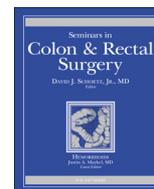




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Complications of hemorrhoid surgery

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A B S T R A C T

Symptomatic hemorrhoids require a number of therapeutic interventions each of which has its own complications. Office-based therapy such as rubber band ligation carries the risk of pain and bleeding, which are self-limited, but also carries the risk of rare complications such as sepsis, which may be life threatening. Operative treatment of hemorrhoids includes conventional hemorrhoidectomy, stapled hemorrhoidectomy, and the use of energy devices. Complications of pain and bleeding are common but self-limited. Late complications such as stenosis and fecal incontinence are rare. Recurrent disease is related to the initial grade and therapeutic approach. Treatment of recurrent hemorrhoids should be individualized based on previous treatments and the grade of disease. Anesthetic complications, especially urinary retention, are common and related to the anesthetic technique. Practitioners should counsel their patients as to the risks of the various approaches to treating symptomatic hemorrhoids.

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1. Introduction

Symptomatic hemorrhoids have been evaluated and treated for thousands of years. There is little doubt that treatment interventions have been avoided over time due to the fear of pain and postprocedure complications. Despite the evolution of modern anesthetic techniques, office-based treatment options and operative technological advances, complications of treatment remain the main impediment in the care of patients with symptomatic hemorrhoidal disease. This review will address the spectrum of common to rare and self-limited to life threatening complications that can arise after various treatments for hemorrhoids.

2. Rubber band ligation

Rubber band ligation of internal hemorrhoids is a common, office-based treatment practiced throughout the world.^{1–3} While very safe, there have been a variety of complications reported following this procedure. Pain is probably the most common complication of hemorrhoidal banding. This can occur in up to one-fourth of cases.^{4–6} Significant pain may be related to improper placement of the band in the anal canal. Placing the band too low results in pain due to the rich somatic innervation within the anal transitional zone. Patients will notice this immediately and removal of the band is sometimes necessary.⁴

Rectal bleeding occurs up to 4% of the time after banding.^{6,7} Interestingly, bleeding has been found by several investigators to be

more likely related to an untreated hemorrhoid than from the ligation site itself.¹ Bleeding can also occur when the rubber band dislodges following necrosis of the tissue within the band. This is almost always self-limited but can be severe enough to require admission to the hospital in approximately 0.5% of cases.^{2,8,9} In patients on anticoagulant and antiplatelet therapy, bleeding can be life threatening.¹⁰ The most recent ASCRS practice parameters do not recommend rubber band ligation in this population.¹¹ Although extremely rare, infection in the form of polymicrobial necrotizing pelvic sepsis has been reported.¹² The incidence of this complication is hard to determine, but is likely well below 0.5%.¹³ Since this complication was originally described, authors have cautioned practitioners to pay attention to symptoms such as worsening pain, fever, and urinary retention as early signs of sepsis.¹⁴ Prompt operative drainage of infection, colostomy, and broad-spectrum intravenous antibiotics, including one that covers *Clostridium*, are indicated if infection is suspected.¹⁵ Symptoms from these infections can progress rapidly and despite intervention, mortality exceeds 30%.¹³ Other infectious complications are even rarer but include pyogenic liver abscess and retroperitoneal abscess.^{13,16} Because infectious complications are so rare, there is currently no evidence to recommend prophylactic antibiotics for rubber band ligation. However, there might be a role for their use in well-selected immunocompromised and/or immunosuppressed patients.

