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Comparison of Non-Surgical Methods for Treating Hemorrhoids. A Systemic Review

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Abstract

Introduction and purpose

Hemorrhoidal disease is one of the most common proctological problems worldwide. The etiology of hemorrhoidal disease has not been fully explained. Authors note that lifestyle factors and dietary habits are primarily responsible for hemorrhoidal disease. These include: a low-fiber diet, constipation, a sedentary lifestyle, and suboptimal body position during defecation commonly observed in Western societies. Due to the high prevalence of the disease in the population and the associated decrease in quality of life, outpatient procedural treatments that are highly effective and allow for a quick return to normal activity are very popular among patients. The aim of this study is to discuss non-surgical methods of hemorrhoid treatment.

Material and methods

This paper was based on a review of materials available on PubMed, searched using the following keywords: “hemorrhoids”, “sclerotherapy”, “rubber band ligation”, „infrared coagulation”, „laser hemorrhoidoplasty”, „Doppler guides hemorrhoidal artery ligation”.

Results

In recent years, there has been a significant development in non-surgical techniques for treating hemorrhoids, which are widely used in patients with grade I-III hemorrhoids and can be performed in an outpatient setting or during short hospital stays with the use of regional anesthesia, such as: Sclerotherapy, rubber band ligation, Infrared coagulation, Laser hemorrhoidoplasty, Doppler Guides Hemorrhoidal Artery Ligation.

Conclusion

In conclusion, non-surgical methods for the treatment of hemorrhoids offer a range of effective alternatives to conventional surgery. The choice of treatment should be individualized, taking into account the severity of the hemorrhoidal disease, patient preferences, and the potential for complications.

Introduction

Hemorrhoids are structures composed of vascular plexuses, smooth muscle, and connective tissue, which help maintain resting pressure within the anal canal. Pathological phenomena occurring within these structures, such as blood stasis and dilation, underlie the development of hemorrhoidal disease, which is one of the most common proctological problems in Poland and worldwide. Hemorrhoids are detected in 1 in 3 Americans during screening endoscopic examinations (colonoscopy and sigmoidoscopy). [1]

Due to their anatomy, hemorrhoids are classified into two categories: internal hemorrhoids located above the dentate line and external hemorrhoids located below this line. External hemorrhoids are covered by squamous epithelium and supplied by somatic sensory innervation, which results in pain in the affected area.

Internal hemorrhoids are classified according to their degree of severity:

- Grade I – hemorrhoids visible only on endoscopic examination

- Grade II – hemorrhoids that protrude from the anal canal under increased intra-abdominal pressure but retract spontaneously
- Grade III – hemorrhoids that protrude from the anal canal and can be manually reduced
- Grade IV – hemorrhoids that are outside the anal canal and cannot be manually reduced [2]

The etiology of hemorrhoidal disease remains a topic of speculation. It is hypothesized that elevated pressure in the anal canal and blood stasis in the veins of the lower half of the body play a role in the pathogenesis of the condition. Authors note that lifestyle factors and dietary habits are primarily responsible for hemorrhoidal disease. These include: a low-fiber diet, constipation, a sedentary lifestyle, and suboptimal body position during defecation commonly observed in Western societies.

Hemorrhoidal disease most commonly presents as rectal bleeding, itching, burning, discharge, hemorrhoid prolapse during bowel movements, or a combination of these symptoms. Diagnosis should include both a subjective and a physical examination, including a digital rectal exam or anoscopy. In certain cases, endoscopic examination is recommended, especially with a family history of cancer. Non-pharmacological methods play a crucial role in treatment, involving lifestyle changes—such as increasing fiber intake in the diet, avoiding prolonged sitting on the toilet, and using measures to facilitate bowel movements. [3]

Due to the high prevalence of the disease in the population and the associated decrease in quality of life, outpatient procedural treatments that are highly effective and allow for a quick return to normal activity are very popular among patients.

These methods are most commonly used to treat Grade II and III hemorrhoids, and also as adjunctive treatment for patients with contraindications to surgical treatment of more advanced hemorrhoidal disease.

