"A REVIEW ON THE CONTEMPORARY AND EMERGING ADVANCES IN THE UNDERSTANDING AND EVASION OF HEMORRHOIDS"

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Abstract

Hemorrhoids, often known as piles, are enlarged veins that resemble varicose veins in the anus and lower rectum. The symptomatic expansion and distal displacement of the typical anal cushions are indicators of hemorrhoids. Numerous factors, such as constipation and delayed straining, have been proposed as causes of hemorrhoidal development. A network of veins in and around the anal trench makes up the hemorrhoid tissues (the last couple of inches of the rectum). The patient may have symptoms such as pain or a burning feeling, bleeding during bowel movements, tissue protruding from the anus, and itching surrounding the anus when these veins enlarge. Throughout history's many centuries, hemorrhoidal dysfunction has been documented. Although there are limited treatments available for hemorrhoids, and therefore, very little to no understanding about the full range of treatment alternatives and novel therapies. This review article outlines the different approaches for treating hemorrhoids including conservative methods via lifestyle modifications, topical agents and phlebotonics. Additionally, non-operative methods include injection, scelerotherapy, infrared coagulation and most preferably rubber band ligation. When non-operative treatments fail to treat, then physician recommend for the surgical procedures as first line treatment. Surgical approaches include open hemorrhoidectomy, stapled hemorrhoidectomy, and Ligasure hemorrhoidectomy. Emerging techniques such as Scelerobanding, Emborrhoid, and Hemorrhoidal laser procedure require additional analysis to determine their function in current hemorrhoid therapy. Briefly, this review provides detailed information about hemorrhoids including various aspects involved in disease progression and treatments.

Keywords: - Hemorrhoids, Piles, Conventional method, Hemorrhoidectomy, Surgical procedure

INTRODUCTION

Throughout hundreds of years of history, Hemorrhoids have been documented [1]. It is a significant medical and economical issue that affects millions of people worldwide [2]. The age range of 45 to 65 years old has the highest incidence of it [3]. Hemorrhoids can be identified by the symptomatic enlargement and distal displacement of the usual anal cushions. The patient may have symptoms like discomfort or burning feeling, bleeding during bowel movements, tissue protruding from the anus, and itching around the anus as these veins enlarge. Hemorrhoidal development has been linked to a variety of factors, including constipation and delayed straining [4].The quality of life is significantly impacted by hemorrhoid illness, which is treatable with a number of surgical and nonsurgical procedures. The goal of this article is to review the most recent options for treating hemorrhoids, with a focus on the benefits of minimally invasive techniques. This will give readers a framework for choosing the best treatment option for their particular case, minimizing complications and eradicating their hemorrhoids [1].

PATHOPHYSIOLOGICAL ASPECT

Hemorrhoids' pathogenesis still needs to be better understood. The prevailing idea holds that an aberrant downward displacement and venous dilatation are caused by the pathological loosening and disintegration of supportive connective tissues in anal cushions. The sliding anal canal theory is the name given to this. This happened when the anal cushion's supporting framework was compromised. The muscle of Treitz, also depicted as avascular support system of the anal cushion. It is made up of the anal submucosal muscle, which is interconnected between the sinusoids that connect the anal cushion to the hemorrhoids floor, and the Park's mucosal suspensory ligament, which penetrates and adheres it to the internal anal sphincter.Following the propulsion of faeces during defecation, it retracts the anal cushion back to its initial position [3]. Atypical venous expansion, vascular thrombus, a deteriorating process in the collagen fibers, as well as distortion and rupture of the anal subepithelial muscle are all observed during a histological examination of the anal cushions.Mucosal ulceration, ischemia, and thrombosis have been linked to extreme instances of a significant hypersensitivity response including the arterial membrane and associated connective tissue [5].

