commercially available fiber preparation (*Plantago ovata*) or placebo [12]. Endoscopy was performed before and after treatment. After 15 days of treatment, those who had received fiber supplementation had significantly fewer bleeding episodes and a reduction in the number of hemorrhoids seen on endoscopy.

The benefit of fiber for irritation, pruritus, or prolapse is less well established than for bleeding [9]. Fiber supplementation may relieve pruritus related to fecal soilage since the bulking effect of fiber may reduce leakage of liquid stool. In one study, fiber supplementation had no effect on hemorrhoidal prolapse [11].

- Patients should refrain from straining or lingering (eg, reading) on the toilet.
- Patients should have regular physical exercise.
- If possible, patients should avoid medications that can cause constipation ([table 3](#)) or diarrhea ([table 4](#)).
- Patients should also limit their intake of fatty foods and alcohol, which can exacerbate constipation [13]. Although a popular myth, eating spicy food (eg, red hot chili peppers) had no effect on hemorrhoid symptoms such as irritation and pruritus in a controlled study [14].

Medications for symptomatic relief — Numerous medications, many over the counter, are available to treat hemorrhoids. Commonly used medications for hemorrhoids include oral or local analgesics to treat pain, topical agents to reduce local swelling or treat contact dermatitis, therapies to reduce sphincter spasm, and venoactive agents (phlebotonics) to increase venous tone of hemorrhoidal tissues. Each of these may be effective for treating one or more of the symptoms of hemorrhoidal disease (ie, irritation, pruritus, bleeding, thrombosis, pain) ([table 1](#)).

However, data on long-term efficacy or side effects are lacking, with a few exceptions. There is high-quality evidence that phlebotonics (eg, flavonoid, hydroxyethylrutoside, calcium dobesilate) can improve hemorrhoid symptoms such as itch and bleeding. The use of phlebotonics for hemorrhoids is common in Europe and Asia but not North America. Other medical therapies for symptomatic hemorrhoid disease are poorly studied in the medical literature. The choice of these medications is informed more by marketing and patient perception than by actual evidence.

Topical analgesics and steroids — Topical ointments containing anesthetics, steroids, emollients, and antiseptics are often self-prescribed by the patients for quick symptomatic relief. However, there is a lack of strong scientific evidence that supports the use of topical ointments.

Topical analgesics, such as mixed [lidocaine-hydrocortisone](#), are effective for relieving acute pain associated with hemorrhoids. However, topical ointments should not be used for longer than one week, to avoid adverse effects such as contact dermatitis [7,8].

Topical steroids, such as [hydrocortisone](#) cream or suppository, may shrink the hemorrhoids and relieve the associated pruritus but have not been well evaluated for effectiveness in treating thrombosed hemorrhoids. If they are used, some experts suggest applying cream rather than using suppositories. Steroid cream should be applied twice a day for no more than seven days. Long-term use should be avoided because of potential thinning of perianal and anal mucosa and increasing risk of injury. If symptoms are persistent, an alternative nonsteroidal ointment should be used. (See "[Topical corticosteroids: Use and adverse effects](#)".)

Venoactive agents — Phlebotonics are primarily used in Europe and Asia to treat acutely inflamed and bleeding hemorrhoids. Phlebotonics have not been approved by the US Food and Drug Administration for the indication of hemorrhoids.

Phlebotonics are a heterogenous class of drugs consisting of plant extracts (ie, flavonoids such as hydroxyethylrutoside) and synthetic compounds (eg, calcium dobesilate) [15]. Because phlebotonics improve venous tone, microvascular permeability, lymphatic activity, and

microcirculatory nutritive flow [16], they may reduce bleeding associated with hemorrhoids. Some studies have found that hydroxyethylrutoside reduces acute and recurrent hemorrhoidal attacks, including those in pregnant women [17-22]. In one study, phlebotonics were useful in bridging patients with advanced hemorrhoid disease to surgery [23]. However, many of the studies had important methodological limitations [24].

A 2012 Cochrane review of 24 randomized trials showed a significant beneficial effect of phlebotonics for outcomes such as pruritus (odds ratio [OR] 0.23, 95% CI 0.07-0.79), bleeding (OR 0.12, 95% CI 0.04-0.37), and overall symptomatic improvement (OR 15.99, 95% CI 5.97-42.84) but less for pain (OR 0.11, 95% CI 0.01-1.11) [25]. In addition, phlebotonics also alleviated post-hemorrhoidectomy symptoms.

Antispasmodic agents — Several types of agents (nitric oxide donors) can be useful for reducing anal sphincter spasm. A small series suggested that topical 0.5% [nitroglycerin](#) ointment may provide temporary analgesia by reducing internal anal sphincter spasm [26]. This dose may be associated with side effects such as headache. A lower dose of nitroglycerin has been used in patients with anal fissures [27]. (See "[Anal fissure: Medical management](#)", section on '[Topical vasodilators](#)'.)

In one report, [nitroglycerin](#) (glyceryl trinitrate) ointment (0.2%, Rectogesic) was effective in controlling bleeding, pain, itch, irritation, and difficulty in defecation [28]. [Isosorbide dinitrate](#) ointment was also used to treat symptomatic hemorrhoids with good results in a small study [29]. A small controlled trial suggested a benefit of topical [nifedipine](#) [30]. Another small trial found that a single intrasphincteric injection of botulinum toxin significantly reduced pain intensity within 24 hours [31].

Sitz baths — Sitz baths are an intuitive topical treatment for acute flare-ups of hemorrhoids to reduce inflammation and edema and relax the sphincter muscles. Patients with significant hemorrhoid disease tend to have elevated sphincter tone. Manometric studies have confirmed that application of moist heat to the perianal area can lower the internal sphincter and anal canal pressures [32]. Sitz baths can relieve irritation and pruritus as well as spasm of the anal sphincter muscles. They should be used with warm, rather than cold, water two to three times per day [33]. A commercially available portable bowl allows for use at the workplace.

REASONS TO REFER TO A SPECIALIST

Hemorrhoids are a common problem that is generally diagnosed and treated by general practitioners. Most patients with low-grade (I or II) internal hemorrhoids respond favorably to

conservative treatment. Such patients do not require any further treatment. Reasons to refer patients to a specialist include refractory or complicated hemorrhoids for possible intervention and rectal bleeding for possible colonoscopy.

