

Observation of the efficacy of Hemocoagulase Atrox combined with Mayinglong Hemorrhoid Cream on postoperative treatment of perianal abscess

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Abstract: To observe and study the efficacy of combined therapy of Hemocoagulase Atrox for Injection and Mayinglong Hemorrhoid Ointment on wound healing and complications after perianal abscess resection. The data of 162 patients who underwent perianal abscess resection were retrospectively analyzed. The data were divided into an observation group and a control group. The control group applied Mayinglong hemorrhoid ointment on the wound surface on the basis of normal saline flushing and the observation group injected atrocoagulase on this basis. The medication cycle was 4 weeks and the clinical effect, wound healing and complication rate after treatment were compared. Wound healing and postoperative complications. After treatment, the total efficacy of the observation group was higher than that of the control group ($P<0.05$); the clinical index scores and Wexner scores of the two groups were lower than before treatment and even lower in the observation group ($P<0.05$); the anal function and The incidence rate of complications was better than that of the control group ($P<0.05$). The combined therapy of Hemocoagulase Atrox for Injection and Mayinglong Hemorrhoid Ointment can effectively reduce the pain symptoms of patients after perianal abscess resection, promote the recovery of anal function and has a short wound healing time, low complication rate and significant effect.

Keywords: Hemocoagulase Atrox, Mayinglong hemorrhoid ointment, perianal abscess surgery

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INTRODUCTION

Perianal abscess is a common anorectal disease with a complex pathogenesis. There is abundant fat and loose connective tissue around the anorectal canal, which provides convenient conditions for the growth and spread of bacteria. Anal crypt infection is the main cause of the disease. Because the anal crypt is funnel-shaped and opens upward, it is easy to retain feces and bacteria. Once blocked, the bacteria will multiply and invade the surrounding tissues, causing infection and forming abscesses (Xiaoyang S *et al.*, 2022). In addition, direct bacterial invasion caused by anorectal trauma, as well as systemic diseases such as Crohn's disease and tuberculosis that lead to reduced immune function of the body, will increase the risk of perianal abscess (Tongli W *et al.*, 2021). From a pathophysiological point of view, inflammation starts with congestion and edema of local tissues. With the gradual development of inflammatory cell infiltration, it eventually leads to tissue necrosis and liquefaction, forming abscesses (Wang Y and Yuansheng T, 2024). Its clinical manifestations are mainly persistent redness, swelling and pain around the anus, accompanied by tenderness and induration, which seriously affect the patient's daily life (Xinjian L, 2024). If not treated in time, the abscess may spread, causing serious complications such as sepsis and even endangering life (Abebe Metasebia W and Nigussie Mary M, 2021). Surgical

excision of the lesion is currently the main treatment for perianal abscesses, which can effectively drain pus and prevent the spread of infection. However, tissue wounds will be left after surgery and complications such as infection are common, which will aggravate inflammation and prolong the patient's recovery time. Mayinglong Musk Hemorrhoid Cream, as a commonly used Chinese medicine preparation, contains ingredients such as musk and bezoar and has the effects of clearing away heat and detoxification, reducing swelling and relieving pain and removing dead tissue and promoting tissue regeneration (Yulu Z and Huizhen X, 2023). Through external application, the drug can directly act on the affected area, effectively relieving postoperative pain and edema and promoting wound healing. Many studies have confirmed that it can improve local blood circulation, promote tissue repair, inhibit the release of inflammatory factors and play a significant role in postoperative wound repair of perianal abscesses (Liangsu S *et al.*, 2025). Due to its good clinical efficacy and few adverse reactions, it is becoming increasingly important in the treatment of modern anorectal diseases. The main ingredient of Hemocoagulase Atrox is batroxobin from the Brazilian lanceheaded pit viper, which is commonly used for various types of bleeding and hemorrhagic diseases. Its use before surgery can reduce bleeding at the surgical site and after surgery (Peng Z *et al.*, 2024). Its mechanism of action is to activate coagulation factors and accelerate the conversion of fibrinogen to fibrin, thereby promoting coagulation.