Sclerotherapy

Sclerotherapy is a treatment technique characterized by submucosal injection of irritating substance called sclerosant. This substance causes inflammation and sclerosis with subsequent obliteration of hemorrhoidal plexus vessels. Different types of sclerosants are used, such as detergents, iodinated substances, osmotic agents. It has become one of the most commonly used office-based methods of treatment of hemorrhoids. It is dedicated to internal

hemorrhoids, mostly of first and second severity degree, however some authors mention use of this method in more advanced hemorrhoids. [4–6]

Clinical practitioners use variety of sclerosants, including aluminum potassium sulfate and tannic acid (ALTA), phenol in almond oil (PAO), polidocanol foam or liquid, 5% quinine and urea, or hypertonic (23.4%) salt solution. [6,4] Studies compared efficacy and safety of mentioned substances. According to Miyamoto et al. [7] ALTA is an effective treatment in second-, third- and fourth degree hemorrhoids. Original work of Hachiro et al. Describes ALTA sclerotherapy as a method with low recurrence rate. [8] PAO may be used in hemorrhoids of first to third degree however it is less effective than ALTA. In a prospective study of Kanellos et al. [9] this method had unsatisfactory recurrence rate.

In comparison to RBL, EIS has a similar efficacy in reducing symptoms of first to third degree hemorrhoids. Both methods are characterized by low frequency of complications. [4]

Study that compared sclerotherapy to a surgical treatment in patients with hemorrhoids at grades III and IV revealed that sclerotherapy had a high efficacy in reducing prolapse (94%) and it was similar to effects of surgery (99%). As a less invasive method sclerotherapy resulted in acceptable 1 year recurrence rate of 16%. [10]

The combination of sclerotherapy with ligation or rectal mucosal fixation is a treatment approach used for managing hemorrhoids, which aims to utilize the benefits of both techniques, potentially leading to better outcomes for patients. Combining treatments can enhance the overall efficacy, particularly in cases where single-modality treatment might be insufficient. Addressing both the hemorrhoidal tissue and the mucosal support can reduce the likelihood of recurrence. [4]

In 2022, a paper was published that evaluated the significance of sclerotherapy as an alternative method for patients whose surgery was postponed due to the COVID-19 pandemic. Scientists evaluated patients with third and fourth-degree bleeding hemorrhoids, in which sclerotherapy using 3% polidocanol foam was performed. An evaluation after 6 months showed an 84 percent effectiveness of this technique. Despite its limited long-term effectiveness, sclerotherapy can be proposed as a bridging method for patients with third and fourth-degree hemorrhoids. [11]

In recent years a new technique of sclerotherapy called cap-assisted endoscopic sclerotherapy (CAES) has emerged. It combines endoscopy with the use of a cap attachment to enhance the delivery and effectiveness of sclerotherapy. It is a promising method that improves the precision of the treatment, especially for challenging cases. [12]

Generally, sclerotherapy is a minimally invasive therapy, however some complications are possible. The most often is pain reported in up to 70% of patients. Studies point out urologic complications such as urinary retention and impotence. [11] Some patients may experience minor bleeding from the injection site, particularly if the hemorrhoid ulcerates. Although rare, there's a risk of infection at the injection site. Most complications are mild and self-limiting, but patients should be monitored for any signs of significant adverse effects. Hemorrhoids might recur after sclerotherapy, especially if the underlying causes are not addressed. Additional treatments or lifestyle changes may be required to manage recurrence. [5]

Rubber band ligation

Rubber band ligation, often abbreviated as EBL (Endoscopic Band Ligation), is a minimally invasive procedure used to treat internal hemorrhoids. It was described in the 1950s and subsequently modified in the 1960s by Barron. It is currently one of the most frequently used techniques in the outpatient treatment of hemorrhoidal disease and is recognized as the safest of the office-based methods used for this condition. It is applicable in the treatment of internal hemorrhoids from the first to the third degree. [13,14] EBL involves placing a tight rubber band around the base of the hemorrhoid to cut off its blood supply, causing it to shrink and eventually fall off. Originally, the procedure was proposed to involve the placement of a single band, but currently, the procedure is performed with the simultaneous application of 2 to even 8 rubber bands. [2]

In a meta-analysis evaluating selected methods for treating hemorrhoidal disease, rubber band ligation was described as somewhat less effective than traditional hemorrhoidectomy, but with a lower rate of complications. Compared to sclerotherapy, rubber band ligation was associated with a lower recurrence rate and a similar frequency of complications. [15]

