



Study on the effect of hyperbaric oxygen therapy on the wound healing and the related serum indexes of rectal abscess patients after surgery

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ABSTRACT

Objective: To observe and research the influence degree of hyperbaric oxygen therapy on wound healing and related serum indexes of rectal abscess patients after surgery. **Methods:** A total of 48 rectal abscess patients treated with operation in my hospital from April 2014 to August 2015 were taken as research objects, and the 48 patients were randomly divided into two groups: control group (postoperative routine treatments, 24 cases) and observation group (postoperative routine treatments and hyperbaric oxygen therapy, 24 cases), and then compared the time constitutes of wound healing, the edema degrees and the related serum indexes of patients in two test groups before the operation and at 1 d, 3 d and 10 d after operation. **Results:** The time constitute of wound healing of observation group is better than that of control group, and the edema degree and the related serum index of observation group are lower than those of control group, and the test result of two groups have significant differences. **Conclusions:** The hyperbaric oxygenation therapy can effectively promote the postoperative wound healing of patients with rectal abscess, and it also has active clinical significance for the control of edema and related serum indexes.

1. Introduction

In the recent years, there are much researches on the physical condition of rectal abscess patients after surgery, especially in the aspect of wound healing. As an effective treatment method, hyperbaric oxygen therapy are widely applied in the treatment of many clinical diseases and earns positive remarks from doctors and patients[1,2]. The research on the applying of hyperbaric oxygen therapy in the clinical treatment of rectal abscess is infrequent, and the study on the promotion of hyperbaric oxygen therapy to the wound healing and related serum indexes of rectal abscess patients after surgery is more rare.

In this paper, the effect of hyperbaric oxygen therapy on wound healing and related serum indexes of rectal abscess patients after surgery was been analyzed and discussed.

2. Materials and methods

2.1 Clinical materials

48 rectal abscess patients treated with operation in my hospital from April 2014 to August 2015 were taken as research objects, and the 48 patients were randomly divided into two groups: control group (postoperative routine treatments, 24 cases) and observation group (postoperative routine treatments and hyperbaric oxygen therapy, 24 cases). In 24 cases of control group, there are 17 males and 7 females, aged 18 to 58 years old (the mean age is 43.0 ± 5.9). The disease course of control group last 2.0 d to 8.6 d (the mean value is 5.8 ± 1.3 d) including ischiorectal space abscess (16 cases), pelvirectal space abscess (6 cases) and others (2 cases). In 24 cases of observation group, there are 18 males and 6 females, aged 18 to 59 years old (the mean age is 42.8 ± 5.7). The disease course of control group last 2.0d to 7.5d (the mean value is 5.5 ± 1.4 d) including ischiorectal space abscess (17 cases), pelvirectal space abscess (5 cases) and others (2 cases). The above factors of patients in the two groups have no significant differences ($P > 0.05$), so the two groups are comparable.

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2.2 Methods

2.2.1 Treatment methods

The patients of control group all received the routine surgical treatment: Surgical incision and drainage of the lesions with routine drugs. On the basis of the routine surgical treatment, the hyperbaric oxygen therapy was added to the patients of observation group by using hyperbaric oxygen chamber at 1 d after operation. The pressure is 0.2 MPa, and the treatment time is 40 min, and the interval of two treatment is 10 min, the treatment lasts 10 d. Then, compared the time constitutes of wound healing, the edema degrees and the related serum indexes of patients in two test groups at 1 d, 3 d and 10 d after operation.

2.2.2 Observing indexes and detection methods

With the venous blood of patients in two test groups before the operation and at 1 d, 3 d and 10 d after operation as studied object, the detection of serum, which gotten by centrifuging the venous blood, was been carried out. The detection indexes include some infection inflammatory state indexes (TNF- α , IL-6 and IL-22) and some pain state indexes (SP, H₂S and NPY). The detection method of the indexes is the enzyme linked immunosorbent assay (ELISA).

2.3 Evaluation criterion

When the observation spot has lightly sag under digital pressure and the recovery of edema is fast, we call it slight edema. The medium edema means that the observation spot has apparent sag under digital pressure and the recovery of edema is relative slow. The severe edema means that the skin of observation spot is tense and shiny, even with appearance of tension blister[3].

2.4 Statistic analysis

The software SPSS 17.0 was used to test the data of this paper. The methods of data validation include the student's test (t test) and Chi-square test (χ^2 test), the examination results show that there is a remarkable difference ($P < 0.05$).

Table 3.

The comparison of inflammatory state indexes of patients at 1 d, 3 d, 10 d after operation.

Groups	<i>n</i>	Time	TNF- α (ng/mL)	IL-6 (pg/mL)	IL-22 (pg/L)
Control	24	before operation	5.65±0.66	9.94±1.15	45.95±5.28
		1 d after operation	7.85±0.71	14.10±1.45	70.32±7.81
		3 d after operation	4.35±0.52	8.42±1.04	43.24±5.19
		10 d after operation	2.54±0.31	6.35±0.65	38.51±4.66
Observation	24	before operation	5.63±0.62	9.97±1.12	45.97±5.23
		1 d after operation	5.56±0.60*	8.87±1.04*	44.87±5.29*
		3 d after operation	2.27±0.29*	5.21±0.60*	37.66±4.52*
		10 d after operation	1.01±0.15*	4.10±0.43*	31.56±3.72*

Compared with control group, * $P < 0.05$.

3. Results

3.1 The comparison of wound healing constitutes time of patients

Compared with control group, the wound healing time of observation group that less than 3 weeks has higher proportion, and the time of wound healing of observation group is shorter than that of control group, and there is a remarkable difference ($P < 0.05$). The detailed data is presented in table 1.