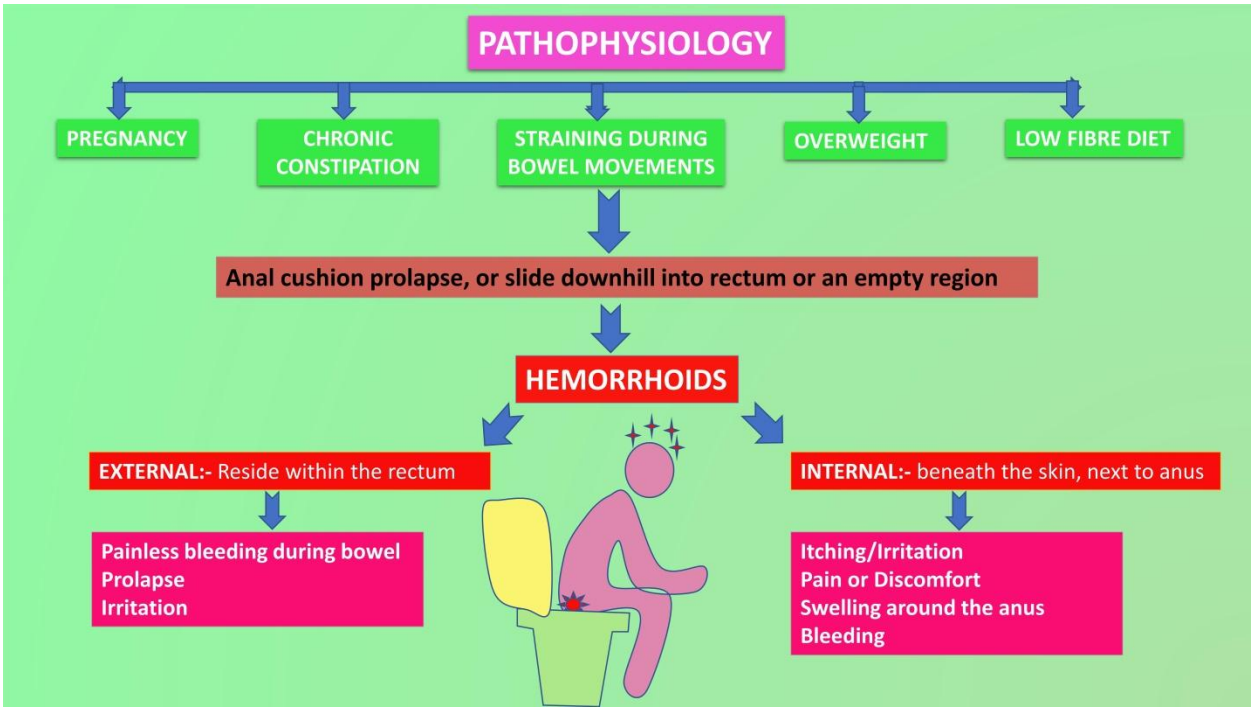

Figure 1: Pathophysiology of Hemorrhoids

CLASSIFICATION OF HEMORRHOIDS

Hemorrhoids can be categorized in accordance with their size (massive or small), position (internal or external), or degree of prolapse (I^{st}– IV^{th}). Columnar epithelium holds internal hemorrhoids in place above the dentate line. Below the dentate line, external hemorrhoids appear encircled by squamous epithelium."Interno-external" hemorrhoids are those that extend both above and below the dentate line [4]. Internal hemorrhoids, which are divided into 4 degrees, are what are meant by the conventional Goligher staging of hemorrhoidal condition [6].

Table 1: Classification of Hemorrhoids

First-degree Hemorrhoids	Do not prolapse but do extend into the anal canal lumen.
Second-degree Hemorrhoids	Protrude past the anal canal but impulsively shrink.
Third-degree	Necessitate physical reduction when they protrude outside the anal

Hemorrhoids	canal when strained.
Fourth-degree Hemorrhoids	Persistently prolapse and are irreducible.

The classification system Goligher proposed more than 30 years ago, is frequently used to assign a grade to hemorrhoid illness. Unfortunately, it has a number of shortcomings since it ignores potential concomitant symptoms, the etiopathogenesis of the disorder, and concurrent clinical circumstances. As a result, several fresh classification schemes have been proposed and recently confirmed.

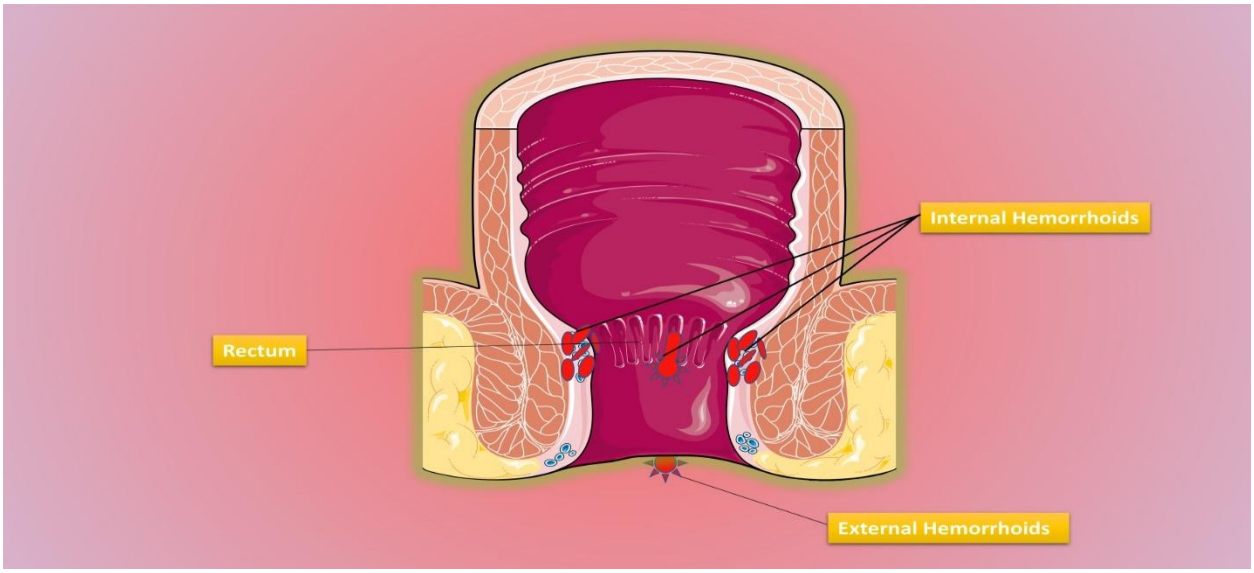

Figure 2: External and Internal Hemorrhoids

PATHOGENESIS

Despite the fact that hemorrhoidal cushions are typical anatomical structures, they are rarely mentioned unless problems start to occur, at which point the word "hemorrhoid" is taken to mean a pathogenic condition [4]. Veins, arteries, and arteriovenous shunts are three vascular systems that are involved in the etiology of internal hemorrhoids. They contribute to the onset of the illness and some of its signs [5]. There are venous plexuses and underlying connective tissues in each of the three anal cushions, which support the structure. Hemorrhoids are referred with a pathological tone only when the blood vessels grow and produce indications (bleeding,

discomfort, prolapse, pruritus). The development of symptomatic hemorrhoids has been linked to inadequate fiber intake, extended use of the toilet, constipation, diarrhea, and physical ailments like pregnancy, ascites, and pelvic space-occupying wounds that are linked to increased intra-abdominal pressure [7].

