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Effect of hyperbaric oxygen therapy on BI index, GCS, SAS and SDS in patients with craniocerebral injury

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ABSTRACT

Objective: To research and analyze the effect of psychological nursing intervention on self-rating depression (SDS), self-rating anxiety scale (SAS), Glasgow Score (GCS), Barthel index (Barthel, index, BI) of patients. **Methods:** From September 2015 to September 2016, 84 patients with craniocerebral injury admitted to our hospital were divided into observation group (n = 42) and control group (n = 42) according to randomized single blindness method. All patients were treated with hyperbaric oxygen therapy. The control group was given routine nursing care, while the observation group was treated by psychological nursing intervention. **Results:** The scores of GCS in the observation group after 2 weeks and 8 weeks of treatment were respectively (7.79±1.42), (11.86±2.56) which were higher than those in the control group (6.23±1.01), (8.21±1.65) the data show significant difference. After treatment, the scores of SDS and SAS in the observation group were respectively (39.14±1.21), (41.67±1.12) which were lower than those in the control group (45.56±2.50), (56.89±2.47) the data show significant difference. The BI index of the observation group was (43.29±4.63), which was higher than that of the control group (36.83±3.10), the scores of NFD was (23.12±1.01) in the observation group, which was lower than that in the control group (28.45±1.67), the data were statistically significant. **Conclusion:** Psychological care intervention in patients with craniocerebral injury treated by hyperbaric oxygen therapy is helpful to improve the adverse psychological state and consciousness state, improve the ability of daily living activities and promote the recovery of neurological function. It can be actively promoted and applied in clinical practice.

1. Introduction

Craniocerebral injury is a common disease in Department of Neurosurgery, which can be caused by traffic accidents, falls and industrial accidents and so on, with the symptoms of nausea, headache, disturbance of consciousness. It will pose a threat to life without timely or properly treatment. Hyperbaric oxygen (HBO) is a common method for the treatment of craniocerebral injury. It is beneficial to increase the oxygen tension of brain tissue, reduce the incidence of brain hypoxia and cerebral edema, and promote the recovery of injured nerve and the improvement of nerve function. Because of the sudden onset, severe illness and rapid change of craniocerebral injury, the patients suffered a severe mental attack. So it is very important to give positive nursing intervention during the treatment period[1]. In order to observe the intervention effect of psychological nursing intervention on craniocerebral injury, 84 cases of craniocerebral injury were collected and reported as follows.

2. Information and methods

2.1. Source of information

A total of 84 patients who meet the inclusion criteria with craniocerebral injury enrolled in our hospital from September 2015 to September 2016 were selected as the subject and randomly divided into observation group and control group. There were 42 cases in the control group, with 24 males and 18 females aged from 52 to 75, the average age of (60.43±1.34) years old. Injury causes: 21 cases of car accident, 19 cases of high fall injury, and the other 2 cases; there were 20 cases of epidural hematoma, 13 cases of subdural hematoma with cerebral laceration and 9 cases of primary

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brain stem injury. There were 42 cases in the observation group, with 25 males and 17 females aged from 51 to 74, the average age of (60.44±1.32) years old. Injury causes: 20 cases of car accident, 19 cases of high fall injury, and the other 3 cases; there were 19 cases of epidural hematoma, 14 cases of subdural hematoma with cerebral laceration and 9 cases of primary brain stem injury. There was no statistically significant difference between the two groups about the general information of patients, including the comparison of age, sex, cause of injury, and damage degree (P>0.05), tips were comparable.

2.2. Inclusion and exclusion criteria

2.2.1 Inclusion Criteria

(1) meet the diagnostic criteria of Neurosurgery[2]; (2) diagnosed by brain CT or MRI; (3) clear awareness, with certain communication skills; (4) voluntarily signed "informed consent".

2.2.2 Exclusion Criteria

(1) combined with important organ dysfunction; (2) previous history of mental and neurological diseases; (3) unconscious and unable to communicate; (4) incomplete information, or halfway out of the research.

2.3 Methods

2.3.1 Hyperbaric oxygen therapy

set the oxygen chamber pressure as 0.2 Mpa, 110 min each time, pressurized time as 25 min, decompression time as 25 min, oxygen for 1 h. Treat 1 times a day for 8 continuous weeks.

2.3.2 Control group

The control group was given routine care, with strict implementation of aseptic operation, maintaining airway patency, closely monitoring vital signs, and strengthening communication with patients during treatment, asking their discomfort and taking symptomatic treatment.