Refer for procedure — Patients should be referred to a colorectal or general surgeon for:

- Symptomatic low-grade (I or II) internal hemorrhoids refractory to six to eight weeks of medical treatment.
- Symptomatic high-grade (III or IV) internal hemorrhoids.
- Thrombosed hemorrhoids, with the exception of subacute (older than three days) thrombosed external hemorrhoids, which can be managed expectantly with resolution of symptoms expected in 7 to 10 days.

The specific indications and technical aspects of office-based procedures and surgical hemorrhoidectomy are discussed in detail elsewhere. (See '[Office-based procedures for symptomatic hemorrhoids](#)' below and '[Surgical treatment of hemorrhoidal disease](#)'.)

Refer for colonoscopy — For patients who present with rectal bleeding, colonoscopy is generally recommended for those ≥ 40 years to exclude more serious underlying disease (eg, malignancy). For patients younger than 40 who have no risk factors for colonic disease and no evidence of other anorectal abnormalities, hemorrhoid treatment can be administered without further endoscopy or imaging studies. Persistent bleeding after successful local treatment of hemorrhoids should prompt referral for colonoscopy in those patients [1].

Patients with hemorrhoids and one of the following conditions should be referred for colonoscopy regardless of age [1]:

- Anemia
- Bleeding that is atypical of hemorrhoids
- A concomitant change in bowel patterns
- A personal history of colorectal polyps
- A family history of inflammatory bowel disease or colorectal cancer in a first-degree relative
- Other suspected pathologic pelvic changes that could contribute to the patient's symptoms

OFFICE-BASED PROCEDURES FOR SYMPTOMATIC HEMORRHOIDS

Office-based procedures are typically offered to patients who have symptomatic internal hemorrhoids that are refractory to conservative medical treatments. The common objective of these therapies is to cause sloughing of excess hemorrhoidal tissue; healing and scarring then fixes the residual tissue to the underlying anorectal muscular ring. In a 2005 Cochrane review of three randomized trials, surgical hemorrhoidectomy was associated with more pain (relative risk 1.94, 95% CI 1.62-2.33) and complications (relative risk 6.32, 95% CI 1.15-34.89) than rubber band ligation [34].

For patients with symptomatic grade I, II, or III internal hemorrhoids refractory to conservative treatment, we recommend an office-based procedure, rather than surgical hemorrhoidectomy, as the initial intervention ([figure 2](#)). Although some surgeons feel that grade III internal hemorrhoids, especially those with multiple pedicles, should be treated surgically, we recommend attempting rubber band ligation at least once. The recovery after rubber band ligation is vastly easier than after hemorrhoidectomy. If rubber band ligation fails to control symptoms adequately, surgery can then be offered.

Patients with internal hemorrhoids of any grade **and** additional anorectal problems, external hemorrhoids, or mixed internal/external hemorrhoids should proceed directly to surgery as those conditions are not amenable to office-based treatments.

Choice of office-based technique — Commonly performed office-based procedures include rubber band ligation, sclerotherapy, infrared coagulation of internal hemorrhoids, and excision of thrombosed external hemorrhoids [35-37]. The choice first depends on local availability. When local expertise is available for more than one procedure, we suggest the following [1,11,38]:

- For healthy patients with grade I, II, or III internal hemorrhoids, we recommend rubber band ligation rather than another procedure. Compared with sclerotherapy or infrared coagulation, rubber band ligation is more effective and requires fewer treatment sessions [39,40]. (See '[Rubber band ligation](#)' below.)
- For patients who are on anticoagulant or antiplatelet drugs, are immunocompromised, or have portal hypertension, we suggest sclerotherapy rather than another procedure. In such patients, rubber band ligation is contraindicated due to the high risk of delayed bleeding, and sclerotherapy is better studied than infrared coagulation in the literature for this group of patients [2]. (See '[Sclerotherapy](#)' below.)
- Acutely thrombosed external hemorrhoids can be treated by office-based excision if the patient presents within the first three days of symptoms. The symptoms usually begin to subside after three days and typically dissipate in 7 to 10 days. Extensive or bleeding

thrombosed external hemorrhoids may require surgical excision in the operating room. (See ["Surgical treatment of hemorrhoidal disease", section on 'Thrombosed external hemorrhoids'](#).)

- Grade IV internal hemorrhoids require definitive surgical treatment. Office-based procedures are ineffective and should not be attempted.
- Patients should be informed before the procedure that office-based procedures do not address any external component (eg, skin tag) of the hemorrhoid.

Techniques

Rubber band ligation — Rubber band ligation is the most commonly used technique for the treatment of symptomatic bleeding internal hemorrhoids. This technique is effective, inexpensive, and easy to perform and only rarely causes serious complications.

Patients with grade II or III internal hemorrhoids are the best candidates for rubber band ligation. External tags and external hemorrhoids are **not** to be treated with this technique, as it would cause excruciating pain. Banding procedures are typically contraindicated in patients with coagulopathies and those on anticoagulation (eg, [warfarin](#), [apixaban](#) [Eliquis], [dabigatran](#) [Pradaxa], [rivaroxaban](#) [Xarelto]) or antiplatelet (eg, [clopidogrel](#) [Plavix]) medications, and patients with cirrhosis and portal hypertension, because of the risk of significant delayed hemorrhage [41]. In the authors' experience, patients on [aspirin](#) therapy can safely undergo rubber band ligation, with a low risk of bleeding. Banding is relatively contraindicated in immunocompromised patients (eg, chemotherapy administration, HIV/AIDS) because of risks of infection and sepsis [42]. (See ["Choice of office-based technique"](#) above and ["Immunocompromised patients"](#) below.)

When performed properly, this procedure does not require any anesthesia (local or intravenous). Usually, only one hemorrhoidal column should be treated at a time to minimize excessive tissue necrosis. However, if the patient tolerates the procedure with only minimal discomfort, then several hemorrhoids can be banded during the same session. As many as three bands in a single column may be safely performed [43]. If multiple sessions are needed, then repeat banding procedures can be performed in three- to four-week intervals to allow any swelling and ulcerations to subside. Many patients complain of anal or rectal "tightness" after the procedure.