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Table 1: Comparison of efficacy between the two groups (n/%)

Group	N	cure	get better	invalid	total efficiency
control group	81	55(67.9)	10(12.3)	16(19.8)	65(80.2)*
observation group	81	69(85.2)	8(9.9)	4(4.9)	77(95.1)*
χ^2					9.541
P					<0.05

This study used Hemocoagulase Atrox and Mayinglong Musk Hemorrhoid Cream to treat patients after perianal abscess resection, based on the complementary effects of the two. Hemocoagulase Atrox focuses on reducing bleeding, reducing the risk of postoperative wound bleeding and creating a good environment for wound healing. Mayinglong Musk Hemorrhoid Cream targets inflammation and wound repair, reduces inflammatory response and accelerates tissue repair. Existing surgical studies have shown that the combined use of hemostatic and anti-inflammatory pro-repair drugs can improve the treatment effect (Yongsheng M and Jinfeng T, 2020). Therefore, this study assumes that the combined use of Hemocoagulase Atrox and Mayinglong Musk Hemorrhoid Cream can reduce bleeding, reduce inflammation, significantly promote wound healing, reduce the incidence of complications and improve the quality of life of patients during the recovery period. A literature review found that there are few studies on the combined use of these two drugs after perianal abscess resection. This study hopes to fill this gap and provide a better treatment plan for the clinic. Focusing on reducing patient pain and improving the quality of life during the recovery period, the clinical value of this study is fully highlighted.

RESEARCH MATERIALS AND PLANS

Data sources

The data come from 162 patients who underwent perianal abscess resection at Xinchang County People's Hospital of Shaoxing City from January 2020 to December 2023 and were retrospectively analyzed. This group mainly included 16 cases of sphincter abscess, 33 cases of perianal subcutaneous abscess, 51 cases of rectal submucosal abscess and 62 cases of ischiorectal fossa abscess. Among the 162 patients, there were 89 males and 73 females, with an age range of 18 to 65 years old and an average age of (38.5±10.2) years old. Twelve patients had hypertension, 8 patients had diabetes and the rest had no obvious complications. Inclusion criteria: all cases meet the diagnostic criteria for perianal abscess; those who undergo perianal surgery for the first time; those who have surgical indications and indications; exclusion criteria: those with severe liver and kidney disease; those with malignant tumor disease; those who have been treated with other drugs within the past 7 days Those with endocrine and coagulation disorders and those allergic to the study drugs in this group. 162 patients were randomly divided into two groups for observation and the difference in general data

was not significant ($P>0.05$). This study was approved by the Ethics Committee of Xinchang County People's Hospital of Shaoxing City (NO.20230021).

METHOD

In the control group, the wound was rinsed with normal saline after surgery and then 2 g of Mayinglong Hemorrhoid Ointment (manufactured by Mayinglong Pharmaceutical Company, National Drug Approval No. Z42021920, batch number: 231105, specification: 20g/tube) was evenly applied to the wound and then bandaged. On the basis of the control group, the observation group was given 1 to 2 units of Hemocoagulase Atrox for Injection (Penglai Nuokang Pharmaceutical Co., Ltd., national drug approval number: H20051840, approval number: 472307132, specification: 2 units/tube) intramuscularly before surgery. Inject once a day. The medication period is 4 weeks.

Observation items

Mainly include: clinical efficacy, pain and healing conditions and anal function, as well as the occurrence of complications during treatment.

Treatment effect

Cure: symptoms disappear and the wound heals to Grade I; improvement: symptoms reduce and wound healing <70%; invalid: symptoms do not improve or worsen and wound healing <30%. Total effective rate = (cure + improvement) / total number of cases × 100%.

Pain condition

Use the VAS scale to evaluate the patient's pain. The lower the score, the lighter the pain.

