

Review Article

Research and Analysis on the Progress of Surgical Treatment for Mixed Hemorrhoids

Bingqiang Shi¹ , Yongfa Zhi^{1,*} , Qing Zhou¹ , Wenyu Niu¹ , Yi Zhang¹ ,
Mingjie Ma¹ , Chunfang Zhao¹ , Xiaode Ren¹ , Le Yue² 

¹Department of Gastrointestinal and Anorectal Surgery, Qinghai Red Cross Hospital, Xining, China

²Department of Hemodialysis, Fifth People's Hospital of Qinghai Province, Xining, China

Abstract

Mixed hemorrhoids is one of the common and frequently occurring diseases in anorectal department. In the early stage, the symptoms are mild or even asymptomatic. In most cases, conservative treatment with medical drugs can be used to improve the symptoms. However, with the development of the disease, the symptoms will gradually become obvious, and the effect of conservative medical treatment will become worse. For mixed hemorrhoids in stages III and IV, surgery is often required in the end. At present, there are various surgical treatments for mixed hemorrhoids. The traditional mixed hemorrhoids external dissection and internal ligation, closed hemorrhoidectomy, and simple external hemorrhoidectomy are mainly used. With the development of technology, the experience is constantly summarized and the surgical methods are improved, such as circular hemorrhoidectomy, selective hemorrhoidectomy, ligation, etc. The surgical treatment of mixed hemorrhoids has gradually changed from the traditional simple removal of hemorrhoid tissue to a new mode based on correcting the hypertrophy of pathological tissue and preserving the complete anal pad tissue. This article will explore the application status, advantages and disadvantages of traditional surgery and minimally invasive surgery in the treatment of mixed hemorrhoids, and analyze the applicability of different surgical methods for patients with different disease severity. By searching and reviewing the relevant literatures at home and abroad in recent years, this paper systematically reviews the latest progress of surgical treatment of mixed hemorrhoids, so as to provide scientific basis and reference value for clinical treatment.

Keywords

Mixed Hemorrhoids, External Stripping and Internal Ligation, Circumcision of Hemorrhoids, Selective Hemorrhoids Mucosa Anastomosis, Minimally Invasive Surgery, Postoperative Complications

1. Introduction

Mixed hemorrhoids are among the most common diseases in the anorectal department, with a significant incidence rate among anorectal diseases [1, 2]. A global epidemiological study indicated that hemorrhoids affect 4.40% of the global

population, with an incidence rate of approximately 49.14%, making it the most prevalent anorectal disease worldwide. In China, anorectal diseases account for 51.14% of the surveyed population, and hemorrhoids have the highest incidence at

*Corresponding author: zyfyd970@163.com (Yongfa Zhi)

Received: 23 November 2025; **Accepted:** 3 December 2025; **Published:** 20 December 2025



Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

50.28% [3]. Mixed hemorrhoids have become a significant health issue that affects patients' quality of life [4]. The primary symptoms include hematochezia, a sensation of an anal foreign body, and swelling and pain. If left untreated, it may impair the physiological function of the rectum and anorectal tissues, potentially causing irreversible damage to the anal sphincter's function. Although mild mixed hemorrhoids can achieve a certain degree of cure through conservative treatment, the effectiveness of conservative treatment for moderate to severe cases is generally poor, leading to surgical treatment becoming the primary method due to its clear curative effects [5]. With the ongoing advancements in medical technology, the surgical approach for mixed hemorrhoids has shifted from the traditional simple excision of hemorrhoid tissue to a new method that focuses on correcting the hypertrophy of pathological tissue while preserving the integrity of the anal pad tissue [6]. This evolution not only reflects the modernization of surgical treatment concepts but also offers patients more personalized and safer treatment options. Therefore, an in-depth study of the progress in mixed hemorrhoids surgery is crucial for enhancing clinical treatment outcomes and improving patients' quality of life.

