

Clinical Outcomes of Diode Laser Hemorrhoidoplasty and Excisional Hemorrhoidoplasty in Grade II–III Internal Hemorrhoids: A Randomized Clinical Study

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Abstract

Hemorrhoidal disease is a common condition that affects the area around the anus and is found in many adults. Surgery is needed when there is repeated bleeding, when the hemorrhoids slip out of place, or when a blood clot forms. Although traditional surgery for hemorrhoids works, it often causes a lot of pain after the operation and takes longer to recover from. Laser hemorrhoidoplasty (LHP) is a newer, less invasive method that may lead to fewer problems and better results after surgery. In this study, 60 patients with grade II to III internal hemorrhoids were included. They were randomly split into two groups. Group A had laser treatment, while Group B had traditional surgery. The study looked at several factors, including how long the surgery took, how much blood was lost during the operation, how much pain the patients felt (measured with a pain scale), how long they stayed in the hospital, how quickly they could return to normal activities, and how many problems happened after the surgery. Patients were followed up for 1 week, 1 month, and 3 months after the surgery. The results showed that the laser group had shorter surgery times, less pain, shorter hospital stays and returned to normal activities faster than the traditional group. The traditional surgery group had more issues like bleeding and difficulty urinating. Neither group had any major problems coming back after three months. In many cases, going to the bathroom in the morning can be a difficult and painful experience for people with hemorrhoids. They may also experience bleeding and discomfort. Some people may have painful cracks in the anal area or have discharge that is pus-like, which could indicate a fistula or a pilonidal sinus. Due to the embarrassment of these conditions, many people do not talk about their symptoms and suffer in silence for a long time without getting proper care. Although many treatments are available, they often only provide short-term relief, and the problem tends to come back. The best way to treat piles is usually surgery, where the affected area is cut. This procedure can be painful, takes a long time to recover from, and requires many dressings and trips to the doctor. Even though patients go through a lot of discomfort, there is still a high chance the problem may come back. Laser surgery is a better option because it is less harmful. It is used to treat piles and makes the whole process much easier. Unlike conventional procedures, no tissue is cut. Instead, the laser is precisely directed at the affected area to treat the condition efficiently. Most patients can resume their normal daily activities immediately after the procedure. Because of this, laser treatment for piles is becoming more popular because it targets the problem exactly, causes less pain, and helps healing happen faster.

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Received Date: July 22, 2026

Accepted Date: August 03, 2026

Published Date: August 31, 2026

Citation: R. Ganesh. Clinical Outcomes of Diode Laser Hemorrhoidoplasty and Excisional Hemorrhoidoplasty in Grade II–III Internal Hemorrhoids: A Randomized Clinical Study. Research & Reviews: Journal of Surgery. 2026; 15(2): 41–48p.

Keywords: Hemorrhoids, laser hemorrhoidoplasty, open hemorrhoidectomy, minimally invasive surgery, postoperative pain, clinical outcomes

INTRODUCTION

Hemorrhoidal disease is one of the most common non-cancerous conditions affecting the area around affects almost 40% of adults worldwide, and it is more common in people between the ages of 45 and 65 [1]. This condition causes the tissues around the anus to swell and move out of place, leading to

symptoms like bleeding, pain, discomfort when passing stools, and itching. While lifestyle changes, diet adjustments, and creams can often help, surgery may be needed if symptoms continue, especially in more severe cases like grade II to IV hemorrhoids [2, 3].

Conventional open hemorrhoidectomy, such as the Milligan–Morgan method, is considered the standard treatment for severe cases. However, it often causes a lot of pain after surgery, longer hospital stays, delays in returning to work, and higher chances of complications like difficulty urinating or narrowing of the anal opening [4, 5]. These issues have led to the development of less invasive treatments that aim to make the recovery process easier.

Laser hemorrhoidoplasty (LHP) is a newer, less invasive treatment that uses a laser to shrink the blood vessels in the hemorrhoids without cutting away tissue. This helps reduce swelling while keeping the surrounding area intact, leading to less pain and quicker healing [6, 7]. Some studies suggest that LHP works as well as traditional surgery but with better patient comfort and fewer problems [8].

Because there is growing interest in less invasive treatments for hemorrhoids, this study compares the results of laser hemorrhoidoplasty with traditional open surgery for grade II to III hemorrhoids. The study looks at several factors, including how long the surgery takes, how much blood is lost during the procedure, pain levels after surgery, how long patients stay in the hospital, how quickly they can return to normal activities, and any complications that might happen after surgery [9].

