S.Das. et.al./ 13(3) PP 1313-1325 2025
Available online at www.abhipublications.org
Review Article
ABHI Publications since 2013
International Journal of Pharmacy and Engineering (IJPE)
ISSN 2320-849X

# HEMORRHOIDS – A CRITICAL REVIEW

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**Abstract:** Symptomatic hemorrhoid disease is a common condition that can significantly affect a person's quality of life. Treatment options vary widely, from conservative approaches to a range of office-based and surgical procedures. This review explores the clinical manifestations, and management strategies for hemorrhoid disease.

**Keywords**: Hemorrhoids, Surgical procedures, Pain, Recurrence, Bleeding.

**INTRODUCTION:** Hemorrhoidal disease is a prevalent condition that affects approximately 4% of the global population. The most widely accepted explanation for its development is the prolapse of the anal cushions. Unlike varicose veins, hemorrhoids are vascular cushions made up of fibroelastic tissue, muscle fibers, and vascular plexuses containing arteriovenous anastomoses. They can be divided into internal, external, & mixed. Internal hemorrhoids are classified based on the extent of their prolapse into the anal canal, while external hemorrhoids can be either acute, presenting as hemorrhoidal thrombosis, or chronic, manifesting as anal skin tags.

Patients with hemorrhoids typically seek medical attention due to symptoms such as painless bleeding, prolapse, discomfort from thrombosed hemorrhoids, or itching. In most cases, the first line of treatment involves conservative measures, including increasing fiber and fluid intake, along with the use of topical medications. If these initial approaches fail to provide relief, more advanced interventions may be necessary, such as rubber band ligation, sclerotherapy, or infrared coagulation.

Surgical intervention is typically considered for patients who have not responded to conservative treatments, which accounts for approximately 5-10% of cases. It is also the primary treatment option for individuals with symptomatic third- or fourth-degree hemorrhoids, as well as for those with acute hemorrhoids that do not show improvement with other therapeutic approaches[1].

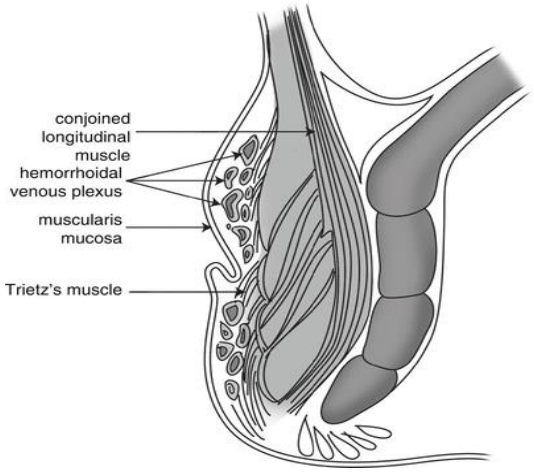
Hemorrhoidectomy is recognized as the gold standard treatment, with the Milligan-Morgan and Ferguson techniques being the most commonly performed procedures worldwide.

While these techniques have demonstrated outstanding results with minimal complications, they are often linked to postoperative pain[1,2].

Although hemorrhoid disease is common and generally has low morbidity, it significantly affects quality of life. A variety of surgical and nonsurgical treatments are available for its management. This review will explore the anatomy, symptoms, and treatment options for symptomatic hemorrhoid disease.

**PATHOPHYSIOLOGY:** Although external hemorrhoids are not classified using a specific clinical taxonomy, internal hemorrhoids are categorized based on the severity of prolapse. First-degree internal hemorrhoids remain inside the anal canal and are identified by increased vascularity. Second-degree hemorrhoids protrude beyond the canal during straining or bowel movements but retract on their own. Third-degree hemorrhoids extend outside the canal and require manual repositioning. Fourth-degree hemorrhoids remain prolapsed and cannot be pushed back in, even with manual effort[3].

