

Research Overview of Sphincter-Preserving Surgery for Complex Anal Fistulas

Zongrun Li^{1,*}, Hua Jiang², Liangwu Huang¹, Wenxin Li¹

¹Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China.

²The Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China.

How to cite this paper: Zongrun Li, Hua Jiang, Liangwu Huang, Wenxin Li. (2022) Research Overview of Sphincter-Preserving Surgery for Complex Anal Fistulas. *International Journal of Clinical and Experimental Medicine Research*, 6(3), 264-268.
DOI: 10.26855/ijcemr.2022.07.006

Received: April 30, 2022

Accepted: May 25, 2022

Published: June 23, 2022

***Corresponding author:** Zongrun Li, Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China.
Email: lzr644328554@163.com

Abstract

Anorectal fistula, referred to as anal fistula, is mainly caused by the infection of the anal glands and the surrounding tissue, which leads to the communication between the rectum and the surrounding tissue, forming a pathological channel. It is a common and frequently-occurring disease in daily life. According to statistics, the total incidence of anal fistula is about 8.6%, which is recognized as one of the most difficult diseases in the world. At present, the main treatment method is surgery, but there are countless cases of fecal incontinence caused by injury to the anal sphincter during surgery, which has a great impact on patients' life and postoperative recovery. Therefore, avoiding or reducing damage to the anal sphincter is the surgeon's top priority during surgery. This article will give an overview of the sphincter-preserving surgery based on the treatment of complex anal fistulas, combined with relevant domestic and foreign literature, so as to help the treatment of anal fistulas.

Keywords

Anal Fistula, Surgical Treatment, Anal Sphincter, Fecal Incontinence, Sphincter-Sparing Surgery

Anal fistula is a well-known disease that has been recorded for a long time. It usually consists of three parts: internal opening, fistula and external opening [1]. The course of the disease is longer, often accompanied by local dampness, itching, etc., causing great trouble to the patient's life. Anal fistulas are difficult to heal on their own, and most of them are treated surgically. However, there are many types of surgical treatment of anal fistula, and we can divide the surgical methods into two categories according to the impact of the operation on the anal sphincter: sphincterotomy and sphincter preservation [2]. For anal fistulas with simple fistulas and low positions, sphincterotomy can often be used, while for the treatment of complex anal fistulas with high positions, curved fistulas, and multiple channels, sphincterotomy may be used. The risk of fecal incontinence after surgery is greatly increased. Reasonable selection of sphincter-preserving surgery can largely avoid the occurrence of various postoperative complications, and is more in line with the minimally invasive concept that surgeons have been adhering to. However, there are many types of sphincter-sparing procedures, and there is a lack of unified understanding, which greatly interferes with clinical applications. Therefore, the author will review the commonly used sphincter-sparing procedures in clinical practice, and describe in detail the operation methods, advantages and disadvantages, contraindications and indications, and postoperative efficacy of various procedures, so as to provide a clearer understanding of the treatment of complex anal fistulas.

1. Dotted thread therapy

The treatment of anal fistula by hanging thread therapy has been recorded in many medical works as early as the

Ming Dynasty in China. As in “Ancient and Modern Medical System”, the book “Daquan” describes in detail the specific operation method of thread hanging therapy, the duration of thread hanging and the mechanism of treating anal fistula. With the continuous improvement and innovation of modern medicine for hanging thread therapy, this technology can be applied to various types of complicated anal fistulas and anorectal abscesses, and according to clinical observations, it has a good cure rate [3]. However, the principle of the traditional thread-hanging technique for treating anal fistula is the chronic cutting effect of suture or rubber band on the fistula. Although it reduces the damage to the anal sphincter compared with fistula incision, it still inevitably causes normal tissue muscle tissue. There is still the possibility of fecal incontinence, and the timing of the tight line is difficult to grasp. When the sutures are tightened at the same time, the patient suffers a greater degree of pain. Therefore, many anorectal surgeons have made improvements on the basis of the traditional hanging thread: when the fistula is curved or far away, a main incision is made from the inner opening along the anal verge, and when the outer opening is far away from the anus, it can be expansion, remove the fibrotic tube, and hang the silk thread or rubber band between the main incision and the external opening; if there are other branch tubes or abscesses during intraoperative exploration, the hemostatic forceps can be used to extend into the lumen to open the fibrotic tube. Drape the silk thread between the main incision and the opening [4]. This practice abandons the traditional thread-hanging therapy for chronic cutting of fistulas and necrotic tissue, but enhances the drainage of infectious substances in the anal fistula space, and preserves the integrity of the anal sphincter to the greatest extent. The patient suffered from fecal incontinence, air leakage, and fluid leakage due to abnormal anal function due to intraoperative injury of the anorectal ring. At the same time, due to the sufficient drainage of the abscess cavity, the virtual hanging thread therapy also greatly reduces the recurrence rate of anal fistula. And because there is no need for graded tightening after surgery, the patient's fear of pain is greatly reduced.

