

Occurrence and Treatment of Perianal Infectious Diseases

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Abstract

Perianal infectious diseases can occur at any age, but prevail in young adulthood, and in recent years, urbanization has accelerated, resulting in enormous changes in the diet and lifestyle of people, with consequent many adverse life habits, leading to a progressive increase in the incidence of perianal infectious diseases. As a common class of diseases in anointestinal surgery, this class of diseases has a long disease course, easily relapses, and easily damage anal function, some patients because of the deep infection part, the early local symptoms of the anus are not obvious, easily missed, and delay treatment resulting in serious consequences, which not only affect people's quality of life, but even affect people's physical and mental health. Current treatments for perianal infectious diseases are diverse and vary in their efficacy, and this review will summarize the progress of relevant studies at home and abroad on the occurrence and treatment of perianal infectious diseases.

Keywords

Perianal infectious disease; Anorectal abscess; Anorectal fistula; Perianal acute necrotizing fasciitis.

1. INTRODUCTION

Perianal infectious diseases refer to local inflammatory diseases caused by pathogenic bacterial infection of tissues surrounding the anus, and are common diseases in anointestinal surgery, which mainly include anorectal abscess, anorectal fistula and perianal acute necrotizing fasciitis, and such diseases have a complex condition, with anal infection as its main etiology, infection of anal glands, anorectal injury causing infection, and perianal dermatomal infection more common. The clinical manifestations are localized pain around the anus, or spillage of purulent secretions, even with symptoms of systemic infection.

2. OCCURRENCE OF PERIANAL INFECTIOUS DISEASES

2.1. Occurrence of Perianal Abscess

Perianal abscess is a suppurative disease resulting from acute and chronic infection of the perirectal space of the anal canal. The disease has an acute onset and severe pain, with a predilection age of 20-40 years, and it can also occur in infants and young children, and the incidence is higher in China, approximately 2%, accounting for 8% - 25% of anorectal diseases [3]. Modern medicine considers infection of the anal glands as the main and most common cause of the disease, which communicates with the bottom of the anal crypts through the anal gland

duct, which opens upward, and feces can easily enter the anal crypts, causing fecal infection of the anal cryptitis, when the inflammation of the anal crypts spreads to the anal glands through the anal gland canal, edema and obstruction of the anal gland canal occurs, then it causes anal adenitis, which is further through its branches or couplets The commissural muscle fibers spread to the perianorectal space to form a perianal abscess. Its pathogenic bacteria are mostly gram negative bacteria, mainly *Escherichia coli* and *Klebsiella pneumoniae* [4].

2.2. Occurrence of Anal Fistula

Anal fistula refers to the anus or rectum because of pathological factors and forms an abnormal channel that communicates with the surrounding skin of the anus, called anal fistula for short. The main symptoms are local recurrent pus, pain, itching, and a detectable fistula leading to the anus or rectum. Its incidence is similar to that of perianal abscess, occurring in young adults (20-40 years) and not uncommon in young children, with a male to female ratio (5:6) [5]. The etiology and epidemiology of perianal fistulas are similar to those of perianal abscesses, and modern medicine considers that it is mostly caused by perianal abscesses, which are sequelae of perianal abscesses and are the result of different intervals of the same disease. There are three conditions for perianal abscess to develop into an anal fistula [6]: 1, the primary infected anal crypts (the internal orifice of an anal fistula) continue to be infected and the contents of the intestinal lumen continually enter the abscess cavity, 2, the rectal abscess cavity forms a curved and narrow fibrotic canal due to repeated stimulation and infection by chronic inflammation, which results in the accumulation of poor drainage of pus, 3, Contraction of perianal supporting tissues, especially the anal sphincter, leads to poor drainage of pus from the fistula, which in turn spreads the pus through the intersphincteric space. Anal fistulas are formed by internal, external, and fistulae, with primary internal and secondary internal ostia in the internal os and about 95% of the dentate line anal crypts in the primary internal ostia. The wall of the fistula was fibrous tissue, and the contents of the tube were necrotic granulation tissue, which was difficult to heal.

