

The Application Effect of Operating Room Nursing for Cerebral Hemangioma Combined with Preventive Measures for Moderate and Hypothermia

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Abstract: *Objective:* To explore the application of moderate and hypothermia control in patients undergoing cerebral hemangioma surgery. By adjusting the precise body temperature of the patients and controlling the changes, the intraoperative and postoperative risks can be reduced, thereby better promoting postoperative recovery. *Methods:* Thirty patients undergoing cerebral hemangioma surgery were randomly selected as the subjects. All the patients were inpatients in the neurology department between May 2023 and May 2024. The control group received traditional routine nursing management. For the patients in the experimental group, in addition to traditional nursing management, there was also moderate and hypothermia intervention. The body temperature was monitored at three points: the tympanic membrane, esophagus, and rectum. The body temperature was effectively monitored to make it fluctuate within a relatively ideal range. The postoperative recovery was paid attention to and monitored. Key monitoring will be conducted on the intraoperative body temperature changes, hemodynamic indicators of the patients, as well as the postoperative awakening time and neurological function recovery indicators of the patients. *Results:* Compared with the control group, the patients in the experimental group with moderate to low body temperature had relatively gentle body temperature curves and little fluctuation in body temperature. In terms of hemodynamics, patients in the experimental group were more stable than those in the control group. Meanwhile, they recovered faster after the operation, the time required for patients to regain consciousness was shortened, and the incidence of postoperative complications was lower, especially infection, cerebral edema, and electrolyte abnormalities were more prominent. The comfort level and satisfaction of patients were relatively higher compared with those in the control group. Therefore, it can play a very good promoting role for the patient in the postoperative recovery. *Conclusion:* The application of moderate and low body temperature in cerebral hemangioma surgery can better stabilize the patient's condition, reduce the occurrence of complications, and is conducive to the recovery of the patient's neurological function. This method has changed the deficiency of body temperature management in traditional nursing and created a more ideal surgical environment for patients.

Keywords: Cerebral hemangioma; Moderate to low body temperature; Operating room nursing; Neural protection

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1. Introduction

Cerebral hemangioma surgery is one of the difficult surgeries in neurosurgery. Factors such as intraoperative temperature, hemodynamics, and neurological functional status can all have a significant impact on the postoperative recovery of patients. Temperature factors, especially the control of body temperature, have always been a key point in nursing work. In the past, it was often difficult to effectively control moderate and low body temperatures in nursing work, which led to a series of complications during the postoperative recovery period of patients, such as cerebral edema and infection. With the gradual development of science, innovative means of nursing work are constantly increasing. The intervention technology for moderate and low body temperature has gradually become a new research direction. The application of temperature control technology can help control moderate and low body temperature during postoperative treatment, reduce temperature fluctuations, improve intraoperative conditions and postoperative management, achieve the improvement of patients' recovery quality, and reduce complications. This approach aims to improve patients' recovery quality and reduce complications, ultimately enhancing patient prognosis ^[1]. In clinical research, the application of moderate and mild hypothermia interventions during cerebral hemangioma surgery will be explored at an appropriate time.

2. Data and methods

2.1. General information

Thirty patients who underwent cerebral hemangioma resection in the Neurosurgery department of the hospital from May 2023 to May 2024 are selected as the research subjects. The inclusion and exclusion criteria are detailed in the patients' explicit acceptance conditions, examination methods, and severity. It was confirmed that all patients are diagnosed with cerebral hemangioma through imaging examinations (CT, magnetic resonance or angiography), and are aged 18 to 65 years old, meeting ASA grades I to III. Meanwhile, the patients voluntarily accepted and cooperated with this study. Patients with severe cardiopulmonary insufficiency, coagulation dysfunction, preoperative infection, etc., are excluded, as well as those who had undergone brain surgery and radiotherapy, and pregnant or lactating women.

The patients are randomly divided into a control group and an experimental group, with 15 cases in each group. The control group consisted of 8 males and 7 females, with ages ranging from 26 to 64 years. The tumor diameter ranged from 2.1 to 5.8 cm. The experimental group included 7 males and 8 females, with ages ranging from 24 to 63 years, and the tumor diameter ranged from 2.0 to 5.9 cm. There was no significant difference in the general data (gender, age, tumor diameter, etc.) between the two groups ($P > 0.05$), indicating that the groups were comparable ^[2].