Benefiting from the above advantages, virtual hanging thread therapy is more and more widely used in various types of anal fistula surgery, but for low simple anal fistula, virtual hanging thread therapy has no obvious advantages.

2. Fibrin glue fistula closure

Fibrin glue fistula occlusion in the treatment of anal fistula slowly emerged in the field of people in the 1980s. Among them, Hjortrup et al. in 1991 used adhesive to treat perineal fistula and created a precedent for fibrin glue fistula closure. It has gradually attracted widespread attention because of its simplicity of operation and the maximum avoidance of anal sphincter injury. The main operation procedure is as follows: after the patient is routinely anesthetized, take the lithotomy position, roughly explore the shape of the fistula and determine the position of the internal opening; secondly, use a curette to scratch the fistula and necrotic tissue, and then use a thin soft catheter. Insert the fistula through the external opening and connect the catheter with a syringe to inject fibrin glue until the inner opening forms a sealing layer; finally, when the catheter is filled with fibrin glue, slowly pull out the catheter from the fistula, and use protein glue again. The outer opening is closed [5]. The fibrin glue used in this operation is made up of a mixture of thrombin and fibrinogen. When thrombin is activated, it can promote the activation and migration of fibroblasts, lead to collagen deposition, and promote the closure of the fistula to play a therapeutic role [6]. This procedure is suitable for the treatment of various types of anal fistulas of low and high simple anal fistulas and complex anal fistulas. It is worth noting that although fibrin glue anal fistula occlusion has higher safety than other surgical methods, the success rate of this surgical method is not satisfactory through numerous clinical observations; Daniel C. DAMIN et al. [5] used protein glue occlusion in 32 patients with anal fistula and found that within 1 year, only 3 patients were successfully cured, and the success rate was only 10%. There are as many as 13 patients with failed protein glue injection, which seems to be quite different from the 85% success rate expected by some scholars. The author has consulted many domestic and foreign literatures, and reports on the success rate of this operation in the treatment of anal fistula range from 0-100%. There may be various reasons for its failure, such as: the length and width of the fistula, the increased pressure in the rectum leading to the discharge of the fibrin plug, and the inability to eradicate the infected tissue [7].

Although the success rate of this operation is low, it is undeniable that this operation has extremely high safety, almost no anal incontinence, air leakage, fluid leakage, etc., and avoids frequent dressing changes after surgery, reducing the number of patients. The degree of pain, especially for high and complex anal fistulas, still has potential advantages and has good research prospects, and it can be regarded as a potential first-line treatment for anal fistulas.

3. Ligation of Intersphincteric Fistula (LIFT)

LIFT was first proposed and used by Arun in 2007, and it is used as a sphincter-sparing therapy for rehabilitation. New technologies for complex anal fistulas are becoming more and more popular. In this operation, an arc-shaped incision is made at the intersphincteric groove fistula, and the intersphincteric groove is approached. The intersphincteric fistula is freed, ligated, and the internal opening is closed, and then the extrasphincteric fistula is fully scraped to clear the necrosis. The granulation tissue is then trimmed and flushed to the surgical wound, and the incision of the intersphincter groove is sutured, and the outer opening can be filled with oil gauze for adequate drainage. The overall operation method conforms to the normal physiological and anatomical structure of the perianus, and is always in balance with the muscle fibers during the whole process of separation and ligation of the fistula, which minimizes the damage to the sphincter, relieves pain, and effectively blocks infection. At the same time, the intersphincteric sulcus fistula is ligated and closed to ensure that the anal gland tissue below the internal opening is closed, and the anal function is better preserved [8]. More importantly, after a long period of clinical observation and data analysis, the success rate of LIFT in the treatment of anal fistula is satisfactory. During the 16-month postoperative follow-up, it was observed that 19 (73%) of the 26 patients had initial healing, and 7 patients had recurrence within 4-8 weeks after surgery, with a recurrence rate of 27%; it is worth noting that, During a follow-up period of up to 16 months, no postoperative anal incontinence was found. Alasari S. et al. [10] analyzed the data of 435 patients reported in the LIFT procedure published so far. The analysis showed that: in all patients, the surgical success rate was 81.37%, and the overall healing time was 8.15 weeks. The complication rate was 1.88%, and no anal incontinence occurred.