2. Traditional Surgical Treatment

2.1. Closed Hemorrhoidectomy (Whitehead)

In 1882, Walter Whitehead, a British surgeon, first reported the treatment of circumferential mixed hemorrhoids by circular resection of the anal mucosa and hemorrhoid tissue. Hemorrhoidectomy is one of the earliest surgical methods for the treatment of mixed hemorrhoids [7]. This surgical method mainly uses hemostatic forceps to lift the skin on the anal edge, make a circular incision 0.5cm below the dentate line, reaching the subcutaneous fat layer, and then make a second circular incision 2-3cm above the dentate line (above the internal hemorrhoids). The two incisions form a circular mucosa hemorrhoid tissue strip. Finally, the circular dissection of tissue - use tissue scissors to separate the hemorrhoids, hyperplastic mucosa and anal sphincter (sphincter) along the submucosa between the two incisions. Internal sphincter was completely dissected. Anastomotic mucosal stump - pull down the upper mucosal stump (above the dentate line), align it with the lower skin stump (below the dentate line), and close the circular wound with continuous suture or intermittent suture. The advantages of this surgical method are simple operation, complete removal of mixed hemorrhoids, grade IV everted hemorrhoids, and low recurrence rate of postoperative mixed hemorrhoids. The disadvantages are large surgical wound, high incidence of postoperative anal stenosis, bleeding, infection, incontinence and other complications, and obvious postoperative pain [8]. According to a foreign report on 7827 patients undergoing hemorrhoidectomy, postoperative bleeding occurred in 6.2%, fecal incontinence in 4.8%, and urinary retention in 3.4% [9]. However, the recurrence

rate of postoperative mixed hemorrhoids was significantly lower than that of external dissection and internal ligation. Whitehead operation was the earliest and effective operation method in the treatment of eversion external hemorrhoids and grade IV mixed hemorrhoids, but it was rarely applied in the late stage due to more complications and obvious postoperative pain.

2.2. Milligan-Morgan Hemorrhoidectomy (MMH)

At the end of the 19th century, building upon the Whitehead operation, British surgeon Miles proposed the "low ligation" method in 1919 to seek a safer surgical procedure. This involved peeling external hemorrhoids through a V-shaped incision, ligating, and removing internal hemorrhoids near the dentate line. While this operation initially established the groundwork for external dissection and internal ligation, it did not address issues with postoperative scar contracture and anal canal function damage. It wasn't until 1937 that Cecil Milligan and Christopher Naughton Morgan from St. Mark's Hospital in England refined the Miles operation. They introduced segmental targeted resection, low node ligation fixation, and open incision design, further resolving the challenges of preserving the anal sphincter, anal pad, dentate line, and anal function [10]. Traditional external dissection and internal ligation is one of the classic surgical methods for treating mixed hemorrhoids. Initially, the size and location of the hemorrhoids are determined using an anoscope (focusing on the three primary hemorrhoid areas), and normal mucosa and skin bridges over 0.5cm are preserved to prevent complete circumferential injury. The edge of the external hemorrhoids is lifted with hemostatic forceps, and a V-shaped or shuttle-shaped incision is made to reach the subcutaneous fat layer. Dissection proceeds along the external hemorrhoid envelope to the dentate line, stopping at the root of the internal hemorrhoids to avoid damaging the internal sphincter. After stripping, the thrombus and connective tissue are completely removed to ensure the external hemorrhoids are cleared, and the root of the internal hemorrhoids (0.3-0.5cm from the dentate line) is clamped with hemostatic forceps to prevent excessive traction. Silk or absorbable thread is used for "8" ligation or through ligation to ensure a firm ligation (preventing slippage and bleeding). All wounds after stripping and resection are left open without suturing. The advantage of this operation is that it can effectively eliminate lesions and significantly reduce the likelihood of postoperative recurrence by completely removing diseased tissue. However, despite its excellent therapeutic effect, the operation has notable drawbacks. Patients often experience severe pain postoperatively, which significantly impacts their quality of life [11]. The healing time for open wounds is prolonged, and insufficient flap preservation may lead to severe complications such as anal stenosis. According to a retrospective investigation and analysis of 137 cases by Saad Ali Chishti, the incidence of

postoperative infection in the operative area was 10%, including 15.3% postoperative bleeding, and 68.5% reported postoperative pain within 24 hours [12].

