



Hemorrhoidal Disease: How to Proceed After Unsuccessful Medical Treatment?



Radha Bansal¹, Aishwarya Yannamani², Hunardeep Kaur Boparai¹, Miguel Eduardo Rodriguez Rodriguez³, Niharika Bheemisetty⁴, Coralvia Yaroslagna Villanueva Perez⁵, Jessica Mariela Amaya-Alvarez⁶, Salma Habib⁷, Thulasi Ram Gudi⁸, Pushan Aggarwal², Ricardo Villela⁹, Jhon Navarro González¹⁰, Allan Roberto Bueso¹¹, and Maria Isabel Gomez Coral¹²

¹Government Medical College & Hospital, Chandigarh, India

²Kasturba Medical College, Manipal, Karnataka, India

³Universidad de Oriente, Venezuela. Larkin Community Hospital, USA

⁴Kurnool Medical College, Andhra Pradesh, India

⁵Universidad Nacional Experimental Francisco de Miranda, Venezuela

⁶Universidad Salvadoreña Alberto Masferrer, El Salvador

⁷Institute of Applied Health Science, Bangladesh. Larkin Community Hospital, USA

⁸Merit Health River Region, Vicksburg, USA

⁹National Autonomous University of Honduras, Honduras

¹⁰Universidad del Zulia, Venezuela

¹¹Universidad Tecnológica Centroamericana, Honduras

¹²Universidad del Valle de México, México

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*Corresponding author: Maria Isabel Gomez Coral, Universidad del Valle de México, México

Abstract

Hemorrhoids are the symptomatic enlargement and displacement of the normal anal vascular plexus. It is estimated that up to 50% of the adult population may eventually develop hemorrhoids. The incidence increases with age and is more common in males than females. Hemorrhoidal disease has a multifactorial etiology, but it mainly results from increased pressure on the hemorrhoidal veins, leading to vascular congestion, enlargement, and subsequent protrusion. The condition is characterized by swelling and inflammation of the blood vessels in the anal canal. Hemorrhoids are classified into two types: internal hemorrhoids, which occur inside the anal canal, and external hemorrhoids, which occur outside the anus. Clinical presentation includes rectal bleeding, prolapse sensation, anal pain, irritation, and/or anal discharge. The most common symptom is rectal bleeding, which is usually painless and associated with defecation. The patient's history and clinical examination establish the diagnosis of hemorrhoids. Treatment depends mainly on the severity of the condition. Conservative therapies such as dietary modifications, increased fiber intake, and sitz baths may be sufficient for mild cases. Topical medications such as corticosteroids, vasoconstrictors, and local anesthetics may also relieve symptoms. Minimally invasive procedures such as rubber band ligation, sclerotherapy, cryotherapy, or infrared coagulation may be recommended for more severe cases. For those severe cases that do not respond to other treatments, a more invasive procedure (hemorrhoidectomy) may be necessary. This article provides a comprehensive overview of the different therapeutic alternatives for hemorrhoids, mainly focusing on surgical procedures.

Keywords: Hemorrhoids; Hemorrhoidal disease; Hemorrhoids surgery; Hemorrhoids treatment

Abbreviations: HD: Hemorrhoidal disease; CT: Computed tomography; EIS: Endoscopic injection sclerotherapy; RBL: Rubber band ligation; IRC: Infrared coagulation; CH: Conventional hemorrhoidectomy; SH: Stapler hemorrhoidectomy; DGHAL: Doppler-guided hemorrhoidal artery ligation.

Introduction

Hemorrhoidal disease (HD), or hemorrhoids, is defined as the symptomatic enlargement and distal displacement of the normal anal cushions (hemorrhoidal plexus) [1]. Hemorrhoids are classified by location; internal (originates above the dentate line and covered by anal mucosa) and external (originates below the dentate line and surrounded by anoderm). Internal hemorrhoids

are usually referred to as non-painful or asymptomatic, while external are symptomatic [2]. Hemorrhoid disease is the fourth leading outpatient gastrointestinal diagnosis, accounting for 3.3 million ambulatory care visits in the United States. Self-reported incidence of hemorrhoids in the United States is 10 million per year, corresponding to 4.4% of the population. Both genders are

affected from age 45 to 65 years. Caucasians are affected more frequently than African Americans, and higher socioeconomic status is associated with increased prevalence [3].