In general, LIFT has a very high success rate, with few postoperative complications and less incontinence; however, this method is only suitable for transsphincteric anal fistulas, and requires the operator to have good medical knowledge. Anatomical knowledge has a clear and clear direction for the channel of fistula, but due to its many advantages, such as the surgical method conforms to the anatomical structure, the surgical incision is small, the clinical effect is satisfactory, and there is no occurrence of anal incontinence, it is worthy of further clinical research and application.

4. Video-Assisted Anal Fistula Treatment

Video-assisted anal fistula therapy (VAAFT) was first developed by Italian professor Meinero [11] in 2006. It is proposed and should be applied to the clinical treatment of anal fistula. This invention brings endoscopic technology into the diagnosis and treatment of anorectal diseases, making the treatment of anal fistula enter the era of precision and visualization [12]. Imaging assessment has evolved to a new stage where fistulas can be explored from the inside and managed. VAAFT integrates the exploration, destruction and scratching of the fistula: the mirror body is connected to the video equipment and under the illumination of the light source, the direction and structural domain of the fistula can be clearly explored, and then the fistula can be accurately performed through the matching single-click electrocoagulation. Burning has a destructive effect, in which the large fistula group structure left by burning can be grasped by grasping forceps, and the small tissue fragments can be scraped with fistula brush to achieve the effect of thorough cleaning [12]. Yang Yong [13] and others conducted clinical observation and comparison of VAAFT and traditional incision and hanging suture in the treatment of complex anal fistula, and observed the postoperative pain, healing time and postoperative recurrence rate of the two patients. Less intraoperative bleeding, less postoperative pain, no anal incontinence, fast wound healing and short hospital stay, but during the subsequent 6-month follow-up, 2 of 30 patients in the VAAFT treatment group had recurrence, while the traditional incision group had 2 recurrences. There were no recurrences among the 30 patients with anal fistula in the open and hanging thread treatment group. The author reviewed the relevant literature on patients with anal fistula who received VAAFT in recent years. The cure rate of VAAFT in the treatment of anal fistula was 70% to 93%, and the recurrence rate was 4% to 30% [14-15]. The reported results vary widely, but no cases of anal incontinence have been found, so the preliminary clinical practice results are satisfactory.

Undoubtedly, accurate identification of fistula and internal orifice, fistula resection, and protection of anal sphincter function are the three main principles for surgical treatment of anal fistula. There is no damage to the sphincter, which is more in line with the requirements of today's surgery for minimally invasive concepts. It is worth noting that the use of VAAFT has many limitations and shortcomings: such a technical equipment is expensive, and for anal fistulas with narrow and large tortuous fistulas, the mirror body is difficult to enter, and it cannot be effectively explored. However, for full horseshoe fistulas, fistulas above the levator ani muscle, or recurrent fistulas, it will be more difficult to locate the internal opening of the anal fistula by relying on the light source [16];

therefore, the type of anal fistula greatly affects this item. Regarding the technical success rate and recurrence rate, Michal [17] believed that the success rate of using VAAFT in the treatment of simple anal fistula was 73.3%, and the success rate of complex anal fistula was 39.47%. Therefore, this technology should be viewed more comprehensively, and its contraindications and indications should be strictly controlled so that it can be better applied in clinical treatment.