2.3. Closed Hemorrhoidectomy (Ferguson)

To address the limitations of open surgery, Ferguson introduced closed hemorrhoidectomy in 1959. This technique utilizes absorbable sutures to close the wound in a single stage, theoretically reducing postoperative pain and promoting faster healing [13]. As the most commonly recommended technique in the United States, the closed hemorrhoidectomy (Ferguson Heaton operation) is associated with less postoperative pain and faster wound healing. However, European scholars who employed the open hemorrhoidectomy (Milligan Morgan operation) reported that its healing rate and postoperative pain levels were similar to those of the closed hemorrhoidectomy [14]. Therefore, the choice of surgical method should comprehensively consider factors such as the size of the hemorrhoids, the experience of the operator, and the needs of the patients. The perioperative pain associated with the Ferguson closed hemorrhoidectomy is significantly lower. Long-term data indicate that the Ferguson hemorrhoidectomy not only has high patient satisfaction but also a low postoperative recurrence rate [15].

3. Minimally Invasive Surgical Treatment

3.1. Procedure for Prolapse and Hemorrhoids (PPH)

In 1998, the procedure for prolapse and hemorrhoids (Procedure for Prolapse and Hemorrhoids, PPH), proposed by the Italian scholar Longo, marked a significant breakthrough in the surgical treatment of mixed hemorrhoids. The procedure is based on the "anal pad descent" theory, which involves the use of a circular stapler to excise the lower rectal mucosa and submucosal tissue, thereby blocking the hemorrhoids' blood supply and repositioning them [16]. Numerous randomized controlled trials have demonstrated that PPH reduces the duration of postoperative pain from the 14 – 21 days typical of traditional surgery to just 3 – 7 days, and the average time to return to work from 3 – 4 weeks to 7 – 10 days. Compared to the Milligan-Morgan hemorrhoidectomy (MMH), PPH not only reduces postoperative pain but also shortens hospital stays, making it a viable alternative therapy [17]. This may be attributed to PPH's ability to preserve anal pad tissue and anal sphincter function, whereas MMH involves the direct excision and ligation of diseased tissue, resulting in greater damage to the anal pad and canal. PPH has demonstrated significant therapeutic efficacy in clinical practice, particularly in terms of postoperative pain relief and recovery speed [18, 19]. Nonetheless, PPH carries a certain

risk of complications, including anastomotic bleeding, anal edema, and anal stenosis, among others. The occurrence of these complications is closely linked to surgical technique, patient individual differences, and other factors [20]. Consequently, it is essential to strictly adhere to surgical indications in clinical practice and to focus on postoperative management to minimize the incidence of complications.

3.2. Selective Hemorrhoidectomy (TST)

TST (Tissue-Selecting Therapy Stapler) is a minimally invasive surgical technique further refined from PPH. Its primary technical feature is the selective removal of hemorrhoidal mucosa based on the patient's specific condition, thereby minimizing damage to healthy tissues [21]. Utilizing a specialized stapler, TST resects and anastomoses only the mucosa above the prolapsed hemorrhoids, preserving some of the normal mucosal tissue. This approach not only helps protect the physiological function of the anal canal but also effectively reduces the risk of postoperative complications. Furthermore, the TST procedure is relatively straightforward, with less intraoperative blood loss and milder postoperative pain, making it a more precise and safe treatment option. Compared to traditional external excision and internal ligation, TST demonstrates significant advantages in surgical outcomes and complications [22]. Studies have shown that the operation time and postoperative bed rest duration for patients in the TST group are significantly shorter than those in the traditional surgery group, and intraoperative blood loss is also notably reduced ($p < 0.05$). In terms of complications, the incidence rate in the TST group is significantly lower than that in the traditional external excision and internal ligation group, particularly regarding postoperative pain score, anal distension, and anal stenosis, among others [23]. Researchers, including Wu Liangqi, have noted that the total effective rate of TST is 95.12%, surpassing the 78.05% of traditional surgery, with a statistically significant difference ($P < 0.05$); TST not only effectively improves surgical outcomes but also markedly enhances patients' postoperative quality of life. It is a minimally invasive surgical method that is highly recommended for promotion [24].

