



Effect of hyperbaric oxygen therapy on SAS and SDS in children with ischemic encephalopathy

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ABSTRACT

Objective: To study and analyze the effect of early psychological intervention on the scores of SAS and SDS in children with hypoxic-ischemic encephalopathy undergoing hyperbaric oxygen therapy. **Methods:** A total of 64 children with hypoxic - ischemic encephalopathy enrolled in our hospital from July 2015 to July 2016 and their parents were selected as study subjects. The patients were treated with hyperbaric oxygen therapy, while their parents were given early psychological intervention. By the way of increasing parents' awareness of the disease, helping parents build confidence in their children's treatment and encouraging them to participate in daily training for their children to relieve their anxiety and depression. The parents' knowledge of the disease before and during treatment, the treatment of hyperbaric oxygen therapy and the change of SAS and SDS were observed. **Results:** After effective intervention, the scores of SAS and SDS of 64 patients' parents were significantly lower than those before treatment. After 1 courses of intervention, the score of SAS was (43.36 ± 1.27) points, and the score of SDS was (45.22 ± 8.13) points. After 2 courses of intervention, the score of SAS was (41.07 ± 1.21) and the score of SDS was (42.35 ± 7.44) points, and parents' awareness of hypoxic-ischemic encephalopathy was significantly increased, and the differences between the two groups were statistically significant. **Conclusion:** Early psychological intervention on parents of children with hypoxic-ischemic encephalopathy can effectively improve the awareness of parents on the disease, so as to improve their acceptance of hyperbaric oxygen therapy; significantly reduce the parents' SAS, SDS score. It is beneficial to build a good doctor-patient and nurse-patient relationship, improve the treatment effect and shorten the treatment time.

1. Introduction

Hypoxic ischemic encephalopathy (HIE) is more common in newborns or children born soon, which is affected by a variety of factors resulting in hypoxia, cerebral blood flow reduction or suspension, and thus causing different degrees of damage to its brain tissue, causing obstacles to the growth and development of children, and may even lead to early death of children, the incidence of sequelae after treatment was 25%-35%[1]. At present, hyperbaric oxygen therapy (HBOT) has an ideal effect in the treatment of hypoxic-ischemic encephalopathy[2]. The method mainly increases oxygen partial pressure to increase oxygen supply to hypoxia cells

and tissues, thereby enhancing mitochondrial enzyme activity of cells, and being beneficial for self-repair and metabolism normalization of cells. Timely oxygen can prevent the occurrence of healthy cells apoptosis, thereby reducing the brain tissue damage play an effective protective effect[3]. Due to a number of systems and organs are still in the developmental state of children after birth, among which the earliest development system is the nervous system and brain develops most rapidly, excessive oxygen will lead to neonatal and infantile fibrous tissue hyperplasia, and thus put impact on vision. At the same time, children's tolerance to hyperbaric oxygen therapy will cause the increase of discomfort in the treatment, so the use of HBOT has certain limitations[4]. After understanding the need for long-term HBOT and being uncertain about the prognosis of the disease, parents will produce higher psychological pressure inevitably, and their psychological fluctuation is great because of the love and pity for their children. By the way of taking early psychological intervention measures on

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parents of patients, our hospital effectively changed parents' health concept and the confidence of treatment, significantly alleviated the anxiety and depression of parents, so that the HOBOT to children with HIE can be maintained, and achieved better clinical efficacy.

2. General information and methods

2.1. General information

A total of 64 patients with HIE children and 32 children with HIE enrolled in our hospital and received HBOT from July 2015 to July 2016 were selected. Among the 32 cases of HIE children, there were 17 boys and 15 girls, aged from 3 to 7 months, with birth weight of 2.2 to 3.8 kg, the treatment time was from 3 to 7 months after birth, and there were 6 severe cases, 15 moderate cases and 11 mild cases[5]. 64 cases of parents were all biological parents of patients, aged from 20 to 34 years old, with the average age of (27.6 ± 6.4) years old. bachelor degree or above in 22 cases, 18 cases of college education, secondary school (including school) in 14 cases, 10 cases of high school or less. There were 22 cases of bachelor degree and above, 18 cases of college education, 14 cases of secondary specialized school (including technology school) and 10 cases of high school and below.