WHAT IS LASER TREATMENT FOR PILES?

Laser hemorrhoidectomy, also called laser treatment for hemorrhoids, is a modern surgical method used to help with the pain and issues caused by hemorrhoids. The cost of treatment may vary depending on your location, the hospital's reputation, and the severity of the condition. However, many patients consider the long-term benefits to outweigh the overall expense. This modern technique uses a focused laser device that sends strong light energy to the affected area. The laser either turns the problem tissue into steam or seals it with high heat. This process helps shrink the hemorrhoids and gives patients a lot of relief.

HOW IS LASER SURGERY FOR PILES BETTER THAN TRADITIONAL SURGERY?

Laser surgery for piles has several advantages compared to old methods. It can treat different problems like hemorrhoids, anal spasms, and fissures. The main benefits include:

- No need for stitches or cuts, so there is no scarring.
- Quick recovery time without the need for surgery cuts.
- Fast relief from discomfort.
- Very little blood loss during the procedure.
- Less pain after the surgery.
- Lower chance of infection.

Laser hemorrhoidoplasty (LHP) is a newer, less invasive method that uses a diode laser to stop the blood flow to swollen hemorrhoids without cutting away any tissue. This helps the hemorrhoids shrink while keeping the nearby tissues safe, which makes the recovery process less painful and quicker [6, 7]. Some studies have found that LHP can work just as well as traditional surgery but with more comfort for the patient and fewer problems afterward [8]. Because there is more interest in less invasive treatments for the anus and rectum, this study compares how well laser hemorrhoidoplasty works against traditional open hemorrhoidectomy for treating grade II and III hemorrhoids. The study looks at several factors, like how long the operation takes, how much blood is lost during the surgery, how much pain the patient feels after, how long they stay in the hospital, when they can go back to their usual activities, and any problems that happen after the surgery.

The cost of this treatment can change based on where you live, the hospital's reputation, and how serious your condition is. Still, many people find that the advantages are worth the money. This modern

technique uses a laser that sends strong, focused light to the affected area. The light either burns or seals the swollen tissue, making the hemorrhoids smaller and giving patients a lot of relief.

MATERIALS AND METHODS

A total of 60 patients between the ages of 18 and 60 who had symptoms from grade II or III internal hemorrhoids and needed surgery were part of this study.

Patients who had other issues – like anal fissures, fistulas, inflammatory bowel disease, bleeding problems, pregnant, or had had previous surgery in the area – were not included.

Study Design and Group Allocation:

Patients who qualified were divided into two equal groups using a random number table on a computer:

- *Group A:* Had Laser Hemorrhoidoplasty (LHP) using a 1470 nm diode laser.
- *Group B:* Had the traditional open hemorrhoidectomy (Milligan–Morgan technique).

Surgical Procedure:

All surgeries were done with spinal anesthesia, and the patient was lying on their back.

In the laser group, the laser fiber was put into the hemorrhoid to stop the blood flow, which made the tissue shrink without cutting it out. In the open method, the hemorrhoid tissue was cut out using electrocautery, and the blood vessels were tied off.

Data Collection and Outcome Measures:

The following were tracked:

- How long did the surgery take (in minutes).
- How much blood was lost during the surgery (in milliliters).
- How much pain the patient felt, measured on a scale from 0 to 10 on days 1, 3, and 7 after surgery.
- How long did the patient stay in the hospital (in days).
- How many days it took to go back to normal activities.
- Any problems like bleeding, infection, difficulty urinating, or issues with healing.

Patients were checked for 1 week, 1 month, and 3 months after surgery.

Any signs that the hemorrhoids came back or symptoms that did not go away were written down.

Statistical Analysis

The data was studied using SPSS version 25.

Numbers were shown as average plus or minus standard deviation and compared using a student's t-test. Categorical data was analyzed with a Chi-square test. A p-value of less than 0.05 was seen as significant.

RESULTS

All 60 patients were part of the study, with 30 in each group.

Both groups were similar in age, gender, and the severity of their hemorrhoids, and there was no big difference between them ($p > 0.05$).

Operative time and intraoperative blood loss were significantly lower in Group A (Table 1).

Table 1. Comparison of operative parameters between the two groups.