3.3. Automatic Elastic Line Ligation (RPH)

RPH (Rubber Band Ligation for Hemorrhoids) is a minimally invasive surgical technique that employs an automatic ligation device to ligate the elastic line at the hemorrhoids or hemorrhoidal mucosa. It primarily utilizes the negative pressure suction generated by the ligation device to draw the target tissue into the device, after which the elastic line is released to complete the ligation. This results in ischemic necrosis of the ligated tissue, which subsequently falls off. RPH is characterized by its simplicity of operation, minimal trauma, and rapid recovery, making it particularly suitable for treating mild to moderate mixed hemorrhoids [25]. Studies have demonstrated that RPH excels in postoperative pain management and complication control, with its postoperative

bleeding rate and incidence of anal edema significantly lower than those in the traditional external hemorrhoidectomy and internal ligation group [26]. Moreover, RPH has a minimal impact on the physiological function of the anal canal and effectively preserves the function of the anal sphincter, leading to its widespread use in clinical practice [27].

3.4. Doppler Ultrasound-guided Hemorrhoid Artery Ligation (DG-HAL)

Doppler ultrasound-guided hemorrhoid artery ligation (DG-HAL) is a minimally invasive surgical technique that utilizes ultrasound technology to locate and ligate the hemorrhoid artery. It involves the use of an ultrasonic Doppler probe to detect the position and blood flow of the hemorrhoid artery, followed by ligation with sutures to block its blood supply. This promotes atrophy and gradual healing of the hemorrhoids. The procedure is characterized by minimal trauma, mild postoperative pain, and rapid recovery, making it particularly suitable for elderly patients or those with underlying medical conditions [28]. Research by Liu Bin and colleagues on 50 cases of DG-HAL demonstrated that the incidence of complications such as postoperative bleeding, anal stenosis, and edema in the DG-HAL group was significantly lower than in the Milligan-Morgan hemorrhoidectomy (MMH) group ($p < 0.05$). Additionally, DG-HAL had a low postoperative recurrence rate, rapid wound healing, a shorter hospital stay, and exhibited good long-term curative effects [29]. However, the widespread clinical application of DG-HAL is still limited due to the high level of operator experience required.

4. Traditional Chinese Medicine Surgery

However, in addition to the traditional methods of external dissection and internal ligation, traditional Chinese medicine has also developed a variety of characteristic methods in the field of mixed hemorrhoid surgery. These include the dry hemorrhoid nail method, the traditional Chinese medicine injection method, and the traditional Chinese medicine ligation method [30]. The dry hemorrhoid nail method involves inserting a special drug nail into the hemorrhoids, utilizing the drug's corrosive effect to induce necrosis and subsequent detachment, thereby achieving therapeutic goals. This method's operation is relatively simple and causes less trauma to patients; however, it may lead to postoperative bleeding, local infection, incomplete necrosis, and other issues, with a lower safety profile. Currently, the clinical application of traditional Chinese medicine in this area is limited [31]. The traditional Chinese medicine injection method involves injecting a sclerosing agent into the hemorrhoids to promote blood vessel occlusion and tissue fibrosis, resulting in hemorrhoid atrophy. This procedure offers the benefits of being minimally invasive and allowing for rapid recovery; however, the long-term efficacy requires further study, and there is a

risk of anal stenosis due to improper injection dosage [32]. The traditional Chinese medicine ligation method involves ligating the base of the hemorrhoids with silk thread or other materials to block blood supply, encouraging necrosis and detachment. It is akin to Western medicine ligation technology but places greater emphasis on the combination of external application of traditional Chinese medicine or fumigation to promote wound healing and reduce postoperative pain. These traditional Chinese medicine surgical methods each have their unique characteristics, providing a range of options for the treatment of mixed hemorrhoids. Nonetheless, in clinical practice, it is essential to strictly adhere to the indications and contraindications to ensure the safety and efficacy of the surgery [30].

