

Observational Study

Efficacy and safety of stellate ganglion block in chronic ulcerative colitis

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Abstract

AIM

To investigate the efficacy and safety of stellate ganglion block for the treatment of patients with chronic ulcerative colitis.

METHODS

A total of 120 randomly selected patients with chronic ulcerative colitis treated in Cangzhou Central Hospital from January 2014 to January 2016 were included in this study. These patients were divided into two groups: control group ($n = 30$), patients received oral sulfasalazine treatment; experimental group ($n = 90$), patients received stellate ganglion block treatment. Clinical symptoms and disease activity in these two groups were compared before and after treatment using endoscopy. Blood was collected from patients on day 0, 10, 20 and 30 after treatment. Enzyme-linked

immunosorbent assay was performed to determine interleukin-8 (IL-8) level. The changes in IL-8 level post-treatment in the two groups were compared using repeated measures analysis of variance.

RESULTS

After treatment, clinical symptoms and disease activity were shown to be alleviated by endoscopy in both the control and experimental groups. However, patients in the control group did not have obvious abdominal pain relief. In addition, the degree of pain relief in the experimental group was statistically better than that in the control group ($P < 0.05$). Ten days after treatment, IL-8 level was found to be significantly lower in the experimental group than in the control group, and the difference was statistically significant ($P < 0.05$). In addition, adverse events were significantly higher in the control group than in the experimental group, and the difference was statistically significant ($\chi^2 = 33.215, P = 0.000$).

CONCLUSION

The application of stellate ganglion block effectively improves treatment efficacy in chronic ulcerative colitis, relieves clinical symptoms in patients, and reduces the level of inflammatory factors. Furthermore, this approach also had a positive impact on the disease to a certain extent.

Key words: Stellate ganglion block; Chronic ulcerative colitis

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Core tip: A total of 120 patients with chronic ulcerative colitis were included in this study to examine the efficacy and safety of stellate ganglion block in patients with chronic ulcerative colitis. The results revealed that stellate ganglion block effectively improves the efficacy of chronic ulcerative colitis treatment, relieves clinical symptoms in patients, and reduces the level of inflammatory factors. Furthermore, this technique has fewer adverse reactions, making it safe and reliable.

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INTRODUCTION

Chronic ulcerative colitis is a common disease and has a high incidence. Its main clinical manifestations include abdominal pain, tenesmus and sepsis, and it can decrease the quality of life of patients^[1-6]. Ulcers of the colonic mucosa occur in patients with this disease,

which can affect the entire colon and rectum, and can easily induce repeated attacks. Sulfasalazine is a commonly used conventional treatment for chronic ulcerative colitis. However, this treatment has certain limitations such as frequent recurrence and side effects. Hence, there is a need for better treatment options^[7-13]. Although the pathogenesis of chronic ulcerative colitis is unclear, a close relationship between the disease and immune dysfunction has been confirmed. Furthermore, the expression of cytokines, particularly interleukin-8 (IL-8), significantly increases during the disease course^[14-22]. Stellate ganglion block is a very common clinical block technique that has been used since the beginning of the last century. Studies have shown that stellate ganglion blocks can regulate multiple system functions in the body, and has a good effect on blood pressure, hyperthyroidism, peripheral facial paralysis and other diseases^[23-27]. With the current rapid development of medicine, some scientists have found that the stellate ganglion block technique also plays an important role in regulating the immune system^[28-32]. Thus, we speculate that stellate ganglion blocks may also have a role in the treatment of chronic ulcerative colitis. Therefore, the main purpose of this study was to examine the efficacy and safety of stellate ganglion block treatment in patients with chronic ulcerative colitis.

MATERIALS AND METHODS

General information

A total of 120 randomly selected patients with chronic ulcerative colitis treated in Cangzhou Central Hospital between January 2014 and January 2016 were included in this study. These patients were divided into two groups: control group ($n = 30$) and experimental group ($n = 90$). The control group comprised 19 male patients (63.3%) and 11 female patients (36.7%) aged between 39 and 56 years, with a mean age of 47.1 ± 5.9 years. Furthermore, the disease course ranged from two months to 10 years, with an average of 4.1 ± 1.4 years. The experimental group comprised 54 male patients (60.0%) and 36 female patients (40.0%), aged between 40 and 57 years, with a mean age of 48.2 ± 6.0 years. Furthermore, the disease course ranged from four months to nine years, with an average of 4.3 ± 1.5 years. Patients in the experimental group were not allergic to lidocaine and had no coagulation disorders. This study was approved by the ethics committee of the institution.