Hemorrhoids are caused by an increased pressure gradient within the hemorrhoid plexus. This is due to an increased intra-abdominal pressure experienced in scenarios such as prolonged straining during defecation or pregnancy and labor [4]. Hemorrhoids develop when the supporting tissues of the anal cushions disintegrate or deteriorate, causing an abnormal downward displacement of the anal cushions causing venous dilatation. The anal cushions cause significant pathological changes, including abnormal venous dilatation, vascular thrombosis, a degenerative process in the collagen fibers and fibroelastic tissues, and distortion and rupture of the anal subepithelial muscle [1]. The symptoms of hemorrhoid disease include pain, bleeding, pruritus, burning, and swelling. Physical findings include skin tags, fistulas/fissures, prolapsed or thrombosed hemorrhoids, and blood [4].

The definite diagnosis of hemorrhoidal disease is based on detailed patient history and careful clinical examination. Assessment should include a digital exam and anoscopy in the left lateral position [1]. Treatment of hemorrhoids ranges from dietary and lifestyle modification to radical surgery. This narrative review aims to identify when to use these options, considering the patient's adverse effects, symptoms, and comorbidities.

Epidemiology & Pathophysiology

Hemorrhoidal disease is a common medical condition characterized by the swelling and inflammation of the blood vessels in the anal canal [5]. The condition is classified into two types: internal hemorrhoids, which occur inside the anal canal, and external hemorrhoids, which occur outside the anus [3]. The prevalence of hemorrhoids varies depending on the population studied and the diagnostic criteria used. However, it is estimated that up to 50% of the adult population may develop hemorrhoids at some point in their lives [3,6]. Hemorrhoids are prevalent in the United States. It is estimated that up to 10 million Americans suffer from symptomatic hemorrhoids each year. The incidence of hemorrhoids tends to increase with age and is more common in individuals aged 45-65 [6]. The condition is more common in men than in women. In addition, certain populations, such as pregnant women and individuals with a family history of hemorrhoids, may be at increased risk [7]. Risk factors for hemorrhoids include a sedentary lifestyle, obesity, pregnancy, chronic constipation, or diarrhea, and straining during bowel movements [6,8]. Other factors that may contribute to the development of hemorrhoids include a low-fiber diet, heavy lifting, and prolonged sitting or standing [8].

Hemorrhoids result from the pathological enlargement and displacement of the hemorrhoidal veins that drain the anal canal. The hemorrhoidal veins are part of the complex vascular network

surrounding the anus and rectum, and they play an essential role in maintaining continence [5,9]. The exact pathophysiology of hemorrhoids is not fully understood, but it is believed to result from increased pressure on the hemorrhoidal veins, leading to engorgement and enlargement [10,11]. This pressure can result from various factors, including constipation, straining during bowel movements, pregnancy, obesity, and prolonged sitting, or standing [12]. Other potential causes of hemorrhoids include a low-fiber diet, which can lead to chronic constipation and straining during bowel movements, as well as a sedentary lifestyle, which can lead to decreased blood flow and increased pressure on the veins in the anal canal [5,12,13]. In addition, aging can contribute to the development of hemorrhoids, as the connective tissues that support the anal canal weaken over time [13]. Moreover, certain medical conditions can also increase the risk of hemorrhoids. These include liver disease, which can cause increased pressure in the veins around the anus, and inflammatory bowel disease, which can cause chronic diarrhea and straining during bowel movements [14]. Finally, genetic factors may also play a role in the development of hemorrhoids, as there is evidence to suggest that a family history of the condition may increase an individual's risk [5,14,15]. Overall, the development of hemorrhoids is complex and can result from a combination of factors, including lifestyle, medical conditions, and genetics [3,13].

