STUDY ON THE EFFECTIVENESS OF HYPERBARIC OXYGEN NURSING AND TREATMENT FOR CHILDREN WITH CEREBRAL PALSY

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ABSTRACT

Objective: *Due to the complicated treatment of cerebral palsy, no ideal therapy is found at present. Therefore, the effectiveness of hyperbaric oxygen nursing and treatment for children with cerebral palsy is studied in this paper.*

Methods: *The clinical effects of hyperbaric oxygen therapy on children with severe cerebral palsy were analyzed by collecting cases and conducting clinical studies.*

Results: *The curative effect of hyperbaric oxygen group was obviously higher than that of conventional group. Therefore, hyperbaric oxygen therapy has obvious curative effect on prognosis of severe cerebral palsy.*

Conclusion: *Hyperbaric oxygen therapy has obvious curative effect on children with cerebral palsy, and factors including sex, age and disease type have no obvious effect on curative effect.*

Keywords: *Nursing and Treatment, Cerebral Palsy, Hyperbaric Oxygen Therapy.*

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Introduction

It is an important measure to ensure medical safety for hospitals to build a harmonious doctor-patient relationship. Children with cerebral palsy refers to the non-progressive brain injury caused by various reasons in the 1 month before and after its birth mainly characterized by central dyskinesia and postural abnormality, and often accompanied by mental retardation, language disorder, epilepsy, etc. In China, the incidence of cerebral palsy is 1.8‰-4‰, which has become one of the main disease that leads to children's disability, bringing a certain burden to family and society. Due to the complex treatment of cerebral palsy, there is no ideal therapy at present[(1)]. In this paper, children with cerebral palsy under 12 years old were treated with hyperbaric oxygen therapy and nursing service, which have achieved satisfactory results.

Cerebral palsy is a common disease in Neurosurgery Department[(2)]. The incidence of cerebral palsy ranks the second of in all kinds of body traumas. It has the characteristics of high incidence, rapid change, urgent operation and heavy duty treatment. It often combines with trauma in other parts of the body, which is the key and difficult point in the treatment process[(3)]. Hyperbaric oxygen therapy can improve microcirculation, promote the recovery of brain tissue of the lesion, improve nerve function, reduce sequelae, improve the prognosis and thus improve the quality of life[(4)]. Analyzing and discussing the function and the effectiveness of hyperbaric oxygen therapy on the prognosis of children with severe cerebral palsy, and specifying the clinical effect of hyperbaric oxygen therapy are conducive to better guide and improve the clinical treatment of the patients with severe cerebral palsy and thus improve the prognosis of the patients[(5)].

Hyperbaric oxygen therapy is a relatively young clinical branch developed in recent years. It refers to the delivery of pure oxygen above 1 atmosphere in hyperbaric oxygen chamber. Through the human

blood circulation system, more oxygen is carried to the brain tissue, increasing oxygen diffusion and oxygen content in the brain tissue, Reducing brain edema as well as intracranial pressure and thus rapidly improving and correcting the brain tissues. Weave hypoxia, reduce brain edema and reduce intracranial pressure[6]. As a unique treatment method, it is widely used in clinic to improve the treatment of patients with severe cerebral palsy and reduce the sequela, attracting much attention from the clinicians[7]. Figure 1 is the diagram of hyperbaric oxygen chamber.

Figure 1: Diagram of hyperbaric oxygen chamber.

Cerebral palsy can cause disorder in blood transport and hypoxia of the brain. Brain is the most metabolic organ in the human body. It is sensitive to hypoxia consume the most oxygen compared with other organs. Brain hypoxia is bound to cause metabolism disorder of cells in the brain, ATP deficiency, lack of energy supply, and function disorder[8-10]. Hyperbaric oxygen therapy can improve oxygen supply of the brain, increase blood oxygen pressure, and increase the content of oxygen in the brain and cerebrospinal fluid. Hyperbaric oxygen therapy can also increase the diffusion radius of oxygen in brain tissue, which can improve the anoxic state of the brain tissue and inhibit the anaerobic metabolism of the brain while enhance oxygen metabolism, increase energy production, reduce acid metabolites produced by anaerobic glycolysis, and enhance the use of glucose[11-13]. Cyclooxygenase 2 is the key for arachidonic acid to synthetize thromboxane and prostaglandins, playing an important role in the synthesis of prostaglandins.