Methods

In the control group, patients received four doses of sulfasalazine twice a day orally. In the experimental group, patients received stellate ganglion block treatment once a day for 30 d. The blocking method used was as follows: 10 mL of 1% lidocaine was injected into the sixth cervical vertebrae, and Horner syndrome

Table 1 Clinical symptoms in the control and experimental groups before treatment *n* (%)

Indices (clinical symptoms)	Control group (<i>n</i> = 30)	Experimental group (<i>n</i> = 90)	<i>t/χ</i> ²	<i>P</i> value
Stomach ache	17 (56.67)	50 (55.56)	0.025	0.874
Time to defecation ($\bar{x} \pm s$)	8.50 ± 1.31	8.71 ± 1.40	-0.723	0.471
Blood and pus	10 (33.33)	29 (32.22)	0.028	0.867
Tenesmus	13 (43.33)	38 (42.22)	0.025	0.874
Interleukin-8 (ng/L)	25.83 ± 3.01	24.97 ± 2.98	1.366	0.175

Table 2 Clinical symptoms of patients in the two groups after treatment *n* (%)

Group	Stomach ache	Time to defecation ($\bar{x} \pm s$)	Blood and pus	Tenesmus
Control group				
Before treatment	17 (56.67)	8.50 ± 1.31	10 (33.33)	13 (43.33)
After treatment	13 (43.33)	2.91 ± 0.97	5 (16.67)	7 (23.33)
<i>t/χ</i> ²	3.548	18.784	7.401	9.000
<i>P</i> value	0.060	0.000	0.007	0.003
Experimental group				
Before treatment	50 (55.56)	8.71 ± 1.40	29 (32.22)	38 (42.22)
After treatment	8 (8.89) ^a	1.12 ± 0.87 ^a	4 (4.44) ^a	6 (6.67) ^a
<i>t/χ</i> ²	49.864	43.684	25.776	34.213
<i>P</i> value	0.000	0.000	0.000	0.000

^a*P* < 0.05 vs the control group.

was observed in these patients. The stellate ganglion block technique was considered successful when no abnormal situations occurred within 30 min.

Outcome measures

Clinical symptoms and IL-8 level: Clinical symptoms were observed before and after treatment. Blood was drawn from patients at the beginning of treatment, on the morning of day 0, and on the 10th, 20th and 30th day after treatment. IL-8 levels were then determined by enzyme-linked immunosorbent assay. Changes in clinical symptoms and related indicators were analyzed and compared in the two groups after treatment.

Screening colonoscopy: Colonoscopy lesions were scored before and after treatment using the Rachmilewitz scoring system.

Statistical analysis

SPSS 17.0 software was used for statistical analysis. Time to defecation and cytokine expression level were determined. The two treatment groups were compared using the *t*-test. The number of cases of abdominal pain, pus and tenesmus were used as enumeration data. Comparisons in these two groups were evaluated using Pearson's χ^2 test.

RESULTS

Comparison of related indices in the two groups before treatment

The differences in the number of patients with blood

and pus and tenesmus accompanied by abdominal pain and the average time to defecation before treatment in the control and experimental groups were not statistically significant (*P* > 0.05). In addition, the difference in IL-8 expression level between these two groups were not statistically significant (*P* > 0.05), as shown in Table 1.

Remission of clinical symptoms in the two groups after treatment

Clinical symptoms in patients in the control and experimental groups were alleviated after treatment. However, abdominal pain was not significantly relieved in patients in the control group. Furthermore, remission in the experimental group was better than that in the control group, and the difference was statistically significant (*P* < 0.05; Table 2).

Comparison of IL-8 expression levels in patients after treatment

In this study, IL-8 expression level was significantly lower in the experimental group than in the control group; and the difference was statistically significant (*P* < 0.05). Furthermore, the duration of treatment and IL-8 expression were significantly reduced in the experimental group, and the differences were statistically significant (*P* < 0.05). However, these differences were not significant in the control group. The maximum value of the measured data was reached at day 0 in the control group, while the minimum value was reached during the first 30 d in the experimental group. In addition, no interactions (*F* = 2.981, *P* = 0.139) between the different time points and group-

Table 3 Comparison of interleukin-8 expression levels between the control and experimental groups

Group	Different time points				Mean	F	P value
	Day 0	Day 10	Day 20	Day 30			
Control group	25.83 ± 3.01	25.23 ± 2.87	24.68 ± 2.99	24.34 ± 2.98	25.02 ± 2.95	2.191	0.060
Experimental group	24.97 ± 2.98	22.20 ± 2.90	15.95 ± 2.62	8.81 ± 2.13	17.98 ± 2.54	9.715	0.000
Mean	25.40 ± 2.95	23.72 ± 2.88	20.32 ± 2.71	16.58 ± 2.35	19.26 ± 2.52	6.114	0.008
<i>t</i>	1.366	4.969	15.249	31.117	12.617	(F = 5.491, P = 0.032) ¹	(F = 2.981, P = 0.139) ²
P value	0.175	0.000	0.000	0.000	0.000		

¹Overall comparison of F statistics and P values between the control and experimental groups; ²Interactions between F statistics and P values.