Patients are placed in the semi-inverted jackknife or left lateral position. The procedure is performed through the anoscope, and small rubber band rings are placed onto the internal hemorrhoids traditionally using a forceps, but other methods have been developed ([figure 3](#)

and [picture 1](#)). When a forceps ligator is used to apply the bands, an assistant is required to stabilize the anoscope. Once the involved hemorrhoid is identified through an anoscope, the rubber ring ligating drum with two rubber rings is placed into the anal canal. The largest internal hemorrhoid should be treated first. The internal hemorrhoid is grasped with forceps, and the excess tissue is pulled toward the tip or drum of the handheld ligator gun apparatus while the trigger causes the release of the rubber band. The rubber rings are then advanced down to the neck of the hemorrhoid. The key technical point is to ensure the bands are placed at least 5 mm above the dentate line to avoid placement onto somatically innervated tissue. Severe pain will result from misapplication of the band below the dentate line or from associated spasm. Thus, prior to rubber band release, the patient should be questioned about the presence of pain, which may indicate the need to select a point more proximal in the anal canal. If a patient experiences intense or excruciating pain as the rubber band is placed, then the band should be removed immediately by cutting the rubber band.

Other application techniques have been described. Each uses the same principles as the traditional forceps approach described above.

- Endoscopic suction ligator – An alternative technique involves suction of the symptomatic hemorrhoid into the ligating drum, which is attached to an endoscope [\[44-46\]](#). The ring is deployed through a trigger passed through the biopsy channel of the endoscope. This approach may allow for adequate ligation with fewer treatment sessions [\[47\]](#). A single-handed nonendoscopic ligating device has also been used successfully and is less expensive than the endoscopic device [\[48\]](#).
- Wall suction ligator – Another technique uses a vacuum suction band ligator [\[49\]](#). The application of the rubber band using wall suction can be performed in fewer sessions compared with the standard forceps technique (1.2 versus 2 sessions). The principles are the same, but the rubber band ligator is attached to wall suction. The operator places the drum with the rubber band against the hemorrhoid. Suction pulls the hemorrhoid into the drum, and the rubber band is deployed. The technical advantage is that the operator can hold the ligator and apply the band with one hand and hold the anoscope with the other unassisted.

Successful ligation results in thrombosis of the hemorrhoid and the development of localized submucosal scarring. The banded hemorrhoidal tissues immediately become ischemic and then necrotic in the next three to five days, forming an ulcerated tissue bed. Complete healing occurs several weeks later.

One of the largest series to describe long-term outcomes of rubber band ligation included 805 patients who underwent 2114 ligations (median of two ligations in each patient) [50]. Excluding 104 patients who were lost to follow-up, treatment was considered successful in 71 percent (80 percent when considering patients who underwent repeated treatment after initial failure). Success rates were similar for all degrees of hemorrhoids. A higher failure rate was observed in patients who required placement of four or more bands.

In a meta-analysis of 12 trials, bleeding stopped after rubber band ligation in up to 90 percent of patients; 78 to 84 percent of those with grade III (prolapsing) hemorrhoids reported symptomatic improvement, and only 50 percent of patients with grade IV hemorrhoids had improvement. The most common complications are bleeding and pain (8 to 80 percent) [51]. However, the success rate often decreases with longer follow-up (eg, 40 to 50 percent at one year [52]).

In a meta-analysis of 18 trials, rubber band ligation was more effective than injection sclerotherapy or infrared coagulation for the treatment of grade I, II, and III hemorrhoids, requiring fewer treatment sessions [39,40]. The risk of complications and pain tended to be greater for rubber band ligation compared with other techniques. Compared with surgery, rubber band ligation had more recurrent symptoms but was associated with fewer complications and pain.

Following rubber band ligation, the most frequent complication is pain, which occurs in approximately 8 percent [43,50,53-55]. Other complications include [56]:

- Delayed hemorrhage – Delayed hemorrhage can occur when the rubber band dislodges, typically two to four days after application or with ulceration and mucosal sloughing, which can occur five to seven days after the procedure. Bleeding can be significant in patients with coagulation abnormalities.
- Hemorrhoidal thrombosis – Hemorrhoids distal to the treated hemorrhoid can thrombose, leading to pain or a palpable mass. (See '[Thrombosed hemorrhoids](#)' above.)
- Localized infection – Localized infection or abscess can occur at the site of band ligation. Persistent pain, fever, or foul-smelling rectal drainage may signal the onset of infection. Surgical drainage may be required. (See '[Perianal and perirectal abscess](#)'.)
- Sepsis – Fulminant sepsis after hemorrhoid ligation is rare but has been reported [53,54]. (See '[Postprocedure care and follow-up](#)' below.)
- Urinary retention.

Sclerotherapy — Injectable sclerosant solutions can also be used to treat symptomatic internal hemorrhoids. The most common solution used is phenol (5%) in vegetable oil, although other sclerosants such as [polidocanol](#) foam [57], [sodium morrhuate](#), [quinine](#), urea hydrochloride, [sodium tetradecyl sulfate](#) (Sotradecol), and hypertonic [saline](#) have all been used. The sclerosant causes an intense inflammatory reaction, destroying redundant submucosal tissue associated with hemorrhoidal prolapse.

As with rubber band ligation, sclerotherapy does not require anesthesia (local or intravenous). Patients are placed in the semi-inverted jackknife or left lateral position, and the procedure is performed through the anoscope. The internal hemorrhoids targeted for treatment are located and injected with 1 to 3 cc of the sclerosant material into the submucosa plane using a long intravenous 21-gauge needle or a spinal needle. A wheal should be raised with the solution. If the injection is too superficial, the area will become tense and blanched, and the injection should stop immediately to minimize risk of mucosal necrosis.

This approach can be used to treat grade I and II bleeding internal hemorrhoids with reported success rates of 75 to 89 percent [58,59], which has more recurrences than rubber band ligation [40]. In a meta-analysis of five trials, sclerotherapy resolved 90 to 100 percent of grade II hemorrhoids; 36 to 49 percent of patients reported postprocedural pain. Bleeding is rare after sclerotherapy [51].