As the hemorrhoidal veins become enlarged, they may protrude from the anus, causing discomfort and pain. This protrusion can be classified as either internal or external hemorrhoids, depending on the location of the enlarged veins relative to the anal canal [16]. Internal hemorrhoids arise above the dentate line within the rectum and are covered by mucosa, which lacks pain receptors [14]. They can be further classified into four degrees, depending on their degree of prolapse from the anal canal. On the other hand, external hemorrhoids are located below the dentate line and are covered by skin, which is innervated and, therefore, more sensitive to pain [13,15,16]. The symptoms of hemorrhoids can be attributed to the mechanical effects of the enlarged veins, including pain, itching, swelling, and bleeding [6]. In severe cases, hemorrhoids can become thrombosed, which can lead to intense pain and require surgical intervention.

Clinical Presentation & Diagnosis

Hemorrhoids can present with various symptoms, including rectal bleeding, the sensation of a prolapsing lesion, anal pain, anal irritation, and/or anal soiling [17]. The most common presenting symptom of hemorrhoids is rectal bleeding, which is usually painless and associated with defecation. Bleeding is attributed to microtrauma of the vessel wall elicited during defecation of hard stools and is arterial in origin, explaining its bright red nature [18]. Darker red blood mixed with the stool suggests a more proximal source. Bleeding is usually self-limiting unless the patient is anticoagulated or has a bleeding diathesis.

Additionally, the venous hypertension of the diseased anal cushions augments the transudation of fluid, producing what has been referred to as 'anal soiling' (although it has nothing to do with incontinence) and local pruritus [19]. Thrombosed internal hemorrhoids usually present as a vast, acutely painful prolapsed hemorrhoid. While hemorrhoidal prolapse is usually a chronic phenomenon, acute prolapse can occur where the hemorrhoid becomes trapped by the sphincter outside the anus, leading to obstruction of venous return, thrombosis, and strangulation [20].

Contrary to thrombosed internal hemorrhoids, a thrombosed external hemorrhoid presents as a small, well-defined nodule confined to the subcutaneous external hemorrhoidal plexus at the anal verge. The patient describes an acutely tender, firm lump at the anal margin, which is covered by anoderm and perianal skin richly innervated with somatic pain fibers. Pain builds to a crescendo over hours and is constant for a few days before the pain gradually eases. The lump takes longer to resolve as the clot is absorbed, leaving a small residual skin tag [20]. The diagnosis of hemorrhoids is confirmed by history and clinical examination. Inspection of the anal margin at rest and with the patient straining will help grade any hemorrhoidal disease.

Hemorrhoids are graded based on the degree of prolapse. Grade I do not prolapse below the dentate line and is visible on an or colonoscopies. Grade II prolapse below the dentate line but reduce spontaneously. Grade III prolapse and require manual reduction. Grade IV prolapse remains below the dentate line and is non-reducible [21,22]. First- and second-degree hemorrhoids are often only visible with a proctoscope and are accentuated when the patient strains. Where the patient has pain that precludes bedside proctoscopy, an examination under anesthesia may be required to exclude other possible causes, such as a fissure, abscess, or anal cancer [22]. Fresh bleeding not associated with anal symptoms and without colorectal 'alarm' symptoms (e.g., change in bowel habit, abdominal pain, weight loss) or family history of colorectal neoplasia should be investigated with at least a flexible sigmoidoscopy. Complete colonic assessment (colonoscopy or computed tomography colonography) is required where the symptom pattern suggests more proximal pathology (e.g., darker red bleeding mixed with stools, anemia, positive fecal occult blood test, abdominal mass, or tenderness). The threshold to perform a colonoscopy (or CT colonography) is lowered with increasing patient age [23].

Conservative & Medical Treatment

The treatment of hemorrhoids depends mainly on the severity of the condition. In general, conservative therapies such as dietary modifications, increased fiber intake, and sitz baths may be sufficient for mild cases [24]. Topical medications such as corticosteroids, vasoconstrictors, and local anesthetics may also be used to relieve symptoms. Minimally invasive procedures such as rubber band ligation, sclerotherapy, or infrared coagulation

may be recommended for more severe cases [24,25]. For those severe cases that do not respond to other treatments, a more invasive procedure (hemorrhoidectomy) may be necessary [25].