5. Transanal opening of intersphincteric space (TROPIS)

For the diagnosis and treatment of anal fistulas, almost all doctors believe that anal fistulas are classified according to the relationship between the shape of the fistula and the sphincter. Row classification has great guiding significance for clinical treatment, and Parks classification method is often used to classify anal fistulas into intersphincteric anal fistulas, transsphincteric anal fistulas, supra-sphincteric anal fistulas and extrasphincteric anal fistulas. Among them, due to the anatomical relationship of the perianal region, the intersphincteric fistula is the most common type of anal fistula, accounting for about 70% [2]. Therefore, Dr. Garg [18] proposed TROPIS for the first time in 2017 and applied it to the clinical treatment of complex anal fistulas. He included 61 patients with high intersphincteric anal fistulas into the clinical study. During the 6-month follow-up, the postoperative condition of 61 patients was evaluated; statistics: The cure rate of the 61 patients was 90.4%, and there was no anal incontinence such as air leakage and stool leakage. In this procedure, the iodophor solution is injected into the anus from the external opening to define the internal opening, and then curved forceps are used to extend the sphincter space from the internal opening, and then the internal and external sphincter gaps are opened and the incision is enlarged with a high-frequency electric knife along the curved forceps. Provides adequate drainage; this incision starts from the internal opening, mainly near the dentate line, and in the case of a horseshoe-shaped fistula, the internal opening of the midline after the incision extends to both sides; if the fistula has an additional supralelevator opening, then the incision extends upward from the posterior internal opening of the midline to the suprarectal opening of the levator ani muscle. It is worth mentioning that this incision is usually curvilinear or may be oblique, depending on the orientation of the intersphincteric fistula [18-19]. In order to better verify the clinical treatment effect of TROPIS, Dr. Garg reported the largest clinical study of anal fistula so far in 2021 [20]. He included 1250 patients with various types of anal fistula into the research group, and preoperative MRI examinations divided the types of anal fistulas into simple and complex anal fistulas; anal fistula incision was used for simple anal fistulas, while anal fistula embolization, TROPIS, and proximal internal orifice burning and regular emptying were used for the treatment of complex anal fistulas. Fistula scraping and curettage [21] (PERFACT) compared the overall healing rate and postoperative complications of these four surgical methods. Statistics show that the cure rate was 98.6% in 611 patients who underwent anal fistula incision, 86% in 408 TROPIS patients, 19.4% in 56 patients with anal fistula embolization, and 175 PERFACT patients. The cure rate in the group was 50.3% (101 patients underwent reoperation with TROPIS after recurrence), and all patients had no anal incontinence after surgery.

From the above statistical results, we can conclude that TROPIS has a good effect in the treatment of anal fistula. Before this report, the PERFACT procedure was mostly used for the treatment of anal fistula, but this study has caused a great impact. Because the TROPIS mucosal incision is less than one-third of the anal circumference, it will not cause anal stenosis. It has almost no effect on the function of the anus and sphincter, and has the advantages of small wound surface, quick recovery, and few complications. The treatment of anal fistula and horseshoe anal fistula has become the first choice for many doctors to treat complex anal fistula.

6. Summarize

For nearly a hundred years, the treatment of complex anal fistulas has always been a hot spot and a difficulty in the research of colorectal surgery diseases, and how to solve the contradiction between radical anal fistula and protection of anal function and avoiding damage to the sphincter is one of the most difficult problems in the treatment of anal fistulas [22]. Although with the development and progress of medicine, the treatment methods of anal fistula have become more and more diversified, and various new sphincter-preserving surgical methods have emerged continuously, such as anal fistula embolization, mucosal flap advancement, anal fistula laser closure, PERFACT, etc [23]. However, many surgical procedures lack the evaluation of actual clinical efficacy or have shortcomings such as high postoperative recurrence rate, high anal incontinence rate, cumbersome procedure and high cost, which will not be repeated in this article. The surgical methods specifically analyzed by the author have more clinical observation bases, and the cure rate is stable and the anal incontinence rate is low. Although it has some shortcomings, it still has great advantages compared with other surgical methods. It is more emphasized that the surgical method of preserving the sphincter does not completely damage the internal and external anal sphincter, but maximizes the

protection of the normal muscle and tissue structure around the anus. On this premise, the fistula can be accurately explored, scratched, and removed. Under the background of today's medical strongly advocating the concept of minimally invasive and patients paying more attention to the quality of life, more novel and concise sphincter-preserving procedures may be derived. Its contraindications and indications, in order to better guide our clinical treatment of anal fistula.