Thus, sclerotherapy is especially beneficial to patients with an elevated bleeding risk (eg, those on anticoagulant or antiplatelet drugs and those with portal hypertension) due to a lack of eschar formation and patients who are immunocompromised due to a lower risk of anorectal sepsis compared with rubber band ligation or hemorrhoidectomy [60]. (See '[Choice of office-based technique](#)' above.)

Complications of sclerotherapy are also uncommon, with the most frequent being minor discomfort or bleeding with the injection. Rectourethral fistulas, rectal perforations, and necrotizing fasciitis are rare complications but can occur with misplaced injections into nonhemorrhoidal tissues or with systemic injections into the vasculature [61-63].

Infrared coagulation — Infrared coagulation involves the direct application of infrared light waves to the hemorrhoidal tissues. Patients with grade I or II bleeding internal hemorrhoids are candidates for this procedure.

Infrared coagulation is sometimes erroneously referred to as laser therapy. Infrared light waves are converted into heat, which results in protein necrosis within the hemorrhoid. This is seen as a white, blanching effect to the mucosa approximately 3 mm wide by 3 mm deep. Over a period

of one to two weeks, the white, discolored mucosa changes into a dark scab and eventually leads to a puckered or ablated area, causing retraction of the redundant hemorrhoid mucosa.

The patient is positioned in the semi-inverted jackknife or left lateral position, and anoscopy is performed. The tip of the infrared coagulation applicator or probe is applied to the base of the internal hemorrhoid for two seconds, with three to five applications per hemorrhoid.

In a meta-analysis of four trials, 78, 51 and 22 percent of patients with grade I, II and III hemorrhoids reported improvement after infrared coagulation therapy [51]. Postoperative pain and bleeding occurred in 15 to 100 percent and 15 to 44 percent of patients, respectively. The recurrence rate was 13 percent at three months.

Compared with rubber band ligation, infrared coagulation is associated with more recurrences but fewer complications and causes less discomfort immediately after the procedure [36].

Others — Other techniques involve the application of monopolar cautery (electrotherapy), bipolar diathermy (Bicap, HET bipolar system), laser photocoagulation, or cryosurgery to cause coagulation and necrosis, which leads to fibrosis in the submucosal layer. They are generally effective for grade I to II internal hemorrhoids, and each has its advocates [64-66].

- Electrotherapy uses a probe to deliver an electric current to the base of the hemorrhoid above the dentate line to cause the hemorrhoid to shrink. It has been used to treat grade I to III internal hemorrhoids. A low-amplitude direct electric current setting (between 8 and 16 mA) can be used in an outpatient setting but often requires repeat procedures; the use of higher amplitudes (up to 30 mA) requires anesthesia [67].
- The HET bipolar system uses bipolar energy to treat symptomatic grade I and II internal hemorrhoids refractory to medical therapy [68]. Limited data have shown it to be safe, effective, and painless [69], and it may be an alternative to rubber band ligation for large internal hemorrhoids and those close to the dentate line.
- Hemorrhoidectomy using the neodymium-doped yttrium aluminium garnet (Nd:YAG) or carbon dioxide laser has been described [70-72]. However, these approaches do not appear to offer a significant advantage to other approaches, and the required equipment is expensive. Furthermore, serious complications have been described [73]. (See "[Basic principles of medical lasers](#)".)
- Cryosurgery is the application of special probes cooled with liquid nitrogen, which causes freezing, necrosis, and subsequent fixation of the hemorrhoidal cushion. Cryosurgery may be associated with a higher rate of complication and less patient satisfaction [74].

Postprocedure care and follow-up — Following office-based procedures, patients are instructed to avoid constipation by using stool softeners and consuming a diet high in fiber and water. If the patient experiences anal or rectal pain or discomfort, warm sitz baths and oral pain medication are advised. The postprocedure instructions are similar to those given following surgical hemorrhoidectomy. (See ["Surgical treatment of hemorrhoidal disease", section on 'Postoperative care and follow-up'](#).)

A rare but life-threatening complication with all office-based procedures is perineal sepsis, which is usually heralded by a triad of severe pain, urinary retention, and fever. Any patient with these symptoms should have follow-up immediately for further evaluation [75].

The prevalence of rectal pathology among patients who present with symptomatic hemorrhoid disease is unknown. Following resolution of symptoms, it is reasonable to suggest a sigmoidoscopy if this has not been previously performed. A colonoscopy can be considered in patients with risk factors for colorectal cancer or in those older than 50 years of age, in whom it serves the added purpose of screening for colorectal cancer. (See ['Refer for colonoscopy'](#) above.)

SPECIAL PATIENT POPULATIONS

Pregnant patients — The prevalence of symptomatic hemorrhoidal disease is 25 to 35 percent during pregnancy, and it is particularly frequent in the last trimester of pregnancy and immediately postpartum [76]. Symptoms range from mild (eg, pruritus, discomfort) to severe (eg, intractable bleeding). Since symptoms generally improve after delivery, treatment during pregnancy is primarily conservative with emphasis on dietary and lifestyle modification, lying on the left side, and the use of mild laxatives and stool softeners to avoid constipation. Topical medications and oral phlebotonics should be used with caution in pregnant patients because data on long-term efficacy and safety are lacking. Surgical treatment (eg, hemorrhoidectomy) is rarely required and is only performed for strangulated or extensively thrombosed hemorrhoids or for intractable bleeding [2].

Immunocompromised patients — Hemorrhoids in immunocompromised hosts should in general be managed conservatively because of the risk of sepsis and poor wound healing associated with any anorectal procedures [77]. If absolutely necessary, sclerotherapy is a safer option for bleeding hemorrhoids in this cohort of patients than either rubber band ligation or hemorrhoidectomy [42,60].