3. Sclerotherapy

Injection of internal hemorrhoids with a sclerosing agent, such as hypertonic saline or phenol, is another common approach to treating internal hemorrhoids. While case series and randomized

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trials show sclerotherapy to be a safe, effective treatment for internal hemorrhoids, this treatment has been associated with rare complications.¹⁸ Pain following sclerosis occurs up to 12% of the time.⁵ Self-limited bleeding can occur, but is less common than after rubber band ligation.^{3,17} Unlike rubber band ligation, sclerotherapy is not contraindicated in patients taking anticoagulant and antiplatelet therapy.¹¹ Life-threatening infection in the form of necrotizing fasciitis and rectal necrosis has also been described with this technique but is quite rare.^{18,19} Transient bacteremia of gram-negative and anaerobic organisms has been shown to occur 6% of the time after sclerotherapy,²⁰ so it follows that distant infection like pyogenic liver abscess could also be expected. This has been reported to occur in at least one patient.²¹ Local necrosis at the injection site has also been reported and can cause rectal perforation²² and rectourethral fistula.²³ All of these complications are extremely rare, occurring so infrequently as to not be reported in most case series.

4. Hemorrhoidectomy

Operative management of hemorrhoids causes significant postoperative pain and prolonged convalescence.³ This is the main reason why patients and surgeons avoid hemorrhoidectomy. Randomized controlled trials show significant pain and narcotic requirements in 5.4%–76% of patients. Management of pain with multimodal therapy, including local infiltration, modern anesthetic techniques, and postoperative narcotic and nonnarcotic medications, has allowed hemorrhoidectomy to be performed in the ambulatory setting.²⁴ However, chronic pain can develop in 14–20% of patients.^{25,26} Early pain should be managed expectantly with pain medication and a bowel regimen. If pain persists longer than 6 weeks, the patient should be evaluated for strictures or fissures. One limitation of defining pain as a complication is that authors have used many different definitions for this problem. In Table 1 pain is defined by the need for more than the standard dosing of medication for more than 5 days. Table 1 also provides a comprehensive summary of the other common complications associated with conventional hemorrhoidectomy. Table 2 summarizes the complications of stapled hemorrhoidectomy reported by several large series and a meta-analysis. The appearance of more vague symptoms, such as tenesmus or pressure, after using this technique has also been reported and seems to be unique to this approach.²⁷ In a Cochrane Review; stapled hemorrhoidectomy was associated with less pain in the immediate postoperative period, but with a higher rate of residual prolapse, recurrent prolapse, and reintervention for prolapse.²⁸ Persisting pain after hemorrhoidectomy needs to be addressed by careful evaluation. Physical examination will reveal the presence of a postoperative fissure or stenosis, but they may be difficult to diagnose in the office due to discomfort, and an examination under anesthesia may be necessary.

5. Other operative techniques

Energy devices such as the LigaSureTM (Valleylab, Boulder, CO) and Harmonic Scalpel[®] (Ethicon, EndoSurgery, Cincinnati, OH) have been introduced to improve results following hemorrhoidectomy. Initial small case series and randomized trials suggested a reduction in postoperative pain and bleeding after surgery using the Harmonic Scalpel[®].^{29,30} However, subsequent randomized trials have not borne out the initial enthusiasm in reduction of pain with this technique.^{31,32} Harmonic Scalpel[®] and LigaSureTM hemorrhoidectomy continue to be popular primarily due to ease of use and shorter operative times. Several randomized trials have been conducted comparing LigaSureTM with PPH showing very low rates of bleeding

Table 1
Complications of conventional hemorrhoidectomy.

Authors	Study design	n	Pain* (%)	Early bleeding† (%)	Late bleeding† (%)	Recurrence (%)	Non-healing (%)	Urinary retention (%)	Incontinence (%)	Stricture/Anal stenosis (%)
Mehigan et al ³⁶	Randomized controlled trial	20	40	5	5	-	10	5	15	0
Lawes et al ⁵⁴	Retrospective collection of randomized controlled trial	16	18	-	0	0	0	-	12.5	0
Racalbuto et al ²⁶	Randomized controlled trial	50	20	2	16	0	4	4	10	0
Peters et al ⁴⁵	Randomized controlled trial	16	19	31	-	0	0	-	12.5	0
Gravie et al ²⁵	Randomized controlled trial	63	18	0	0	5	0	5.2	7.5	1.8
Wang et al ⁴²	Randomized controlled trial	42	76	-	2.4	-	4.8	12	2.4	4.8
Mastakov et al ³⁵	Meta-analysis of randomized controlled trials	510	-	3.9	-	-	0.7	4.1	-	0.7
Giordano et al ⁴⁶	Meta-analysis of 15 randomized controlled trials	597	5.4	-	8.5	1.7	2.3	-	2.6	3.0
Argov et al ⁵⁵	Retrospective	2280	-	-	0.4	0	-	0.4	-	-

