

Clinical effect of intrathecal injection of medicine combined with continuous lumbar cistern drainage on intracranial infection after intracranial tumor surgery

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Abstract: This study was designed to scrutinize the clinical effectiveness of intrathecal injection of medicine along with constant lumbar cistern drainage on intracranial infection subsequent to intracranial tumor operation. Sixty two patients with intracranial infection after intracranial tumor surgery were selected as the objects of study divided into combined treatment group (n=31) and the control group (n=31) according to the time of admission. Patients in the combined treatment group were treated with intrathecal injection of medicine combined with group's continuous lumbar cistern drainage while patients in the control group were just treated with intravenous antibiotic therapy followed by comparison in the clinical efficacy, infection control, the level of inflammatory factor like crp, IL-4 and incidence of complication in the two groups were compared respectively. The total effectiveness rate was 96.77% in the combined treatment group and 80.65% in the control group indicating statistical significant difference ($p < 0.05$). The average time of infection control in the combined treatment group and the control group was 9.05 ± 2.08 and 17.07 ± 3.34 days respectively. After treatment, the restoration effect of serum crp and IL-4 in the combined treatment group was better ($p < 0.05$). The complication incidence of patients in the combined treatment group was 3.23% while it was 16.13% in the control group. Therefore, the difference between the two groups was statistically significant ($p < 0.05$). This advanced combination therapy proved to be effective as the total clinical efficacy was relatively high. Moreover, the combination therapy also shortened the time of infection control with lesser complication rate and reduce inflammatory factor.

Keywords: Intrathecal injection, lumbar cistern drainage, intracranial infection.

INTRODUCTION

Intracranial infection is a common complication of craniocerebral operation, which will increase patient's disabling rate and fatality rate if not controlled properly (Hui *et al.*, 2016). The effect of routine antibiotic therapy is not good as it is barred by the blood-brain barrier. Although intrathecal injection, a common therapy for intracranial infection can improve patient's clinical symptoms, it is still ineffective in controlling many patient's infection after surgery (Zhang 2017; Yang & Qin, 2014). Intrathecal injection combined with continuous lumbar cistern drainage is an advanced combination therapy. In order to clarify its clinical value, this present research was conducted over sixty two patients with intracranial infection after intracranial tumor surgery as the objects of study by dividing the objects into the combined treatment group and the control group according to the time of admission and were studied by grouping antitheses.

MATERIALS AND METHODS

Patients

Sixty two patients with intracranial infection after intracranial tumor surgery were selected as the objects of

study with the time of treatment in affiliated hospital of Hebei University, China from June 2016 to June 2017. In the combined treatment group, the sex ratio of male to female was 17:14 and patients were 37 to 66 years old with an average age of 48.76 ± 4.31 years. The ratio of male to female in the control group was 16:15 and the age of patients ranged from 36 to 66 years with a mean age of (48.59 ± 4.51) years.

Patients in the two groups were treated with dehydration, neurotrophic drug therapy and so on. Patients in the control group were just treated with intravenous antibiotic therapy by intravenous infusion of broad-spectrum antibacterial medicines. In the combined treatment group, patients were treated with intrathecal injection of medicine combined with continuous lumbar cistern drainage. Patients kept side-lying position with their back perpendicular to bed surface. In addition, their head bent to their chest and their arms clasped round knees and kept close to abdomen so as to make their body arched. The junction of posterior superior iliac spine and posterior midline was injection point. After injection, lumbar cistern tube was put into patient's body and then intrathecal injection of sensitive antibiotics was performed daily through t-branch pipe. Two hours later, pipe-gripping remained open so that drainage tube could be used to maintain continuous external drainage.

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Table 1: Comparison of the total clinical efficacy between the combined treatment group and the control group

Group	Patient (n)	Recovered (n)	Improved (n)	Inefficient (n)	Effective rate (%)
Combined treatment	31	24	6	1	96.77
Control	31	14	11	6	80.65
x2	----	----	----	----	7.332
P	----	----	----	----	0.011

Table 2: Comparison of the time of infection control and the level of serum inflammatory factor between the combined treatment group and the control group

Group	Crp (mg/L)		IL-4 (ng/L)	
	Before treatment	After treatment	Before treatment	After treatment
Combined treatment (n=31)	63.87±10.17	11.23±2.08	2.03±0.59	0.35±0.16
Control (n=31)	63.62±10.22	18.31±3.13	2.04±0.65	0.53±0.24
T	0.357	6.571	0.268	6.375
P	0.452	0.015	0.562	0.016

Table 3: Comparison of complication incidence between the combined group and the control group

Group	Patient (n)	Wound infection (n)	Pleural effusion (n)	Pulmonary infection (n)	Incidence (%)
Combined treatment	31	4	1	1	3.23
Control	31	1	0	1	16.13
x2	----	----	----	----	7.281
P	----	----	----	----	0.012

Evaluation criterion

The two groups were compared for the clinical efficacy, infection control, the level of serum inflammatory factor like crp and IL-4 and complication respectively.