Patients on anticoagulant or antiplatelet drugs — Patients taking anticoagulants (eg, [warfarin](#)) or antiplatelet agents (eg, Plavix) often present with bleeding hemorrhoids. The bleeding episodes, however, are usually self-limited and do not require cessation or reversal of the medications. Most patients with low-grade hemorrhoids (I or II) respond to conservative management. For the rare patients who have persistent bleeding, sclerotherapy can be used. Rubber band ligation is contraindicated in patients who are on anticoagulant or antiplatelet medications because of a risk of catastrophic rectal bleeding after the eschar lifts off. If rubber band ligation or hemorrhoidectomy is required for high-grade or complicated hemorrhoids, these medications need to be stopped for five to seven days before the procedure [2].

Patients with portal hypertension — Patients with portal hypertension, most commonly as a result of liver cirrhosis, often have rectal bleeding. The clinician needs to distinguish between rectal variceal bleeding and hemorrhoidal bleeding. The former is treated with suture ligation, transjugular intrahepatic portosystemic shunt, or medications to control portal hypertension. (See "[Methods to achieve hemostasis in patients with acute variceal hemorrhage](#)", section on 'Management of ectopic varices'.)

Hemorrhoidal bleeding in patients with portal hypertension is first treated conservatively. Patients who fail conservative management are usually treated with sclerotherapy. Rubber band ligation is contraindicated, again because of the risk for delayed bleeding. Patients who fail sclerotherapy require either suture ligation of the bleeding hemorrhoid or surgical hemorrhoidectomy [2].

Patient with inflammatory bowel disease — Historically, hemorrhoid surgery in patients with inflammatory bowel disease reportedly led to significant complications such as sepsis, stenosis, fistulas, fecal incontinence, nonhealing wounds, and even need for proctectomy. The complication rates were also substantially higher with Crohn disease than with ulcerative colitis.

Thus, most patients with inflammatory bowel disease who develop symptomatic hemorrhoids are managed conservatively with a high-fiber diet, oral hydration, warm sitz bath, and oral phlebotonics. Select patients with symptoms refractory to best medical therapy may be offered surgical treatment if their inflammatory bowel disease is under control, and such patients should be counselled regarding the high-risk nature of any intervention.

The optimal surgical treatment for this patient population is not known; most reports were based on small retrospective studies conducted many years ago [78]. However, surgeons often prefer conventional techniques such as hemorrhoidectomy, or minimally invasive techniques such as rubber band ligation or hemorrhoidal artery ligation, to hemorrhoidopexy due to the life-threatening complications associated with the latter [75].

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See ["Society guideline links: Hemorrhoids"](#).)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see ["Patient education: Hemorrhoids \(The Basics\)"](#))
 - Beyond the Basics topics (see ["Patient education: Hemorrhoids \(Beyond the Basics\)"](#))
-

SUMMARY AND RECOMMENDATIONS

- **Initial lifestyle modification for all symptomatic hemorrhoids** – For all patients with symptomatic hemorrhoids, we recommend initial conservative treatment with dietary management consisting of adequate fluid and fiber intake (**Grade 1B**). (See '[Conservative treatment for all patients](#)' above.)
- **Definitive management for grade I, II, or III internal hemorrhoids** – Most patients with low-grade (I or II) internal hemorrhoids respond favorably to conservative treatment and do not require any further treatment. Reasons to refer patients to a specialist include refractory or complicated hemorrhoids for possible intervention and rectal bleeding for possible colonoscopy. (See '[Reasons to refer to a specialist](#)' above.)

- **Patients refractory to initial lifestyle modification** – For patients with grade I, II, or III internal hemorrhoids refractory to conservative treatment, we recommend an office-based procedure, rather than surgical hemorrhoidectomy, as the initial intervention (**Grade 1B**). Compared with surgical treatment of hemorrhoids, most office-based procedures cause less pain and fewer complications. (See '[Rubber band ligation](#)' above.)

Commonly performed office-based procedures include rubber band ligation, sclerotherapy, and infrared coagulation of internal hemorrhoids.

- For healthy patients with grade I, II, or III internal hemorrhoids, we recommend rubber band ligation rather than another office-based procedure (**Grade 1B**). Compared with sclerotherapy or infrared coagulation, rubber band ligation is more effective and requires fewer treatment sessions.
- Rubber band ligation is contraindicated in patients who are on anticoagulant or antiplatelet drugs, are immunocompromised, or have portal hypertension. In these patients, we suggest sclerotherapy rather than infrared coagulation (**Grade 2C**). Sclerotherapy is better studied in these patients. (See '[Sclerotherapy](#)' above.)

- **Definitive management for grade IV internal hemorrhoids** – Patients with grade IV internal hemorrhoids, those with combined internal and external hemorrhoids and significant prolapse, and those with another indication for anorectal surgery should be offered surgical hemorrhoidectomy if they fail conservative treatment. (See "[Surgical treatment of hemorrhoidal disease](#)".)
- **Definitive management for external hemorrhoids** – Acutely thrombosed external hemorrhoids can be treated by office-based excision if the patient presents within the first three days of symptoms. The symptoms usually begin to subside after three days and typically dissipate in 7 to 10 days. Extensive or bleeding thrombosed external hemorrhoids may require surgical excision in the operating room. (See "[Surgical treatment of hemorrhoidal disease](#)", section on '[Thrombosed external hemorrhoids](#)'.)