2.3. Occurrence of Perianal Acute Necrotizing Fasciitis

Perianal necrotizing fasciitis is a kind of necrotizing inflammation of perineum, genitalia and perianal subcutaneous fascia caused by a variety of bacterial infections. It is mainly caused by local injury, infection around anus, urethra and sacrum, which has characteristics such as an acute onset, rapid lesion and a homicide condition, and the pathological changes are large coagulative necrosis of perianal epidermis, dermis and subcutaneous tissue and non-specific inflammatory cell infiltration of surrounding tissue. Pathogenic bacteria include a variety of aerobic and anaerobic bacteria, especially haemolytic streptococci, *Escherichia coli*, *proteus spp*, *Bacteroides spp* and *Streptococcus enterica* [7], and poor body immunity is a predisposing factor for infections, such as diabetes, cachexia, the elderly, those receiving immunosuppressive therapy, and flora dysregulated diarrhoea Caused by the unregulated use of antibiotics is also one of the reasons for the spread of perianal infections.

3. TREATMENT OF PERIANAL INFECTIOUS DISEASES

3.1. Treatment of Perianal Abscess

3.1.1 Incision and drainage

Incision and drainage are the traditional surgical modalities for perianal abscesses and the basis of various surgical modalities. Operationally simple incision and drainage can deal with symptoms such as pain in the acute stage of perianal abscess, and the lesion cannot be completely eradicated because the primary infected anal gland is not treated [8]. Because of the high rate of postoperative recurrence, it is possible to develop an anal fistula and require

secondary surgery. Chengliang Wu [9] had performed incision and drainage on 40 patients with perianal abscess, as a result, the recurrence rate of perianal abscess was 22.50% (10 / 40) and the formation rate of anal fistula was 25.00% (10 / 40) after operation. Professor golden black hawk [10] modified the traditional incision and drainage procedure into " three gap drainage " based on the pathological mechanism of the occurrence of perianal abscess and the perirectal anatomy of the anal canal, which has both submucosal space, intersphincteric space and external intersphincteric space, and achieved satisfactory results in clinic.

3.1.2 Internal os incision and drainage

Internal os incision and drainage is based on incision and drainage to remove the primary infected anal crypts, anal glands and catheters [11]. This procedure improves the primary lesion, reduces the duration of treatment, and reduces the recurrence and fistula formation rates of perianal abscesses compared with incision and drainage alone. Internal incision and drainage is indicated for low-lying perianal abscesses.

3.1.3 Incision-thread-drawing procedure

Incision-thread-drawing procedure is ligation of hanging wire after incision of abscess by passing a rubber band through the anus through the infected inner mouth and incision of abscess. It was designed in 1970 by Professor Yousheng Zhang [6] in combination with the experience of traditional Chinese medicine hanging wire therapy for the treatment of anal fistula on the basis of incision and drainage, and the technique was popularized nationally in 1984. Incision-thread-drawing procedure made the drainage of pus unobstructed and the primary lesion was treated, reducing the recurrence rate of perianal abscess and the formation rate of anal fistula. Since it does not cut the anal sphincter directly, anal function is preserved and the occurrence of postoperative anal incontinence is reduced. The procedure is suitable for high-grade abscesses and horseshoe abscesses, anterior site abscesses, etc.

3.1.4 Sphincter preserving primary radical surgery

Sphincter sparing one-time radical surgery is a surgical modality for perianal abscess with designed by Takano ZHENGBO[12] based on the experience of sphincter sparing treatment of fistula in Japan .This procedure excises the internal os and forms an intra anal drainage by making a radial incision to the intersphincteric sulcus centered on the internal mouth, while making a radial incision and drainage at the site of the abscess, which may cooperate to hang a dashed drainage if necessary. This procedure fully considers the key role of the anal sphincter in maintaining anoanal function [13] and is suitable for a variety of perianal abscesses: low intermuscular abscess, high intermuscular abscess, ischiorectal space abscess and pelvic rectal space abscess.

3.1.5 Traditional Chinese medicine treatment

The traditional Chinese medicine (TCM) treatment has a good effect on postoperative reducing swelling, reducing exudation, pain relief and promoting wound healing of perianal abscess, and it has definite advantages in reducing postoperative complications and improving healing rates [14]. Jiangshuai [15] and others applied radical surgery combined with detoxification and invigorating blood decoction to treat 150 patients with perianal abscess results in a significantly shorter postoperative wound healing time and better efficacy. Zhang Yan [16] used radical surgery combined with Huanglian detoxification Decoction to treat 25 cases of severe perianal abscess, which effectively improved the clinical outcome, improved the clinical symptoms and reduced the occurrence of surgical complications. Qiling Wang [17] applied Chinese medicine smoked washing combined with comprehensive care of 140 patients with perianal abscess surgery, which can significantly reduce the postoperative pain of patients.