5. Summary

In conclusion, various surgical methods exhibit significant differences in treatment efficacy, postoperative complications, and patient experience. Therefore, it is crucial to select the appropriate surgical approach based on the patient's unique circumstances, physical health, and personal preferences. Future clinical practice should concentrate on developing individualized treatment plans to maximize therapeutic outcomes and minimize patient discomfort. The advancement of surgical treatment for mixed hemorrhoids will focus on technological innovation, interdisciplinary collaboration, and foundational research, with the goal of enhancing both treatment efficacy and safety. This will optimize therapeutic outcomes and improve the quality of life for patients post-operation.

Abbreviations

MMH	Milligan-Morgan Hemorrhoidectomy
Miles	William Ernest Miles
PPH	Procedure for Prolapse and Hemorrhoids
TST	Tissue-Selecting Therapy Stapler
RPH	Rubber Band Ligation for Hemorrhoids
DG-HAL	Doppler-guided Hemorrhoidal Artery Ligation

Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Chaowen Chen, anorectal disease professional committee of the World Federation of Chinese Medicine Societies Expert consensus on perioperative management of hemorrhoids [j]. Chinese Journal of minimally invasive surgery, 2023, 23(6): 401-408.
<https://doi.org/10.3969/j.issn.1009-6604.2023.06.001>