Several lifestyle changes can help alleviate symptoms and reduce the risk of developing hemorrhoids [26]. First-line conservative treatment of hemorrhoids consists of a high-fiber diet (30 to 45 g per day), fiber supplementation, increased water intake, warm water (sitz) baths, and stool softeners [26,27]. Fiber supplementation decreases the bleeding of hemorrhoids by 50-60% and improves overall symptoms. Eating a high-fiber diet (fruits, vegetables, whole grains, and legumes) can help soften stool and make bowel movements easier, reducing the risk of straining and pressure on the rectum and anus [28]. Drinking water and other fluids can help prevent constipation and make it easier to pass stool. Physical activity can help promote bowel regularity and reduce the risk of developing hemorrhoids. Lastly, avoiding straining during bowel movements and prolonged sitting or standing is essential, which might put pressure on the rectum and anus, leading to hemorrhoids [25,28,29]. By incorporating these lifestyle changes, the patient may be able to reduce the frequency and severity of hemorrhoid symptoms and prevent further complications. However, if symptoms persist or worsen, it's important to rule out other potential causes and provide additional treatment options [30].

There are multiple topical over-the-counter hemorrhoid medications. These may provide short-term relief, but most have not been studied for effectiveness or safety for long-term application [31]. These remedies include astringents (witch hazel), protectants (zinc oxide), decongestants (phenylephrine), corticosteroids, and topical anesthetics [32]. Over-the-counter hemorrhoid preparations often combine two or more of these ingredients. Topical creams and ointments commonly contain ingredients such as hydrocortisone, lidocaine, or pramoxine that help reduce inflammation, pain, and itching [31,33]. Another option to relieve pain is using warm water baths (sitz baths). However, these have been shown only to decrease pain temporarily [33,34]. Another class of medications that may be used to treat hemorrhoids is suppositories. They can contain ingredients such as hydrocortisone, witch hazel, or glycerin, which can help to reduce inflammation and relieve discomfort [33].

In some cases, oral medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) may be used to alleviate pain and reduce inflammation. However, these medications should be cautiously used as they can cause gastrointestinal side effects. Prescription therapies may also be part of first-line treatment [28,30,33]. Topical nitroglycerin as a 0.4% ointment decreases rectal pain caused by thrombosed hemorrhoids, although it is more commonly used for anal fissures [34]. Topical nifedipine also has been demonstrated to be effective for pain relief, but it must be compounded by a pharmacy because there is no commercially available preparation [34,35].

A single injection of botulinum toxin into the anal sphincter effectively decreases the pain of thrombosed external hemorrhoids. It's important to note that while these medications can provide relief for the symptoms of hemorrhoids, they do not treat the underlying condition [36]. Therefore, in some cases, more invasive treatments may be necessary to address the hemorrhoids. Overall, the success rates of medical therapy for hemorrhoids vary widely depending on the individual patient and the severity of their condition. In general, mild to moderate cases of hemorrhoids can often be effectively managed with medical therapy, while more severe cases may require more invasive interventions [24,30,33].

Sclerotherapy

Endoscopic Injection Sclerotherapy (EIS) is a minimally invasive procedure that involves injecting a sclerosing agent, such as sodium morrhuate or polidocanol, directly into the hemorrhoid tissue [37]. The sclerosing agent causes inflammation and scarring of hemorrhoids, leading to its shrinkage and eventual resolution. Indications for sclerotherapy in hemorrhoids include first- and second-degree internal hemorrhoids that are bleeding, prolapsing, or causing discomfort [38]. The procedure benefits patients with mild to moderate symptoms who do not respond to conservative measures such as dietary changes and topical medications. Sclerotherapy is considered a safe and effective alternative to surgical intervention in these cases and may also be helpful for patients who are unable or unwilling to undergo surgery [39].

The procedure is typically performed on an outpatient basis and may be repeated as necessary to achieve the desired results. Studies have reported varying success rates of sclerotherapy in treating hemorrhoids, depending on the severity of the condition and other factors [39,40]. However, on average, sclerotherapy has been shown to have a success rate of approximately 70-80% in treating first- and second-degree hemorrhoids. The success rate may be lower for third- and fourth-degree hemorrhoids and other treatments may be necessary, such as rubber band ligation or surgery [40]. It's important to note that success rates can vary depending on individual circumstances and the healthcare provider's expertise in performing the procedure.

