Journal of Clinical and Nursing Research

Research Article

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD

Effect of Early Controlled Hypotension on Patients with Traumatic Brain Injury

Yong Liu

Department of Neurology in the Fourth People's Hospital in Yibin, Yibin 644000, Sichuan Province, China

Abstract: ***Objective:*** To investigate the clinical effect of early controlled hypotensive therapy in patients with traumatic brain injury (TBI). ***Methods:*** 68 patients with acute TBI in our hospital were selected for this investigation. They were evenly divided into a control group and an observation group according to the difference of blood pressure and basic level, whose lesion area after treatment, postoperative intracranial pressure after 2 d and 7 d, and GCS score of prognostic quality before and after treatment were made comparison. ***Results:*** The post-treatment lesion area of the observation group was lower than that in the control group (P<0.05); the postoperative intracranial pressure after 2d and 7d of the control group was better than the observation group(P<0.05), and the same with GCS score, which has statistical significance (P<0.05). ***Conclusion:*** Early controlled hypotensive therapy has a significant clinical effect on patients with brain trauma, it can reduce the lesion area after treatment and postoperative intracranial pressure as well.

Keywords: Acute traumatic brain injury; Early stage; Hypotension; Therapeutic effect

Publication date: July, 2020
Publication online: 31 July, 2020
[*]***Corresponding author:*** Yong Liu, cderyiyuanjianyan@163.com

Traumatic brain injury is a common clinical neurosurgical disease, most of which is caused by direct action of external force, and it changes rapidly, usually accompanied by the intracranial pressure increase, especially for those with a history of hypertension, the change blood pressure is more obvious, which will affect the prognosis of patients, and thus the quality of their life[1]. It is more difficult for patients with acute brain trauma and hypertension using early antihypertensive therapy in clinic. Based on this, the clinical outcomes of early controlled hypotension therapy in patients with acute traumatic brain injury were analyzed in this study and as follows.

1 Clinical materials and methods

1.1 General materials

68 patients with acute TBI in the Department of neurosurgery of our hospital were selected and divided into a control group and an observation group in terms of the blood pressure and basic level difference. There were 34 patients in the observation group, 21 males and 13 females, the average age was (46.1±29.58) years with the oldest 66 and the youngest 24, the difference between systolic pressure and basic level was 0-15 mmHg, and the difference between diastolic blood pressure and basic ones was 0-10 mmHg. In the control group, there were 34 patients with 20 cases of male and 14 cases of female, whose age vary from 24 to 65 and (45.63±9.21) in average. The difference between diastolic blood pressure and basic level was more than 10 mmHg, and the difference between systolic blood pressure and the basic was more than 15 mmHg. There was no statistical significance but comparability in age and sex between the two groups (P>0.05). Inclusive criteria: (1) a history of hypertension on the patient before brain injury; (2) the onset was 2h or more. Exclusion criteria: (1) acute cerebrovascular disease; (2) abnormal coagulation. Both groups of patients volunteered for this study and signed informed

consent forms.

1.2 Methods

Two groups of patients were sent to the hospital for head CT scan, routine blood pressure, the range of blood pressure control changes according to the blood pressure difference. The observation group:0-15 mmHg of difference between systolic blood pressure and the basis, 0-10mmHg of difference between diastolic blood pressure and the basis in decompression; in the decompression of the control group, the difference between systolic blood pressure and the basis was over 15 mm Hg, and the difference between diastolic blood pressure and the basis was more than 10 mm Hg.

1.3 Outcome measures

1.3.1 Lesion area before and after treatment

The lesion area before and after treatment was compared in two groups.

1.3.2 Post-treatment 2d and 7d intracranial pressures

The postoperative intracranial pressure was observed after 2d and 7d in two groups.

1.3.3 Prognosis quality GCS score of pretreatment and post-treatment

Glasgow Coma Scale (GCS)[2] was used to evaluate the prognosis quality of patients, in which scoring as eye opening (1-4), verbal response (1-5), body movement (1-6); coma (3-8), moderate disorder of consciousness (9-11) with, mild disorder of consciousness (12-14), clear consciousness of accessibility(15) in patients.

1.4 Statistical methods

Both groups used SPSS 23.0 version of statistical software for analysis, where (±s) stands for the measurement data, t for test, and P<0.05 for statistical significance.

2 Results

2.1 Lesion area before and after treatment

Before treatment, there was no statistical significance (P>0.05) in the difference of the CT lesion area between the two groups. In the comparison of the CT lesion area between the two groups after treatment, it was found that the observation group was superior to the control group, whose data was very different from each other and met the criteria (P<0.05). The results are as follows.

Table 1. Comparison results of lesion area before and after treatment in two groups ($\bar{x} \pm s$, cm^2)

Group	Cases	Pretreatment	Post-treatment
control group	34	16.91±6.45	24.87±6.62
observation group	34	16.85±6.42	17.22±5.89
t	-	0.038	5.034
P	-	0.969	0.000

2.2 Intracranial pressures after treatment

The postoperative intracranial pressure after 2 d and 7 d of the observation group was significantly lower than that in the control group. The large difference of data in both groups met the standard (P<0.05), and the results are shown in Table 2.