Clinical indicators

Wound secretion evaluation criteria

If the surface dressing is dry, it is scored as 0 points; if it is wet and less than 1/3, it is scored as 1 point; if it is 1/3 to 2/3, it is scored as 2 points; if the surface dressing is wetted >2/3, it is scored as 3 points. The score is negatively correlated with the degree of healing, with higher scores indicating worse healing.

Granulation tissue evaluation criteria

The granulation tissue grows well is scored as 0 points, the wound appears as dark red granules as 1 point, the wound surface is light red as 2 points and the wound surface

appears as dark gray granules as 3 points. The score is negatively correlated with the growth status of granulation tissue. The higher the score, the worse the growth status of granulation tissue.

The granulation growth and healing conditions of the wounds in the two groups were strictly recorded.

Anal function

Anal function indicators include the maximum systolic pressure of the anal canal, diastolic pressure and the length of the high-pressure zone of the anal canal. The above indicators are measured using a Biolab pressure detector and a pressure sensor catheter; the Wexner (Yong Y *et al.*, 2023) table is used to evaluate the degree of fecal incontinence, with a score ranging from 0 to 20 points. Those with lower scores indicate that the anal function has recovered well.

Postoperative complications

The postoperative complications of the two groups were recorded.

Data processing

SPSS 20.0 professional software was used and t or χ^2 test was used. $P < 0.05$ was considered as a statistical difference.

RESULTS

Comparison of drug efficacy

The comparison of the efficacy of the two groups of drugs is shown in table 1.

Comparison of pain and healing conditions

After treatment, the scores of various indicators in both groups were significantly improved and the observation group was better ($P < 0.05$). See table 2.

Comparison of anal functions

After medication, the anal function indicators of the observation group were better than those of the control group ($P < 0.05$), see table 3.

Comparison of complications between the two groups

The incidence of adverse reactions was 34.6% in the control group and 14.8% in the observation group, see table 4.

Among the 9 patients with wound bleeding in the control group, 5 had a small amount of bleeding, which was manifested as a small amount of bleeding on the wound surface after surgery. The bleeding stopped after 5-10 minutes of gauze pressing; 3 had moderate bleeding, with a bleeding volume of about 5-10ml, which was controlled after local application of hemostatic drugs and pressure bandaging for 30 minutes; 1 had a large amount of bleeding, with a bleeding volume of more than 10ml and needed to return to the operating room for suture and

hemostasis. Among the 3 patients with wound bleeding in the observation group, 2 had a small amount of bleeding, which could be stopped by simple local compression; 1 had moderate bleeding, which stopped after local application of hemostatic gel. Among the 5 patients with wound infection in the control group, 3 were infected with *Staphylococcus aureus*, which was confirmed by bacterial culture and drug sensitivity test and 2 were infected with *Escherichia coli*. Among the 3 patients with wound infection in the observation group, 2 were infected with *Staphylococcus aureus* and 1 was a mixed infection (*Staphylococcus aureus* and *Staphylococcus epidermidis*). Infections in the control group mostly occurred 3-5 days after surgery, while infections in the observation group mostly occurred 4-6 days after surgery, which helps to analyze the pattern of infection. The one anal fistula in the control group was a low-position simple anal fistula, with the fistula located between the anal sphincters and only one internal opening and one external opening; no anal fistula occurred in the observation group.

DISCUSSION

Perianal abscess is an anorectal disease caused by anal crypt gland infection. The clinical manifestations are perianal pain and swelling and in severe cases, fever, fatigue and difficulty in urination and defecation (Xiangchi P, 2022). Most of the clinical symptoms are acute and the patient suffers severe pain. If not treated in time, the condition will be aggravated and even abnormal intersection of the anorectal and perineal skin may lead to the formation of anal fistula (Qiao Z *et al.*, 2023). Perianal abscesses that cannot be treated conservatively or have poor drainage must undergo surgical resection, which mainly involves local cleaning and disinfection, filling the incision with metronidazole gauze, etc., to facilitate wound recovery (Zhao T, 2021). Moreover, due to the large surgical wound and the limited perianal anatomy, infection is prone to occur after surgery, which can even lead to symptoms such as edema, pain, bleeding, abnormal growth of granulomas, or reinfection, difficulty in defecation, slow wound healing and the occurrence of anal fistulas and anal fistulas. Complications such as stenosis (Dongsheng S, 2022). Severe cases can also lead to anal sphincter spasm and anal tissue edema, seriously affecting anal function (Jiancheng X *et al.*, 2023). Therefore, postoperative intervention and treatment for perianal abscess is crucial to reduce pain and promote healing (J J Z *et al.*, 2020).

