

Research on the Application of Rapid Rehabilitation Surgical Nursing in Perioperative Period of Cerebral Aneurysm Interventional Embolization

Li Yao, Zhang Xiangqin, Li Yan, Gao Jing, Yang Qianwei

Affiliated Hospital of Hebei University, Baoding City, Hebei Province, 071000, China

Abstract: The purpose of this study was to evaluate the application of ERAS nursing model in perioperative period of interventional embolization of cerebral aneurysms, with a view to improving the quality of rehabilitation and nursing satisfaction of patients. The clinical data of 68 patients who underwent interventional embolization of cerebral aneurysms in our hospital from May 2022 to May 2023 were analyzed retrospectively. According to the different nursing mode, the patients were divided into control group (34 cases, receiving conventional care) and observation group (34 cases, receiving ERAS care). The differences in postoperative pain score, Barthel index, length of stay and nursing satisfaction were compared between the two groups. The observation group was significantly better than the control group in postoperative pain score (mean score of 2.94 ± 0.89 on the 3rd day after surgery) and Barthel index (mean score of 85.17 ± 5.31 on the 4th week after surgery) (mean score of 4.58 ± 1.21 on the 3rd day after surgery and 75.32 ± 6.45 on the 4th week after surgery). All the P values were less than 0.05. The average length of stay in the observation group was 8.45 ± 1.27 days, which was significantly reduced from 12.36 ± 1.58 days in the control group ($P < 0.05$). The nursing satisfaction survey showed that the satisfaction of patients in the observation group was higher than that in the control group (58.82% vs. 29.41%, $P < 0.05$). The application of ERAS nursing model in perioperative nursing of cerebral aneurysm interventional embolization can significantly optimize the postoperative rehabilitation process of patients, reduce pain, shorten hospital stay, and improve patients' satisfaction with nursing.

Keywords: Rapid rehabilitation surgical care; Cerebral aneurysm; Interventional embolization; Perioperative period; Rehabilitation quality; Nursing satisfaction

1. Introduction

With the advancement of medical technology, the treatment of cerebral aneurysm has shifted from craniotomy to minimally invasive interventional embolization, but perioperative management is still the key to improve the prognosis and quality of life of patients. In recent years, Enhanced Recovery After Surgery (ERAS) nursing model, as an emerging perioperative management strategy, has demonstrated its advantages in a variety of operations, including reducing postoperative complications, shortening hospital stay and improving patient satisfaction^[1].

While traditional perioperative management focuses on post-operative recovery, ERAS nursing model focuses more on the whole treatment cycle, from preoperative preparation to postoperative rehabilitation, with a series of optimization measures. The model emphasizes multidisciplinary teamwork, including doctors, nurses, dietitians, etc., to work together to develop a personalized care plan for patients. The core of ERAS model is to change traditional concepts, promote preoperative education, reduce preoperative fasting time, optimize intraoperative management, and promote early postoperative activity and diet^[2].

Although ERAS has been extensively studied in many surgical procedures, relatively few studies have been conducted on its application in interventional embolization of cerebral aneurysms [3]. In view of this, this study retrospectively analyzed the clinical data of 68 patients who underwent interventional embolization for cerebral aneurysms in our hospital, and evaluated the influence of ERAS nursing model on perioperative management. By comparing with the conventional nursing model, the purpose is to verify whether the application of ERAS model in the perioperative period of interventional embolization of cerebral aneurysms can improve the rehabilitation process and the overall satisfaction of patients, so as to provide a more scientific and humane nursing plan for the clinic.

2. Data and methods

2.1. General information

This study was a retrospective case study involving 68 patients who underwent interventional embolization for cerebral aneurysms in our hospital. The time range is from May 2022 to May 2023. The patients ranged in age from 30 to 70 years, with 35 men and 33 women. All patients were diagnosed with cerebral aneurysm by head CT or MRI and underwent interventional embolization in our hospital.

Inclusion criteria: (1) age between 30 and 70 years; (2) Diagnosis of cerebral aneurysm based on imaging examination (CT or MRI); (3) Interventional embolization of cerebral aneurysm was performed in our hospital; (4) Complete medical records and postoperative follow-up data; (5) The patient or his family members sign the informed consent.