*Pain defined as requiring more than the standard pain medication dose after 5 days of procedure.
†Early and late bleeding defined as within or after 48 h of procedure.

Table 2
Complications of stapled hemorrhoidectomy.

Authors	Study design	n	Pain* (%)	Early bleeding† (%)	Late bleeding† (%)	Recurrence (%)	Non-healing (%)	Urinary retention (%)	Incontinence (%)	Stricture/Anal stenosis (%)
Mehigan et al ⁵⁶	Randomized controlled trial	20	40	0	5	–	–	5	10	5
Racalbuto et al ²⁶	Randomized controlled trial	50	6	6	6	4	6	2	8	0
Basdanis et al ³³	Randomized controlled trial	50	6	6	2.2	6	–	14	–	–
Kraemer et al ⁵³	Randomized controlled trial	25	12	0	12	–	1	4	0	0
Gravie et al ²⁵	Randomized controlled trial	63	–	1.9	3.1	11	3.8	1.9	2.5	0
Giordano et al ⁴⁶	Meta-analysis of 15 randomized controlled trials	604	2.1	–	9.7	8.7	2.8	–	1.1	1.9
Arroyo et al ²⁷	Consecutive study	200	4	0.5	2	7	1	–	11	–
Rondelli et al ⁵¹	Consecutive series	300	13	2.7	–	0.6	0	2.7	0	0
Giuratrabocchetta et al ⁵²	Randomized controlled trial	135	–	0.03	–	–	–	–	–	–
Arslani et al ⁴³	Randomized controlled trial	46	10	6.5	6.5	11.1	–	–	4.3	4.3

*Pain defined as requiring more than the standard pain medication dose after 5 days of procedure.

†Early and late bleeding defined as within or after 48 h of procedure.

Table 3
Complications of energy device hemorrhoidectomy.

Authors	Study design	n	Pain* (%)	Early bleeding† (%)	Late bleeding† (%)	Recurrence (%)	Non-healing (%)	Urinary retention (%)	Incontinence (%)	Stricture/Anal stenosis (%)
Armstrong et al ²⁹	Consecutive study	500	–	0	0.6	0	1	2	0.2	–
Lawes et al ⁵⁴	Retrospective collection of randomized controlled trial	18	5.5	–	5.5	0	0	–	27	0
Basdanis et al ³³	Randomized controlled trial	45	13	2.2	3.1	0	–	11.1	–	–
Kwok et al ³²	Randomized controlled trial	47	38	4.2	2.1	0	0	14.8	2.1	0
Peters et al ⁴⁵	Randomized controlled trial	14	7	0	–	0	–	–	14	0
Kraemer et al ⁵³	Randomized controlled trial	25	8	1	16	–	0	2	0	1
Wang et al ⁴²	Randomized controlled trial	42	28	–	2.4	–	4.8	4.8	0	2.4
Mastakov et al ³⁵	Meta-analysis of 11 randomized controlled trials	536	–	2.6	–	–	0.5	1.6	–	0.9
Arslani et al ⁴³	Randomized controlled trial	52	11.5	1.9	3.8	1.9	–	–	1.9	1.9

*Pain defined as requiring more than the standard pain medication dose after 5 days of procedure.