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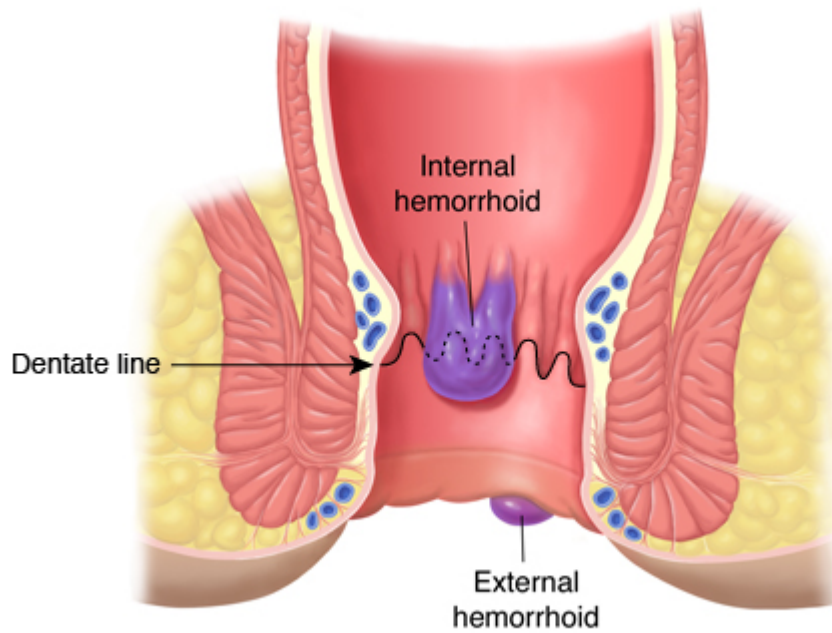
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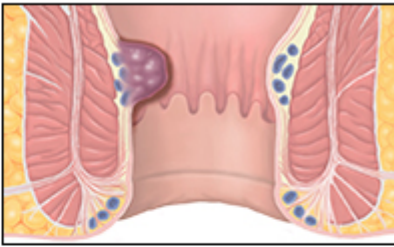
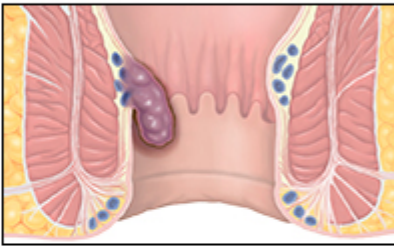
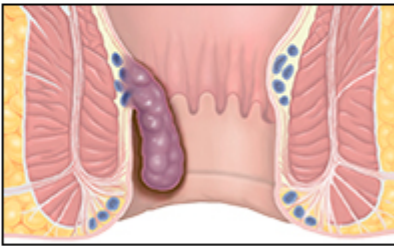
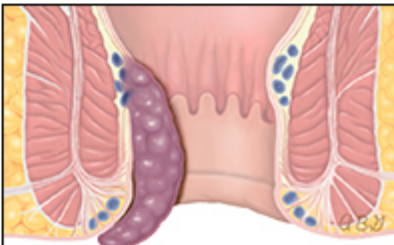
GRAPHICS

Hemorrhoids



The dentate line divides the anal canal into two parts. Internal hemorrhoids originate from above the dentate line; external hemorrhoids originate from below the dentate line.

Grades of internal hemorrhoids^[1,2]

Grade	Symptoms	Exam	Treatment	Illustration
1	Painless bleeding	Hemorrhoid with vascular engorgement bulging into anal canal without prolapse	First-line: Medical Second-line: Office procedures (eg, RBL)	
2	Painless bleeding, perianal itching	Hemorrhoid prolapses with straining but reduces spontaneously	First-line: Medical Second-line: Office procedures (eg, RBL)	
3	Painless bleeding, perianal itching, swelling, staining or soilage with mucus/feces	Hemorrhoid prolapses beyond the dentate line with straining and is only reducible by manual pressure	First-line: Medical Second-line: Office procedures (eg, RBL)	
4	Pain, bleeding, swelling, soilage with mucus/feces	Grossly evident prolapse of hemorrhoid tissue that is non-reducible; chronic inflammatory changes (mucosal atrophy, friability, maceration, and ulceration)	Surgical excision	

Refer to UpToDate topics on details of treatment options for internal hemorrhoids.

RBL: rubber band ligation.

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Medications for treatment of symptomatic hemorrhoids in nonpregnant adults*

Drug	Dose	Role and precautions
Treatment		
Anesthetics, local		
Dibucaine 1% rectal ointment	Sparingly as needed up to four times per day	<ul style="list-style-type: none">▪ Temporary relief of acute pain and pruritus.▪ Intended for short-term, intermittent use.▪ For external use only. Local burning is common.▪ Systemic absorption is variable.
Pramoxine 1% rectal foam	As needed up to five times per day	
Astringent and protectants, topical		
Witch hazel pads	As needed up to six times per day or after each bowel movement	<ul style="list-style-type: none">▪ Provides temporary relief of pruritus and irritation.▪ Witch hazel may dry secretions and tighten tissues▪ Zinc oxide has protectant, astringent, and antiseptic properties.▪ Well tolerated; rare allergy.
Zinc oxide topical paste	As needed	
Corticosteroids, topical		
Hydrocortisone rectal cream 1 to 2.5%	Rectal cream: Apply sparingly as needed up to two times per day	<ul style="list-style-type: none">▪ Provides local anti-inflammatory and analgesic effect.▪ For intermittent short-term use (ie, no more than 7 days) due to risk of mucosal thinning.▪ Avoid in persons with local infection.▪ Variable systemic absorption; caution in pregnancy.
Hydrocortisone rectal suppository 25 to 30 mg	Suppository: 1 suppository per rectum as needed up to two times per day	
Vasoactive agents, topical		
Nitroglycerin (glyceryl trinitrate) 0.2 to 0.5%	Apply pea-sized amount two times per day	<ul style="list-style-type: none">▪ Potential option for managing pain associated with anal

ointment*		<p>sphincter spasm or thrombosed external hemorrhoids.</p> <ul style="list-style-type: none"> Systemic adverse effects (eg, headache) are common.
Phenylephrine 0.25% rectal ointment or suppository (eg, Preparation-H)	<p>Ointment: Apply as needed up to four times per day</p> <p>Suppository: 1 suppository per rectum as needed up to four times per day</p>	<ul style="list-style-type: none"> Frequent choice for temporary relief of acute symptoms (ie, bleeding or pain on defecation). Well tolerated; rare systemic effects. Ointment may be applied externally or inserted per rectum using applicator.