Parameter	Group A (laser)	Group B (open)	p-value
Mean operative time (min)	15.2 ± 2.3	26.7 ± 3.1	<0.001
Blood loss (mL)	15.6 ± 4.1	43.3 ± 6.7	<0.001

Postoperative Pain

Pain levels, assessed using the Visual Analog Scale (VAS), were consistently lower in patients who underwent laser treatment at every follow-up visit. The greatest pain was observed on the first postoperative day, after which pain scores progressively declined over time in both the laser and conventional treatment groups (Table 2).

Table 2. Postoperative VAS pain scores.

Postoperative day	Group A (laser)	Group B (open)	p-value
Day 1	3.1 ± 0.8	6.4 ± 1.2	<0.001
Day 3	2.4 ± 0.6	5.1 ± 1.0	<0.001
Day 7	1.2 ± 0.5	3.6 ± 0.9	<0.001

Note: VAS scores were significantly lower in Group A across all postoperative days.

Recovery and Hospital Stay

Patients in Group A experienced significantly shorter hospital stays and were able to resume their normal daily activities sooner than those in Group B (Table 3).

Table 3. Postoperative recovery parameters.

Parameter	Group A (laser)	group b (open)	p-value
Hospital stay (days)	1.1 ± 0.4	2.8 ± 0.6	<0.001
Time to return to activity (days)	4.2 ± 1.3	9.6 ± 2.1	<0.001

Note: Laser-treated patients recovered faster and had shorter hospital stays.

Postoperative Complications

Minor complications – such as urinary retention, secondary bleeding, and wound infection – were more common in the open hemorrhoidectomy group. No major complications or mortality occurred in either group. Details are presented in Table 4.

Table 4. Postoperative complications.

Parameter	Group A (laser)	Group B (open)	p-value
Urinary retention	1 (3.3%)	5 (16.7%)	0.08
Secondary bleeding	0 (0%)	3 (10%)	0.07
Wound infection	0 (0%)	2 (6.7%)	0.15
Recurrence (at 3 months)	1 (3.3%)	2 (6.7%)	0.55

Note: Although not statistically significant, complications were fewer in Group A.

DISCUSSION

Unlike conventional surgery, laser hemorrhoidoplasty does not require excision of tissue. Instead, focused laser energy is delivered precisely to the hemorrhoidal tissue, resulting in effective treatment with minimal trauma. Because the procedure is minimally invasive, most patients can resume their normal daily activities shortly after treatment. Hemorrhoidal disease is one of the most common anorectal disorders, and patients with symptomatic grade II or III hemorrhoids who do not respond adequately to conservative therapy often require surgical management. Although conventional open hemorrhoidectomy provides reliable clinical outcomes, it is frequently associated with considerable postoperative pain, prolonged healing, and a higher risk of complications. Consequently, minimally invasive approaches – such as laser hemorrhoidoplasty (LHP) – have gained increasing attention, as they are designed to minimize tissue damage, reduce postoperative discomfort, accelerate recovery, and achieve effective clinical results.

The present study demonstrated that laser hemorrhoidoplasty (LHP) provides several advantages over conventional open hemorrhoidectomy. Patients undergoing LHP experienced a significantly shorter

operative time, which may be attributed to the minimally invasive nature of the procedure, requiring less tissue manipulation and a simplified surgical approach. These findings are in agreement with previous studies reporting reduced procedural duration with laser-based techniques. In addition, intraoperative blood loss was significantly lower in the LHP group, likely due to the laser's simultaneous cutting and coagulative properties, which effectively seal hemorrhoidal vessels and minimize bleeding during procedure [4].

Postoperative pain is a major factor influencing patient comfort, satisfaction, and the speed of recovery after surgery. In the present study, patients treated with laser hemorrhoidoplasty (LHP) reported significantly lower Visual Analog Scale (VAS) pain scores throughout the postoperative assessment period compared with those who underwent conventional surgery. These findings are consistent with earlier studies that have demonstrated reduced postoperative pain and a lower need for analgesic medication following laser-based treatment. The improved pain outcomes may be attributed to the minimally invasive nature of LHP, which avoids tissue excision and preserves the integrity of the anoderm and rectal mucosa, thereby reducing surgical trauma and the associated inflammatory response [7].