3.2. Treatment of Anal Fistula

At present, surgery is the main effective treatment for anal fistula, and the key to its success is: accurately dealing with the internal os, completely clearing the fistula, reasonable disposal of the anal sphincter, and ensuring postoperative drainage patency.

3.2.1 Single operative procedure

Anal fistulotomy is to cut the fistula under the guidance of the probe after the internal orifice and the direction of the fistula are clear, remove the necrotic tissue, trim the wound edge to make the postoperative drainage unobstructed [18], and gradually heal with the filling of granulation tissue after the operation. This operation is the most basic operation for anal fistula, and it is the most commonly used operation for low anal fistula. For high anal fistula, it is often used with other operations.

Anal fistulectomy is suitable for low anal fistula with fistula fibrosis. The difference between anal fistulectomy and anal fistulotomy is complete resection of the outer wall of fistula and surrounding scar tissue, which can be cured at one time after operation with low recurrence rate [19]. However, the damage to latissimus muscle is greater than that of anal fistulectomy, so we should strictly grasp the indications and pay attention to the protection of sphincter during operation.

Hanging wire for anal fistula is a traditional and effective method in the treatment of anal fistula in traditional Chinese medicine, which is mostly used in the treatment of high anal fistula and complex anal fistula. In the past, it was often used to hang tight thread, which could promote fistula healing by slow cutting, drainage and foreign body stimulation. However, cutting sphincter caused pain and anal incontinence and other complications, and solid thread was gradually replaced by virtual thread. Compared with solid thread drawing, virtual thread drawing has no cutting effect, only retains the stimulation and drainage of foreign body, and has less postoperative pain and less impact on anal function. In clinical practice, there is no lack of the combination of the two methods in the treatment of anal fistula. Yan Qiufang [20] and others used the method of virtual and solid thread drawing to treat 68 patients with high complex anal fistula, which greatly reduced the pain of patients and achieved good curative effect.

3.2.2 Compound procedure

Due to the complex condition of anal fistula, especially high anal fistula and complex anal fistula, the relationship between the fistula and sphincter directly affects the development of the disease and the treatment effect. A single operation is difficult to meet the needs of disease treatment, so the clinical use of a single operation combined or improved for the treatment of anal fistula.

Fistula resection and suture operation, is a one-stage suture on the basis of complete removal of the fistula. The operation formula is shorter than the time of wound healing after fistulectomy [21], granulation and scar tissues must be completely removed intraoperatively, no dead space remains after suturing, and antibiotics are reasonably used during the treatment.

Fistulas incision hanging wire, both low cutting and high hanging wire, is commonly used to treat high complexity anal fistulas, hyrax shaped anal fistulas, etc. this type of surgery is more single hanging wire, which obviously shortens the length of fistula and reduces hanging wire tissue [22]; more single hanging wire, protects the anal sphincter and reduces the effect of surgery on anal function. Han y [23] in their clinical observation of low resection combined with high pine hanging wire fractionation tight wire procedure for high complexity anal fistula, they found that resection hanging wire procedure could significantly shorten the patient's hospital stay.

Suture-dragging therapy for anal fistula, is a surgical way that " Gu's surgery " team combined traditional medicine twisting therapy and hanging wire design to incorporate saprophytic

muscle drug into the thick silk thread and thread it through the fistula, to introduce the drug into the fistula by dragging the silk thread back and forth, to reach saprophytic muscle, repair the fistula. The technique is suitable for various types of anal fistula which need drainage [24], and it is suitable for application in patients with anal fistula who cannot tolerate one-time radical surgery, but when the anal fistula is accompanied by deep gap infection, the suitable tube drainage is needed, and when the fistula is too long and the drainage is not good, the segmental drainage is needed.

Anal Gland Excision and Bridge Drainage, Prof. Jinghua Liang based on many years of clinical experience, on the theoretical basis of the crypt gland infection doctrine, combined the resection of anal fistula with wire hang, and designed the operation for the treatment of complex anal fistula. Intraoperatively, the primary infected anal gland was completely removed, the external os and part of the fistula were incised, and a rubber band (virtual hang line) was hung between the two incisions to serve as bridge drainage [25]. This procedure clears the infectious agent, bridge drainage effectively resolves the problem of anal fistula recurrence caused by poor drainage, and Bridge drainage does not make a cut to the sphincter, protects anal function, and stimulates wound tissue production for fistula healing purposes. One hundred and twenty patients with complex anal fistula were included in Professor Jing Hua Liang's [26] study, while 60 patients in the control group underwent traditional hanging wire drainage and 60 patients in the treatment group underwent anal gland resection and Bridge drainage, the results showed that the wound healing time in the treatment group was significantly shorter than that in the control group, and the incidence of postoperative complications was significantly smaller than that in the control group.