Original study that evaluated EBL in over 2600 patients with 2nd, 3rd and 4th degree hemorrhoids disclosed that 86,8% of participants was asymptomatic at the end of the treatment, while 84,5% remained asymptomatic after two years. Less than 16% required re-intervention, including again EBL or surgery. The authors described pain as the most common complication, which occurred among about 16% of patients. [16]

Rubber band ligation has been described as an effective treatment method for patients in high-risk groups who have contraindications to anesthesia or surgical procedures, such as patients with hemophilia, pregnant women, or HIV carriers. [17]

In a study comparing procedures with the placement of a single band versus procedures with the simultaneous placement of several bands, it was found that in the latter case, patients more frequently reported pain and local symptoms such as swelling or edema. However, these symptoms were transient. No increased incidence of severe bleeding or peritoneal infection was observed. Therefore, EBL with the simultaneous placement of more than one band is an acceptable method and is associated with fewer repeat treatments. [18]

New versions of the Barron method are being developed. In a study comparing the traditional method with endoscopic ligation using a flexible videoendoscope, the following conclusions were drawn: patients who underwent videoendoscopic elastic band ligation required fewer procedures to achieve the desired effect and a smaller number of bands was used. The rates of complications such as pain and bleeding, as well as the recurrence rate, were similar for both methods. [19]

Many studies have compared EBL and sclerotherapy in terms of effectiveness and safety. One article discusses the use of both methods in patients with liver cirrhosis. Among the patients included, a low recurrence rate was observed (18.3% after EBL, 26.6% after sclerotherapy) and re-bleeding (10% after EBL, 13.33% after sclerotherapy). Patients who underwent EBL experienced pain less frequently. [20]

Different results were obtained in a study conducted among patients of Nigerian hospital, where pain was more severe in those who underwent EBL compared to those who underwent sclerotherapy after the first and second rounds of treatment. The trend was reversed after the third course of treatment. [21]

Comparing both methods, it was shown that EBL has a higher success rate and requires fewer courses of treatment than EIS. [4]

Most frequently occurring complications of RBL are pain and bleeding. The overall complication rate ranges from 3% to 18%. According to various sources, pain occurs with a frequency ranging from 8% to 80%, while bleeding occurs in up to 50% of patients. [5]

Patients who are taking anticoagulant medications are particularly at risk for experiencing bleeding after the procedure including life-threatening hemorrhage. Although rare, there is a risk of infection at the site of the banding. [13]

IRC

Infrared coagulation (IRC) is a minimally invasive procedure used to treat internal hemorrhoids. It involves the use of infrared light to coagulate blood vessels, leading to the shrinkage of hemorrhoidal tissue. According to a randomized clinical trial, the effectiveness of this method in eliminating bleeding and hemorrhoid prolapse depends on the stage of the disease in which it is used. IRC proved to be most effective for first-degree hemorrhoids, followed by second and third degrees, with success rates of 78%, 51%, and 22%, respectively. [5]

A study comparing IRC and EBL in patients with second-degree hemorrhoids showed that IRC was associated with less pain and a quicker return to work, while EBL had greater long-term effectiveness. [22]

IRC can be used as a standalone method or in combination with another form of therapy. The combination of infrared coagulation with oral intake of flavonoids increases treatment effectiveness, as demonstrated in a study by Dimitroulopoulos et al. concurrent use of IRC and oral flavonoids for hemorrhoids from first to third degree resulted in the elimination of bleeding after 5 days in 74.8% of participants. [23]

IRC is effective for treating early-stage hemorrhoids, particularly Grade I and II. The treatment results in significant relief of symptoms such as bleeding, pain, and prolapse. Studies report that IRC achieves satisfactory outcomes in approximately 60-80% of patients. This includes the reduction or elimination of symptoms like bleeding and prolapse. While IRC is effective, it may not be as successful as other methods like rubber band ligation (RBL) for more advanced hemorrhoids (Grade III and IV). IRC is most beneficial for early-stage hemorrhoids and may require additional sessions for complete resolution. [24]