The precise pathophysiology of hemorrhoidal disease remains unclear. Earlier theories suggesting that hemorrhoids are a form of anorectal varices have been debunked. Research by *Goenka et al.* indicates that patients with portal hypertension and varices do not show a higher prevalence of hemorrhoids, challenging the validity of this theory[4].




**Pathophysiology of hemorrhoids**

The widely accepted theory regarding the development of hemorrhoids is the sliding anal canal lining theory. This theory suggests that hemorrhoids result from the weakening of the supporting structures of the anal cushions. Factors such as aging, heavy lifting, excessive straining during bowel movements, and prolonged sitting are believed to contribute to this deterioration. Hemorrhoids are therefore considered a pathological condition characterized by the abnormal downward displacement of the anal cushions, leading to venous dilation[5].

Histopathological analysis of the anal cushions reveals several changes, including abnormal dilation of veins, vascular thrombosis, and degeneration of collagen fibers and fibroelastic tissues. Additionally, there is distortion and rupture of the anal subepithelial muscle. In more severe cases, a significant inflammatory response may occur, affecting the vascular walls and surrounding connective tissue, often leading to mucosal ulceration, ischemia, and thrombosis[6].

**DIAGNOSIS:** The most frequent symptom of hemorrhoids is painless rectal bleeding during bowel movements. Patients often describe noticing bright red blood dripping into the toilet bowl. This occurs because hemorrhoidal tissue has a direct connection between arteries and veins[7].

A positive fecal occult blood test or anemia should not be assumed to be caused by hemorrhoids without a thorough evaluation of the colon. This is particularly important if the bleeding pattern is unusual for hemorrhoids, if an anorectal examination does not reveal a clear source of bleeding, or if the patient has notable risk factors for colorectal neoplasia[8].

Prolapsed hemorrhoids can lead to perineal irritation or anal itching due to mucus secretion or fecal soiling. Patients with large hemorrhoids may also experience a sensation of rectal fullness or incomplete evacuation. While hemorrhoids themselves are typically not painful, discomfort can occur if thrombosis develops, especially in external hemorrhoids, or if a fourth-degree internal hemorrhoid becomes strangulated. In individuals with hemorrhoids, anal pain is more often associated with conditions such as anal fissures or perianal abscesses.

A definitive diagnosis of hemorrhoidal disease relies on a thorough patient history and a meticulous clinical examination. The evaluation should involve a digital rectal examination and anoscopy, with the patient positioned in the left lateral decubitus position. The perianal region should be carefully examined for the presence of anal skin tags, external hemorrhoids, perianal dermatitis due to anal discharge or fecal soiling, anal fissures, and fistula-in-ano. Some practitioners prefer to observe the patient in a squatting position while straining to assess the extent of prolapse.

Although internal hemorrhoids are not palpable, a digital rectal examination can help identify abnormal anorectal masses, anal stenosis, scarring, and assess anal sphincter tone. Additionally, it can provide insight into potential prostatic hypertrophy, which may contribute to straining and exacerbate the descent of anal cushions during urination. During anoscopy, the size, location, degree of inflammation, and presence of bleeding should be documented. Enhanced visualization of the anal canal and hemorrhoids can also be achieved using a colonoscope with intrarectal retroflexion or a transparent anoscope combined with a flexible endoscope, allowing for detailed imaging and documentation[9].

**MEDICAL TREATMENT:**

**Topical treatment:** The main goal of most topical treatments is to manage symptoms rather than provide a cure, often necessitating additional therapeutic interventions. Various topical formulations, such as creams and suppositories, are available, many of which can be purchased over the counter. However, strong scientific evidence supporting their effectiveness remains limited. These medications may include ingredients like local anesthetics, corticosteroids, antibiotics, and anti-inflammatory agents[10].