Table 1.

The comparison of wound healing time constitution in two groups.

Group	<i>n</i>	The constitution of wound healing time (cases / %)		Wound healing time (d)
		Less than 3 weeks	More than 3 weeks	
Control	24	13 (54.17)	11 (45.83)	20.68±3.41
Observation	24	18 (75.00)*	6 (25.00)	15.45±2.98*

Compared with control group, * $P < 0.05$.

3.2 The comparison of edema condition of patients at 1 d, 3 d, 10 d after operation

Compared with control group, the edema incidence of observation group at 1 d, 3 d and 10 d after operation has lower proportion, and there is a remarkable difference ($P < 0.05$). The detailed data is presented in table 2.

Table 2.

The comparison of edema condition of patients at 1 d, 3 d, 10 d after operation (cases/%).

Group	<i>n</i>	Time	Slight	Medium	Severe
Control	24	1 d after operation	5 (20.83)	9 (37.50)	10 (41.67)
		3 d after operation	8 (33.33)	9 (37.50)	7 (29.17)
		10 d after operation	14 (58.33)	6 (25.00)	4 (16.67)
Observation	24	1 d after operation	10 (41.67)	8 (33.33)	6 (25.00)*
		3 d after operation	15 (62.50)	7 (29.17)	2 (8.33)*
		10 d after operation	20 (83.33)	4 (16.67)	0 (0.00)*

Compared with control group, * $P < 0.05$.

3.3 The comparison of inflammatory state indexes of patients at 1 d, 3 d, 10 d after operation

The serum inflammatory state indexes of patients in two groups, such as TNF- α , IL-6 and IL-22, all have no significant differences ($P > 0.05$) before operation. However, the serum inflammatory state indexes of the observation group all lower than those of the control

Table 4.

The comparison of pain state indexes of patients at 1 d, 3 d, 10 d after operation.

Groups	n	Time	SP (μ g/mL)	H ₂ S (μ mol/L)	NPY (μ g/L)
Control	24	before operation	4.87±0.50	58.58±6.30	266.46±25.35
		1 d after operation	7.85±0.64	71.42±7.88	298.84±30.12
		3 d after operation	5.23±0.52	62.67±7.10	272.56±27.43
		10 d after operation	2.76±0.34	57.31±6.04	260.18±24.10
Observation	24	before operation	4.85±0.53	58.61±6.16	266.50±25.29
		1 d after operation	4.76±0.47*	60.36±7.52*	270.51±26.60*
		3 d after operation	2.80±0.35*	54.28±5.76*	245.52±22.64*
		10 d after operation	1.33±0.20*	50.33±5.42*	220.72±21.8*

Compared with control group, * $P < 0.05$.

group at 1 d, 3 d and 10 d after operation, and there is a remarkable difference ($P < 0.05$). The detailed data is presented in table 3.

3.4 The comparison of pain state indexes of patients at 1 d, 3 d, 10 d after operation

The serum pain state indexes of patients in two groups, such as SP, H₂S and NPY, all have no significant differences ($P > 0.05$) before operation. However, the serum pain state indexes of the observation group all lower than those of the control group at 1d, 3d and 10d after operation, and there is a remarkable difference ($P < 0.05$). The detailed data is presented in table 4.

4. Discussion

Rectal abscess is not uncommon in the clinical, and the research on the physical condition of rectal abscess patients, especially on the treatment and prevention of rectal abscess is sufficient[4,5]. Lots of relevant study show that the infection inflammatory state of rectal abscess patients is poor and the pain state of rectal abscess patients is serious too. Meanwhile, the indexes of infection inflammatory state and pain state both have significant abnormalities during treatment courses[6,7]. Therefore, the improvement and control of above-mentioned aspects should be paid more attention in the progress of treatment. The surgical treatment is an important treatment method for rectal abscess, but the research on surgical treatment is insufficient. As an invasive treatment method, surgical treatment may leads to pain and inflammatory stress response at the affected area[8]. So, it is very necessary to carry out a further study on the control of inflammatory infection and pain for the rectal abscess patients. In the clinical application, there are many indexes related to inflammatory infection degree, and the TNF- α , IL-6 and IL-22 of the rectal abscess patients is been more researched among the indexes. But the most research was not analyzed the changes of the indexes in detail. So, we should further explore the change rules of the indexes in detail[9,10]. Besides, the SP, H₂S and NPY of the rectal abscess patients, as three relevant indexes of organism pain, all present a tendency of abnormal increase[11]. So, the control of the indexes has higher degree of demands.

In this paper, the influence degree of hyperbaric oxygen therapy on wound healing and related serum indexes of rectal abscess patients after surgery is been explored, and the result shows that the hyperbaric oxygen therapy has higher clinical application value in the treatment of rectal abscess including greatly reduce the time of wound healing and accelerate the improvement speed of edema degree after surgery. Moreover, compared with control group, the inflammatory state indexes and pain state indexes of observation group at 1 d, 3 d and 10 d after operation patients of have a more effectively decrease at a far quicker descent speed. This indicates that

the hyperbaric oxygen therapy has remarkable effects on promoting the rehabilitation of rectal abscess patients for it can effectively improve the local blood circulation ability and the local antioxidant ability and establish a foundation for the acceleration of wound healing.

In summary, the hyperbaric oxygenation therapy can more effectively promote the postoperative wound healing of patients with rectal abscess, and it also has active clinical significance for the control of edema and related serum indexes.

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