CLINICAL PRESENTATION

Rectal bleeding, the perception of a prolapsing lesion, anal discomfort, anal irritation, excessive mucosal discharge[8], and/or anal soiling are just a few of the symptoms that hemorrhoids can cause. However, there is a wide range of differential diagnoses to rule out more serious illness as these indications are not unique to hemorrhoid. It's only possible to diagnose hemorrhoids on the basis of symptoms present in the patients after ruling out these alternative explanations. Internal hemorrhoids that have thrombosed typically manifest as huge, excruciatingly distressing prolapsed hemorrhoid. While hemorrhoidal prolapse is typically a chronic condition, it is possible for it to manifest as acute prolapse, in which the hemorrhoid gets trapped by the sphincter outside the anus and causes thrombosis, strangling, and obstruction of venous return. A thrombosed external hemorrhoid is different from thrombosed internal hemorrhoids in that it only affects the anal verge's subcutaneous external hemorrhoidal plexus and manifests as a tiny, well-defined lump. The patient describes a hard, acutely sensitive lump at the anal edge that is highly innervated with somatic pain fibers and covered by anoderm and perianal skin. Pain progressively lessens after intensifying over several hours, remaining consistent for a few days, and becoming less intense. As the clot is absorbed, the lump takes longer to go away, leaving a minor skin tag behind [5,6].

DIAGNOSIS OF HEMORRHOIDS

An associated medical background for specific symptoms and indications, supported by a physical exam and a few diagnostic tests, should be the main focus of the diagnosis [9]. Checking the region around anus might help to identify external hemorrhoids. Doctor will do a digital rectal exam and maybe perform procedures to check within rectum and anus in order to identify internal hemorrhoids.

Medical history

A thorough patient history is crucial. The intensity, acuteness, the indications, the regularity of bowel movements, any accompanying symptoms (such as faecal incontinence), daily dietary routines, and information about bowel movements should all be included. Some patients have lifelong constipation or diarrhea, depending on their bowel habits. As a result, it is important to check what a patient believes to be normal bowel behavior. Additionally, it's crucial to rule out Crohn's disease, anal fissures, anal abscesses, and externally thrombosed hemorrhoids.

Physical examination

A physical examination should identify hemorrhoid and rule out other anorectal conditions. Anorectal digital examination, examination of the perianal tissues, and assessment of the degree of hemorrhoidal prolapse under strain should all be included. An anoscope should be used to inspect the anorectal mucosa. Because of greater patient comfort than the prone position, the sims position should be chosen [9].

Diagnostic tests

***Colonoscopy*: -** An outpatient procedure called a colonoscopy is used to see inside one's large intestine (colon and rectum). During diagnosis, a colonoscope is used (sometimes called a scope). This long, flexible tool has a camera and tissue-removal capabilities. A colonoscopy is frequently used to examine digestive symptoms like blood, pain in the abdomen, or modifications in bowel habits.

Sigmoidoscopy: - A sigmoidoscopy is a diagnostic procedure used to examine the lower portion of colon or large intestine, known as the sigmoid colon. Rectum and anus are located nearby in the region ofcolon. A tissue sample or biopsy can also be taken with a sigmoidoscopy. The removal of polyps and hemorrhoids is another use for it. Additionally, it's a check for rectal and colon cancer screening. A thin, flexible tube known as a sigmoidoscope is used in sigmoidoscopy. The tube has a camera and a little light. It is inserted into the anus and steadily forwarded into the lower portion of colon through rectum.

***Barium Enema*: -** An X-ray examination called a barium enema can find alterations or anomalies in the large intestine. This procedure is also referred to as a colon X-ray.To execute an enema, a liquid is pumped into the rectum through a thin tube.In this instance, the fluid has a metallic component (barium) that covers the colon's lining. Soft tissues are typically poorly shown by X-rays, but the barium coating makes the colon's silhouette very distinct. Air is inserted into the colon during a barium enema examination. The colon is expanded by the air, which also enhances image characteristic. This procedure is called an air-contrast (double-contrast) barium enema.

***Anorectal Manometry*: -** The most prevalent examination for determining anorectal dysfunction is anorectal manometry. It is an invasive procedure to assess the anal and rectal muscles' functionality. The anorectal sphincter is a set of muscles that regulates how faeces exits from the body. If these muscles are too lax, too tight, or are not contracting at the appropriate time, anorectal manometry may assist to identify these issues. Diagnosing ailments like faecal incontinence and constipation is made easier using anorectal manometry. A balloon-equipped catheter that is placed into the rectum and anus. A device is connected with the catheter which

changes the pressure in the balloon by expanding and compressing by using air. The pressure gadget is connected to computer software that manages the test parameters and collects data from the balloon. Normally, the examination lasts for 30 minutes [10].

***Barium Defecography*: -** Evacuation proctography, another name for barium defecography, is a test that uses fluoroscopy to assess the anatomical makeup and physiological state of the pelvic floor and anorectum. It evaluates the interactions between the pelvic tissues while they are at rest, when there is an increase in intraabdominal and intrapelvic pressure, and when defecating. Most crucially, it enables functional evaluation of the processes of defecation in real time while seated on a toilet. Defecography is a helpful method for diagnosing a variety of pelvic floor and anorectal disorders [11].

MANAGEMENT OF HEMORRHOIDS

Conservative Treatment: Hemorrhoids are generally treated with conservative methods, which include preventive care and minimally invasive procedures, especially in the community [12]. Regardless of the severity of the hemorrhoids, it is effective for all grades and is linked to some improvement.

Lifestyle and Dietary Modification

Unquestionably, diet and lifestyle are crucial to hemorrhoid management. Daily oral intake of fiber has shown to improve hemorrhoid symptoms and lower the risk of bleeding[9]. A meta-analysis of seven clinical trials provided support for the claim of benefit, demonstrating that a fiber supplement reduced bleeding risk by almost 50% while also relieving symptoms, with no effect on prolapse. It is advised to consume flaxseed, seaweed, and wheat bran either in their natural state or as pharmaceutical formulations [12]. In numerous randomized trials, stimulant laxatives have demonstrated efficacy in the treatment of hemorrhoid symptoms by lowering the chance of bleeding and the likelihood of persistentindications when compared to the placebo group. Although it makes logical sense to increase oral fluid intake, exercise frequently, avoid constipation-causing medicines, and prevent straining, there is regrettably less evidence to support these recommendations [13].