Combination anesthetic and corticosteroid, topical

<p>Lidocaine and hydrocortisone cream (eg, lidocaine-hydrocortisone 2%-2%, 3%-0.5%, and 3%-1%)[¶]</p> <p>Lidocaine and hydrocortisone gel (eg, lidocaine-hydrocortisone 2.8%-0.55% and 3%-2.5%)[¶]</p>	<p>Cream or gel: Apply as needed up to two times per day</p>	<ul style="list-style-type: none"> Temporary relief of acute pain and pruritus; local anti-inflammatory effect. For intermittent short-term use (ie, no more than 7 days) due to risk of mucosal thinning and contact dermatitis. May be applied externally or inserted per rectum using applicator. Avoid in persons with local infection. Variable systemic absorption; caution in pregnancy.
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Prevention

Bulk-forming laxatives (ie, fiber supplements), oral^Δ

Methylcellulose	<p>Initially 1 tablespoon (≈2 grams fiber) or 4 caplets (500 mg fiber per caplet) once per day; may increase to 1 tablespoon or 4 caplets three times per day</p>	<ul style="list-style-type: none"> Reduces bleeding and possibly symptoms in nonprolapsing hemorrhoids; gradual onset of effect over 6 weeks or more.
Polycarbophil	<p>Initially 1 to 2 tablets (500 mg fiber per tablet) per day; may increase to 2 to 4 tablets per day</p>	<ul style="list-style-type: none"> Useful in patients with inadequate dietary fiber intake who may be at risk for constipation or diarrhea.

Psyllium	Initially 1 tablespoon (≈3.5 grams fiber) once per day; may increase to 1 tablespoon three times per day	<ul style="list-style-type: none"> ▪ Adequate oral fluid intake required; administer with 180 to 360 mL (6 to 12 ounces) water or fruit juice.
Wheat dextrin	Initially 1 caplet (1 gram fiber) or 1 teaspoonful (1.5 grams fiber) per day; may increase to 3 caplets or 2 teaspoonfuls three times per day	<ul style="list-style-type: none"> ▪ Gradually increase dose as needed to minimize gas and bloating. ▪ Do not administer within 1 hour of other medications.
Stool softeners, oral		
Docusate sodium	100 mg orally two times per day	<ul style="list-style-type: none"> ▪ Decreases straining. ▪ Well tolerated. Use lower dose if administered with another laxative.

- Medical therapy for internal hemorrhoids may be useful for controlling symptoms in lower-grade disease and acute bleeding in higher-grade hemorrhoids pending definitive therapy (eg, banding, sclerotherapy, cryotherapy, or surgery).
- Before applying topical preparations, the affected area should be gently cleansed and allowed to dry.
- A large number of topical preparations are available in addition to those listed in the table; evidence of efficacy for most is lacking.
- Medications in this table are available without a prescription (over the counter) in the United States, except where noted.

* Nitroglycerin 0.4% rectal ointment is available as a prescription product in the United States and other countries and has been studied for anal fissure. Other strengths of nitroglycerin ointment shown in the table are not commercially available products in the United States.

¶ Available only as a prescription product in the United States.

Δ A high-fiber diet and increased fluid intake is recommended in most patients with hemorrhoidal disease to soften stools and prevent the need for straining. Patients should also be counseled to avoid prolonged sitting or straining on the toilet, on improving anal hygiene, and on avoiding triggers for constipation or diarrhea. Recommendations on dietary fiber intake are provided elsewhere in UpToDate.

Prepared with data from:

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Dietary fiber content of frequently consumed foods

Food	Fiber, g/serving
Fruits	
Apple (with skin)	3.5/1 medium-sized apple
Apricot (fresh)	1.8/3 apricots
Banana	2.5/1 banana
Cantaloupe	2.7/half edible portion
Dates	13.5/1 cup (chopped)
Grapefruit	1.6/half edible portion
Grapes	2.6/10 grapes
Oranges	2.6/1 orange
Peach (with skin)	2.1/1 peach
Pear (with skin)	4.6/1 pear
Pineapple	2.2/1 cup (diced)
Prunes	11.9/11 dried prunes
Raisins	2.2/packet
Strawberries	3.0/1 cup
Juices	
Apple	0.74/1 cup
Grapefruit	1.0/1 cup
Grape	1.3/1 cup
Orange	1.0/1 cup
Vegetables	
Cooked	
Asparagus	1.5/7 spears
Beans, string, green	3.4/1 cup
Broccoli	5.0/1 stalk
Brussels sprouts	4.6/7-8 sprouts
Cabbage	2.9/1 cup (cooked)
Carrots	4.6/1 cup

Cauliflower	2.1/1 cup
Peas	7.2/1 cup (cooked)
Potato (with skin)	2.3/1 boiled
Spinach	4.1/1 cup (raw)
Squash, summer	3.4/1 cup (cooked, diced)
Sweet potatoes	2.7/1 baked
Zucchini	4.2/1 cup (cooked, diced)
Raw	
Cucumber	0.2/6-8 slices with skin
Lettuce	2.0/1 wedge iceberg
Mushrooms	0.8/half cup (sliced)
Onions	1.3/1 cup
Peppers, green	1.0/1 pod
Tomato	1.8/1 tomato
Spinach	8.0/1 cup (chopped)
Legumes	
Baked beans	18.6/1 cup
Dried peas	4.7/half cup (cooked)
Kidney beans	7.4/half cup (cooked)
Lima beans	2.6/half cup (cooked)
Lentils	1.9/half cup (cooked)
Breads, pastas, and flours	
Bagels	1.1/half bagel
Bran muffins	6.3/muffin
Cracked wheat	4.1/slice
Oatmeal	5.3/1 cup
Pumpernickel bread	1.0/slice
White bread	0.55/slice
Whole-wheat bread	1.66/slice
Pasta and rice cooked	
Macaroni	1.0/1 cup (cooked)
Rice, brown	2.4/1 cup (cooked)

Rice, polished	0.6/1 cup (cooked)
Spaghetti (regular)	1.0/1 cup (cooked)
Flours and grains	
Bran, oat	8.3/oz
Bran, wheat	12.4/oz
Rolled oats	13.7/1 cup (cooked)
Nuts	
Almonds	3.6/half cup (slivered)
Peanuts	11.7/1 cup

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Drugs associated with constipation

Analgesics
Anticholinergics
Antihistamines
Antispasmodics
Antidepressants
Antipsychotics
Cation-containing agents
Iron supplements
Aluminum (antacids, sucralfate)
Barium
Neurally active agents
Opiates
Antihypertensives
Ganglionic blockers
Vinca alkaloids
Calcium channel blockers
5HT3 antagonists