Despite being minimally invasive and generally well-tolerated with a low risk of complications, EIS has potential risks and complications [41]. Patients may experience mild discomfort, such as itching or burning, as well as temporary bleeding or discharge. Patients may also experience bleeding, swelling, or bruising at the injection site. In rare cases, the injection may cause an allergic reaction or infection. However, these symptoms typically resolve on their own within a few days [37]. Another potential risk of sclerotherapy is the development of blood clots in the treated veins, which may cause inflammation and pain. In addition, there is a risk that the injected chemical solution may leak into surrounding tissues, causing damage

or irritation [42,43]. In some cases, sclerotherapy may also lead to the recurrence of hemorrhoids or the development of new hemorrhoids. There are certain situations in which sclerotherapy may not be recommended due to potential risks and complications [44].

Contraindications to sclerotherapy in hemorrhoids include allergic reaction to the sclerosing agent or other components of the injection solution, bleeding disorders or those taking blood-thinning medications, patients with severe (third- or fourth-degree) hemorrhoids, pregnant women (the effects of the procedure on the developing fetus are not well understood), and patients with an active infection or inflammation in the treatment area [43,44]. Hemorrhoids are a common condition that often recurs. Outpatient treatment is usually sufficient for patients with hemorrhoids, allowing them to leave the hospital soon after treatment. However, the effectiveness of EIS typically takes 1-2 weeks [42,44]. During this time, it is helpful for doctors and nurses to provide education and information to patients to improve treatment success. Patients should be educated on improving their lifestyle habits, such as consuming high-fiber foods and drinking plenty of water, avoiding constipation and diarrhea, taking stool softeners as prescribed, and avoiding prolonged sitting [45]. Adequate education and management can improve treatment outcomes and reduce the likelihood of hemorrhoid recurrence.

Overall, sclerotherapy is highly effective, safe, and does not require hospitalization. Additionally, it is a low-cost option with a low incidence of postoperative complications, as well as very few severe complications [40,45]. It is crucial that specialists provide pre-operative care, including taking a detailed history of the patient, and that patients receive postoperative education on how to soften their stools, manage pain if necessary, and be aware of early and late complications.

Cryotherapy

Cryotherapy is a procedure that involves the destruction of inflamed blood vessels, followed by fixation [46]. The hemorrhoids are frozen using liquid nitrogen in a closed probe at -180° or by rapidly expanding pressurized nitrous oxide inside a sealed chamber at -80° [47]. After 6 hours, swelling occurs, followed by thrombosis and infarction at 24 hours. The affected area undergoes necrosis, and superficial sloughing and ulcer formation occur within the next 10 to 14 days [46]. The procedure causes the blood vessels to constrict and reduces blood flow to hemorrhoids, which can help to decrease swelling and discomfort. Cryotherapy is typically performed as an outpatient procedure and can be done using local anesthesia to minimize pain or discomfort [48,49].

It may be used alone or in combination with other treatments, such as medication or dietary changes, depending on the severity of the hemorrhoids and the patient's individual needs [49]. As with any medical procedure, potential risks and

side effects are associated. The complications of cryotherapy might include pain and discomfort in the area where the treatment is applied (due to the freezing of nerve endings and tissue damage), hemorrhage, infection, fistula formation, fecal incontinence (lesion to muscles and nerves of the rectum and anus) [50].

Studies have shown that cryotherapy can effectively reduce the symptoms of hemorrhoids, such as pain, swelling, and bleeding. However, the success rates of this treatment can vary depending on the severity of the hemorrhoids and other individual factors [50,51]. In a large-scale prospective study, cryotherapy was found to effectively treat hemorrhoids in 88% of patients. Another study reported a success rate of 87% in patients who received cryotherapy for their hemorrhoids [50]. While cryotherapy offers potential benefits and can be an effective treatment option for hemorrhoids, it is important to note that this procedure is not widely used. Firstly, it requires special and relatively expensive equipment and is more time-consuming on an outpatient basis compared to newer techniques [52,53]. Additionally, the discharge that results from this procedure is often copious and has an offensive odor. Lastly, the outcome cannot be determined by gross evaluation at the time of the procedure [53].