LHP

Laser hemorrhoidoplasty (LHP) is a method in which laser is used to precisely target hemorrhoidal tissue. The laser emits a focused beam of light that generates heat, which coagulates or vaporizes the hemorrhoidal tissue. It is one of the most current methods in hemorrhoids management. In a recent retrospective study, the conditions for performing laser

hemorrhoidoplasty were discussed. The study included 100 patients with third-degree hemorrhoids, of whom 48 underwent laser hemorrhoidoplasty (LH). The average procedure time was 16.5 minutes, and the hospital stay was up to 1 day. Patients returned to normal activities an average of 2.3 days after the procedure. The recurrence rate was 22%. The authors noted that this method minimizes pain, thereby reducing the need for pain-relief medications and their potential side effects. [25]

In a meta-analysis comparing the results of laser hemorrhoidoplasty (LH) and conventional hemorrhoidectomy, attention was also drawn to the lower frequency of post-procedural pain with LH. LH shows an advantage in terms of shorter procedure duration (average difference of 12.65 minutes) and less blood loss (average difference of 19.78 ml). [26]

The authors of the study comparing the Milligan-Morgan hemorrhoidectomy method with laser hemorrhoidoplasty presented the following conclusions: during a follow-up period of 25 ± 8 months, patients who underwent LHP had a higher recurrence rate of hemorrhoidal disease symptoms (21.6% compared to 7.8%) and a higher recurrence rate of hemorrhoid prolapse (18.8% compared to 1.1%) in comparison to patients after Milligan-Morgan hemorrhoidectomy. On the other hand, cases of anal stenosis were observed in those who underwent traditional hemorrhoidectomy, whereas no such cases were reported in those who underwent LHP. At 25 ± 8 months, 95.9% of patients in the LHP group said they would be willing to repeat the procedure if their hemorrhoidal disease persisted or recurred, compared to 59% of patients in the MM group. [27]

A retrospective evaluation of 103 patients who underwent laser hemorrhoidoplasty revealed that no intraoperative complications were observed. Postoperative complications occurred in 3 (2.9%) patients, which included bleeding requiring hospitalization in 1 patient, bleeding and pain in 1 patient, and headache in 1 patient secondary to spinal anesthesia. [28]

DGHAL

Doppler Guides Hemorrhoidal Artery Ligation involves selectively ligating the blood vessels supplying the hemorrhoids. A Doppler probe is used to identify the vessels. The procedure is most commonly performed under spinal or general anesthesia in the lithotomy position using a specially designed anoscope. [29]

In a two-center study conducted in Poland and Austria, DGHAL treatment was performed on patients with second to fourth-degree hemorrhoids and was evaluated as a safe and effective method that could serve as an alternative to conventional hemorrhoidectomy. However, the authors noted that the effectiveness of the applied method varied depending on the severity of the disease. A good or very good outcome was achieved in 92.4% of patients with stage II hemorrhoids, 84% with stage III, and 41% with stage IV. [30]

A study conducted in the Netherlands compared the effectiveness of DGHAL to RBL. After one course of treatment, improvement in symptoms was observed in 67% of patients who underwent DGHAL and 79% of patients who underwent RBL. During the follow-up period, 18% of patients after DGHAL required re-intervention compared to 6% of patients after RBL. The authors concluded that, despite its low mortality rate, DGHAL is a method reserved for patients with less advanced hemorrhoids. The role of DGHAL lies somewhere between outpatient methods, such as coagulation or sclerotherapy, and advanced surgical techniques. [31]

Conclusion

In conclusion, non-surgical methods for the treatment of hemorrhoids, including sclerotherapy, rubber band ligation (RBL), laser hemorrhoidoplasty, infrared coagulation (IRC), and Doppler-guided hemorrhoidal artery ligation (DGHAL), offer a range of effective alternatives to conventional surgery. Each method has its own strengths and limitations, making them suitable for different stages of hemorrhoidal disease and patient profiles. Overall, the choice of treatment should be individualized, taking into account the severity of the hemorrhoidal disease, patient preferences, and the potential for complications. These non-surgical methods provide valuable options for managing hemorrhoids with a focus on minimizing discomfort and promoting quicker recovery, while surgical options remain a necessity for more advanced or refractory cases.

Disclosure:

Authors' contribution:

Conceptualization: Nadia Miga-Orczykowska

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