†Early and late bleeding defined as within or after 48 h of procedure.

and postoperative pain.^{33,34} In a meta-analysis of randomized controlled trials, postoperative pain was significantly reduced after energy device hemorrhoidectomy when compared with conventional hemorrhoidectomy.³⁵ In another review of nine randomized trials, there was no difference in the rates of other complications but there was a shorter operative time and less blood loss³⁶ (See Table 3).

Another technology currently available is the ultrasound-guided hemorrhoid artery ligation (HAL) procedure. This technique uses ultrasound to locate and ligate the inflow to the internal hemorrhoids and for fixation of the prolapse.³⁷ Case series show relatively low rates of complications, including bleeding and pain, but long-term follow-up is limited and further study has been recommended.^{37,38} Interestingly, some authors have suggested that the use of the ultrasound guidance is unnecessary, and two admittedly underpowered randomized trials failed to show any difference in efficacy or complications in ligating and fixating hemorrhoids with or without Doppler guidance.^{23,39} It is unclear what the long-term impact of the HAL technique will be, but a true understanding of the short and long-term complications of this procedure awaits more rigorous study.

6. Urinary retention

Urinary retention is a well-known complication of hemorrhoidectomy and tends to occur more frequently in males, particularly in the elderly and very young. Although posthemorrhoidectomy urinary retention has been attributed to pain, it is seen with the same frequency despite the operative approach. However, spinal and general anesthesia are associated with a higher rate of urinary retention compared with intravenous sedation with local anesthetic.⁴⁰ Minimization of perioperative fluid administration after anorectal surgery by decreasing the distention of the urinary bladder has been evaluated and shown to be an effective approach to reduce postoperative urinary retention.⁴¹

Treatment of urinary retention is by placement of a Foley catheter for 24–48 h to allow the pain and swelling to resolve.

This can usually be accomplished through the office or emergency room and rarely requires readmission. If retention recurs, urologic consultation should be obtained. Often a 5-day course of tamsulosin and continued indwelling Foley catheter drainage followed by a voiding trial is recommended.

7. Stricture

A stricture is thought to occur when the surgeon excises too much hemorrhoidal and anal canal tissue. With healing, scar formation further reduces the anal canal aperture and results in a symptomatic stricture. Randomized control trials have reported strictures in up to 5% of patients having conventional or stapled hemorrhoidectomy and 2% with energy device hemorrhoidectomy.^{42,43} A variety of procedures available to treat symptomatic stricture have been described. Mild strictures may be initially managed with diet, fiber supplements, and stool softeners. Anal dilatation is the simplest approach and is often adequate for less severe strictures with soft or web-like scarring.⁴⁴ If dilatation fails or is not possible due to the nature of the stricture, a more extensive advancement flap may be necessary. A simple advancement using a Y-V technique may suffice and is effective in over 64% of patients in several case series.^{45,46} A variety of shaped island-type flaps including diamond-, rectangular-, and house-shaped advancement flaps have been shown to treat stricture effectively. An example of a house flap is shown in Fig. 1. These are employed for severe strictures and operative protocol should include mechanical bowel preparation and prophylactic antibiotics.

8. Fecal incontinence

Hemorrhoidectomy poses the risk of damaging the anal sphincter muscles, so many authors monitor postoperative symptoms of incontinence. Although its definition in the literature is not uniform, long-term incontinence is rarely reported. In a meta-analysis of 11



Fig. 1. House flap. From left to right and top to bottom images show (A) the presence of a chronic stricture; (B) diagram of a house flap including the stricture; (C) dissection of flap borders; (D) advancement of entire house flap to line the anal canal; (E) healing progress at 3 weeks after house flap reconstruction; (F) complete healing and stricture repair 8 weeks after house flap reconstruction. Images courtesy of W. Brian Sweeney, MD.

randomized trials, incontinence was not a complication directly related to hemorrhoidectomy.³⁵ However, other randomized controlled trials report 1 or 2 patients with symptoms of incontinence, most of which resolved within a month.^{29,32,43,47} Given the number of clinical trials not reporting incontinence as a significant problem, this complication appears to be quite rare following surgery. Management of postoperative fecal incontinence should start with an assessment of sphincter integrity with endorectal ultrasound or manometry. Patients with loose frequent stools can be managed with fiber and antidiarrheal agents. Rarely, a sphincter repair may be attempted, but there are no results available in the literature and this approach should be attempted with caution.