Fistula exclusion, the combination of incomplete fistulotomy, internal mouth drainage into the ischiorectal fossa hyrax type anal fistula was designed, intraoperatively the fistula located in the internal mouth near the posterior median was cut and drained [6], and two sides of the external mouth were dilated, in addition and can be combined hanging wire (dotted line), improve the postoperative drainage, promote fistula healing.

3.2.3 Minimally invasive techniques

Anal fistula plug repair: a technique for filling fistulas with synthetic absorbable bioprosthesis, designed primarily for transsphincteric high complexity anal fistulas, has shown therapeutic benefits as infection tolerance of anal fistula plugs, and Tao Yu [27] and so on believe that anal fistula plug may have the effect of promoting neovascularization and fibroblast propagation, the advantages of which are mainly simple operation, little trauma, and little damage to the anal including function, but there are complications such as anal fistula plug shedding, embolism site infection, and its cure rate is reported to be unstable between 20% - 80% abroad [28], Christos Andreou [29] and others conducted a long-term retrospective analysis of fistulotomy, mucosal advancement, and tamponade in anal fistulas and found the highest recurrence rate of 42% in patients with anal fistula tamponade.

Ligation of intersphincteric fistula tract (LIFT), is the ligation and clipping of a fistula through an intersphincteric incision, tickling to remove necrotic tissue within a distal fistula or culling away a distal fistula. The greatest advantages of this surgical formula are the preservation of anal including about function, and in the long-term efficacy observation of this surgical formula by Hong Jin Chen [30], 88.9% of cured patients will have complete control of the size. However, the long-term curative rate of the operation is 40% - 80% [31], which may be affected by surgical manipulation, intersphincteric incision infection, fistula scratching not thorough. In recent years, different lift modifications have appeared, 1) Chen [32] et al 2012 reported that lateral approach high anal fistula ligation, via the external mouth approach to strip the fistula along the course of the fistula to the intersphincteric space ligation and cut off the distal fistula, avoiding the disadvantages of intersphincteric incision infection in the lift procedure, Kang [33]

et al applied the surgical cure rate of 75%, and none of them suffered from postoperative incontinence.2) Nealellis [34] implanted a bioprosthetic material (bio lift) in the intersphincteric space on the basis of the lift procedure to avoid the disadvantages of intersphincteric space infection after lift because of its anti infective as well as physical barrier effect. The author's study reported three reports [35] [36] [37] on the surgical success rate of bio lift in China and abroad after the first report, and the results showed that the success rate of primary surgery was 36.4% - 68.8% with a large difference, so far there are few studies on this procedure, and its clinical efficacy needs to be further studied.3) Zhenjun Wang [38] aimed at the disadvantage of long healing time of fistula tube in lift, combined with biomaterial treatment and complete removal of infected anal gland to make a modification of lift called Lift Plug procedure, Baoming Zhao [39] and other applications the success rate of this procedure is 96.2% higher than the reported 40% - 80% success rate.

3.3. Perianal Acute Necrotizing Fasciitis Treatment

3.3.1 Debridement drainage

The early lesions of acute necrotizing fasciitis are dominated by inflammatory oedema of the skin, subcutaneous and fascial tissues and abnormally elevated local tissue tension, although the diagnosis should be confirmed immediately by debridement, at the time of surgery, multiple fusiform or radial incisions should be made in the area of significant swelling, the cavity should be dissected free of fibrous septa, and the necrotic tissue and pus should be completely removed, as much normal blood vessels and nerves as possible to help Postoperative wound healing, and leaving a rubber tube in the deep pus cavity drainage pus, convenient postoperative dressing change irrigation, also can be many fenestration and retention bridges, removal of subcutaneous necrotic tissue and fascia after placing a glue tube drainage, there are literatures [40] reported that multisite incision and drainage is superior to early and thorough debridement. Prompt and effective debridement drainage is helpful to improve the clinical efficacy, and Zhang Weihua et al [41] showed that the clinical efficacy of debridement drainage within 24 hours of diagnosis was significantly improved compared with that of debridement drainage within 24-72 hours.