2.2 Criteria for case selection

2.2.1 Diagnostic criteria for children

Referring to The Diagnostic Criteria of Neonatal Hypoxic Anoxic Encephalopathy to diagnose the HIE, and the diagnosis was based on the clinical manifestations and obstetrical history of the children.

2.2.2 Children inclusion criteria

(1) Meet the diagnostic criteria; (2) no other serious disease combined with heart, kidney and other vital organs; (3) with parents who are informed and agreed to receive treatment.

2.2.3 Exclusion criteria

(1) Congenital malformations; (2) congenital organ failure; (3) susceptibility tests showed an allergic constitution.

2.2.4 Parents inclusion criteria

(1) With serious unstable mood, anxiety and depression after knowing the illness, treatment and risk of children; (2) with the willingness to abandon the treatment; (3) voluntarily sign the informed consent.

2.3 Methods

2.3.1 HBOT for children with HIE

The treatment instrument was medical hyperbaric oxygen chamber of YCI803-23 made in Italy. For the children of 3-5 months after birth, setting the boost and buck time as 15-20 min, gauge pressure as 0.03-0.04 MPa, regulator oxygen for 40 min, and 1 times a day. 10 times was a course of treatment, and after which rest for 10-14 d; for the children of 5-7 months after birth, setting the boost and buck time as 20 min, gauge pressure as 0.04 - 0.05 MPa, regulator oxygen for 50 min, and 1 times a day. 10 times was a course of treatment, and after which rest for 10-14 d.

2.3.2 Early psychological intervention for parents

(1) Specialized health education was taken on parents. Making a detail introduction about HIE, answering the doubts and questions of parents, introducing the use of HBOT in the treatment of HIE and improving the awareness of hyperbaric oxygen therapy, so as to make them aware the importance of hyperbaric oxygen therapy, which is beneficial to insist on HBOT for children[8]; (2) Strengthening the communication with parents, helping parents establish confidence in the treatment through the list of recent curative effect and recovery of children with ideal good cases, and encouraging parents to participate actively in the intervention training and help the medical staff with the rehabilitation of children; (3) Paying attention to the parents' psychological and emotional changes, timely psychological counseling was made for parents, and showing that our hospital will make every effort to treat children to reduce their pessimism on the treatment; (4) A nurse and a parent were allowed to enter the treatment room for close observation. After confirming that the parent did not carry any items, he was allowed to enter the treatment room and be guided to observe the treatment of the child, including the response to the ringtone, vision perception of the situation, etc. Meanwhile, parents was told not to worry too much about crying of children, which can help children to increase oxygen intake, so as to improve the oxygen supply in the brain, and the children will stop crying and sleep when they are tired[9]. (5) The changes in children with the disease would make some parents have the mood of anxiety or depression. At this time, the medical staff should be timely to explain the reasons of changes, expound the necessity of adherence to the treatment, and guide parents for the routine nursing care of children to increase the intimacy between parents and children; (6) Some parents have the thought of abandoning the treatment because of financial difficulties. At this time, medical staff should show their concern and care for them, actively seek the relevant rescue channels and treatment costs, and try to reduce costs according to the relevant policy. Meantime, let parents see the efforts our hospital made for the treatment of children to obtain the understanding of parents and to encourage their adherence to treatment, to help children to restore health together with our hospital.

2.4 Evaluation indicators

The Wang Zheng-yu Self-rating Anxiety Scale (SAS) and Chen Rui Self-rating Depression Scale (SDS) were used to evaluate the anxiety and depression of 64 patients before and after psychological intervention[10,11]. They filled out by 1 professional in the side guide. For parents with lower knowledge level, they can be evaluated directly by the question-answering method. When the scale is issued, it begins to be filled and recovered on the spot.

SAS evaluation criteria: mild anxiety: 50-59 points, moderate anxiety: 60-69 points, severe anxiety: ≥ 70 points; SDS evaluation criteria: no depression: < 53 points, mild to mild depression: 53-62 points, moderate depression: 63-72 points, severe depression: > 72 points[12].

