Original Article
Effect of high-quality nursing on psychological status and prognosis of patients undergoing brain tumor surgery

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Abstract: Objective: To investigate the effect of high-quality nursing on psychological status and prognosis of patients undergoing brain tumor surgery. Methods: One hundred and ten patients undergoing brain tumor surgery were divided into control group (n=55, receiving routine nursing) and observation group (n=55, receiving high-quality nursing). The psychological status (Hamilton Anxiety Rating Scale (HAMA) and Hamilton Depression Rating Scale (HAMD)), quality of life (Generic Quality of Life Inventory-74 Scale (GQOLI-74)), prognosis (Glasgow Outcome Scale (GOS)), self-efficacy (Strategies Used by People to Promote Health Scale (SUPPH)) and complications of patients in both groups were recorded and compared. Results: After intervention, scores of HAMA and HAMD in both groups decreased, while scores of GOS, GQOLI-74 and SUPPH in both groups increased (all P<0.05). Compared with the control group, scores of HAMA and HAMD in the observation group were lower after intervention, while scores of GOS, GQOLI-74 and SUPPH were higher (all P<0.05). There was no significant difference in mortality between the two groups (P>0.05). The overall complication rate in the observation group was lower than that in the control group during hospitalization (P<0.05). Conclusion: Perioperative high-quality nursing for patients undergoing brain tumor surgery can significantly alleviate the adverse psychological states, reduce the complication rate and improve the postoperative self-efficacy and quality of life.

Keywords: Brain tumor, high-quality nursing, psychological status, prognosis

Introduction

Brain tumor is one of the common diseases in neurosurgery, which develops from lesions in brain tissue, nerves, meninges, pituitary gland and so on as well as metastasis or infiltration from tumors in other organs or tissues [1]. Brain tumors can cause the compression of brain tissue and nerves and elevated intracranial pressure due to its expansive growth characteristics, which then leads to symptoms such as dizziness, headache and blurred vision. As disease progresses, patients can present with clinical symptoms such as clouding of consciousness [2]. However, the onset of brain tumors occurs slowly and the early clinical symptoms are not obvious. Most patients present with symptoms after several months, and some patients only present with symptoms such as dizziness, headache and blurred vision after years. Surgery is the main treatment for brain tumors, but the high incidence of postoperative complications not only affects the prognosis of patients, but also greatly reduces the quality of life (QOL) [3]. Most perioperative routine nursing measures for patients undergoing brain tumor surgery are symptomatic treatment and daily care for postoperative complications, but less attention is paid to patients' intraoperative psychological state and long-term QOL.

High-quality nursing is a kind of patient-centered nursing model that aims to provide patients with "quality and efficient" medical services by strengthening basic nursing and fully implementing nursing responsibility. This nursing model is widely used in many clinical departments with good results. For example, study by Burton et al. (2018) showed that high-quality nursing could improve the postoperative QOL in patients undergoing gastrectomy for gastric carcinoma [4]. Also, study by Mendes et al.

(2015) revealed that high-quality nursing could improve the treatment compliance in patients with coronary heart disease [5]. This study aimed to investigate the effect of perioperative high-quality nursing on psychological status and quality of life in patients undergoing brain tumor surgery.

Materials and methods

General information

A prospective study was conducted to divide 110 patients undergoing brain tumor surgery admitted to our hospital from September 2018 to February 2020 into control group (n=55, receiving routine nursing) and observation group (n=55, receiving high-quality nursing) according to the random number table method. The inclusion criteria were the following: Patients aged 20-65 years; patients confirmed with brain tumor by imaging examinations; patients scheduled for surgical treatment after admission and patients who signed the informed consent.

The exclusion criteria were the following: Patients combined with other brain diseases; patients who received glucocorticoids or immunosuppressive drugs within 1 month before enrolment in the study; patients combined with immune system diseases, mental illness and cognitive dysfunction; patients with a history of brain trauma and patients combined with other malignancies. This study was approved by the medical Ethics Committee of our hospital.

Methods

Patients in both groups received surgical treatment. Patients in the control group received routine nursing in the perioperative period: perfecting preoperative examinations, monitoring postoperative vital signs closely and conducting symptomatic treatment for complications.