References

- [1] Lu Jingen, Ding Yijiang. (2009). *Anorectology of Integrated Traditional Chinese and Western Medicine* [M]. Beijing: China Traditional Chinese Medicine Publishing House, 2009.
- [2] Wang Jianping. (2014). *Chinese Colorectal Surgery* [M]. Beijing: People's Health Publishing House, 2014.
- [3] Wu Zuozhou. (2006). The historical evolution of thread hanging therapy [J]. *Jiangsu Traditional Chinese Medicine*, 2006, (08).
- [4] Wu Feiping. (2017). Analysis of the safety and efficacy of virtual hanging thread therapy in the treatment of high anal fistula [J]. *Journal of Changchun University of Traditional Chinese Medicine*, 2017, 33(03).
- [5] Daniel C. Damin. (2009). Fibrin glue in the management of complex anal fistula [J]. *Arq Gastroenterol*. Oct-Dec 2009, 46(4): 300-3.
- [6] J. M. C. Yeung. (2010). Fibrin glue for the treatment of fistulae in ano – a method worth sticking to? [J]. *Colorectal Dis.*, 2010 Apr., 12(4).
- [7] Hammond, T. M. (2004). Fibrin glue in the management of anal fistulae [J]. *Colorectal Dis.*, 2004.
- [8] Lin Yanbo. (2021). Influence of transsphincteric fistula ligation on pain and anal function in patients with transsphincteric anal fistula surgery [J]. *Practical Clinical Integrative Medicine*, 2021, 21(05).
- [9] Sileri, P., Giarratano, G., Franceschilli, L., Limura, E., Perrone, F., Stazi, A., Toscana, C., Gaspari, A. L. (2014). Ligation of the intersphincteric fistula tract (LIFT): a minimally invasive procedure for complex anal fistula: two-year results of a prospective multicentric study [J]. *Surg Innov.*, 2014 Oct., 21(5): 476-80.
- [10] Alasari, S., Kim, N. K. (2014). Overview of anal fistula and systematic review of ligation of the intersphincteric fistula tract (LIFT) [J]. *Tech Coloproctol*, 2014, 18(1): 13-22.
- [11] Meineri, P., Mori, L. (2011). Video-assisted anal fistula treatment (VAAFT): a novel sphincter-saving procedure for treating complex anal fistula [J]. *Tech Coloproctol*, 2011, 15(4): 417-422.
- [12] Yao Yibo. (2020). Video-assisted anal fistula treatment (VAAFT) operation technique [J]. *Colorectal and Anal Surgery*, 2020, 26(06).
- [13] Yang Yong. (2021). Observation on the efficacy of video-assisted anal fistula therapy in the treatment of 30 cases of complex anal fistula [J]. *Chinese Journal of Anorectal Diseases*, 2021, 41(09).
- [14] Adegbola, S. O., Sahnun, K., Pellino, G., Tozer, P. J., Hart, A., Phillips, R. K. S., Warusavitarne, J., Faiz, O. D. (2017). Short-term efficacy and safety of three novel sphincter-sparing techniques for anal fistulae: a systematic review [J]. *Tech Coloproctol.*, 2017 Oct., 21(10).
- [15] Zarin, M., Khan, M. I., Ahmad, M., et al. (2015). VAAFT: Video assisted anal fistula treatment; bringing revolution in fistula treatment [J]. *Pak J Med Sci.*, 2015, 31(5): 1233-1235.
- [16] Yao Yibo. (2018). Video-assisted treatment of anal fistula: application and exploration of a new technology for the treatment of anal fistula [J]. *Journal of Clinical Surgery*, 2018, 26(04).
- [17] Michal Romaniszyn. (2017). Video-Assisted Anal Fistula Treatment: Pros and Cons of This Minimally Invasive Method for Treatment of Perianal Fistulas [J]. *Gastroenterology Research and Practice*, Volume 2017, 12: 1.
- [18] Garg, P. (2017). Transanal opening of intersphincteric space (TROPIS) - A new procedure to treat high complex anal fistula [J]. *Int J Surg.*, 2017 Apr., 40: 130-134.
- [19] Guo Gaozheng. (2021). Clinical study of intersphincterotomy in the treatment of high anal fistula based on the mechanism of intersphincteric infection [D]. *Nanjing University of Traditional Chinese Medicine*, 2021, 000306.
- [20] Garg, P., Kaur, B., Goyal, A., Yagnik, V. D., Dawka, S., Menon, G. R. (2021). Lessons learned from an audit of 1250 anal fistula patients operated at a single center: A retrospective review [J]. *World J Gastrointest Surg.*, 2021 Apr 27, 13(4): 340-354.
- [21] Garg, P. (2016). PERFECT procedure to treat supralelevator fistula-in-ano: A novel single stage sphincter sparing procedure [J]. *World J Gastrointest Surg.*, 2016, 8(4): 326-334.
- [22] Lv Changyao, Wu Jing, He Hongbo. (2018). Advances in minimally invasive surgical treatment of anal fistula [J]. *Modern Journal of Integrated Traditional Chinese and Western Medicine*, 2018, 27(01): 106-111.
- [23] Du Jinxin, Yang Shiwei, Xin Xuezhai. (2020). Research status and progress of sphincter-preserving surgery for anal fistula [J]. *Journal of International Surgery*, 2020, 47(11): 777-781.