Topical treatments can be effective for certain groups of patients with hemorrhoids. For example, a study by *Tjandra et al*[11]. demonstrated that applying 0.2% glyceryl trinitrate ointment helped alleviate hemorrhoidal symptoms in individuals with low-grade hemorrhoids

and elevated resting anal canal pressures. However, 43% of patients reported experiencing headaches as a side effect. Similarly, Perrotti et al. found that nifedipine ointment was beneficial in managing acute thrombosed external hemorrhoids. It is important to highlight that the relief provided by nitrites and calcium channel blockers in hemorrhoidal treatment is likely due to their ability to relax the internal anal sphincter rather than a direct vasodilatory effect on hemorrhoidal tissue.

Some topical treatments for hemorrhoids focus on vasoconstriction of the vascular channels rather than affecting the tone of the internal anal sphincter. An example is Preparation-H® (Pfizer, United States), which contains 0.25% phenylephrine, along with petrolatum, light mineral oil, and shark liver oil. Phenylephrine is a vasoconstrictor that primarily exerts its vasopressor effects on the arterial circulation, while the remaining ingredients serve as protective agents. Preparation-H is available in various formulations, including ointment, cream, gel, suppositories, and medicated wipes for convenient use[13]. It produces temporary relief in symptoms of acute hemorrhoids, like bleeding & pain on defecation.

## Non-operative treatment

**Sclerotherapy:** Sclerotherapy is a recommended treatment for first- and second-degree hemorrhoids. This procedure involves injecting chemical agents to induce fibrosis, which helps secure the mucosa to the underlying muscle. Commonly used solutions include 5% phenol in oil, vegetable oil, quinine, urea hydrochloride, and hypertonic salt solution. It is crucial to administer the injection into the submucosa at the base of the hemorrhoidal tissue rather than directly into the hemorrhoids, as improper placement can lead to transient precordial and upper abdominal pain. Misplacement may also result in complications such as mucosal ulceration, tissue necrosis, or, in rare cases, severe infections like prostatic abscess or retroperitoneal sepsis. Patients with immunodeficiency or predisposing valvular heart disease may require antibiotic prophylaxis to reduce the risk of bacteremia following the procedure[17].

**Rubber band ligation:** Rubber band ligation (RBL) is a fast, straightforward, and effective procedure for treating first- and second-degree hemorrhoids, as well as select cases of third-degree hemorrhoids. This technique involves applying a rubber band around the hemorrhoidal tissue, leading to ischemic necrosis and subsequent scarring, which helps secure the connective tissue to the rectal wall. If the band is placed too close to the dentate line, severe pain may occur due to the presence of somatic nerve afferents, necessitating immediate removal. RBL can be safely performed at multiple sites in a single session[18] using various commercially available instruments. These include hemorrhoid ligator rectoscopes[19] and endoscopic ligators[20], which utilize suction to draw excess tissue into the applicator, allowing the procedure to be conducted by a single operator.

The most frequent complication associated with rubber band ligation (RBL) is pain or rectal discomfort, which can typically be managed with warm sitz baths, mild pain relievers, and stool softening through the use of mild laxatives or bulk-forming agents. Additional complications may include minor bleeding due to mucosal ulceration, urinary retention, thrombosed external hemorrhoids, and, in very rare cases, pelvic sepsis. Patients are advised to discontinue anticoagulant use one week before and two weeks after the procedure to minimize risks.

**Infrared coagulation:** The infrared coagulator emits infrared radiation that induces coagulation of tissue and evaporates cellular water, leading to shrinkage of the hemorrhoidal mass. During the procedure, a probe is positioned at the base of the hemorrhoid through an anoscope, with a recommended contact duration of 1.0 to 1.5 seconds, depending on the coagulator's wavelength and intensity[21]. Following treatment, the affected tissue appears as a white spot due to necrosis, which later heals through fibrosis. Compared to sclerotherapy, infrared coagulation (IRC) is less reliant on technical precision and eliminates the risk of complications associated with incorrect sclerosing injections[14]. Despite being a safe and efficient method, IRC may not be the best option for larger, prolapsing hemorrhoids.