2.2. Method

2.2.1. Control group

The management of the operating room temperature in the nursing of the control group is relatively simple. With the adoption of conventional vital sign monitoring and intraoperative cooperation, the temperature in the operating room remained basically stable. Before the operation, the vital signs, identity, and other information of the patients are confirmed, and during the operation, the smooth operation is ensured through methods such as tracheal intubation and position adjustment. However, the monitoring of the patient's body temperature during the operation is limited to two measurements before anesthesia induction and the end of the operation, and there is no continuous and accurate method for temperature regulation. Room temperature and cotton quilts can ensure

a certain degree of temperature control, but they cannot regulate the slight changes in the body temperature of surgical patients during the operation ^[3].

2.2.2. Experimental group

The control group is only given a further detailed and precise body temperature management plan on the basis of routine care. This included preoperative body temperature sensitivity assessment, which could formulate a body temperature management plan based on the patient's physical signs. Temperature monitoring during the operation and effective cooling plans could avoid body temperature fluctuations. Intensive cooling of key indicators during the operation could bring more guarantees for the neuroprotection of patients. The mild rewarming plan after the operation can ensure that the patient's body temperature rises steadily during the rewarming process and avoid the occurrence of complications caused by a relatively fast rewarming speed. The postoperative body temperature monitoring and hemodynamic monitoring can enable the nursing staff to adjust the nursing plan based on the results of various indicators during the operation and precisely adjust the increase in body temperature ^[4].

2.3. Observation indicators

The observation indicators of this study include body temperature control, hemodynamics, neurological function recovery, and postoperative complication observation indicators, which reflect the surgical and recovery conditions of patients in detail and comprehensively ^[5].

Stabilizing body temperature is the first step. Measuring the range of body temperature changes and the percentage fluctuation of the target temperature is used to evaluate the effect of temperature regulation during the operation, and also serves as the basis for analyzing postoperative care strategies. The amplitudes of MA and HR can reflect the stability of the patient's circulation, and at the same time, the impact of body temperature changes on the cardiovascular system can also be observed. The influence of body temperature regulation on hemodynamic indicators is observed through these two indicators ^[6]. The recovery of neurological function, the recovery time of patients combined with the GCS score further reflects the recovery of patients' consciousness. The neurological deficit score further reflects the comprehensive functional impairment of the nervous system.

In terms of complication monitoring, the focus is on factors such as incision infection, cerebral edema, and electrolyte imbalance that might affect the recovery of patients ^[7].

2.4. Statistical analysis

This study used statistical software SPSS 25.0 for data analysis to ensure the reliability and validity of the research results. Measurement data are expressed as $\bar{x} \pm s$, and t-tests are used for comparison between groups. Count data are expressed as cases or rates (%) and χ^2 tests are used. All data are double-entered and checked by both parties to ensure the accuracy of the data ^[8]. Due to the missing data, the mean method is adopted for processing to reduce the impact of the data missing rate on the results.

3. Result

3.1. Comparison of intraoperative body temperature control and hemodynamic parameters between the two groups of patients

Table 1 illustrates the precise control of intraoperative body temperature and the stability of hemodynamics are the

key factors for the success of cerebral hemangioma surgery. By comparing and analyzing the amplitude of body temperature fluctuation, the proportion of target temperature maintenance time and hemodynamic indicators of the two groups of patients, it is found that the intraoperative body temperature of the patients in the experimental group was more stable and the hemodynamic parameters fluctuated less. Precise control of moderate and low body temperature can provide a better protective environment for brain tissue and reduce the risk of ischemia-reperfusion injury. The following table presents in detail the comparison results of intraoperative body temperature control and hemodynamic parameters between the two groups of patients. The data show that the experimental group is superior to the control group in all indicators.