- [2] Kaidar-Person O, Person B, Wexner SD. Hemorrhoidal disease: A comprehensive review. *J Am Coll Surg.* 2007; 204(1): 102-117. <https://doi.org/10.1016/j.jamcollsurg.2006.08.022>
- [3] Huang H, Gu Y, Ji L, et al. A NEW MIXED SURGICAL TREATMENT FOR GRADES III AND IV HEMORRHOIDS: MODIFIED SELECTIVE HEMORRHOIDECTOMY COMBINED WITH COMPLETE ANAL EPITHELIAL RETENTION. *Arq Bras Cir Dig.* 2021; 34(2): e1594. Published 2021 Oct 15. <https://doi.org/10.1590/0102-672020210002e1594>
- [4] Lina-Sun, wen-Dong, jianfei-Shen, et al Research progress in surgical treatment of moderate and severe mixed hemorrhoids [j]. *medical review*, 2020, 26(20): 5. <https://doi.org/10.3969/j.ion.1006-2084.2020.20.028>
- [5] Samalavicius N E, Gupta R K, Nunoo - Mensah, Joseph, et al. Global treatment of haemorrhoids—A worldwide snapshot audit conducted by the International Society of University Colon and Rectal Surgeons [J]. *Colorectal Disease*, 2024, 26(10). <https://doi.org/10.1111/codi.17140>
- [6] Xu H, Yan X, Hao D, Hu J, Wang Y. Clinical Efficacy of Automatic Ruiyun Procedure for Hemorrhoids and Procedure for Prolapse and Hemorrhoids in the Treatment of Mixed Hemorrhoids: A Comparative Study. *Ann Ital Chir.* 2025; 96(2): 205-212. <https://doi.org/10.62713/aic.3746>
- [7] Erzurumlu K, Karabulut K, Özbalcı GS, Tarım İA, Lap G, Güngör B. The Whitehead operation procedure: Is it a useful technique?. *Turk J Surg.* 2017; 33(3): 190-194. Published 2017 Sep 1. <https://doi.org/10.5152/turkjsurg.2017.3483>
- [8] Liu X, Sheng B, Zhang J, et al. Modified whitehead hemorrhoidectomy versus partial hemorrhoidectomy for fourth-degree circular mixed hemorrhoids: A retrospective analysis. *Heliyon.* 2024; 10(7): e28465. Published 2024 Mar 20. <https://doi.org/10.1016/j.heliyon.2024.e28465>
- [9] Lohsiriwat V, Sheikh P, Bandolon R, et al. Recurrence Rates and Pharmacological Treatment for Hemorrhoidal Disease: A Systematic Review [J]. *Advances in Therapy*, 2023, 40(1): 117-132. <https://doi.org/10.1007/s12325-022-02351-7>
- [10] Sena G, Gallo G, Vescio G, et al. Excisional Haemorrhoidectomy: Where Are We? [J]. *Reviews on Recent Clinical Trials*, 2020, 15. <https://doi.org/10.2174/1574887115666200319153439>
- [11] Sun XW, Xu JY, Zhu CZ, Li SJ, Jin LJ, Zhu ZD. Analysis of factors impacting postoperative pain and quality of life in patients with mixed hemorrhoids: A retrospective study. *World J Gastrointest Surg.* 2024; 16(3): 731-739. <https://doi.org/10.4240/wjgs.v16.i3.731>
- [12] Chishti S S A, Niaz A, Kashif M, et al. Comparative Outcomes of Milligan-Morgan (Open) Versus Ferguson (Closed) Hemorrhoidectomy: A Retrospective Study [J]. *Cureus*, 2024. <https://doi.org/10.7759/cureus.75012>
- [13] Berhuni M S, Yonder H. Efficacy of Stapled Haemorrhoidopexy vs. Ferguson Haemorrhoidectomy in the Treatment of Haemorrhoidal Disease: A Prospective, Randomised, Single-Blind Comparison [J]. 2025. <https://doi.org/10.29271/jcpsp.2025.10.1234>
- [14] Gachabayov M, Angelos G, Orangio G, Abcarian H, Bergamaschi R; Hemorrhoids Study Group. Transanal Hemorrhoidal Dearterialization With Mucopexy Versus Ferguson Hemorrhoidectomy for Prolapsed Internal Hemorrhoids: A Multi-center Prospective Study. *Ann Surg.* 2023; 278(3): 376-382. <https://doi.org/10.1097/SLA.0000000000005961>
- [15] Eray IC, Topal U, Gumus S, Isiker K, Yavuz B, Aydin I. Comparative analysis of Ferguson hemorrhoidectomy combined with doppler-guided hemorrhoidal artery ligation and Ferguson hemorrhoidectomy in hemorrhoidal disease treatment. *World J Gastrointest Surg.* 2025; 17(3): 103953. <https://doi.org/10.4240/wjgs.v17.i3.103953>
- [16] Zhang, Guoxing et al. "Network meta-analysis of randomized controlled trials comparing the procedure for prolapse and hemorrhoids, Milligan-Morgan hemorrhoidectomy and tissue-selecting therapy stapler in the treatment of grade III and IV internal hemorrhoids (Meta-analysis)." *International journal of surgery (London, England)* vol. 74 (2020): 53-60. <https://doi.org/10.1016/j.ijsu.2019.12.027>
- [17] Yinxia-Peng Effect of procedure for prolapse and hemorrhoids on prognosis of grade III and above mixed hemorrhoids [j]. *progress of modern general surgery in China*, 2020, 23(5): 3. <https://doi.org/10.3969/j.issn.1009-9905.2020.05.010>
- [18] Zhang, Yulong et al. "Establishment and validation of clinical prediction model for hemorrhoid recurrence after procedure for prolapse and hemorrhoids." *Medicine* vol. 102, 26 (2023): e34062. <https://doi.org/10.1097/MD.00000000000034062>
- [19] Xianfeng-Mai Clinical effect of external dissection and internal ligation combined with procedure for prolapse and hemorrhoids on circumferential mixed hemorrhoids [j]. *modern diagnosis and treatment*, 2024, 35(23): 3567-3569. <https://doi.org/10.20246/j.cnki.issn.1001-8174.2024.23.052>
- [20] Wei, Dan et al. "Prevention and Treatment of Anastomotic Strictures After Procedure for Prolapse and Hemorrhoids." *Risk management and healthcare policy* vol. 16 1351-1357. 26 Jul. 2023, <https://doi.org/10.2147/RMHP.S407021>
- [21] Hongbo Zhao, QiangLiu Comparison of the effect of traditional surgery and selective hemorrhoidectomy and anastomosis in the treatment of severe hemorrhoids [j]. *clinical medical research and practice*, 2022, 7(21): 78-81. <https://doi.org/10.19347/j.cnki.2096-1413.202221022>
- [22] Qingyu Luo Clinical efficacy of selective hemorrhoid mucosal anastomosis combined with external dissection and internal ligation in the treatment of mixed hemorrhoids [j]. *medical theory and practice*, 2020, 33(13): 2. <https://doi.org/10.19381/j.issn.1001-7585.2020.13.044>
- [23] Xueli Xin, Deyu Song, Bin Zhao, et al. comparison of short-term efficacy and safety between selective hemorrhoid mucosal anastomosis and Doppler ultrasound-guided hemorrhoid artery ligation plus external dissection and internal ligation in the treatment of elderly patients with III~IV degree mixed hemorrhoids [j]. <https://doi.org/103969/jissn1671-4695202023024>