Table 4 Adverse reactions in the control and experimental groups after treatment

Group	Stomach discomfort	Liver and kidney dysfunction	Headache	Rashes	Vomiting	Neck pain	Incidence
Control group	5	1	3	2	2	0	43.33%
Experimental group	0	0	0	0	0	7	7.78%

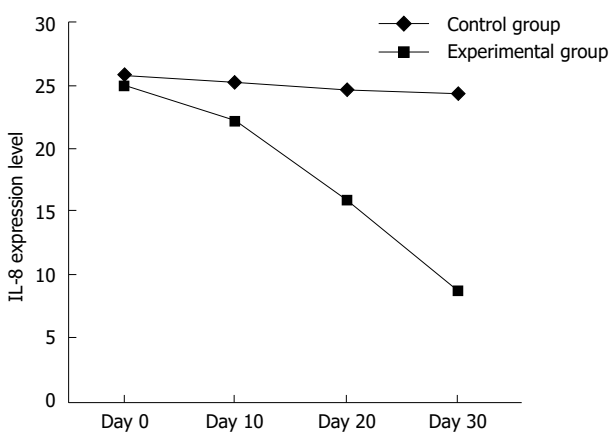


Figure 1 Interactive contour map of time points and group factors. IL-8: Interleukin-8.

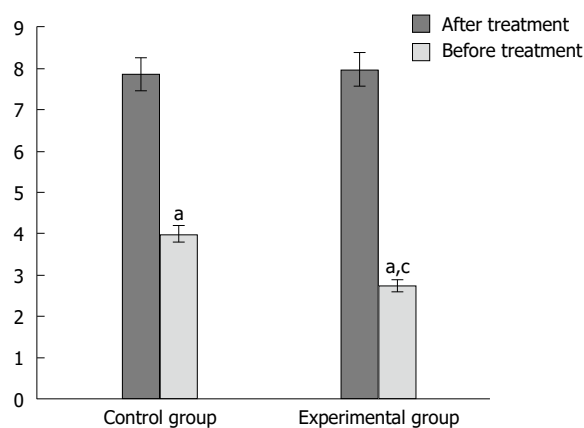


Figure 2 Colonoscopy scores of patients in the two groups. ^aP < 0.05 vs the control group before treatment; ^cP < 0.05 vs the control group after treatment.

ings were observed (Table 3, Figure 1).

Colonoscopy scores in the two groups before and after treatment

Colonoscopy scores significantly decreased at 30 d after treatment in both groups. However, these scores decreased more significantly in the experimental group, compared with the control group; and the difference was statistically significant (P < 0.05; Figure 2).

Adverse reactions

In the control group, 13 patients experienced stomach discomfort, liver and kidney dysfunction, headache, and other adverse reactions. In the experimental group, only seven patients had mild pain in the neck, which disappeared after a few days. The proportion of adverse events was significantly higher in the control group; and the difference was statistically significant ($\chi^2 = 33.215, P = 0.000$; Table 4).

DISCUSSION

In recent years, the incidence of chronic ulcerative

colitis has gradually increased. This recurrent disease causes serious harm to human health^[33-36]. Sulfasalazine is a commonly used drug for treating chronic ulcerative colitis. However, due to its side effects, better methods of treatment are required^[37-40]. The pathogenesis of chronic ulcerative colitis is complex. However, recent studies have shown that this disease and immune dysfunction are correlated^[41,42], and that the stellate ganglion block technique plays a very important role in regulating immune function^[43-46]. Therefore, the main aim of this study was to investigate the efficacy and safety of the stellate ganglion block technique in the treatment of chronic ulcerative colitis.