Phlebotonics

The indications of hemorrhoids, such as bleeding, discomfort, inflammation, and recurrence, are significantly influenced by phlebotonics [9]. A diverse class of medications known as phlebotonics is used to treat hemorrhoidal illness during bouts of thrombosis as well as the mildintense phases of I and II-degree hemorrhoids. Despite the fact that their exact mechanism is not entirely understood, it is linked to regulating capillary permeability, enhancing lymphatic drainage, strengthening blood vessel walls, and raising venous tone. They have been used to treat

a number of ailments, such as lymphedema, hemorrhoids, and chronic venous insufficiency. There may be a benefit, according to numerous studies evaluating the effectiveness of phlebotonics in curing the indications of hemorrhoidal illness [14]. The most widely used oral phlebotonics for hemorrhoids are flavonoids. Although flavonoids' function is still up for question, they are known to have anti-inflammatory properties in addition to having an impact on venous tone, capillary permeability, and lymphatic drainage. Recent research demonstrates that flavonoids are a viable alternative therapy for both "long-term" hemorrhoid treatment and acute symptomatic hemorrhoid treatment, allowing patients to transition to surgical treatment in a healthier state. A possible advantage has also been noted in easing post-hemorrhoidectomy symptoms. According to a study, flavonoids and preparations containing flavonoids that have phlebotomical effects may be essential in the treatment of individuals with severe hemorrhoid illness. Patients in this study found their adoption to be safe and well-tolerated. Throughout the duration of the trial, they improved the hemorrhoidal condition by lowering the severity and frequency of symptoms as well as the localized inflammation [15].

Topical Agent

The majority of minor cases of hemorrhoids can be treated with over the counter (OTC) topical creams, gels, ointments, and wipes from your neighborhood drugstore. The majority of OTC drugs typically contain a vasoconstrictor, which constricts blood vessels and shrinks skin tissue to lessen pressure and pain from hemorrhoids. Witch hazel, zinc oxide, phenylephrine, astringents (like witch hazel), decongestants, corticosteroids, and topical anesthetics are a few of them. Two or more of these chemicals are frequently combined in over-the-counter hemorrhoid treatments [5]. Additionally, these drugs frequently contain skin shields and perhaps even topical analgesics like lidocaine. A topical anesthetic called lidocaine makes the region where it is applied numb. Additionally, several overthecounter hemorrhoids remedies contain hydrocortisone, a steroid that helps to reduce inflammation and thus lowers pressure and pain.

Hot Sitz Bath

Most doctors regularly advise warm water sitz baths for a number of ailments, including gynecologic and anorectal problems. A sitz bath can help patients with pain relief and wound healing, according to a number of disciplines, including rectal and colon surgery, obstetrics and gynecology, urology, and cancer therapy. Sitz baths are widely used for pain management in addition to medications for postoperative pain control because they are a secure method of cleaning and reducing pain in the incisions on the anal sphincter after hemorrhoidectomy. To lessen the itch, pain, and discomfort brought on after hemorrhoidectomy, hot sitz bath is advised. Water has likely been used for medical purposes from the dawn of time. One of the fundamental treatment modalities that is frequently employed in the system of natural medicine is hydrotherapy. Different physiological systems may respond differently to the use of water in different forms and temperatures. It is a common naturopathic therapeutic approach that was

practiced in ancient civilizations including India, China, and Egypt. Patients who have had hemorrhoids removed frequently have painful defecation and wound pain. Warm water washing and sitz baths could ease this ache [16].

Office – based Treatment: For I, II, and III- degree hemorrhoids which do not respond to conservative management, office-based treatments are frequently used. These treatments' main objective is to lessen blood circulation into the hemorrhoidal sac. Although significant problems are rare and office-based therapies are very effective, recurrence rates can be substantial and force individuals to seek further therapy. For patients with degree I, II, and some with degree III hemorrhoids,the office-based therapies are strongly advised.

Rubber Band Ligation

Blaisdell introduced a novel method for the in-office ligation of bleeding internal hemorrhoids in the 1950s that does not require hospitalization. Internal hemorrhoids are practically painless, easily accessible, and hence suited for outpatient treatment, which is the basis for this novel idea. The most significant, affordable, and frequently available treatments for I to III- degree internal hemorrhoids are rubber band ligation (RBL), which causes fibrosis, retraction, and fixation of the hemorrhoidal cushions. RBL technique can be used with or without an endoscope, a suction elastic band ligator, or a forceps ligator. It can also be used with an endoscope with forward-view [17]. The ligation is carried out in the region above the dentate line, which lacks sensory nerves, without the requirement for bowel preparation or sedation. RBL has a success rate ranging from 69% to 97%. Longer follow-up durations have been associated with an increased number of recurrences; however, recurrences can be cured with further sessions, and more treatment sessions can shorten the time until a recurrence.This method has a number of difficulties, which can be categorized as minor or substantial (severe). More frequent and typically regarded as minor problems are minor bleeding, soreness, vaso-vagal sensations, band slippage, priapism, trouble urinating, and anal fissure. Major consequences that have been less frequently documented include extensive bleeding, thrombosed hemorrhoids, excruciating discomfort, and urinary retention requiring catheterization, fistula, and mortality. The most frequent side effects are discomfort and bleeding. An analysis of 39 studies involving 8060 individuals who were submitted to RBL found that 14% of the patients experienced post-banding problems, including severe pain in 5.8% of cases, hemorrhage in 1.7% of cases, infection in 0.05% of cases, and anal fissure and fistula in 0.4% of cases. Some illnesses, including HIV and Crohn's disease, have been listed as contraindications for RBL of hemorrhoids [17, 18]. The advantages of using RBL technique is that it can be easily repeated and frequently provided as a course rather than as an isolated therapy. With no difference in the rate of complications, RBL was more effective than injectable sclerotherapy for all hemorrhoids. Compared to patients who had sclerotherapy, those who received RBL were less likely to need additional treatment.