9. Ectropion

Ectropion can occur rarely after hemorrhoidectomy. Symptoms of pruritus, soilage, and mucosal weeping, with a physical examination showing rectal mucosa outside the anal canal is the usual presentation. Traditionally, the performance of the white-head hemorrhoidectomy resulted in this complication more frequently. Symptomatic ectropion always requires surgery. The particular operation selected will be dependent on operator experience and the nature of the ectropion. A single quadrant or two separate areas of ectropion can be treated with house or diamond-style island advancement flaps. Circumferential ectropion is best treated with S-plasty advancement flaps.^{48,49}

10. Recurrence

Recurrent symptoms can occur following all treatment options for hemorrhoids. Despite the frequency of recurrent symptomatic hemorrhoids, little is written on how to approach it, and there are

no evidence-based guidelines available. Treatment approach will vary widely based on the clinical scenario and surgeon's experience. In general, one should frame recurrence related to the initial treatment in relation to the recurrent symptoms. At initial treatment, randomized trials seem to favor rubber band ligation over sclerotherapy to reduce the chance of recurrence.¹¹ When managing grade III and IV hemorrhoidal disease, one randomized control trial showed a markedly higher incidence of prolapse recurrence after stapled hemorrhoidectomy.⁵⁰ After over a decade of study, it seems PPH has a higher recurrence rate. (See Table 2) Recurrent bleeding after rubber band ligation or other office-based treatments should initially be approached with additional rubber bands. However, once multiple bands have been placed and bleeding persists, escalation of treatment to an operative approach seems warranted, and in fact this is a common indication for surgical therapy. Recurrent bleeding after operative therapy will depend on whether PPH or excisional approach was used at initial surgery. Despite a low incidence of early postoperative bleeding, when compared to other techniques, stapled hemorrhoidectomy is associated with more frequent episodes of late bleeding, often corresponding to the circular staple line.^{26,33} Recurrent bleeding after hemorrhoidectomy can often be treated with office-based therapy (Fig. 2). Treatment should be tailored to the grade of the hemorrhoids that they recur with (Fig. 3). Reoperative hemorrhoidectomy should be approached with caution for fear of anal stenosis, but is not absolutely contraindicated.

11. Summary

Although safe and widely practiced, operative hemorrhoidectomy continues to carry the risk of morbidity and complications that are a challenge to surgeons. Proper technique and patient