2.3.3 Observation group

The observation group was given psychological nursing intervention, and scientifically assessing the patient's mental status, targeted psychological intervention was taken: (1) Psychological intervention before treatment. Actively communicate with patients, understand the causes of injury, give the greatest support and comfort, patiently listen to the patient's complaints, answer questions patiently and in time, and stabilize the patient's condition. At the same time, the principle, specific methods, process, advantages and points for attention of hyperbaric oxygen therapy are introduced in detail, so as to improve the cognitive level and eliminate the fear caused by the unknown. Informing the patient the normal phenomenon during the treatment to make them mentally prepared. Patients with treatment experience are invited to exchange and share, emphasizing the effect comparison before and after treatment, rendering the magic effect of treatment, helping patients build confidence in rehabilitation, and improving treatment compliance. (2) Psychological intervention during treatment. Communicating with the patient through the intercom during the whole process, informing patients does not need to be nervous and the medical staff will accompany them all the time. Telling them to inform the medical staff in time when they are unwell.

The cabin temperature is strictly controlled at 25 degrees centigrade to avoid premature ear swelling, ear fullness and earache symptoms in patients to cause the panic. Closely observe the complexion and reaction of patients, ask whether there is discomfort, make patients feel be loved and valued to eliminate their anxiety and loneliness. When stabilizing, introduce the function of continuous oxygen inhalation, guide the patients to inhale oxygen correctly, play soft and soothing music to relax the body and mind, ask the patients' feelings, and improve their sense of comfort and security. When decompression, guide the patient to adjust the respiratory rate, pay attention to keep warm. Once the aerosol appeared, it should be slow decompression and adjust the temperature to avoid the patient tension. (3) Psychological intervention after treatment. Take the initiative to ask the feeling and oxygen equipment usage of patients, be patient to answer questions, praise the patient's active cooperation, introduce the importance of adherence to treatment, and eliminate concerns to take treatment with an easy attitude, improve the therapeutic effect. At the same time, health lectures were carried out and health manuals were given to introduce hyperbaric oxygen, diet after treatment, life knowledge, etc. Guide the exchange of experience among patients, encourage with each other, and ease the negative emotions, to establish confidence in the treatment, correct bad habits, so as to achieve the best effect of rehabilitation.

2.4 Judgment Criteria

2.4.1 GCS[3] score

GCS score was used to assess the consciousness of patients: 5 points: good recovery; 4 points: mild disability, can take care of themselves; 3 points: moderate disability; 2 points: severe disability; 1 points: death.

2.4.2 Self-rating depression scale (SDS) and self-rating anxiety scale (SAS)

SDS and SAS[4] was used to assess the psychological state of patients, the higher the score indicates more serious depression and anxiety.

2.4.3 Barthel index

The Barthel index was used to assess the ability of daily living activities of patients, the higher score indicates the higher ability of living activities; neurological deficit score (NFD) was used to assess the patient's neurological function, the lower scores indicates the better recovery.

2.5 Statistical analysis

All data of patients with craniocerebral injury were recorded in SPSS 22.0 statistical software. The statistical test standard was set as $\alpha = 0.05$. The measured data were calculated using the mean ± and average (Mean ± SD) to express, and t was used to inspect; The count data generated by the study was described by (n%) and inspected by bangla. If $P<0.05$, the difference was statistically significant.

3. Result

3.1. GCs score comparison

There was no significant difference in GCS scores comparison before the treatment between the two groups ($P>0.05$). The GCS scores of the observation group after 2 and 8 weeks of treatment were higher than those of the control group ($P<0.05$). As shown in Table 1.

3.2. SDS, SAS Score Comparison

There was no significant difference in the scores of negative psychological status before treatment between the two groups ($P>0.05$). After treatment, the levels of SDS and SAS in the observation group were lower than those in the control group ($P<0.05$). As shown in Table 2.

3.3 NFD, BI Score Comparison

There was no significant difference in NFD and BI scores between the two groups before treatment ($P>0.05$). After treatment, the patients in both groups were improved, BI was higher in the observation group than in the control group, NFD score was lower than the control group ($P<0.05$). See Table 3.

4. Discussion

Craniocerebral injury has the features of acute onset, in critical condition, rapid change and so on, which can cause cerebral edema, cerebral hypoxia, cerebral ischemia and brain occupying lesions. As soon as possible to eliminate brain edema and promote the absorption of hematoma is beneficial to brain cell function and nerve function, and can improve the prognosis effect. Not timely treatment for craniocerebral injury will seriously damage the blood-brain barrier, increase the risk of disability and death. 106 cases of brain injury patients reported by Li Dongmei[5] shows that hyperbaric oxygen can improve hypoxia and ischemia, reduce brain edema and reduce intracranial pressure. The use of hyperbaric oxygen is conducive to reduce vertebral artery vasospasm, increase cerebral

Table 1.
GCS scores comparison before the treatment between the two groups (score).