Mayinglong Hemorrhoids Ointment contains traditional Chinese medicine ingredients such as musk, calamine and bezoar (Qianyan L and Zhiyun P, 2023). Pharmacological research shows that the main component of calamine is the ore of smithsonite, which contains zinc carbonate, which has a moisturizing effect.

Table 2: Comparison of clinical indicators between the two groups ($\bar{x} \pm s$)

Group	N	wound pain score		Wound granuloma score		Wound secretion score		Wound healing time (d)
		before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	
control group	81	5.69 \pm 1.21	2.12 \pm 0.78*	2.15 \pm 0.79	1.55 \pm 0.92*	2.12 \pm 0.90	1.49 \pm 0.75*	26.15 \pm 2.5
observation group	81	5.75 \pm 1.32	1.75 \pm 0.65*	2.24 \pm 0.61	1.01 \pm 0.70*	2.15 \pm 0.85	1.02 \pm 0.66*	20.05 \pm 2.1
t		0.3035	3.729	0.815	0.442	0.210	4.222	16.838
P		0.958	<0.005	0.974	<0.005	0.934	<0.005	<0.005

Note: * means the difference is statistically significant ($P < 0.05$).**Table 3:** Comparison of anal function between the two groups ($\bar{x} \pm s$)

Group	N	systolic blood pressure (mmHg)		diastolic blood pressure (mmHg)		High voltage belt length (cm)		Wexner rating (points)	
		before treatment	after treatment	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
control group	81	102.19 \pm 11.21	112.80 \pm 12.46*	69.25 \pm 7.29	152.75 \pm 16.19*	3.22 \pm 0.35	2.90 \pm 0.39*	3.41 \pm 1.27*	2.63 \pm 1.05*
observation group	81	102.25 \pm 12.03	121.55 \pm 12.54*	70.14 \pm 7.44	167.54 \pm 15.10*	3.25 \pm 0.31	2.52 \pm 0.30*	3.52 \pm 1.11	2.02 \pm 1.03*
t		0.032	4.443	0.651	3.428	0.602	6.950	0.589	3.866
p		0.917	<0.005	0.956	<0.005	0.884	<0.005	0.964	<0.005

Note: * means the difference is statistically significant ($P < 0.05$).**Table 4:** Comparison of complications between the two groups (n/%)

Group	N	pain	Bleeding from the wound	anal fistula formation	anal stenosis	Wound infection	Incidence of adverse reactions
control group	81	11(13.6)	9(11.1)	1(1.2)	2(2.5)	5(6.2)	28(34.6) *
observation group	81	5(6.2)	3(3.7)	0	1(1.2)	3(3.7)	12(14.8) *
χ^2							5.165
P							<0.05

Note: * means the difference is statistically significant ($P < 0.05$).

At the same time, Mayinglong ointment can form a thin powdery layer on the wound, which may prevent excreta and pollutants from irritating the wound and effectively promote wound healing (Shijun H *et al.*, 2022). In addition, SXP4 in musk extract can reduce the release of inflammatory mediators, effectively reduce inflammatory reactions and relieve pain (Liu H *et al.*, 2022). Musk ketone in musk can inhibit the release of inflammatory cytokines such as tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6) by binding to specific receptors on the cell membrane, reducing inflammatory responses and thus relieving pain. Zinc carbonate, the main component of calamine, can participate in zinc ion metabolism in cells, affect the proliferation of fibroblasts and the synthesis of collagen and promote wound healing. At the same time, bilirubin in bezoar has an antioxidant effect, which can remove oxygen free radicals from the wound surface, reduce oxidative stress damage and create a favorable environment for wound repair.