Satisfaction survey: In the process of hyperbaric oxygen therapy for children and the psychological intervention for their parents, our hospital self-made "nursing job satisfaction questionnaire" was issued and collected immediately after it has been filled out.

Satisfaction degree of the parents was counted. "Nursing Job Satisfaction Questionnaire" includes the following: reception, work attitude, doubts answering, help, service level and communication, and each content sets up four evaluation criteria: very satisfied (90 points and above), Satisfaction (70 to 89 points), general (50-69 points), dissatisfied (less than 50 points). The total score was the average score of the six survey content. The evaluation criteria: satisfaction (80 points and above), general (60 to 79 points), dissatisfied (60 points or less), satisfaction = (satisfaction + general)/total number of cases * 100%.

2.5 Statistical processing

SPSS 19.0 software was used for data inspection in this study, χ^2 was used to compare the count data, with the expression of rate (%), t was used to inspect measurement data, and with the expression of Mean \pm SD. ($P < 0.05$) indicates that the difference was statistically significant.

3. Result

After the early psychological intervention, the scores of SAS and SDS of the 64 parents decreased significantly after treatment for 1 courses ($P < 0.05$), as shown in Table 1.

The questionnaire survey of satisfaction of the 64 parents was conducted and showed that 39 cases (60.94%) of satisfaction, 21 cases (32.81%) of general, 4 cases (6.25%) of dissatisfied. The overall satisfaction rate was 93.75%.

Table 1.

Scores of SAS and SDS before or after treatment (scores).

Index	n	Before treatment	1 courses after treatment	t	P
SAS	64	47.62 \pm 1.85	43.36 \pm 1.27	15.187	0.000
SDS	64	54.43 \pm 9.28	45.22 \pm 8.13	5.972	0.000

After 2 courses of psychological intervention, the SAS and SDS scores of 64 parents were significantly different compared with the 1st courses ($P < 0.05$). For further details, see Table 2.

Table 2.

Scores of SAS and SDS 1 or 2 courses after treatment (scores).

Index	n	1 courses after treatment	2 courses after treatment	t	P
SAS	64	43.36 \pm 1.27	41.07 \pm 1.21	10.444	0.000
SDS	64	45.22 \pm 8.13	42.35 \pm 7.44	2.059	0.042

4. Conclusion

HIE is a serious threat for the children's health and life safety, and there are different performance of children according to the different degrees of disease. For example, mild HIE patients often show excitement, irritability and other relatively mild symptoms, moderate HIE patients usually manifested as drowsiness, suppression and muscle loss and other symptoms, and severe HIE children often show coma, hypotonia, areflexia and soft severe symptoms[13]. According to the research of Giesinger RE[14], HIE children will happen diving reflex in hypoxia, and it should meet short-term brain, heart blood supply by reducing the blood supply of non-vital organs. But if the oxygen deficit lasts too long, it can cause ischemic damage to the brain tissue. Comparative experiments on a total of 140 cases of HIE children was made by Wang Kai-yuan[13]. The short-term clinical

efficacy of not recovered was 16.6% in the treatment group of 72 patients treated with hyperbaric oxygen therapy, while the control group of 68 cases was 47.1%, with significant difference ($P < 0.05$). The curative effect of hyperbaric oxygen therapy in children with HIE is more ideal.

HBOT needs to place children in the oxygen chamber, so the parents will inevitably worry about the situation of children, and worry about permanent neurological deficits in children. Therefore, they are prone to have the mood of anxiety and depression, and the psychological burden is too heavy to adhere to the HBOT for children. The 34 parents of HIE children treated with HBOT were given nursing care intervention by Tang Mei-feng[15]. After the first and second course of treatment, 34 cases of parental anxiety and depression scores were significantly lower than before intervention, which shows that early psychological intervention for parents of HIE children has a very positive significance. In this study, the SAS, SDS scores of 64 parents of HIE children after early psychological intervention were significantly decreased. It effectively alleviates the anxiety and depression of parents, improves the confidence of HBOT. At the same time, the satisfaction rate of parents in the evaluation of nursing work in our hospital reached 93.75%, which is conducive to building a harmonious and friendly doctor-patient relationship.

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