Group	Before treatment	2 weeks of treatment	8 weeks of treatment
Observation group	5.58±0.76	7.79±1.42	11.86±2.56
Control group	5.60±0.78	6.23±1.01	8.21±1.65
T	1.053	1.977	2.407
P	0.869	0.032	0.006

Table 2.
SDS and SAS scores comparison before the treatment between the two groups (score).

Group	Time	SDS score	SAS score
Observation group	Before treatment	60.28±3.51	52.93±3.76
	After treatment	$41.67\pm1.12^{\triangle*}$	$39.14\pm1.21^{\triangle*}$
Control group	Before treatment	60.30±3.52	52.90±3.75
	After treatment	$56.89\pm2.47^{\triangle}$	$45.56\pm2.50^{\triangle}$

Note: Compared with before treatment, $^{\triangle}P<0.05$; compared with the control group, $^{*}P<0.05$

Table 3.
BI and NFD scores comparison before and after treatment between the two groups (score).

Group	Time	BI	NFD
Observation group	Before treatment	17.83±2.44	35.24±2.30
	After treatment	$43.29\pm4.63^{\triangle*}$	$23.12\pm1.01^{\triangle*}$
Control group	Before treatment	17.81±2.45	35.22±2.28
	After treatment	$36.83\pm3.10^{\triangle}$	$28.45\pm1.67^{\triangle}$

Note: Compared with before treatment, $^{\triangle}P<0.05$; compared with the control group,$^{*}P<0.05$.

blood flow and improve neurological function. Although hyperbaric oxygen is effective in the treatment of craniocerebral injury, it's prone to appear psychological disorders, anxiety, depression, and lack of treatment confidence because of the sudden onset of the disease and the little treatment knowledge of patients, resulting in reducing the quality of life of patients[6]. Ying Chun[7] carried out the treatment of comprehensive psychological care intervention on the basis of craniocerebral surgery, which is conducive to improving adverse psychological symptoms and improve the quality of life of patients.

In recent years, most studies have shown that psychological care intervention in patients with craniocerebral injury treated by hyperbaric oxygen therapy makes patients and their families fully understand the purpose, methods, precautions of hyperbaric oxygen therapy, eliminating the unknown fear, improving bad mental state and the compliance. The study of She Huiying[8] shows that strengthening the early rehabilitation intervention for patients with craniocerebral injury is conducive to ease anxiety and depression, promote nerve function recovery and improve quality of life. At the same time, psychological care intervention on the basis of hyperbaric oxygen therapy can be used to alleviate the symptoms of the disease, give patients spiritual comfort and emotional support, bring motivation for the rehabilitation of patients, and actively cooperate with clinical work to achieve the desired therapeutic effect[9]. The study of Yang Yan[10] shows that psychological care intervention can significantly improve the state of consciousness in patients with hyperbaric oxygen, and improve the prognosis. In the study of Liu Yuling[11], the control group was given routine care, and the observation group received psychological care. The results show that psychological care intervention can enhance the effect of hyperbaric oxygen therapy, improve the patient's neurological function and the ability of daily living activities.

With the change of medical model, modern nursing concept requires nurses to meet the needs of patients with psychological, physical, social and other needs, not only pay attention to patients with physical changes, but also pay attention to the psychological and social function of the improvement, in order to achieve overall health. Because the short-term effect of hyperbaric oxygen treatment is not obvious, patients need to adhere to treatment, which requires nurses to master communication skills, to create a good atmosphere through sympathy, support, inspiration, persuasion, etc., to help patients form a correct understanding of the disease and enhance the confidence of rehabilitation[12]. The results of this study showed that the scores of SDS and SAS in the observation group were lower than those in the control group (P<0.05), and the GCS score was higher than that of the control group (P<0.05), suggesting that psychological nursing intervention could improve the consciousness of the patients with craniocerebral injury, reducing the negative emotions and improve patient coordination. Nursing staff should encourage patients to express their true thoughts, giving personalized psychological intervention, and give full play to the therapeutic effect of hyperbaric oxygen, thereby speeding up the recovery of neurological function, improve daily life ability.

In summary, the implementation of psychological nursing intervention on patients with hyperbaric oxygen in the treatment of craniocerebral injury is conducive to improving the awareness status of patients, relieving mental disorders, giving full play to their initiative, actively cooperating with the clinical work, improving neurological function and quality of life, to achieve the best treatment effect. It has important clinical value.

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