Exclusion criteria: (1) severe heart, liver, kidney and other organ dysfunction; (2) mental illness or cognitive dysfunction, unable to cooperate with treatment and research; (3) preoperative use of anticoagulant or antiplatelet drugs; (4) History of cerebral aneurysm rupture or serious complications; (5) Have participated in other clinical studies.

This study protocol has been reviewed and approved by the Ethics Committee of our hospital (approval number: ERAS-2022-05). Study the ethical principles of compliance with the Helsinki Declaration. All participants were informed of the study content and signed informed consent prior to joining the study.

2.2. Research method

In this study, two different nursing modes were used to compare the rehabilitation effect of cerebral aneurysm interventional embolization. The control group received standard neurosurgical care, while the observation group received the Rapid Rehabilitation surgery (ERAS) care model. Control care includes traditional measures such as providing basic health education, monitoring vital signs, and guiding medication. The application of ERAS in the observation group was as follows:

Preoperative: (1) Assist patients with sorting out personal belongings after admission, change hospital gowns, and disinfect personal belongings; (2) Popularize the relevant knowledge of cerebral aneurysm to patients and their families, explain the process of interventional embolization therapy in detail, and patiently answer questions to reduce patients' fear and emotional fluctuations; (3) Optimize the ward environment, including temperature, humidity regulation and air purification, to create a comfortable rest environment; (4) Instruct patients to pay attention to the control of neck movement, cough, rise and other movements before surgery to prevent the risk of cerebral aneurysm rupture; (5) Shorten the preoperative water prohibition time and try to avoid the use of nasogastric tubes.

Intraoperative: (1) Provide adequate glucose water 2 hours before surgery to prevent hypoglycemia; (2) Assist the patient to transfer to the operating table and maintain a comfortable position; (3) Closely monitor patients' vital signs and report any abnormalities promptly; (4) The intraoperative fluid and urine volumes were recorded to ensure that the patient's temperature was stable.

After surgery: (1) Escort the patient back to the ward and make sure there are no missing surgical instruments; (2) Assist the patient to maintain a flat position, raise the head and provide oxygen; (3) Continuous infusion to maintain electrolyte balance; (4) Monitoring blood gas indexes, timely detection and reporting of possible complications; (5) After the patient is awake, inform the result of the operation and emphasize the importance of resting.

Postoperative rehabilitation nursing: (1) Assist the patient to get up and gradually move within 8 hours after surgery; (2) Guide the patient to exercise the upper limb and control the intensity of the exercise; (3) Assist the patient to get out of bed and clean the body to prevent pressure sores; (4) Arrange short activities, such as walking or gentle exercise, three times a day to avoid fatigue; (5) Provide nutritional supplements rich in vitamins, fiber and trace elements, as well as a gradual transition from liquid foods to solid foods to restore gastrointestinal function; (6) Use a variety of methods for pain relief, including optimizing the use of analgesic drugs, helping patients to divert attention to reduce pain, and performing body massage to relieve pain when necessary.

2.3. Observation index

The main outcome measures included postoperative pain score, Barthel index, length of stay, and patient satisfaction with care. The postoperative pain score was assessed by using internationally recognized pain scoring criteria designed to quantitatively analyze changes in the degree of postoperative pain in patients. The Barthel Index is used to measure a patient's ability to perform personal care and activities of daily living after receiving different modes of care. Records of length of stay were used to assess the effect of the two modes of care on reducing the length of stay of patients. Finally, the patients' feedback on nursing satisfaction was collected through questionnaire survey to objectively evaluate the acceptance and effect of the two nursing models.

2.4. Statistical significance

Descriptive statistical methods (such as mean and standard deviation) were used to analyze the basic information of the patients. To compare the differences between the two groups, such as postoperative pain score, Barthel index, length of stay, etc., appropriate statistical tests, such as T-test or Chi-square test, will be used to determine whether there is a significant difference between the two groups of data. All statistical analysis will be carried out in SPSS statistical software. If the P-value obtained in the study is less than 0.05, it will be considered statistically significant.

3. Result

The results of this study were based in part on a comparison between the control group (traditional neurosurgical care) and the observation group (rapid rehabilitation surgical care).