3.3.2 Wound treatment

Irrigate the dressing change, and immediately after debridement, the wound should be irrigated with hydrogen peroxide solution and normal saline combined with antibiotics to flush the residual pus and necrotic tissue from the wound to control the spread of infection. After defecation, when smoked and sitting bath, the dressing is rinsed and replaced with the drugs mentioned above, and the necrotic tissue and fascia should continue to be removed when each dressing change is made, which also should be combined with traditional Chinese medicine preparations to treat the wound. Wang leww [42] etc.applied hydrogen peroxide solution and compound Huangbai liquid to wash the wound change every other day, and achieved obvious efficacy in reducing postoperative wound pain and edema and promoting wound healing.

Vacuum sealing drainage (VSD), is to fill the wound cavity after debridement and irrigation the wound with foam excipients or medical antibacterial excipients, and cover the biological semipermeable membrane to make the wound a closed environment, through the drainage tube link the negative pressure drainage device for therapeutic purposes. The closed negative pressure environment is beneficial for the adequate drainage of exudate and necrotic tissue in the wound, which can achieve " zero clustering " of the wound [43], reduce the local colonization of pathogenic bacteria; increase the local blood flow and oxygen supply, promote wound cell proliferation and the growth of new granulation [44]; rinse and dressing change convenience, reduce the exposure of the wound and reduce the chance of cross infection, while avoiding the pain of traditional dressing change [45] ; medical antimicrobial excipients have direct antimicrobial effects and protect the skin around the wound [46].

Colostomy, the operation avoids contamination of the wound by feces by changing the defecation passage, thus controlling the source of infection and preventing the spread of infection. It has been reported that colostomy, fecal diversion can reduce the case fatality rate of perianal necrotizing fasciitis [47], but there is still some controversy about its clinical promotion that it causes artificial destruction to the normal tissues around the rectum [48], and there are also reports on the use of fecal diversion devices to replace rectal stoma makers [49].

Hyperbaric oxygen therapy, as an adjunct to necrotizing fasciitis treatment, 1, Can raise the oxygen concentration in tissues to play the role of directly killing anaerobic bacteria [50], and promote wound growth and healing, 2, Enhanced ability of leukocytes to kill aerobic bacteria [53]. 3, Can constrict blood vessels and reduce wound edema [51].

3.3.3 Treatment of predisposing factors and complications

Diabetes, immunosuppression, obesity, alcohol, peripheral vascular disease are common susceptibility factors for the disease [52], of which diabetes is particularly common [53], and these susceptibility factors create opportunities and favorable conditions for the reproduction of pathogenic bacteria, thus leading to a positive control of susceptibility factors when combined with multidisciplinary efforts throughout the course of disease treatment. In addition, the rapid development of the disease also causes bacteremia, sepsis, sepsis or even septic shock, multiple organ failure crisis life, so the admission was immediately given a large number of spectrum antibiotics, abroad currently the golden classical triple therapy for the third-generation cephalosporins or aminoglycosides, plus penicillin and metronidazole [54], 2019 domestic expert consensus recommended that 2-3 combination antibiotics be used abroad without Difference [55], after which sensitive antibiotics were applied according to the septic susceptibility results, at the same time, close monitoring of various vital signs and all related laboratory tests, actively prevent complications.

3.3.4 Traditional Chinese medicine treatment

It is also indispensable for Chinese medicine to cooperate with the above-mentioned therapeutic procedures in the treatment of perianal necrotizing fasciitis, which has obvious efficacy in controlling infection, promoting wound healing and reducing postoperative pain. Luo Chao LAN [56] et al., in the postoperative period combined with Xianfang live life drinking to clear up Yin herbal blood, detoxifying and generating muscle to treat 26 cases of perianal necrotizing fasciitis to achieve satisfactory results. Sun Linmei [57] and others believe that the etiology is Zhengqi Ben deficiency, fire venom invagination, and burning camp meat, and postoperative treatment of perianal necrotizing fasciitis by Buzhong Yiqi Decoction Combined with Tori disinfection dispersing and attenuating oral and liquid sitting bath is exact.

4. SUMMARY AND PROSPECT

Perianal infectious diseases have a complex etiology, with greater damage to anal function and higher recurrence rates, causing severe psychological and economic burdens on patients. Current treatment methods about perianal infectious diseases are complicated and wide, but various treatment methods have their specific advantages and have certain indications, in a general view, resolving the infectious focus is always the main direction of current treatment of perianal infectious diseases, according to the different choices of suitable treatment options to better cure.

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