Rubber Band Ligation

Most patients with grade I and II and select patients with grade III internal hemorrhoidal disease who fail medical treatment can be effectively treated with office-based procedures, as hemorrhoid banding is typically the most effective option. The most popular and effective treatment is rubber band ligation (RBL), which has been shown to be superior to sclerotherapy and infrared coagulation. Ligation of the hemorrhoidal tissue results in ischemia and necrosis of the prolapsing mucosa, followed by scar fixation to the rectal wall. This quick technique is well tolerated in patients because the ligature is performed above the dentate line, where somatic sensitivity is absent [54]. RBL should be considered a first-line therapy for first- to third-degree internal hemorrhoids commonly indicated for bleeding and/or prolapsing [55].

Several complications associated with this technique can be classified as minor or major (severe). Mild bleeding, pain, vaso-vagal symptoms, slippage of bands, priapism, difficulty in urination, anal fissure, and chronic longitudinal ulcers are more common and normally considered minor complications. Massive bleeding, thrombosed hemorrhoids, severe pain, urinary retention needing catheterization, pelvic sepsis, fistula, and death are significant complications that have been less commonly reported. Several studies described different rates of complications following RBL, ranging from 3% to 18.8%. Certain conditions have been considered a contraindication for RBL of hemorrhoids due to a higher risk of complications, namely, HIV and Crohn's disease [56].

One of the advantages of this procedure is that it does not require general anesthesia. To minimize the risk of developing tissue necrosis secondary to the ligation, it has been recommended that only one column should be ligated at a time. If the patient can tolerate the procedure with minimal pain, up to three bands of hemorrhoids in a single column can be ligated under one session [57]. The procedure is performed via anoscopic visualization of the hemorrhoids and the application of small rubber bands into them using forceps, always treating the largest internal hemorrhoid first. The main goal is to apply the rubber band at least 5 mm above the dentate line. This is to avoid grasping tissue that is innervated and can cause pain for the patient. Patients should always be questioned after the ligation for the presence of pain.

Other techniques that have been described include endoscopic suction ligator and wall suction ligator, both using a forceps-guided approach. Both of them are associated with adequate ligation with fewer treatment sessions. A clear advantage of the wall suction ligator is that the operator can hold the ligator and apply the band with one hand while holding the anoscope in the other, unassisted. The successful ligation of the hemorrhoid results in thrombosis and the development of submucosal scarring, which later become ischemic and necrotic in the following five days. Complete healing usually occurs over several weeks [58].

One of the most extensive retrospective series that explored the long-term outcomes of RBL included 805 who underwent a median of 2 ligations per patient. Treatment was considered successful in 71% of them. The success rate was similar regarding the degree of hemorrhoids. Treatment failure was related to the application of more than 4 band ligations [59]. In a large meta-analysis of over 12 trials, rectal bleeding was controlled 90% of patients, 78-84% of patients with prolapsing hemorrhoids reported symptomatic improvement, and only 50% of patients with grade IV hemorrhoids had any improvement, reinforcing the indication for this procedure in less severe cases of hemorrhoidal disease. The most common complication of this procedure has been pain, anywhere ranging from 8-80% [59,60].

Another complication that has been reported is bleeding, which can typically occur two to four days after the application, being significant in patients with coagulation abnormalities or patients on antiplatelet/antithrombotic therapy, for which it is recommended that patients stop this medication one week prior and two weeks after the procedure. Localized infectious complications have been reported following RBL, with serious complications reported in rare cases, including pelvic sepsis, Fournier's gangrene, liver abscesses, tetanus, and bacterial endocarditis. A related hypothesis to these complications includes the transmural necrosis that facilitates the development of deep infections by migrating the bowel flora, which can then spread to adjacent tissue [60].

Infrared Coagulation

Infrared coagulation, often known as IRC, is a treatment that is generally well tolerated, safe and has a minimal risk of complications. It has been noted that the frequency of adverse effects related to IRC is minimal. Numerous patients have indicated that they had very little to no pain either during or after the procedure itself. Infrared coagulation is a procedure that does not need invasive surgery and may be used to treat internal hemorrhoids in the outpatient setting. IRC is a procedure that involves directing infrared radiation onto the internal hemorrhoid using a light guide. This causes hemorrhoids to coagulate. The infrared coagulator's radiation pulse, which coagulates tissue protein and evaporates water from cells, causes the superfluous hemorrhoid tissue to be coagulated, eradicated, and eventually scarred and fixed [61].