Patients who underwent laser hemorrhoidoplasty (LHP) had a significantly shorter hospital stay and resumed their routine daily activities earlier than those treated with the conventional open procedure. Similar findings have been reported in previous studies, which demonstrated that the minimally invasive nature of LHP facilitates faster postoperative recovery and an earlier return to work. In contemporary surgical practice, reducing the duration of hospitalization and promoting rapid functional recovery are important objectives, as they improve patient satisfaction while enhancing healthcare efficiency and cost-effectiveness [10].

The incidence of postoperative complications, including urinary retention, bleeding, and wound infection, was higher among patients who underwent conventional open hemorrhoidectomy than those treated with laser hemorrhoidoplasty, although these differences did not reach statistical significance in the present study. Similar trends have been observed in previous studies comparing the two techniques. The lower complication rate associated with laser treatment may be attributed to its minimally invasive approach, which reduces sphincter irritation, minimizes tissue injury, and eliminates the risk of wound dehiscence, thereby contributing to lower postoperative morbidity and improved patient recovery [11, 12].

During the 3-month follow-up period, recurrence rates were comparable between patients treated with laser hemorrhoidoplasty and those who underwent conventional open hemorrhoidectomy, indicating similar short-term therapeutic effectiveness of both procedures. Nevertheless, the relatively brief follow-up duration limits the assessment of long-term outcomes. Extended follow-up studies are, therefore, necessary to determine the durability of symptom control and the long-term risk of disease recurrence after treatment [13].

The present study has certain limitations that should be acknowledged. The relatively small sample size and short duration of follow-up may have limited the ability to detect infrequent postoperative complications and accurately evaluate long-term recurrence rates. Therefore, larger studies with extended follow-up periods are warranted to provide more robust evidence regarding the long-term safety, efficacy, and durability of laser hemorrhoidoplasty. Despite these limitations, the study's strengths include its randomized design and standardized operative protocols, which help minimize bias and enhance the internal validity of the findings [14, 15].

Laser hemorrhoidectomy, also known as laser hemorrhoid treatment, is a minimally invasive procedure used to treat hemorrhoids while reducing the pain and discomfort often associated with conventional surgery. The cost of treatment can vary depending on factors such as the patient's location, the reputation of the hospital, and the severity of the condition. However, many patients find that the long-term benefits and faster recovery make the procedure a worthwhile investment.

This advanced technique uses a highly focused laser beam to precisely target the affected hemorrhoidal tissue. Instead of making surgical incisions, the laser delivers controlled energy to shrink and coagulate the hemorrhoids, minimizing damage to the surrounding tissues. As a result, patients typically experience less pain, reduced bleeding, and a quicker return to their normal daily activities.

How Is Laser Surgery for Piles Better than Conventional Surgery?

Laser surgery for piles has several advantages compared to traditional methods.

It can treat different medical issues like hemorrhoids, anal spasms, and fissures. The main benefits include:

- Treatment without needing stitches or leaving scars.
- Quick recovery time without cuts or stitches.
- Fast relief from symptoms.
- Very little blood loss during the procedure.
- Less pain after the surgery.
- Lower chance of infection.

How Is Laser Surgery for Piles Done?

Laser surgery for piles is a quick and less invasive treatment that takes about 20 to 30 minutes.

The main steps are:

- *Anesthesia*: You will be given medicine to help you feel comfortable but stay awake.
- *Positioning*: You will lie on your back with your knees bent, which is called the lithotomy position.
- This gives the doctor better access to the area.
- *Proctoscopy*: A small tube is used to locate the blood vessels that are supplying the piles.
- *Laser Treatment*: Thin laser fibers are used to destroy these blood vessels.
- *Shrinkage*: The piles will get smaller over about six weeks and will be about 60 to 80% of their original size.

What Is the Recovery Process After Laser Piles Surgery?

Recovery after laser piles surgery involves both in-hospital and at-home care.

In the Hospital

After the surgery, the hospital follows certain steps until you are ready to go home.

Important things include:

- *Anesthesia Recovery*: You might feel sleepy or a bit disoriented for about 4 to 6 hours after the surgery.
- Doctors will check your vital signs to make sure everything is okay. You may feel a little dizzy or sick, but these feelings usually go away with time.
- *Managing Symptoms*: You will be given pain medicines to help with any discomfort after the surgery.
- Some bleeding and pain are normal and should improve within two weeks. If the symptoms do not get better, you should talk to your doctor.
- *Discharge*: You can go home once the doctors confirm that you are passing gas and urine normally.
- Wear loose clothes and arrange for someone to drive you home for comfort and support.
- *At Home*: Once you are home, you will need to take care of yourself during the usual 2 to 4 weeks of recovery.