- [24] Liangqi Wu, Zhen Hui Observation on the effect of selective hemorrhoid mucosal resection and anastomosis combined with external dissection and internal ligation in the treatment of mixed hemorrhoids [j]. traffic medicine, 2021, 35(06): 610-611+614.
<https://doi.org/10.19767/j.cnki.32-1412.2021.06.020>
- [25] Zhaojian Huang, Kemin Yang, Jun Fang, et al Clinical efficacy of automatic elastic line hemorrhoids ligation in the treatment of stage III and IV mixed hemorrhoids [j]. Jiangsu medical journal, 2022 (004): 048.
<https://doi.org/10.19460/j.cnki.0253-3685.2022.04.010>
- [26] Yingying-Guo, Tianyu-Zhou, Xiaozhen- Cheng, et al Meta analysis of automatic elastic line ligation combined with traditional external dissection and internal ligation in the treatment of mixed hemorrhoids [j]. Journal of Shenyang Medical College, 2024, 26(01): 30-36+42.
<https://doi.org/10.16753/j.cnki.1008-2344.2024.01.006>
- [27] Gang Xie, Jin'e Luo, Qiling Su, et al A randomized controlled study on the clinical efficacy of modified automatic elastic string hemorrhoid ligation combined with Xiaozhiling injection in the treatment of III degree hemorrhoids [j]. Chinese Journal of digestive surgery, 2024, 23(12): 1538-1543.
<https://doi.org/10.3760/cma.j.cn115610-20240919-00424>
- [28] MingfangLi Observation on the curative effect of hemorrhoid artery ligation guided by Doppler ultrasound in the treatment of 40 cases of mixed hemorrhoids [j]. Chinese Journal of ano-rectal diseases, 2024 (12).
<https://doi.org/10.3969/j.issn.1000-1174.2024.12.009>
- [29] Bin Liu, Fenglin Liu, Qian Xu Doppler ultrasound guided hemorrhoid artery ligation in the treatment of 50 cases of mixed hemorrhoids [j]. Chinese Journal of anorectal disease, 2020, 40(6): 2.
<https://doi.org/10.3969/j.issn.1000-1174.2020.06.011>
- [30] Ming Di, Rong Wang Overview of surgical treatment of mixed hemorrhoids [j]. Henan traditional Chinese medicine, 2023, 43(04): 643-648.
<https://doi.org/10.16367/j.issn.1003-5028.2023.04.0131>
- [31] Qiuyue Sun, Xiaoqiang Jia, Dongbing Li, et al Discussion on the principle and practice of copper ion electrochemical academic treatment of internal hemorrhoids based on the theory of dry hemorrhoids [j]. Chinese Journal of integrated traditional and Western medicine surgery, 2023, 29(5): 691-693.
<https://doi.org/10.3969/j.issn.1007-6948.2023.05.024>
- [32] Xingxiao Huo, Songpeng Sun, Junhong Long, et al Investigation on the application status of hemorrhoids injection therapy in China [j]. Chinese general practice, 2025, 28(35): 4435-4441.
<https://doi.org/10.12114/j.issn.1007-9572.2025.0078>