Therapeutic effect criterion

Recovered: patients' clinical symptoms disappeared and laboratory examination together with etiological examination returned to normal.

Improved: Patient's clinical symptoms improved and their viral infection resolved.

Inefficient: patients had no significant improvement or aggravated 72 hours after treatment (total effective rate=cure rate + improvement rate) (Liu *et al.*, 2014).

STATISTICAL ANALYSIS

The software SPSS 20.0 was used as the statistical tool. Enumeration data was expressed by n and % and χ^2 was used for testing. The measured data expressed in the form of (x±s) was tested by independent-sample t test. If $p < 0.05$ was satisfied, it was of statistical significance.

RESULTS

Comparison of the total clinical efficacy

The total effective rate was 96.77% in the combined treatment group and 80.65% in the control group, so the difference between the two groups was of statistical significance ($p < 0.05$) as shown in table 1.

Comparison of the time of infection control and the level of serum inflammatory factor

The average time of infection control in the combined treatment group and the control group was 9.05±2.08 and 17.07±3.34 days respectively.

Similarly after treatment, the recovery effect of serum crp and IL-4 in the combined treatment group was better. There was a clear distinction when compared with the control group ($p < 0.05$) as given in table 2.

Comparison of complication incidence

The complication incidence of patients in the combined treatment group was 3.23%, while it was 16.13% in the control group. Therefore, the difference between the two groups was of statistical significance ($p < 0.05$) shown below in table 3.

DISCUSSION

Neurosurgery can cause immense trauma associated with many factors facilitating the development of infection that leads to serious adverse effect on the prognosis of patients. If not solved in time or mishandled, this will give rise to a relatively high mortality (Chen *et al.*, 2017; Koyanagi *et al.*, 2017). After intracranial tumor surgery, patients usually infect with gram-positive coccus, which is often treated with routine intravenous antibiotics. However, due to such factors as blood brain barrier and the lack of opsonic and fungicidal property within

infected cerebrospinal fluid, the therapeutic efficacy is not ideal (Bekelis *et al.*, 2013). The repeated replacement of cerebrospinal fluid can contribute to strong painful infections and increase the risk of infection, making it hard to achieve the goal of clinical treatment.

Lumbar cistern drainage can fully expel bacteria and inflammatory substances from patient's cerebrospinal fluid which can promote the generation of patient's cerebrospinal fluid, thus reducing the occurrence of repeated infection. While carrying out lumbar cistern drainage, the puncture point should not be too high. The depth of tube inserted should be controlled properly and the status of patients after cannulation should be observed closely. The joint should be fastened and the drainage tube unblocked. The drainage height should be kept at 5 to 10 centimeters of the external acoustic canal. According to patient's intracranial pressure, we should reasonably adjust the position of drainage bag with usual daily volume of drainage not higher than 500mL (Koyanagi *et al.*, 2017; Li & Ai, 2015).

In this clinical treatment research, the total effective rate was 96.77% in the combined treatment group and 80.65% in the control group. The difference between the two groups showed that the clinical efficacy of the group treated with single medicine combined with lumbar cistern drainage could achieved more desired clinical efficacy than the group just treated with single medicine since its total effective rate was relatively higher. The time of infection control in the combined treatment group was comparatively shorter and its incidence of complication was 3.23%, while that of the control group was 16.13%. This demonstrated the application value of combined treatment that enjoys a faster infection control rate and can reduce the incidence of complication during the period of treatment, thus guaranteeing the safety of patients during treatment. Moreover, the study also found that after treatment, the restoration effect of serum crp and IL-4 in the combined treatment group was better, which revealed that intrathecal injection of medicine combined with continuous lumbar cistern drainage reduced the level of serum inflammatory factors crp and IL-4.

To sum up, intrathecal injection of medicine combined with continuous lumbar cistern drainage effectively prevented patient of suffering from intracranial infection after intracranial tumor surgery with relatively high total effective rate, short time of infection control and low incidence of complication. In addition, the combined therapy also reduced the level of inflammatory factors.

CONCLUSION

With high efficiency and security value, this advanced drug therapy was recommended by the research to be promoted during the period of treatment for patients with intracranial infection after intracranial tumor surgery.

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