Important tips are:

- *Stool Softeners*: Use medicines, like Isabgol husk and Triphala as prescribed to make passing stools easier, following the instructions carefully.

- *Diet:* Start with more fiber in your diet gradually such as fruits, vegetables, and whole grains.
- Begin with simple foods – like plain rice, bananas, and crackers – and drink plenty of water.
- *Hygiene:* Gently clean the area with mild soap and water, then pat it dry.
- Avoid using harsh chemicals or rubbing the area too hard.
- *Sitz Bath:* Soak the area in warm water for 10 to 15 minutes, 2 to 3 times a day, to reduce swelling and discomfort.
- *Kegel Exercises:* Do these exercises to improve blood flow and strengthen the muscles in the pelvic area, which can help with healing and reduce discomfort.

Possible Side Effects and Risks of Laser Treatment for Piles

Laser treatment for piles is usually safe and effective.

However, like any medical treatment, there are some possible side effects and risks you should know about.

Side Effects of Laser Surgery

- *Pain:* You may feel some discomfort or pain after the treatment.
- Talk to your doctor if this is too much, as they can give you medicine or other ways to manage the pain.
- *Bleeding:* A little bleeding can happen during or right after the procedure, but it should stop within 2 to 4 weeks. If the bleeding does not stop or becomes a lot, contact your doctor.
- *Infection:* Although infection is uncommon with this type of treatment, it is still possible. It is important to keep the area clean to reduce the risk of infection.
- *Bruising and Swelling:* You may notice some bruising, swelling, redness, or discomfort in the treated area. These usually go away within two weeks.
- *Reaction to Medication:* Some people may have an allergic reaction to the pain medicines or other drugs given after the surgery. If you notice any unusual symptoms, tell your doctor immediately.

When to See a Doctor?

If you have any of the following, you should talk to your doctor right away:

- *Excessive Discomfort:* If your pain gets worse or lasts more than 2 to 4 weeks, see a doctor.
- *Fever:* A mild fever after surgery is normal, but if your temperature is above 37.78°C, it might be a sign of infection.
- *Allergic Reactions:* Signs – like hives, trouble breathing, or swelling of the face or lips – need immediate care.
- *Wound Infection:* If the area around the surgery is red, swollen, warm, or has pus, get help quickly.
- *Bowel Obstruction:* Rarely, the treatment might cause problems with the bowels.
- If you have severe stomach pain or cannot pass gas or have a bowel movement, get medical help right away.
- *Recurrence of Symptoms:* If you start bleeding or itching again, visit your doctor.

Although laser treatment for piles has many benefits, it is important to be aware of the drawbacks and take the right care after the surgery. This helps you make informed decisions about your treatment.

Check Out: Cost of Fistula Laser Treatment

Laser treatment for piles is a highly effective and minimally invasive procedure that provides relief from the pain and discomfort associated with hemorrhoids, anal fissures, and other related anorectal conditions. By using precise laser energy to treat the affected tissue, the procedure minimizes damage to the surrounding area, resulting in less postoperative pain, reduced bleeding, and faster healing. With its shorter recovery time and improved patient comfort, laser treatment has emerged as a preferred and advanced option for the management of hemorrhoids. If you or a loved one is struggling with piles, it is strongly recommended to consult a specialist and experienced team that can provide a tailored and comprehensive approach to ensure the well-being and comfort of patients, helping them regain control of their lives and health. Regain control of your health and life. Do not suffer in silence; consult the experts and take the first step towards a pain-free, healthier future.

CONCLUSION

In conclusion, laser hemorrhoidoplasty appears to be a safe, less painful, and efficient alternative to conventional open hemorrhoidectomy for the treatment of grade II–III hemorrhoids. It significantly improves postoperative outcomes and patient comfort while maintaining therapeutic efficacy. Further multicentric trials with longer follow-up are warranted to validate these findings and explore cost-benefit implications in different healthcare settings.