Hemocoagulase Atrox for Injection is purified hemocoagulase, which is mainly extracted from adder venom. It contains thromboplastin-like and batrotoxin-like enzymes that promote blood coagulation. It can promote platelet aggregation and accelerate thrombosis, thereby effectively reducing intraoperative and postoperative bleeding (Aixue Z and Xiaomei Z, 2022). In addition, the drug also contains fibrin monomer, which can promote cumulative blood coagulation (Y N Z, 2020). The drug does not contain neurotoxins and other toxins, so it will not cause liver, lung, or kidney damage or serious adverse reactions. The advantage of Hemocoagulase Atrox for Injection is that it can accelerate platelet aggregation and release a large amount of coagulation factors and platelet factors, so it has a significant hemostatic effect. Hemocoagulase Atrox for Injection is mainly used clinically to treat various bleeding diseases. The drug has a rapid onset of action, reaches its peak in a short time and the drug effect lasts for a long time. The drug concentration can remain unchanged for 24 hours (Jun Z, 2020). Therefore, it has a significant hemostatic effect and is beneficial to wound healing (Zhiwei Z and Yongqiang L, 2023). After intramuscular injection, Hemocoagulase Atrox is rapidly absorbed and generally reaches peak blood concentration within 15-30 minutes. It is mainly metabolized by the liver in the body, broken down into small molecules by the action of liver enzymes and excreted from the body through the kidneys. The elimination half-life of the drug in the body is about 2-3 hours, which allows it to play a hemostatic role in a relatively short period of time and the efficacy is maintained for a certain period of time, meeting the hemostatic needs of surgery and the early postoperative period.

Pharmacological interaction between Mayinglong Hemorrhoid Cream and Hemocoagulase Atrox. Although

there is no direct research showing that there is a clear interaction between the two, theoretically, the effect of Mayinglong Hemorrhoid Cream in improving local blood circulation may promote the distribution of Hemocoagulase Atrox in local tissues, allowing it to reach the target site faster and enhance the hemostatic effect. At the same time, Hemocoagulase Atrox reduces bleeding and can provide a relatively stable wound environment for Mayinglong Hemorrhoid Cream to better exert its anti-inflammatory and healing effects. The two work together to promote the recovery of the wound after perianal abscess surgery.

Because the surgical wound for perianal abscess is large and the amount of bleeding is large, postoperative functional recovery is delayed and it is easy to cause hematogenous shock or even anemia. The application of Hemocoagulase Atrox for Injection and Mayinglong combined therapy can effectively reduce intraoperative and postoperative oozing and bleeding, greatly improve surgical safety and promote postoperative recovery. In this study, the overall curative effect of the observation group after treatment was significantly better than that of the control group ($P < 0.05$), indicating that the combined use of Hemocoagulase Atrox for Injection and Mayinglong Hemorrhoid Cream in the treatment of postoperative patients with perianal abscess can effectively improve the cure rate. After treatment, the clinical index scores and wound healing time of both groups were significantly lower than before treatment and the observation group was significantly better than the control group ($P < 0.05$); the anal function scores of both groups were better than before treatment and the observation group was better than before treatment. Compared with the control group ($P < 0.05$). It shows that the application of Hemocoagulase Atrox for Injection and Mayinglong combined therapy can effectively reduce pain, shorten the hemostasis time, produce good wound granulation growth, shorten the healing time and effectively improve anal function.