**Radiofrequency ablation:** Radiofrequency ablation (RFA) is a relatively recent approach to treating hemorrhoids. This technique involves using a ball electrode connected to a radiofrequency generator, which is applied to the hemorrhoidal tissue. The energy delivered causes coagulation and evaporation[22] of the targeted tissue. As a result, the vascular components of the hemorrhoids shrink, and the remaining tissue adheres to the underlying structures through fibrosis. RFA is an outpatient procedure performed with an anoscope, similar to sclerotherapy. Potential complications include acute urinary retention, wound infection, and perianal thrombosis. While RFA is generally considered a painless procedure, it has been linked to a higher likelihood of recurrent bleeding and prolapse[23].

**Cryotherapy:** Cryotherapy eliminates hemorrhoidal tissue by using a freezing cryoprobe. It is believed to cause less pain as extremely low temperatures destroy sensory nerve endings. However, clinical studies have shown that this method often results in prolonged pain, an unpleasant odor, and a high likelihood of persistent hemorrhoidal masses[24]. Due to these drawbacks, cryotherapy is seldom utilized.

Two meta-analyses have compared the outcomes of the three most common non-surgical treatments for hemorrhoids—sclerotherapy, rubber band ligation (RBL), and infrared coagulation (IRC) [25], [26]. Both studies found that RBL had the lowest recurrence of hemorrhoidal symptoms and the fewest cases requiring retreatment. However, RBL was also associated with a significantly higher incidence of post-procedural pain. Based on these findings, RBL is recommended as the primary non-surgical treatment for grade I-III hemorrhoids. Additionally, a survey conducted in the UK, which included nearly 900 general and colorectal surgeons [27], revealed that RBL was the most frequently performed procedure, followed by sclerotherapy and hemorrhoidectomy.

Operative treatment: An operation is conducted when the non-operative procedures have failed or difficulties have occurred. Distinct philosophies concerning the pathogenesis of hemorrhoidal disease generates various surgical approaches-

**Summary of individual philosophies concerning the pathogenesis of hemorrhoids and associated surgical approaches-**

| Theory | Short description | Surgical approach |
|---|---|---|
| Sliding anal cushions | Hemorrhoids evolve when the carrying tissues of the anal cushions deteriorate or disintegrate | Hemorrhoidectomy, plication |
| Rectal redundancy | Hemorrhoidal prolapse is correlated with an inner rectal prolapse | Stapled hemorrhoidopexy |
| Vascular abnormality | Hyperperfusion of arteriovenous plexus inside anal cushion develops in the formation of hemorrhoids | Doppler-guided hemorrhoidal artery ligation |

**Hemorrhoidectomy:** Excisional hemorrhoidectomy is considered the most effective treatment for hemorrhoids, offering the lowest recurrence rate compared to other available methods[26]. This procedure can be carried out using various techniques, including scissors, diathermy[28], [29], or advanced vascular-sealing devices such as the Ligasure (Covidien, USA) )[30], [31] and the Harmonic scalpel (Ethicon Endosurgery, USA) [32], [33]. It is a safe procedure that can be performed on an outpatient basis under perianal anesthetic infiltration[34], [35].

The primary indications for hemorrhoidectomy include cases where non-surgical treatments have failed, as well as acute complications like strangulated or thrombosed hemorrhoids. Additionally, it may be chosen based on patient preference or when other anorectal conditions, such as anal fissures or fistula-in-ano, require surgical intervention[36]. In clinical settings, excisional hemorrhoidectomy is most commonly performed for third-degree or fourth-degree internal hemorrhoids.

A significant disadvantage of hemorrhoidectomy is the associated postoperative pain[35]. Research indicates that Ligasure hemorrhoidectomy leads to reduced postoperative pain, shorter hospital stays, quicker wound healing, and faster recovery when compared to traditional methods such as scissors or diathermy hemorrhoidectomy[37-39]. Other potential postoperative complications include acute urinary retention (reported in 2% to 36% of cases), postoperative bleeding (0.03% to 6%), bacteremia, septic complications (0.5% to 5.5%),

wound breakdown, delayed healing, loss of anal sensation, mucosal prolapse, anal stricture (0% to 6%), and, in some instances, fecal incontinence (2% to 12%)[40-43]. Recent findings suggest that if malignancy is not suspected, hemorrhoidal specimens may not require pathological examination[44].