Experiment

Methods

By collecting cases, carrying out clinical studies, the effectiveness of hyperbaric oxygen therapy for severe cerebral palsy is analyzed. Related mechanisms of hyperbaric oxygen therapy to improve the prognosis of patients with severe cerebral palsy are studied by reviewing the past researches. Attentions are introduced for patients with severe cerebral palsy during hyperbaric oxygen therapy. 20 cases with severe cerebral palsy treated with hyperbaric oxygen therapy in recent years were compared with 20 cases who received routine treatment. The routine group was treated with dehydration, hemostasis, wake promotion, acid inhibitation, neurotrophic treatment, blood vessels expansion, etc.; hyperbaric oxygen therapy was added to the hyperbaric oxygen group on the basis of routine treatment.

These included 16 cases of diffuse axonal injury, in which 10 of them is treated with hyperbaric oxygen therapy, and 6 are treated with routine treatment; 5 patients suffer from cerebral contusion, in which 2 of them are treated with hyperbaric oxygen therapy, while 3 of them belong to routine treatment; 7 cases are suffered from cerebral hemorrhage, in which 2 are treated with hyperbaric oxygen therapy, while 5 are with routine treatment; 12 cases are with cerebral hemorrhage caused by hematoma removal, of which 6 are treated with hyperbaric oxygen therapy while routine therapy for the other 6 cases. Indexes including age, sex, type of disease, admission, hyperbaric oxygen treatment and discharge status were observed and analyzed. Results show that the effect of hyperbaric oxygen treatment group was better than that of the conventional group. There were significant differences in statistics. The disease type, age and sex of the patients have no effect on the treatment effect.

Subjects

Cases of severe cerebral palsy were selected, with complete laboratory and imaging data, some of which were treated with hyperbaric oxygen and routine treatment, and the rest were only given routine treatment. The cases were divided into the routine group and the hyperbaric oxygen group. In the hyperbaric oxygen group, there were 15 males and 5 females from 19 to 69 years old, and with an average age of 35.15 years old. Among the subjects, 10 of them are suffered from diffuse axonal injury,

2 of them are with cerebral contusion, 2 are with cerebral hemorrhage, and 6 suffer from hemorrhage after evacuation of hematoma. In the routine group, there were 14 males and 6 females with a age range of 16~67 years old and an average age of 44.85 years old, among which, 6 cases are diffuse axonal injury, 3 are brain contusion, 5 are cerebral hemorrhage, and another 6 suffer from hemorrhage after evacuation of hematoma. History, physical examination and imaging examination are used to exclude clinical cases of intracranial tumor, intracranial infection and vascular malformation. There was no significant difference in the distribution of disease between the two groups (P>0.05), and the two groups were comparable. Figure 2 is the brain nerve characteristics of cerebral palsy.

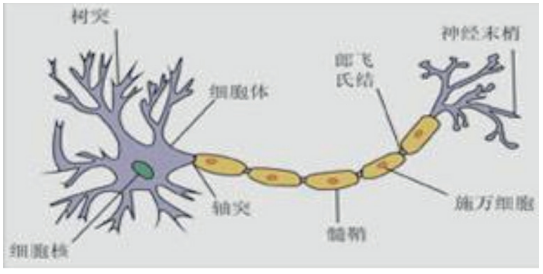

Figure 2: Brain nerve characteristics of cerebral palsy.