This study supplemented the corresponding treatment plan for each complication. For wound bleeding, in addition to the different hemostatic measures taken according to the amount of bleeding mentioned above, methods for preventing bleeding are also summarized, such as careful hemostasis during surgery and avoiding strenuous activities after surgery. For *Staphylococcus aureus* infection, cephalosporin antibiotics (such as cefuroxime, a dose of 1.5g each time, twice a day, intravenous drip) are mainly used for treatment and the course of treatment is 7-10 days; for *Escherichia coli* infection, quinolone antibiotics (such as levofloxacin, a dose of 0.5g each time, once a day, intravenous drip) are used for treatment and the course of treatment is also 7-10 days. During the treatment period, the wound care was also strengthened, the dressing was changed regularly and the wound was kept clean and dry. For anal fistula formation, the treatment plan for the

patient with low simple anal fistula in the control group. First, conservative treatment was used, including daily sitz baths with potassium permanganate solution (concentration of 1:5000, sitz bath time of 15-20 minutes, twice a day) to promote local blood circulation and reduce inflammation; at the same time, antibiotic ointment (such as erythromycin ointment) was applied to the wound to prevent further infection. After 1 month of conservative treatment, the patient's symptoms did not improve significantly and an anal fistula incision was subsequently performed. During the operation, the fistula was completely incised and the necrotic tissue and secretions in the fistula were removed. After the operation, the dressing was changed regularly until the wound healed.

Although this study shows that the postoperative effect of Hemocoagulase Atrox combined with Mayinglong Hemorrhoid Cream in the treatment of perianal abscess is significant, there are still some limitations and potential risks that cannot be ignored. For patients with pre-existing diseases, risks need to be paid special attention. For patients with bleeding diseases, the complex coagulation mechanism of Hemocoagulase Atrox may cause abnormal coagulation when using it. For example, patients with abnormal platelet function may have excessive platelet aggregation, forming local thrombus, hindering perianal blood circulation, delaying wound healing and even causing serious complications. Patients with cardiovascular diseases have a hypercoagulable blood state. The use of Hemocoagulase Atrox will increase the risk of thrombosis and may lead to serious events such as myocardial infarction and stroke. Due to poor wound healing ability and susceptibility to infection, the risk of infection in diabetic patients may change during combined treatment and needs to be closely monitored. In terms of drug interactions, although there is no clear research on the combined use of the two, there is a potential risk if the patient takes other drugs at the same time. For example, for patients who are taking anticoagulants (such as warfarin and aspirin), the combined use of Hemocoagulase Atrox may interfere with the anticoagulant effect and increase the risk of bleeding or thrombosis. Drugs that affect the activity of hepatic drug enzymes may also affect the metabolism of thrombin, change its pharmacokinetic parameters and thus affect efficacy and safety. Therefore, when used clinically, doctors should inquire about the patient's medication history in detail and observe closely. There are also problems with long-term or repeated use. Long-term use of Mayinglong Hemorrhoid Ointment may cause local skin allergies, such as contact dermatitis and affect wound healing. Long-term or repeated use of Hemocoagulase Atrox may cause the body to develop tolerance, reduce the hemostatic effect and keep the body in a hypercoagulable state for a long time, increasing the risk of thrombosis. Therefore, for patients who require long-term or repeated combination treatments, doctors should carefully evaluate, closely observe and adjust the

plan in a timely manner.

This study has certain limitations. The research samples were all from Xinchang County People's Hospital, Shaoxing City and were a specific population treated in a single institution. This may limit the universality of the research results. Patients in different regions and different medical institutions may have differences in disease characteristics and treatment habits. The conclusions of this study may not be fully applicable to patients with perianal abscess surgery in other environments or regions. Subsequent studies can expand the sample source and include patients from multiple centers and different regions to improve the universality of the research results.

CONCLUSION

In summary, in postoperative patients with anal abscess, when Hemocoagulase Atrox for Injection and Mayinglong are used in combination, bleeding can be quickly stopped, the formation of fresh granulation tissue can be effectively promoted and postoperative pain symptoms can be reduced. The wound healing time is short and the incidence of complications is low, which is beneficial to postoperative recovery.

In the future, prospective follow - up studies will be conducted to track the patients' conditions at 3 months, 6 months and 1 year after the operation, so that the long - term efficacy and delayed complications can be clarified. At the same time, active cooperation with other medical institutions will be carried out to expand the sample range and improve the universality of the results.

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