Medications associated with diarrhea

System targeted by drug	Type of agent	Examples
Cardiovascular	Antiarrhythmics	Digoxin Procainamide Quinidine
	Antihypertensives	ACE inhibitors Angiotensin II receptor blockers* Beta blockers Hydralazine Methyldopa
	Cholesterol-lowering agents	Clofibrate Gemfibrozil Statins
	Diuretics	Acetazolamide Ethacrynic acid Furosemide
Central nervous system	Antianxiety drugs	Alprazolam Meprobamate
	Antiparkinsonian drugs	Levodopa
	Other agents	Anticholinergic agents Fluoxetine Lithium Tacrine
Endocrine	Oral hypoglycemic agents	Metformin
	Thyroid replacement therapy	Synthroid
Gastrointestinal	Antiulcer/antacid drugs	H2RAs Magnesium-containing antacids Misoprostol Proton pump inhibitors
	Bile acids	Chenodeoxycholic acid Ursodeoxycholic acid
	Laxatives	Cathartics Lactulose Sorbitol

	Treatments for inflammatory bowel disease	5-aminosalicylates (particularly olsalazine)
Musculoskeletal	Gold salts	Auranofin
	Nonsteroidal antiinflammatory drugs	Ibuprofen Mefenamic acid Naproxen Phenylbutazone
	Treatments for periodic fever syndrome or gout	Colchicine
Other	Antibiotics [¶]	Amoxicillin Ampicillin Cephalosporins Clindamycin Neomycin Tetracycline
	Antineoplastic agents	Many
	Dietary	Alcohol Sugar substitutes (eg, sorbitol)
	Vitamins	Magnesium Vitamin C

ACE: angiotensin-converting enzyme; H2RA: histamine-2 receptor antagonist.

* Olmesartan has been associated with sprue-like enteropathy.

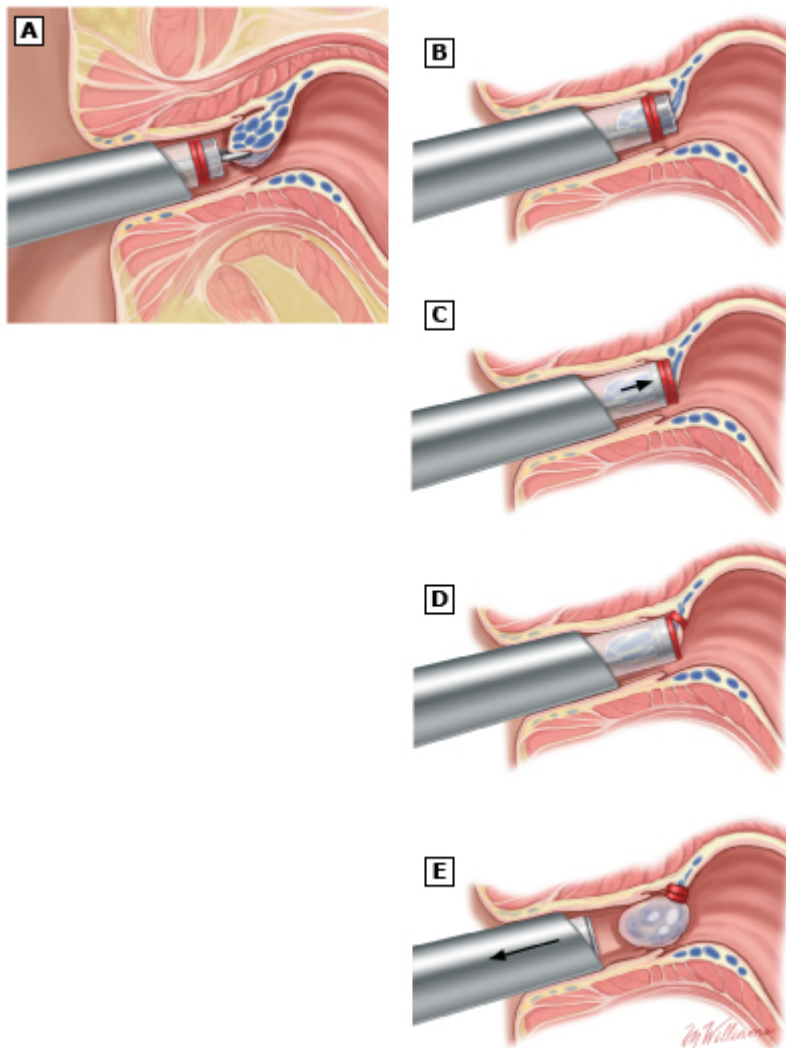
¶ Most antibiotics have been associated with diarrhea.

Data from:

1. Holt PR. Diarrhea and malabsorption in the elderly. *Gastroenterol Clin North Am* 2001; 30:427.

2. Ratnaik RN, Jones TE. Mechanisms of drug-induced diarrhoea in the elderly. *Drugs Aging* 1998; 13:245.

Rubber band ligation



Panels A through E depict the technique of applying the rubber band to treat internal hemorrhoids.

(A) shows the forceps grasping the hemorrhoid. Note the band on the drum of the ligator.

(B) is a lateral view of the forceps grasping the hemorrhoid.

(C) shows the retraction of the forceps and the hemorrhoid into the drum of the ligator.

(D) shows the hemorrhoid pulled through the drum and the rubber band applied at the base of the hemorrhoid. Gentle traction is applied on the hemorrhoid by the forceps to secure it while the band is released from the ligator.

(E) depicts the banded, swollen hemorrhoid.

Rubber band ligation of internal hemorrhoid



This photograph shows the forceps inserted through the anoscope in preparation to release the rubber band and ligate the internal hemorrhoid.

Courtesy of Richard Billingham, MD.

Graphic 89835 Version 3.0

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Ronald Bleday, MD No relevant financial relationship(s) with ineligible companies to disclose. **Elizabeth Breen, MD** No relevant financial relationship(s) with ineligible companies to disclose. **Martin Weiser, MD** Consultant/Advisory Boards: PrecisCa [Gastrointestinal surgical oncology]. All of the relevant financial relationships listed have been mitigated. **Wenliang Chen, MD, PhD** No relevant financial relationship(s) with ineligible companies to disclose.

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