Injection Sclerotherapy

Sclerotherapy injections have become a common form of treatment for all grades of internal hemorrhoids in a variety of circumstances and co-morbidities. Sclerotherapy injections can be administered while taking note of the hemorrhoid landscape, which helps to minimize risks. The anal cushion will be retracted cranially as a result of submucosal injection at the base of the hemorrhoid with sclerosing drugs such as 5% phenol in oil, vegetable oil, quinine, urea hydrochloride, and hypertonic saline. Several injections are frequently required before the anal cushion is in its usual position. Hemorrhoids in grades I and II should be treated with sclerotherapy. Perivasal injection is the recommended method. Injection mistakes could be problematic. They could lead to ulceration if applied too superficially. Pain and potential strictures result from digging too far into the muscle. Upper abdomen or precordial pain can be experienced after plexus venosus injections. An abscess and periprostatic nerve injury from going too far into the prostate can also lead to erectile dysfunction [19]. It may also be as dangerous as retroperitoneal sepsis [20]. Except in cases of immunodeficiency, sclerotherapy does not require prophylactic antibiotics [21, 22].Sclerotherapy injections is risk-free and does not significantly raise the risk of bleeding. It is a minimally invasive technique, has a low post-procedure pain and patients can return to their normal routine in very less time duration.

Infrared coagulation

Hemorrhoids can be treated without surgery in an outpatient setting with infrared coagulation (IRC). IRC uses infrared radiation as a heat source to quickly coagulate, or clot, the blood veins supplying the hemorrhoids [4]. Single-use flexible fiberoptic probes that are introduced through an endoscope channel can be used to administer IRC. IRC is more frequently carried out with non-endoscopic devices, which include a power unit and a tungsten-halogen light [23, 24]. The hemorrhoidal cushion is put over the infrared light probe, which is then momentarily activated to convert infrared light to heat. The submucosa eventually fibroses as a result of the heat-induced coagulation, necrosis occurs [24]. There are additional methods for achieving coagulation. When electrical current is applied to the tip of a bipolar probe, it flows between the positive and negative electrodes to produce heat [25]. A thermocouple located inside the probe tip of a heater probe emits heat when current is introduced to cause coagulation. In a randomized trial, the heater probe performed worse than the bipolar probe, causing more discomfort, less failures, and a quicker onset of symptom relief [26].IRC is thought to be up to 95% effective for symptoms relief. Infrared coagulation is a simple procedure when compared to rubber band ligation. It is a quick procedure, and efficient outpatient treatment for I and II-degree hemorrhoids and recuperation time is incredibly short.

Doppler-guided Hemorrhoidal artery ligation

Doppler-guided Hemorrhoidal artery ligation, termed as Transanal Hemorrhoidal Dearterialization (THD) created by Morinaga in 1995 is a method which aims to relieve

symptoms without removing the hemorrhoidal plexus or surrounding mucosa [27]. The sites of the Doppler identified arteries around the anorectal perimeter were noted when the proctoscope with the Doppler probe was fully inserted into the anal canal. After that, the proctoscope was removed in order to track the artery distally all the way to the hemorrhoid's peak. Second, in the study forms, the locations of the greatest prolapsing hemorrhoids were noted for future mucopexy. Thirdly, due to progressive ligation and compensating arterial signalling, the Doppler-demonstrated arteries were immediately ligated with a "Z-stitch" at the location of the best signal, which was partially different from the initial site of the best Doppler signalling. The biggest prolapse sites were subsequently treated by a mucopexy using the THD Slide^{TM}, which was reinserted as close as feasible to the specific location of prolapse after the arteries had been fixated. As the mucopexy's closest "fixation site," a "Z-stitch" was created. After tying the knot, the rectal mucosa was exposed by removing the proctoscope's sliding portion so that mucopexy could be carried out under close supervision. In order to save the hemorrhoidal cushion, a running suture was placed up to the apex of the hemorrhoidal cushion. The suture was then delicately knotted when the proctoscope was withdrawn. Reinserted into the distal rectum with the proctoscope and Doppler probe, artery signals across the anal circumference were collected [28]. THD is an effective and safest treatment options for II-to-III-degree hemorrhoids. This method's benefits include no surgical incisions, reduced discomfort, and quick healing.

Laser Hemorrhoidectomy

Hemorrhoid laser ablative therapy appears to have minor side effects. Depending on the amount of time as well as intensity of application, the laser light beam shrinks and degenerates' tissue at various depths. According to recent research, using laser technology to treat hemorrhoids was painless, safe, and produced moderate to complete resolution in a brief period of time [3].The most popular kind of laser for surgical intervention is the Nd-YAG laser (neodymium-Yttrium-aluminum-garnet laser) [29, 30]. According to some research, laser treatment success rates can reach over 95%, and patient satisfaction rates are around the same [31]. In comparison to excisional surgeries, the pain score is relatively low. Following laser hemorrhoidoplasty, recurrence rates ranged from 7.8 to 34% [32]. The majority of studies on laser hemorrhoidoplasty acknowledged that this surgery was more expensive than the other methods for treating hemorrhoids. However, this technique is simple to learn, quickly to execute, effectively resolves symptoms in the short term [3]. Patient satisfaction was higher as a result of laser therapy. A desirable treatment option in the future could be laser therapy.