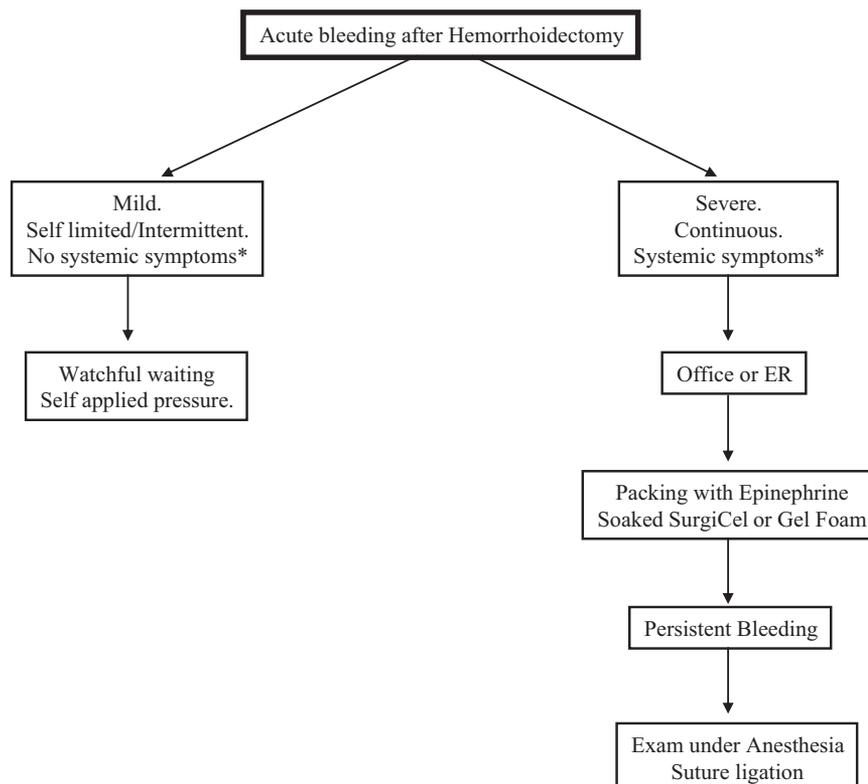


Fig. 2. Algorithm on the management of acute bleeding after hemorrhoidectomy. *Systemic symptoms include dizziness, light headedness, shortness of breath, rapid heart rate, and hypotension.

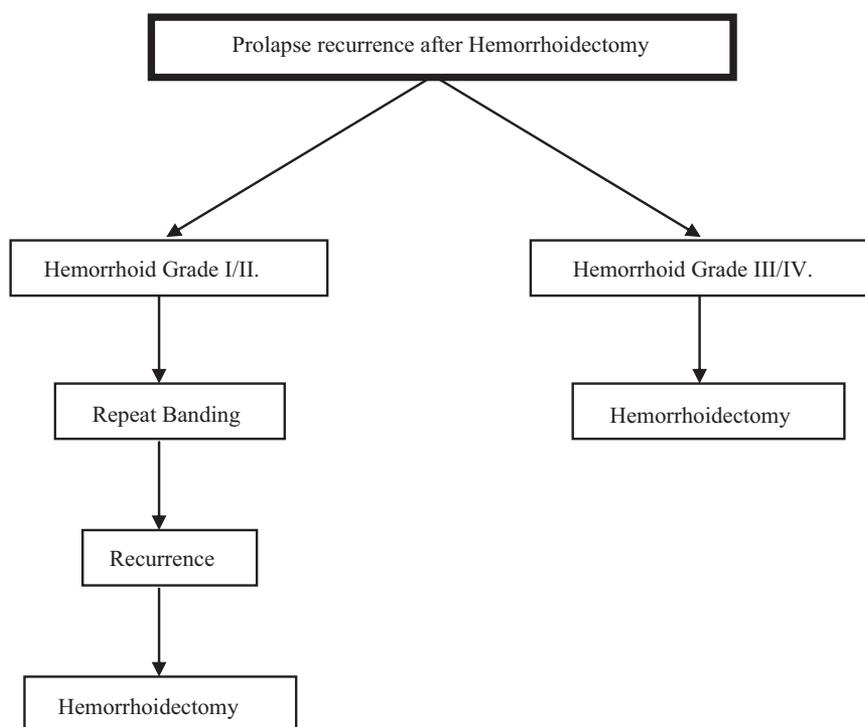


Fig. 3. Algorithm on the management of prolapse recurrence after hemorrhoidectomy.

selection can mitigate the risk of complications in many patients. Although there is no documented advantage in postoperative complications, reduced operative time and blood loss make the use of energy devices a popular alternative to traditional hemorrhoidectomy. Stapled hemorrhoidectomy has slightly higher complication rates including recurrence but less postoperative pain. Patient education should include a discussion of the risks of the various treatment options.

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