Table 1. Comparison of intraoperative body temperature control and hemodynamic parameters between two groups of patients ($\bar{x} \pm s$)

Indicator	Control group (<i>n</i> =15)	Experimental group (<i>n</i> =15)	<i>t</i>	<i>P</i>
Amplitude of body temperature fluctuation (°C)	1.83 ± 0.46	0.76 ± 0.29	7.624	0.003
The proportion of the target temperature maintenance time (%)	58.41 ± 9.27	91.63 ± 5.18	12.304	0.006
Fluctuation range of mean arterial pressure (mmHg)	26.47 ± 6.85	12.36 ± 3.94	6.853	0.005
Heart rate fluctuation range (bpm)	21.69 ± 5.93	10.28 ± 3.17	6.759	0.003

3.2. Comparison of postoperative recovery and incidence of complications between the two groups of patients

Table 2 shows that the rapid recovery of neurological function and the reduction of complications after surgery are important criteria for evaluating the quality of surgery and nursing. Detailed records and analyses of the indicators, such as the postoperative awakening time, neurological function score, complication rate, and patient satisfaction of the two groups of patients were made. The results showed that the patients in the experimental group who received moderate and hypothermia intervention recovered faster after the operation, had better neurological function, a significantly lower incidence of complications, and higher patient satisfaction. This further confirms the positive role and clinical application value of moderate and hypothermia intervention in the surgery of cerebral hemangioma.

Table 2. Comparison of postoperative recovery and incidence of complications between the two groups of patients

Indicator	Control group (<i>n</i> =15)	Experimental group (<i>n</i> =15)	<i>t</i> / χ^2	<i>P</i>
Postoperative awakening time (min)	62.47 ± 13.26	38.94 ± 9.57	5.763	0.002
After the operation 24h GCSScore (points)	12.67 ± 1.94	14.33 ± 0.82	3.136	0.004
Postoperative NIHSS score (points)	8.21 ± 2.47	4.53 ± 1.68	4.927	0.003
Complication rate (%)	33.33(5/15)	6.67(1/15)	3.968	0.046
Patient satisfaction (points)	83.27 ± 6.35	92.64 ± 4.18	4.802	0.008

4. Discussion

In this study, regarding body temperature and postoperative recovery, the conclusion on the relationship between body temperature control and intraoperative hemodynamic stability was drawn^[9]. Starting from the actual clinical

situation, the research results can be understood at a deeper level, providing a basis for the improvement of future treatment strategies. The two indicators of temperature fluctuation amplitude and the time to maintain the target temperature in this subject can indicate the influence of the stability of intraoperative temperature on the circulatory system. Frequent fluctuations in body temperature after surgery can lead to vasoconstriction or dilation of the body's blood vessels, thereby causing hemodynamic instability. Good body temperature control can provide a more ideal condition for the circulatory system and reduce the occurrence of postoperative complications^[10].

Secondly, this study points out the significance of postoperative neurological function recovery. The changes in items such as postoperative awakening time, Glasgow Coma Scale score (GCS), and NIHSS score indicate the metabolic rate of anesthetic drugs and the process of nerve recovery. The metabolism of anesthetic drugs and the postoperative recovery largely depend on the quality of the patient's recovery, such as the recovery of neurological function^[11]. The postoperative recovery speed of patients in the experimental group was relatively fast. It can be seen that body temperature control and neuroprotection have an impact on postoperative recovery. The metabolism of anesthetic drugs in the body is affected by many aspects. The stability of body temperature may indirectly assist the metabolism of anesthetic drugs, reduce the awakening period of anesthesia for patients, and help patients recover faster^[13].

In addition, the incidence of complications and the satisfaction of patients are also notable results in this study. The reduction in the incidence of postoperative complications is closely related to the control of body temperature during the operation^[12]. Both higher and lower temperatures may induce the occurrence of various complications. This is particularly important for brain surgeries. During the operation, a certain body temperature needs to be maintained. If the body temperature is not properly controlled, it will cause various complications for the patient, thereby affecting the quality of postoperative recovery. In this study, the incidence of complications in the experimental group was not high, and the postoperative satisfaction of the patients was also relatively high. This might be closely related to various factors such as meticulous intraoperative management and postoperative care methods. The psychological needs of patients themselves will be inseparably related to their treatment effects. Providing patients with a good treatment experience can improve their overall satisfaction^[14, 15].

5. Conclusion

In conclusion, this study has demonstrated the significance of maintaining the patient's body temperature during surgery for the stability of circulatory circulation during the operation and the early recovery of patients after the operation.

Disclosure statement

The author declares no conflict of interest.

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