Table 2: Overview of "Office-based Procedures"

Technique	Indications	Contraindications	Adverse Reactions	Advantages

Injection Sclerotherapy	Grade III hemorrhoids with novel sclerosing agents.Grade I and II hemorrhoids if conservative treatment has failed.	Hemorrhoidal thrombosis Allergic Asthma Pregnancy and Lactation	Impotence Discomfort Bruising Skin discoloration Swelling	Quick recovery Minimally invasive Quick procedure Painless
Laser Hemorrhoidectomy	Only a few selected III-grade hemorrhoids. Grade I and II hemorrhoids.	Fecal incontinence Rectocele Anorectal Chron's disease	Sensation Thrombosis Increased cost Burning	Quick recovery Low postoperative discomfort
Infrared Coagulation	Grade III if conservative treatment has failed and hemorrhoids of Grades I and II.	Renal Diseases Colitis Hemorrhoidal thrombosis Pregnancy Coagulopathy	Urinary incontinence Pain Thrombosis Bleeding	Minimally invasive Quick procedure Effective Painless
Rubber Band Ligation	Grade III if conservative treatment has failed and hemorrhoids of Grades I and II.	Pregnancy Immunodeficiency Anorectal Chron's disease Coagulopathy	Difficulty in Pelvic sepsis Mild Bleeding Urination Pain	Painless Minimally invasive Quick procedure
Doppler Guided Hemorrhoidal Artery Ligation	Only a few selected III-grade hemorrhoids. Grade I and II hemorrhoids.	Anorectal Chron's disease Coagulopathy Rectocele	Increased cost High rate of recurrence	Quick recovery Low postoperative discomfort

Surgical Treatment: The surgery's goal is to remove or eliminate hemorrhoidal tissue. During surgery, both the internal and exterior hemorrhoidal plexuses are removed [5]. It is stated that

people with disorders of grades III and IV must need surgical therapy [33]. The following list includes the different surgical options.

Open Hemorrhoidectomy

This method is the most popular and successful surgical method for the treatment of hemorrhoids [31, 34]. It is the preferred treatment for III- and IV-degree hemorrhoids. Drs. Milligan and Morgan created this technique in the United Kingdom in 1937, primarily for hemorrhoids in degree II to IV. After making a V-shaped cut with a scalpel in the skin around the hemorrhoid's base, the entire hemorrhoid is separated from its bed using scissors in the submucous area. The pedicle is reached, and the distal portion is removed after the pedicle is ligated with strong catgut. Similar procedures are used to treat other hemorrhoids, but a skin bridge is left in between to prevent stenosis. A hemostatic gauze pad is placed in the anal canal, and the wound is left exposed. Anesthesia is used during the procedure, either general or epidural. The most prevalentadverse effects of open hemorrhoidectomy are postoperative discomfort, acute urinary retention, and bleeding. The major advantage of open hemorrhoidectomy is that it reduces the post-operative pain. It is the cost-effective treatment and has faster wound healing in patients. Hence, this method is simple, safe, and affordable[35, 36].

Closed Hemorrhoidectomy

Drs. Ferguson and Heaton introduced the technique in the United States in 1952. It was a modification of the Milligan-Morgan approach. The Milligan-Morgan technique is used in conjunction with this technique. Following surgical removal of the hemorrhoidal tissues, the wounds are completely or partly closed with absorbable running suture in this instance [37].Compared to open methods, closed methods are better for promoting quicker wound healing but offer little benefit for reducing postoperative discomfort. This method does not have any serious drawbacks.

Stapled Hemorrhoidectomy

Circular stapled rectal mucosectomy, often known as the surgical hemorrhoidectomy, is one method that Dr. Antonio Longo proposed as an alternative to in 1998. By cutting off the blood supply to internal hemorrhoids, the new surgical technique aims to diminish the size of the hemorrhoids. This also reduces the size of the vascular cushions and the rectal mucosa to lessen the risk of prolapse. The lack of a perianal incision and the insensitivity of the mucosa on the rectal wall above the dentate line make this surgery less painful thereafter [38]. According to Longo's approach, a stapled hemorrhoidopexy surgery is carried out [39]. Every patient underwent surgery in the lithotomy position. A purse-string suture is positioned 4 cm above the dentate line following the placement of an anal dilator in the anal canal [38, 40]. A circular stapler is then inserted transanally after that. The purse-string suture is fastened to the anvil of the apparatus, which is situated close to it. The linked rectal mucosa is drawn into the stapler as

the suture is retracted. A ring of mucosa close to the hemorrhoids is simultaneously excised by closing the anvil and firing the circular stapler, cutting the blood supply [41]while retaining continuity of the rectal mucosa [42]. To aid in achieving hemostasis, the stapler was maintained shut after closing for 30 seconds. If any bleeding is found after analysis, plans are taken to stop or absorb the bleeding. To avoid post-operative rectal stenosis, there should be a gap between the staple lines of at least 3 to 3.5 cm [43]. Better outcomes and quicker recovery time were seen with stapled hemorrhoidectomy. The majority of surgeons have accepted this treatment since there is less postoperative pain. Stapled hemorrhoidectomy is linked to less problems, quick healing, quicker return to work, and high patient satisfaction [38].

Ligasure Hemorrhoidectomy

A bipolar electrothermal tissue-sealing device called LigaSure can be used to seal blood vessels up to 7 mm in diameter with little collateral tissue damage and only minor tissue charring because the thermal spread is contained to within 2 mm of the surrounding tissues. The hemostasis produced by this device, which employs a current with extreme frequency, is achieved by denaturing the collagen and elastin present in the vessel wall and the surrounding connective tissues [44]. The restricted heat energy spread lessens anal spasm, enables a bloodless hemorrhoidectomy, and speeds up wound healing and post-operative pain relief. Similar to open and closed hemorrhoidectomy, the LigaSure tissue-sealing device is used during the procedure in place of a diathermy. Using the LigaSure device, the hemorrhoids masses are retracted and separated from the internal sphincter, the pedicles are kept away from the internal sphincter, and the resected wound is left open to heal with sufficient skin bridges. It demonstrates that open and closed hemorrhoids can both benefit from LigaSure hemorrhoidectomy for short-term outcomes [44, 45]. When compared to a typical hemorrhoidectomy, the Ligasure Hemorrhoidectomy has various benefits, including a shorter recovery time, less blood loss during the treatment, less post-operative pain, less urine retention, and a shorter hospital stay.