Table 2. Comparison of 2d and 7d intracranial pressures of two groups ($\bar{x} \pm s$, kPa)

Group	Cases	2 d	7 d
control group	34	4.15±0.35	3.68±0.29
observation group	34	3.29±0.41	2.82±0.43
t	-	9.302	9.669
P	-	0.000	0.000

2.3 Prognosis quality GCS score of pretreatment and post-treatment

Before treatment, there was no statistical significance (P>0.05) in the difference of the GCS score between the two groups. In the comparison of the GCS score between the two groups after treatment, it was found that the observation group was superior to the control group, whose data was very different from each other and met the criteria (P<0.05). The results are shown in Table 3 below.

Table 3. Comparison results of prognosis quality GCS score before and after treatment ($\bar{x} \pm s$, kPa)

Group	Cases	Pre-treatment	Post-treatment
control group	34	6.19±1.32	7.56±1.35
observation group	34	6.17±1.33	12.13±1.16
t	-	0.062	14.971
P	-	0.951	0.000

3 Conclusion

The brain is one of the most important parts of the human body, it contains nerve fibers, nerve nuclei and other structures, if acted by external force, the function of nerve tissue will be damaged to a certain extent. The clinical manifestations of brain trauma are closely related to the injury site. For example, local injury may lead to local neurological dysfunction, diffuse injury may cause conscious disturbance and coma[3]. There are plenty of clinical symptoms of TBI such as coma, headache, vomiting, convulsions or hemiplegia and brain hernia[4]. In general, most patients with traumatic brain injury (TBI) have some degree of conscious disturbance, which has a negative influence on the treatment, increases the risk of complications and hinders the progress of treatment. In clinic, acute TBI is a serious disease in neurosurgery with the characteristics of acute onset. It should be taken effective methods for these patients to speed up the treatment process. The secondary brain injury (brain edema and intracranial Hematoma) has a profound effect on the treatment and prognosis of patients with acute TBI. There will be lesion area spreading for many patients with acute brain injury within a week after injury. The results of this study showed that the area of CT lesion increased after treatment compared with that before treatment in both groups, and the results were consistent with the above conclusions. The occurrence of brain trauma and secondary brain injury on patients is closely related to cerebral perfusion which is mainly influenced by a rise in blood pressure[5]. For normal people, cerebral blood vessels can be automatically adjusted, the cerebral blood flow can be effectively stabilized once blood pressure maintains a certain range. If the human body suffers from acute brain trauma, there will be increased intracranial pressure, damaged brain tissue, destroyed blood-brain barrier, blocked cerebral blood perfusion and secondary brain injury, aggravating the opening of blood-brain barrier and leading to a vicious circle. And for patients with acute brain trauma, high blood pressure will disrupt the self-regulation mechanism of cerebral vessels and cause cerebral edema because of excessive cerebral perfusion, blood pressure must be controlled to enhance the therapeutic effect. The treatment effect is different due to the difference in the degree of blood pressure control during hypotension treatment. In this study, the difference between systolic blood pressure and basic level was 0-15 mmHg and the difference between diastolic blood pressure and basic level was 0-10 mmHg in the observation group; But for the control group, the former is more than 15 mmHg and the latter is over 10 mmHg. The results showed that the lesion area in the observation group was lower than that in the control group (P<0.05), and the GCS score was significantly better than that in the control group (P<0.05). The postoperative intracranial pressure after 2d and 7d in the observation group was superior to that in the control group (P<0.05). A conclusion can be drawn from the above that the difference between systolic and basic blood pressure should be controlled at 0-15 mmHg and the difference between diastolic and basic level should be controlled at 0-10 mmHg in patients with acute brain injury with decompression, which can inhibit the spread of lesion area and improve the prognosis of patients. Patients with acute brain injury are easy to have hypotension after medication, and the cerebral blood flow can be easily affected without any benefit to patient prognosis. As a result, in the process of lowering blood pressure of patients with acute brain trauma, the blood pressure must be controlled reasonably to prevent the blood pressure from decreasing signi icantly[6-7].

In summary, the clinical effect of early controlled hypertension management in patients with acute brain injury is significant. When reducing the blood pressure, it needs to be controlled within a reasonable range to improve the patient's prognosis and therapeutic effect.

References:

[1] Tai LH. Prevention of early controlled hypotension on the increase of intracranial hematoma in patients with acute hypertension[J]. Digest of World Latest Medical Information (e-edition), 2015(41): 2, 4.

[2] Ma C. Prevention of early controlled hypotension on the increase of intracranial hematoma in patients with acute hypertension[J]. Digest of World Latest Medical Information, 2019, 19(33): 145-147.

[3] Zhao XL, Wu XH, Li YG, et al. Effect of acute isovolumic hemodilution combined with controlled hypotension on cerebral oxygen metabolism and early cognitive function in patients with craniocerebral tumor[J]. Anhui Medical and Pharmaceutical Journal, 2019, 23(11): 2170-2175.

[4] Song RY. Study on the effect of early controlled hypotension in the treatment of acute brain injury[J]. Medical Information, 2017, 30(9): 63-64.

[5] Zhang WL. Therapeutic effect of early controlled hypotension in the treatment of acute brain injury[J]. Medical Aesthetics and Cosmetology, 2019, 28(7): 14

[6] Lu B, Yang YL, Yu H, et al. Application of isovolumic hemodilution combined with controlled hypotension in the surgical treatment of craniocerebral trauma[J]. Shandong Medical Journal, 2017, 57(34): 59-61.

[7] Luo Q. Application of controlled hypotension in the operation of acute brain injury [J]. Chinese Journal of practical medicine, 2004.