**Plication:** Plication is an effective method for repositioning anal cushions without the need for excision. This technique involves suturing the hemorrhoidal mass and securing it with a knot at the uppermost vascular pedicle. However, certain complications may still arise after the procedure, including bleeding and pelvic pain[45].

**Doppler-guided hemorrhoidal artery ligation:** A technique utilizing Doppler-guided ligation of the terminal branches of the superior hemorrhoidal artery was introduced in 1995 as an alternative to traditional hemorrhoidectomy[46]. Known as Doppler-guided hemorrhoidal artery ligation (DGHAL), this procedure has gained popularity in Europe. The concept behind this approach was later validated by vascular studies[47,48], which revealed that individuals with hemorrhoids exhibited an increased caliber and arterial blood flow in the terminal branches of the superior rectal arteries. By employing suture ligation to cut off the arterial supply to hemorrhoidal tissue, this method aims to alleviate hemorrhoidal symptoms.

DGHAL is particularly effective in treating second- and third-degree hemorrhoids. However, it may not sufficiently address prolapsing symptoms in more advanced cases. Short-term results and recurrence rates within one year have been found to be comparable to those of conventional hemorrhoidectomy[49]. Since there remains a possibility of revascularization and symptom recurrence, further research is needed to assess the long-term effectiveness of DGHAL[50].

**Stapled hemorrhoidopexy:** Stapled hemorrhoidopexy (SH) has been utilized since 1998[51] as a surgical technique for treating hemorrhoids. This procedure involves the use of a circular stapling device to remove a ring of excess rectal mucosa located above the hemorrhoids, effectively repositioning them back within the anal canal. In addition to correcting the prolapse, this method also reduces blood flow to the affected tissue.

A recent meta-analysis examining surgical outcomes of SH compared to conventional hemorrhoidectomy analyzing 27 randomized controlled trials with a total of 2,279 procedures—revealed that SH is associated with several advantages. These include reduced postoperative pain, quicker recovery of bowel function, shorter hospital stays, faster return to daily activities, improved wound healing, and higher patient satisfaction[52].

However, long-term studies indicate that SH has a greater likelihood of hemorrhoidal prolapse recurrence[52,53,54]. Factors such as the recurrence rate, the cost of the stapling device, and the risk of serious complications including rectovaginal fistula[55] and rectal stricture[56,57] make SH a more selective option. As a result, it is typically recommended for patients with circumferential prolapsing hemorrhoids or those with at least three advanced internal hemorrhoidal lesions.

DGHAL and SH are two modern surgical techniques designed to address hemorrhoids by targeting their underlying causes. DGHAL focuses on reducing blood flow to the anal canal

through dearterialization, while SH works by repositioning and eliminating anorectal mucosal prolapse. A recent retrospective study examining 18-month outcomes for patients with grade III hemorrhoids who underwent DGHAL (n = 51) or SH (n = 63) found both methods to be safe and effective. DGHAL was associated with reduced pain, a shorter hospital stay, and faster recovery; however, it had a higher recurrence rate and lower patient satisfaction compared to SH[58]. Additionally, a smaller prospective trial assessing DGHAL and SH for grade II-III hemorrhoids reported comparable short-term and long-term outcomes[59]. Despite this, patients who received DGHAL returned to work sooner and experienced fewer complications than those treated with SH.

**CONCLUSION:** Hemorrhoid disease is a prevalent yet intricate condition. It is essential to thoroughly assess patients exhibiting signs and symptoms to rule out other conditions that may present similarly. Various treatment options are available, and the selection of an appropriate approach should be tailored to each patient based on their specific clinical circumstances.

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Received: May 13TH 2025, Accepted: May 25th 2025