Postoperative stenosis: An uncommon but significant anorectal surgery consequence is anal stenosis post stapled hemorrhoidectomy. Anal stenosis is a disorder in which the anal canal narrows, causing the patient to experience pain and difficulties when passing feaces. Anatomical deformities such as alterations in the anal canal's diameter, the presence of cicatrices, and a loss of the anal canal's elasticity are characteristics of anal stenosis. Patients also express concerns about alterations in the appearance of faeces, clearance issues, feeling uncomfortable after defecating, and discomfort while defecating. Excessive hemorrhoidectomy is the primary cause of anal stenosis in 90% of cases [46]. Furthermore, flat stools and bleeding when defecating were occasionally reported by patients. Some individuals depend on laxatives because they are afraid of discomfort and impacted faeces.The diagnosis is verified through a medical assessment. Based on the degree of the stenosis, a variety of techniques are utilized to manage this ailment, ranging from pharmacological to different surgical operations. For the majority of individuals with mild to severe anal stenosis, medication therapy with fiber supplements or stool softeners would be an

option. For individuals with severe anal stenosis and in the event that medicinal treatment has failed, however, other surgical techniques are performed. A patient with a mild or even moderate degree of anal stenosis may only require lateral sphincterotomy.For more severe situations, different flap anoplasty techniques should be considered to substitute the cicatrized tissues.A potential treatment for severe anal stenosis is diamond-shaped flap anoplasty with partial lateral internal sphincterotomy because it is simple, has a limited risk of complications, a high effectiveness, and is simple to repeat. It also ensures complete patient satisfaction [47].

EMERGING TECHNIQUES

Emborrhoid technique

Endovascular embolization of the superior rectal artery (SRA) is among the newer therapies for hemorrhoids with symptoms. In 2014, Vidal et al. released their "hemborrhoid" therapy, which is based on the idea that ligating the hemorrhoid artery stops hemorrhoids from bleeding [48]. Under local anesthetic, the Seldinger method was used to puncture the femoral artery. For a selective angiography, a guiding catheter (6-F or 7-F) was inserted at the inferior mesenteric artery's origin. In order to accomplish an angiography of the lower mesenteric artery, 10–15 ml of non-ionic iodinated contrast agent was used. Through a 5-F catheter that was positioned precisely above the location where the SRA split into its distal branches, embolization was carried out. The utilization of ordinary metallic coils and non-lysing synthetic polyvinyl alcohol (PVA) particles with hydraulically delivered embolic agents was utilized. The distal branches of the SRA were blocked off using PVA particles with a tiny diameter (0.3 mm). The SRA trunk was then filled with 3-5 mm metallic coils to finish the embolization process. Once the "end point" was reached, endovascular intervention was completed. Following the treatment, a compression bandage was placed over the puncture site, and 8–12 hours of bed rest were advised [49]. SRA embolization appears safe, is theoretically viable, and may be beneficial in relieving hemorrhoid problems, according to preliminary research. Currently, this operation can be viewed as a tool in the surgeon's toolbox for treating this prevalent and incapacitating ailment. To outline the indications and the purpose of this strategy compared to standard treatment and other minimally invasive procedures like sclerotherapy, rubber band ligation, or laser dearterialization, the cost and duration of the hospital stay should also be taken into account [48].The fundamental benefit of the emborrhoid procedure is that the patient has negligible pain. The emborrhoid method has not resulted in any significant problems, particularly none that are ischemia or continence related. In an outpatient setting, this method is accessible. The day after embolization, the patient can resume their normal activities. If necessary, a supplemental treatment may be used after embolization. The procedure can be completed quickly in an hour or less especially if middle rectal artery embolization is not required. Direct anorectal trauma is no longer a risk thanks to embolization.

Sclerobanding

Sclerobanding is a brand-new method for treating II and III-degree hemorrhoidal illness that combines rubber band ligation with 3% polidocanol foam sclerotherapy.To have the clearest

view of the anorectal area and to validate the preoperative staging, the patient is positioned in the lithotomy position. A rubber band is used to ligate the bases of each hemorrhoidal nodule above the dentate line. A biopsy can be taken from any suspicious region and sent for histology. After that, 3% polidocanol foam is injected into the ligated nodule in a volume of 2 or 3 ml. Following the process, the patient is observed for one hour. Stool softeners and analgesics are administered for patients who are in pain or have chronic constipation. Sclerobanding combines both procedures in order to improve efficiency and lessen some of their common side effects [50]. Sclerobanding is currently proven to be a secure and efficient procedure, with a success rate of 78% overall and 86% following a second session [51]. Sclerobanding may offer positive effects in surgical recovery programs since it can be done in an office setting without the need for anesthesia or a formal operating room and has a minimal amount of complications and readmission. II- and III-degree hemorrhoidal illness is treatable safely and affordably by sclerobanding [50].

HeLP

The phrase "Hemorrhoidal Laser Procedure," or "HeLP," refers to a technique that uses a 980-nm diode to shorten the terminal branches of the superior hemorrhoidal artery [52].A 20 MHz Doppler transducer is utilized to precisely locate the superficial arteries at a distance of 2.5 cm above the dentate line. At that level, the 980 nm laser energy generates shrinkage up to a depth of 4 mm, decreasing the blood flow [53]. HeLP has demonstrated to be secure, efficient, and simple to use. Although severe mucosal prolapse has been reported to improve, it's still an efficient substitute for the management of symptomatic hemorrhoids, particularly when bleeding and discomfort are the primary symptoms. This treatment may also be connected to mucopexy or rectoanal repair. This innovative method is based on the same principles as hemorrhoidal artery ligation and transanal hemorrhoidal dearterialization surgeries, however it may be less invasive and not call for general anesthesia [54]. Postoperative bleeding, which occurs in between 5.9% and 8.8% of reported cases and necessitates a hemostatic operation in more than half of them, is the most prevalent intraoperative procedure-related complication [52].HeLP is a novel nonexcisional, minimally invasive therapy for individuals with II- and III-degree hemorrhoids who do not have extensive mucosal prolapse. This method has a rapid recovery period, can be done in a day surgery environment, causes minimal to no intra- or postoperative discomfort, and significantly reduces symptoms.