Comparison standard

Basic cure: the development order reaches the basic or normal standard, achieve symmetry of limb movement without abnormal posture, walk normally, intelligence are almost equal to that of the normal children, without language barrier, good reaction ability;

Visible effect: obvious improvement in exercise function, control of abnormal posture, active movement, good reaction, improved intelligence;

Effective: muscle tightening and muscle strength are improved, body movement and posture are improved, intelligence is slightly improved, abnormal posture is in control;

Ineffective: no change after treatment. The total effective rate was calculated according to the number of basic cure, visible effect, and effective cases.

Results and discussion

Statistical analysis

Table 1 is the count data with a row number greater than 2. row * Chi square test of list data, soχ^2=n(ΣA^2/nRnC-1)=6.96α=0.05, ν=(R-1)(C-1), P > 0.05. A is the actual frequency of each lattice, nR and nC are the sum of rows and columns corresponding to A respectively. R and C are row numbers and column numbers. Therefore, the type of disease has no effect on the efficacy of the two therapies. Table 2 is collected data 1 with a count of more than 2 lines.

	Effective	Invalid	Total
Cerebral hemorrhage	1	6	7
Postoperative hematoma clearance	8	4	12
Cerebral contusion	4	1	5
Diffuse axonal injury	10	6	16
Total	23	17	40

Table. 1: This article studies the data obtained.

	Effective	Invalid	Total
Men	18(a)	11(b)	29(a+b)
Women	5(c)	6(d)	11(c+d)
Total	23(a+c)	17(b+d)	40(n)

Table. 2: With a count of more than 2 lines.

$\chi^2=(ad-bc)^2n/(a+b)(c+d)(a+c)(b+d)=0.90$, $\alpha=0.05$, $\nu=(R-1)(C-1)$, in which R and C are the number of rows and columns. P > 0.05, so there was no difference between the two treatments. Therefore, gender has no effect on the curative effect of the two treatments. Table 3 collected data 2 with more than 2 lines.

Grouping	Effective	Invalid	Total
A group	6	1	7
B group	5	3	8

Table. 3: Age data of rows more than 2.

This table is the age data with a row number greater than 2. chi square test of the row list data, so the χ^2=n(ΣA^2/ nRnC -1)=3.872, α=0.05, ν=(R-1)(C-1), P > 0.05. A is the actual frequency of each lattice, nR and nC are the sum of rows and columns corresponding to A respectively, and R and C are row numbers and column numbers respectively. Therefore, age has no effect on the efficacy of the two therapies.

Comprehensive comparison of group A and group B

The purpose of this study was to compare the efficacy of two treatments for severe cerebral palsy, and chi square test was used to compare the data between the two groups. Because it is four lat-

tice data, the chi square test of four lattice data is used, $\chi^2=(ad-bc)^2n / (a+b)(c+d)(a+c)(b+d)=5.01$, $\alpha=0.05$, $\nu=(R-1)(C-1)$, in which R and C are rows and columns. $P<0.05$, therefore, the two kinds of treatments are different. Since the curative effect of the hyperbaric oxygen group is obviously higher than that of the normal one. Hyperbaric oxygen therapy has a significant effect on the prognosis of severe cerebral palsy. Table 4 is a comprehensive comparison between group A and group B.

	Effective	Invalid	Total
Grouping	15(a)	5(b)	20(a+b)
A group	8(c)	12(d)	20(c+d)
B group	23(a+c)	17(b+d)	40(n)

Table. 4: A comprehensive comparison between the A group and the B group.

Conclusion and prospect

Through the retrospective analysis of two groups of severe cerebral palsy patients, we can draw the following conclusion: hyperbaric oxygen therapy has obvious effect on the patients with cerebral palsy while gender, age and type of disease have no obvious effect on the curative effect. The treatment of hyperbaric oxygen on the basis of conventional treatment can reduce the subsequent damage of cerebral palsy and the rate of disability and mortality of patients with mild diseases, promote the recovery of neurological function and improve prognosis. According to literature review, as long as the patient's condition is allowed, the vital signs are stable and no contraindications exist, hyperbaric oxygen should be given as early as possible, and different courses should be selected according to different patients, the patient's condition and the recovery status.

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