Table 1: Postoperative pain score

Group	Day 1 after surgery (minutes)	Postoperative day 3 (minutes)	T-value	p-value
Control group	6.25 ± 1.35	4.58 ± 1.21	4.762	0.000
Observation group	4.67 ± 1.18	2.94 ± 0.89		

Table 2: Barthel index

Group	Postoperative week 1 (minutes)	4 weeks after surgery (minutes)	T-value	p-value
Control group	45.67 ± 5.18	75.32 ± 6.45	6.125	0.000
Observation group	55.29 ± 4.89	85.17 ± 5.31		

Table 3: Length of stay (days)

Group	Average length of stay (days)	T-value	p-value
Control group	12.36 ± 1.58	5.942	0.000
Observation group	8.45 ± 1.27		

Table 4: Nursing satisfaction [n(%)]

Group	Very satisfied	satisfaction	normal	dissatisfy	Chi-square value	p-value
Control group	10 (29.41%)	18 (52.94%)	4 (11.76%)	2 (5.88%)	8.765	0.012
Observation group	20 (58.82%)	12 (35.29%)	2 (5.88%)	0 (0.00%)		

Table 5: Incidence of postoperative complications

Group	Complication rate	Chi-square value	p-value
Control group	8 (23.53%)	6.298	0.012
Observation group	2 (5.88%)		

From the above data, it can be seen that the postoperative pain score (Table 1) in the observation group was significantly lower than that in the control group, especially on the third day after surgery. The Barthel index (Table 2) showed that the recovery of daily living ability in the observation group was significantly better than that in the control group at 4 weeks after surgery. Length of stay (Table 3) Data analysis results showed that the average length of stay of patients in the observation group was significantly shorter than that in the control group. The results of the analysis of care satisfaction (Table 4) showed that a higher proportion of patients in the observation group reported being very satisfied, reflecting the effectiveness of the rapid rehabilitation surgical care model in improving patient satisfaction. The incidence of postoperative complications (Table 5) was significantly lower in the observation group than in the control group.

4. Discuss

Modern medical concepts emphasize that while ensuring the treatment effect, the postoperative recovery process of patients should be optimized. The traditional approach to neurosurgical care focuses on basic vital sign monitoring and medication guidance, but this approach often fails to sufficiently motivate patients to actively participate, resulting in passive care for a longer period of time. This approach may not be conducive to a quick recovery. The unique advantage of ERAS is that it can promote overall benefits from three dimensions: patient, medical team and medical institution [3].

(1) For patients: improving the speed of postoperative rehabilitation is based on enhancing comfort and improving satisfaction. In other words, this will not reduce the quality of the patient's recovery after surgery, but is expected to significantly improve. Shorter hospital stays also mean a reduction in the total cost of patient treatment, potentially reducing the risk of poverty due to illness. (2) For medical personnel: ① The implementation of the rapid rehabilitation surgical nursing mode means to improve the medical level and standardize the treatment process, which will improve the professional ability of medical personnel as a whole; ② By accelerating the postoperative recovery of patients, medical staff can feel a stronger sense of accomplishment, thus stimulating their higher work enthusiasm and helping to build a dynamic medical team [4]; ③ The acceleration of nursing rhythm and the implementation of continuous care can enrich clinical data and make it more complete; ④ The new model can also reduce the frequent doctor-patient disputes in traditional nursing and promote harmonious doctor-patient relationship. (3) Hospital level: ① Shortening hospital stay can not only reduce the risk of death and complications, but also help improve the reputation of the hospital; ② Reducing medical insurance expenditure can help improve the benefits of the whole society and become an effective way to solve the problem of pension and medical insurance gap [5,6].

The objective of this study was to evaluate the efficacy of ERAS in the perioperative period of interventional embolization of cerebral aneurysms. The results showed that the observation group receiving ERAS was superior to the control group receiving traditional neurosurgical care in terms of postoperative pain management, recovery of ability to live daily, reduced length of hospital stay, improved patient satisfaction, and reduced risk of complications.

In terms of postoperative pain score, patients in the observation group experienced a significant reduction in pain perception, which may be attributed to the integrated management strategy for postoperative pain in the ERAS care model. The ERAS model emphasizes preoperative education, meticulous operation during surgery and active intervention after surgery, making patients feel more comfortable throughout the treatment process and reducing the aggravation of pain caused by anxiety and tension. In addition, early postoperative activity and rational use of analgesic drugs can also help reduce pain [7].