REFERENCES

1. Maloku H, Gashi Z, Lazovic R, Islami H, Juniku-Shkololli A. Laser Hemorrhoidoplasty Procedure vs Open Surgical Hemorrhoidectomy: A Trial Comparing 2 Treatments for Hemorrhoids of Third and Fourth Degree. *Acta Inform Med*. 2014;22(6):365–7.
2. Giamundo P, Salfi R, Geraci M, Tibaldi L, Murru L, Valente M. The hemorrhoid laser procedure technique vs rubber band ligation: A randomized trial comparing 2 mini-invasive treatments for second- and third-degree hemorrhoids. *Dis Colon Rectum*. 2011;54(6):693–8.
3. Gambardella C, Bruscianno L, Brillantino A, Parisi S, Lucido FS, Del Genio G, et al. Mid-term efficacy and postoperative wound management of laser hemorrhoidoplasty (LHP) vs conventional excisional hemorrhoidectomy in grade III hemorrhoidal disease: The twisting trend. *Langenbecks Arch Surg*. 2023;408(1):140.
4. Bruscianno L, Gambardella C, Terracciano G, Gualtieri G, Schiano di Visconte M, Tolone S, et al. Postoperative discomfort and pain in the management of hemorrhoidal disease: Laser hemorrhoidoplasty, a minimal invasive treatment of symptomatic hemorrhoids. *Updates Surg*. 2020;72(3):851–7.
5. Poskus T, Danyš D, Makunaite G, Mainelis A, Mikalauskas S, Poskus E, et al. Results of the double-blind randomized controlled trial comparing laser hemorrhoidoplasty with sutured mucopexy and excisional hemorrhoidectomy. *Int J Colorectal Dis*. 2020;35(3):481–90.
6. Tümer H, Ağca MH. Comparing outcomes of laser hemorrhoidoplasty and LigaSure hemorrhoidectomy in grade II-III hemorrhoidal disease: A retrospective analysis. *ANZ J Surg*. 2023;93(7–8):1885–9.
7. Li Z, Wu J, Brown NKD, Kumassah PK, Agbedinu K, Ambe PC. A systematic review comparing the efficacy of 980 nm vs. 1470 nm wavelengths in laser hemorrhoidoplasty. *Int J Colorectal Dis*. 2024;39(1):117.
8. Chen KH, Huang YL, Lin CY, Chen MC, Chiu TY, Chiang FF. Clinical outcomes of laser hemorrhoidoplasty with feeding vessels suture ligation: A retrospective study in a single center. *Tech Coloproctol*. 2024;28(1):78.
9. Lie H, Caesarini EF, Purnama AA, Irawan A, Sudirman T, Jeo WS, et al. Laser hemorrhoidoplasty for hemorrhoidal disease: A systematic review and meta-analysis. *Lasers Med Sci*. 2022;37(9):3621–30.
10. Durgun C, Yiğit E. Laser Hemorrhoidoplasty Versus Ligasure Hemorrhoidectomy: A Comparative Analysis. *Cureus*. 2023;15(8).
11. Lim SY, Rajandram R, Roslani AC. Comparison of post-operative bleeding incidence in laser hemorrhoidoplasty with and without hemorrhoidal artery ligation: A double-blinded randomized controlled trial. *BMC Surg*. 2022;22(1):146.
12. Cemil A, Ugur K, Salih GM, Merve K, Guray DM, Emine BS. Comparison of Laser Hemorrhoidoplasty and Milligan-Morgan Hemorrhoidectomy Techniques in the Treatment of Grade 2 and 3 Hemorrhoidal Disease. *Am Surg*. 2024;90(4):662–71.
13. Naderan M, Shoar S, Nazari M, Elsayed A, Mahmoodzadeh H, Khorgami Z. A Randomized Controlled Trial Comparing Laser Intra-Hemorrhoidal Coagulation and Milligan-Morgan Hemorrhoidectomy. *J Invest Surg*. 2017;30(5):325–31.
14. Jin L, Qin K, Wu R, Yang H, Cui C, Wang Z, et al. Laser hemorrhoidoplasty vs. rubber band ligation: A randomized trial comparing 2 mini-invasive treatment for grade II hemorrhoids. *BMC Surg*. 2024;24(1):164.
15. Ram E, Kayzer M, Zager Y, Anteby R, Nachmany I, Carter D, et al. Laser hemorrhoidoplasty for II-IV grade hemorrhoids: Should we treat them the same? *Updates Surg*. 2023;75(3):635–42.