When performed by a trained professional, IRC is a safe and well-tolerated operation that seldom causes problems. The efficacy of this method has been studied extensively. When comparing IRC to hemorrhoidectomy, one researcher found that patients in the IRC group saw a prevalence of bleeding that was only 5%. In contrast, patients in the hemorrhoidectomy group experienced a prevalence of bleeding that was 30% [62]. Also, one of the advantages of IRC is that it is a quick and convenient outpatient procedure that can be performed in an office setting. It was shown that the IRC group was able to return to work sooner than the hemorrhoidectomy group. IRC has been demonstrated to be more effective in reducing post-procedural pain than other treatment methods. Patients who had IRC had much less pain in the immediate time after treatment, compared to those who underwent standard hemorrhoidectomy, according to prospective research that compared the two procedures [62,63].

Although IRC therapy is considered an excellent alternative to standard treatment, it has also been suggested that IRC is less effective than other treatments like banding or sclerotherapy, as it requires a higher number of procedures to be as effective when compared with the other two therapies. This is despite several other studies linking IRC to reduced rates of postoperative pain and complications [64]. As with any procedure, it is important to consider the treatment that will benefit the patient the most. While rubber band ligation has a higher short-term success rate, infrared photocoagulation is the better option for reducing the amount of discomfort experienced by the patient [65]. For this reason, considering patients individually will allow the medical professional to provide the best quality of care to the patient.

IRC is a cost-effective treatment option for internal hemorrhoids. It is well established that IRC is less expensive than rubber band ligation, surgery, or other standard hemorrhoid treatment. In addition, because IRC is a minimally invasive procedure, it is associated with lower healthcare costs compared to more invasive surgical treatments, thus being preferred many

times by patients. Overall, the available evidence suggests that IRC is a safe, effective, and cost-efficient treatment option for internal hemorrhoids. While some studies have reported a higher recurrence rate than traditional surgical treatments, IRC offers several advantages, including a low risk of complications, minimal discomfort, and the ability to perform the procedure on an outpatient basis.

Hemorrhoids Surgery

While non-surgical treatments have greatly improved, surgery remains the most effective and highly recommended approach for patients suffering from severe internal hemorrhoids of grade III or IV, external and mixed hemorrhoids, and recurring hemorrhoids [66]. Standard surgical options include open or closed hemorrhoidectomy, stapled hemorrhoidopexy, and Doppler-guided hemorrhoidal artery ligation, each with varying success rates and potential complications that require thorough discussion with the patient. Although surgery is linked to more negative side effects than office-based or medical treatments, it can prevent long-term complications [67]. The most frequent post-operative issue is pain, but anal stricture and incontinence, albeit rare, may result from excessive tissue removal and damage to the sphincter muscles [66,68]. These can be avoided by retaining normal anoderm between excisions, not excising all hemorrhoid sacs at once for patients with extensive lesions, and performing careful dissection in the submucosal plane [69].

Conventional hemorrhoidectomy (CH) is the most commonly used surgical method [70]. It involves the removal of the hemorrhoidal sac and is usually reserved for prolapsing disease. This procedure entails using scissors (or diathermy) to excise hemorrhoidal cushions from the internal anal sphincter and ligate the vascular pedicle [70,71]. There are two types of CH: open and closed. Open hemorrhoidectomy involves leaving the wound open, while closed hemorrhoidectomy requires suturing the mucosa and skin after excising the hemorrhoids [71]. A systematic review conducted by Bhatti et al. compared open versus closed techniques and found that the closed method resulted in less post-operative pain, better wound healing, and reduced bleeding. The recurrence rates, post-operative complications, surgical site infection, and length of stay were similar with either approach [72]. Additionally, using diathermy instead of surgical scissors was shown to decrease operative time and analgesic requirements with no increased risk of post-operative hemorrhage without pedicle ligation [73,74]. Despite the drawbacks of prolonged wound healing and delayed return to normal activities, CH is still regarded as the gold standard for surgical treatment of hemorrhoids, as it effectively removes the prolapsed hemorrhoidal tissue mass and has a significantly lower disease recurrence rate than other methods. However, post-operative pain remains a significant concern [75,76].