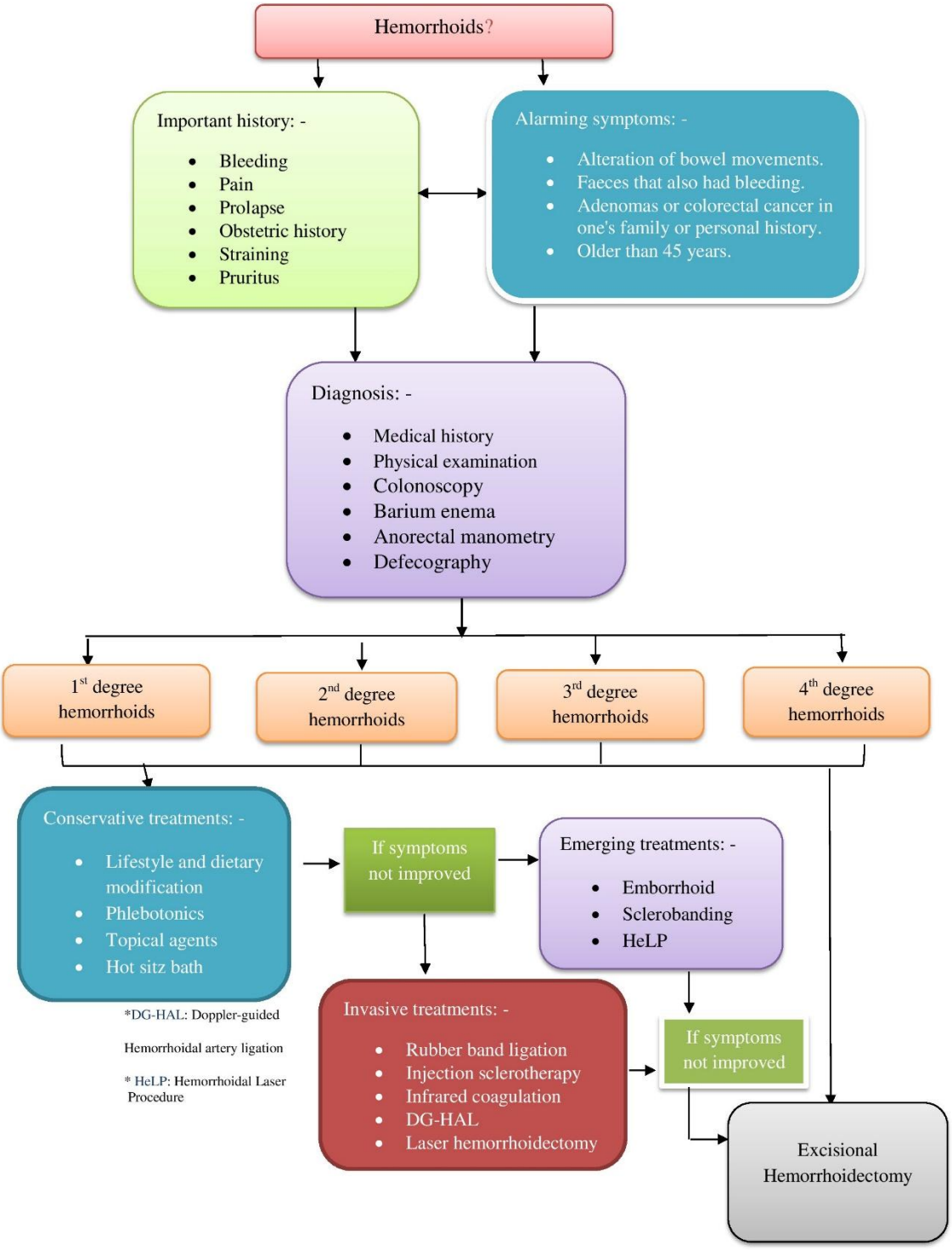

Fig. 3. Algorithm for the treatment and management

CONCLUSION AND FUTURE PROSPECTS

One of the most prevalent anorectal illnesses that negatively affect a person's quality of life is hemorrhoids. Despite the fact that there are medications for treating the symptoms and office treatments for treating Grade I and II problems. Many hemorrhoid patients merely seek confirmation that they do not have more serious pathology and do not need any particular therapy. Surgery should be considered when other treatments are ineffective or when a patient has a higher-grade problem. The most emerging technique currently being used in the treatment of hemorrhoids is Emborrhoid, Sclerobanding, and HeLP.

Although newer methods claim to be less painful, there is still uncertainty about their long-term effectiveness and the likelihood of recurrence. In order to provide each patient with a customized care plan, surgeons treating hemorrhoids should be skilled in a range of procedures. Patients with symptomatic hemorrhoids should be counseled with the benefits and drawbacks of each surgical approach.

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Conflict of Interest:

The authors declare that they have no competing interests.

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List of Abbreviations:

RBL: Rubber Band Ligation, **IRC:** Infrared Coagulation, **THD**: Transanal Hemorrhoidal Dearterilization, **OTC**: Over the Counter, **SRA:** Superior Rectal Artery, **PVA:** Polyvinyl Alcohol, **HeLP:** Hemorrhoidal Laser Procedure, **HAL:** Hemorrhoidal Artery Ligation, **Nd-YAG:** Neodymium-aluminum-garnet Laser