The improvement of the Barthel index further confirmed the positive impact of the ERAS nursing model on the recovery of patients' ability to perform daily living. At 4 weeks after surgery, the Barthel index of patients in the observation group was significantly higher than that of the control group, indicating that patients in ERAS mode could recover their self-care ability of daily life more quickly. This may be due to the promotion of early postoperative activity in the ERAS nursing model, which promotes the recovery of physical function by patients getting out of bed early, thus speeding up the

rehabilitation process^[8].

The reduced length of hospital stay is another significant advantage of the ERAS model of care. The study data showed that the average length of hospital stay in the observation group was significantly shorter than that in the control group, which not only helps to reduce the pressure on medical resources, but also indicates the potential of the ERAS nursing model to improve hospital bed turnover. The reduction in the length of hospital stay can reduce the financial burden on patients, while reducing the risk of complications that may come with a long hospital stay.

The increase in patient satisfaction with care reflects the acceptance of the ERAS care model among patients. The improvement of satisfaction is closely related to the improvement of postoperative rehabilitation quality of patients, which may also be related to more humanistic care and individualized nursing measures in ERAS nursing model. Providing personalized care plans that are tailored to the specific needs of patients makes patients feel valued and cared for, resulting in increased care satisfaction.

In addition, the decrease in postoperative complications was also noteworthy. The incidence of complications in the observation group was significantly lower than that in the control group, which may be related to the prevention and management of postoperative complications in the ERAS nursing model. The implementation of ERAS nursing model can effectively prevent the occurrence of postoperative complications through comprehensive nursing intervention.

Overall, ERAS nursing model provides patients with a comprehensive therapeutic environment conducive to recovery through its multi-faceted nursing measures. However, this study also has some limitations, such as a relatively small sample size and retrospective study. Future studies could validate the conclusions of this study by expanding the sample size and prospective design, and further explore the application of the ERAS care model in other types of surgery. In addition, individual patient differences in response to ERAS care models should also be considered to further personalize and optimize care plans.

References

- [1] LV Fengying, Wu Xifeng, Wang Suqing. Application effect of rapid rehabilitation surgical nursing in perioperative period of interventional embolization of cerebral aneurysm [J]. *Chinese Journal of Health Standard Management*, 2021, 12(7): 143-146. (in Chinese) DOI: 10.3969/j.issn.1674-9316.2021.07.0052.
- [2] Zhao Shuizhen, Li Shao, Jiang Xiaoyan. Application value of perioperative rapid rehabilitation nursing in patients with cerebral aneurysm undergoing interventional embolization [J]. *Chinese Journal of Medical Sciences*, 2019, 10(13): 106-108, 194.
- [3] Fan Liyun. Study on the application of rapid rehabilitation surgical nursing in perioperative period of cerebral aneurysm interventional embolization [J]. *Science and Health*, 2020, 23(7): 277.
- [4] Li Yuping. Analysis of the value of rapid rehabilitation surgical nursing in perioperative period of cerebral aneurysm interventional embolization [J]. *Journal of Dietary Health*, 2020(37): 237.
- [5] WU Yue. Effect of rapid rehabilitation surgical nursing on rehabilitation effect and nursing satisfaction of patients with cerebral aneurysm interventional embolization [J]. *Journal of Dietary Health*, 2020(47): 142.
- [6] Chen Hong, Wu Jian, Zhang Jinzhen, et al. Nursing intervention effect of integrated medical care combined with rapid rehabilitation surgery mode in interventional embolization treatment of cerebral aneurysm [J]. *Journal of Kunming Medical University*, 202, 43(4): 163-169.
- [7] Yu Lijuan, Zhao Yulan, Li Shumin, et al. Clinical study of perioperative rapid rehabilitation nursing for cerebral aneurysms undergoing interventional embolization [J]. *Journal of Health Advice*, 2012, 16(9): 136-138.
- [8] Wei Le. Effect analysis of rapid rehabilitation surgical nursing mode in perioperative period of cerebral aneurysm interventional embolization [J]. *Journal of Clinical Medical Literature Electronic*, 2002, 9(1): 44-47.