IL-8 content in patients in the two groups before and after treatment

Research has shown that the occurrence of chronic ulcerative colitis is accompanied by the formation of immune complexes and cytokines, which is difficult to treat^[47]. Of these cytokines, IL-8 can lead to chemotaxis of neutrophils, eosinophils, lymphocytes and other cells, and the release of media that can damage

endothelial cells and related tissues and organs, leading to inflammation^[48]. In this study, stellate ganglion block was administered 30 times to patients in the experimental group and led to a reduction in IL-8 expression. The level of IL-8 expression did not significantly change in patients in the control group. In addition, abdominal pain was not significantly relieved after treatment in the control group, while abdominal pain was relieved in the experimental group. This suggests that neutrophil chemotactic factors are released through the activation of macrophages in patients with chronic ulcerative colitis, and both macrophages and neutrophils can increase IL-8 secretion, leading to inflammation^[47]. After stellate ganglion block treatment, the inflammatory chemokine IL-8 was reduced in patients in the experimental group, chemotaxis was inhibited, and peripheral blood histamine only slightly increased; thus, reducing inflammation^[48].

Changes in clinical symptoms in the two groups before and after treatment

Abdominal pain, tenesmus and sepsis are the main clinical manifestations of chronic ulcerative colitis, which seriously affect the normal daily life of patients^[6]. Sulfasalazine is a commonly used drug for treating chronic ulcerative colitis. However, it has some limitations due to its side effects^[10]. Therefore, this study used stellate ganglion block as a new method for treating this disease from the perspective of immunology. Patients were divided in the control group who were treated with conventional sulfasalazine, and the experimental group in which patients were treated with stellate ganglion block.

Pus and tenesmus symptoms were significantly reduced in both groups. The time to defecation was also significantly reduced in both groups, but relief of clinical symptoms was more obvious in the experimental group. Furthermore, colonoscopy scores were significantly decreased in the experimental group compared with the control group. In addition, research has shown that immune function in the human body induces environment stability and defense, as well as other vital functions; and counting and activity improves humoral immunity. Finally, this treatment reduces the production of inflammatory cytokines *in vivo* in patients with chronic ulcerative colitis, and improves clinical symptoms^[49]. Furthermore, studies have shown that the stellate ganglion block technique improves blood circulation by inhibiting the activity of the sympathetic nervous system. This can provide chronic ulcerative colitis patients with immune complexes and induces the rapid clearance of inflammatory cytokines, thereby improving the condition of patients^[50].

Adverse reactions

Fewer adverse symptoms were observed following treatment with the stellate ganglion block technique,

and the liver, kidney, stomach and other organs were less affected, when compared with the control group. These findings indicate that the stellate ganglion block has good healing power and few side effects, demonstrating that this treatment is safe and reliable.

This study has limitations. The sample size was small. Furthermore, IL-8 levels in patients included into this study were not compared with healthy subjects. Hence, further studies with a larger sample size are needed.

In conclusion, the stellate ganglion block technique is a new method for treating chronic ulcerative colitis. This method can significantly improve clinical symptoms, reduce the production of inflammatory cytokines, has fewer adverse reactions, and is safe and reliable, thereby improving the quality of life of patients. This technique is worthy of further research conducted with a larger sample size, and could be used in clinical practice.

COMMENTS

Background

Chronic ulcerative colitis is common, and has a high incidence. Abdominal pain, tenesmus and sepsis are the main clinical manifestations of this disease, which can decrease the quality of life of patients. Ulcers of the colonic mucosa occur in patients with chronic ulcerative colitis, which can affect the entire colon and rectum, and induce repeated attacks. Sulfasalazine is a commonly used conventional treatment for chronic ulcerative colitis. However, it has certain limitations such as disease recurrence and side effects. Hence, there is a need for better treatment options.

Research frontiers

Although the pathogenesis of chronic ulcerative colitis is unclear, the close relationship between this disease and immune dysfunction has been confirmed. Furthermore, the expression levels of cytokines, particularly interleukin-8, significantly increases during the disease course.

Innovations and breakthroughs

Stellate ganglion block is a very common clinical block technique that has been used since the beginning of the last century. Studies have shown that stellate ganglion block can regulate multiple system functions in the body, and has a good effect on blood pressure, hyperthyroidism, peripheral facial paralysis and other diseases. With the current rapid development of medicine, some scientists have found that the stellate ganglion block technique also plays an important role in regulating the immune system. Thus, we speculate that stellate ganglion blocks may also have a role in the treatment of chronic ulcerative colitis.

Applications

The stellate ganglion block technique can effectively improve the efficacy of chronic ulcerative colitis treatment, relieve clinical symptoms in patients, and reduce the level of inflammatory factors. Furthermore, it has fewer adverse reactions, thereby making it a safe and reliable treatment method.

Peer-review

Stellate ganglion block technique can effectively improve the efficiency of chronic ulcerative colitis treatment, relieve the clinical symptoms of patients, and reduce the level of inflammatory factors. Furthermore, it has fewer adverse reactions, thereby allowing it to be a safe and reliable treatment method. This technique is worthy of further studies conducted with large sample sizes, and can be used in clinical practice.

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