Stapler hemorrhoidectomy (SH) was developed as an alternative to CH. It involves the stapling of rectal mucosa just

above the hemorrhoid to move upward the prolapsing part of the hemorrhoidal cushion [77]. Unlike traditional methods of removing hemorrhoidal tissue, SH uses a circular stapler to excise a circumferential ring of mucosa four centimeters above the dentate line, interrupting the superior hemorrhoidal vessels and restoring hemorrhoidal tissues to their original position [78]. As the excision occurs above the dentate line, it avoids painful wounds in the somatically innervated anoderm. The success of SH is based on the procedure's circumferential nature and ability to restore the anatomy of the anal canal [78,79]. To perform SH, all prolapsing hemorrhoids are first reduced, and then a suture is placed three to four centimeters above the dentate line, catching only the mucosa and submucosa. Complications for SH are similar to those of CH, including rectovaginal fistula, anal stenosis, or sphincter injuries.

However, rare but potentially life-threatening complications have been described, including anastomotic leakage with pelvic sepsis, anovaginal fistula, and Fournier's gangrene. While SH causes less post-operative pain than CH, a small but significant number of patients have complained of chronic pain post-SH [80]. An estimated 15 - 20% of patients might experience excessive pain lasting for months, with 1-2% reporting permanent pain [78,80]. Although post-operative pain scores appear to be lower with stapled hemorrhoidectomy than with excisional hemorrhoidectomy, this procedure is not superior in terms of recurrence [79].

Doppler-guided hemorrhoidal artery ligation (DGHAL) is an alternative surgical option for treating hemorrhoids. This procedure uses a Doppler probe to identify and ligate individual hemorrhoidal arteries while performing mucopexy to reposition prolapsing tissue [81]. A recent retrospective study found that at 1 year, recurrence rates were 5.3% for grade II hemorrhoids and 13% for grade III hemorrhoids, and at 5 years, recurrence rates were 12% for grade II and 31% for grade III [82]. This method appears suitable for grades I-III hemorrhoids, particularly grade II, but additional large-scale prospective studies are necessary to confirm its effectiveness for more advanced lesions [81,82]. Although it has a high morbidity rate (15-18%), mainly pain or tenesmus, it produces less post-operative pain compared to other surgical techniques [83].

Overall, this procedure has the potential to become a favored treatment based on currently available data.

The optimal surgery for hemorrhoids should have high efficacy with a low recurrence rate, minimal post-operative pain to allow for early resumption of everyday activities, and be safe with minimal morbidity [81]. Although conventional hemorrhoidectomy remains the "gold standard" when considering recurrence, it is often associated with significant post-operative pain, perianal discharge, and irritation. In recent years, there have been advancements in hemorrhoidectomy techniques to achieve the "ideal" operation. Numerous surgical

options have been described, and multiple trials conducted, with some techniques considered superior to others and others suggested to be universally effective for all presentations of hemorrhoids [81-83]. Therefore, determining the best surgical approach should be tailored to the patient's specific needs.

Conclusion

Hemorrhoidal disease is a well-known, prevalent condition that affects a broad range of adults and results in millions of visits annually. Despite the significant burden of this condition, individuals with symptomatic hemorrhoids are typically treated with either over-the-counter remedies of uncertain effectiveness or more invasive interventions that can be expensive, inconvenient, and occasionally associated with complications. Unfortunately, there is insufficient evidence about the risk factors, impact, and therapy options for hemorrhoids. As a result, patients with hemorrhoid symptoms spend substantial amounts of time and money seeking relief. Treatment of symptomatic hemorrhoids can involve dietary advice, lifestyle modification, pharmacological approaches, office-based procedures such as rubber band ligation and sclerotherapy, or radical surgery, depending on the severity and grade of the condition. However, due to the intense postoperative pain and potentially severe complications associated with hemorrhoidectomies, such as anal stricture and fecal incontinence, the current trend is moving toward non-operative approaches and non-excisional surgical techniques.

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