Patients in the observation group received high-quality nursing in the perioperative period [6, 7]. Preoperative care: Each preoperative examination was perfected in the company of family members or nursing staff to ease the fearful psychology of patients. Patients were informed about the necessity of surgical treatment, surgical procedures, postoperative complications and management 1-2 days before

surgery. It was allowed to have those who had successful surgery in the past and have recovered well afterwards come to hospital to communicate with patients, which can greatly enhance their confidence in treatment. Intraoperative care: After entering the operating room, the patient assumed the position meeting surgical requirements under the guidance and help of nursing staff. Intravenous access was then established. Before anesthesia, the patient was informed that the operating physician has extensive clinical experience and high professional level, which could eliminate the fear and tension of them. The ECG monitor was connected to monitor the patient's various vital signs closely, and patients cooperated with the clinicians to complete the procedure successfully. Postoperative care: After surgery, all patients were transferred to the wards and vital signs were closely monitored. Blood pressure and temperature of patients were measured 2 times per day. After awaking from anesthesia, patients were asked about subjective sensation and continuous anesthetic administration was used for those with severe pain. To avoid postoperative pulmonary infections and keep the respiratory tract unobstructed, the sputum was aspirated promptly for patients with sticky sputum in respiratory tract. The patient was maintained on prolonged bed rest after surgery. The family members of patients were instructed to help the patients turn over in bed regularly to avoid the development of pressure sores. In addition, patients were given leg raising exercises regularly to prevent deep venous thrombosis. Nursing staff communicated with patients once a day to discover their psychological changes timely and analyze the causes of emotional fluctuation. Psychological guidance was given to patients whose emotion fluctuated greatly to eliminate the post-operative anxiety and other emotions.

Outcome measures

Primary outcome measures: All scales were evaluated before operation and at discharge.

The psychological status of patients was evaluated using the Hamilton Anxiety Rating Scale (HAMA) and Hamilton Depression Rating Scale (HAMD, 17 items) [8, 9]. A score of HAMA ≥7 indicates possible anxiety, and a score of HAMD 7-17 indicates possible depression. A high-

Table 1. General information of patients in the two groups ($\bar{x} \pm sd$)

Groups	Observation group (n=55)	Control group (n=55)	χ^2/t	P
Gender (n)			1.310	0.252
Male	30	24		
Female	25	31		
Age (years)	40.3±5.4	39.9±6.6	0.348	0.729
Course of disease (years)	1.2±0.4	1.3±0.5	1.384	0.169
Tumor site (n)			2.022	0.846
Glioma	10	13		
Meningioma	11	10		
Medulloblastoma	13	8		
Astrocytoma	8	9		
Brain metastasis	5	7		
Others	8	8		
Underlying Disease (n)			1.354	0.716
Hypertension	7	8		
Hyperlipidemia	6	4		
Diabetes mellitus	2	4		
Coronary heart disease	1	2		

Table 2. HAMA and HAMD scores in the two groups before and after intervention ($\bar{x} \pm sd$)

Group	HAMA score	HAMD score
Observation group (n=55)		
Before intervention	7.87±1.44	8.30±1.20
After intervention	6.10±1.38[*,#]	6.08±1.35[*,#]
Control group (n=55)		
Before intervention	8.03±1.60	8.22±1.52
After intervention	6.97±1.21[*]	7.01±1.26[*]

Notes: HAMA: Hamilton Anxiety Rating Scale. HAMD: Hamilton Depression Rating Scale. Compared with before intervention, [*]P<0.05; compared with the control group, [#]P<0.05.

er score indicates greater anxiety and depression severity.

The QOL was assessed using the Generic Quality of Life Inventory-74 (GQOLI-74) [10]. The scores of material life condition range from 16 to 80, and the scores of social function, physical function and psychological function range from 20 to 100. A higher score indicates a better QOL.

The prognosis of patients was evaluated using Glasgow Outcome Scale (GOS) with a total score of 5 [11]. A higher score indicates a better recovery. A score of five indicates that patients recover well and can live a normal life.

A score of one indicates death.

Secondary outcome measures: The self-efficacy of patients was evaluated using the Strategies Used by People to Promote Health Scale (SUPPH) which includes stress reduction (10-50 points), making decision (3-15 points) and positive attitude (15-75 points) [12]. A higher score indicates greater self-efficacy. The mortality and postoperative complications of patients in both groups were recorded.

Statistical analysis

SPSS statistics software version 20.0 was used for statistical analysis. The enumeration data were expressed as n (%) and tested by Chi-square test. The measurement data are expressed as mean ± standard deviation ($\bar{x} \pm sd$). Paired t-test was used to compare the data before and after the intervention, and independent t-test was used to compare the data between two groups. P<0.05 was considered statistically significant.

Results

Comparison of general information

There was no significant difference in general information between the two groups (all P>0.05). See **Table 1**.

Psychological status

Before intervention, there was no significant difference in scores of HAMA and HAMD between the two groups (all P>0.05). After intervention, scores of HAMA and HAMD in both groups decreased and scores of HAMA and HAMD in the observation group were lower than those in the control group (all P<0.05). See **Table 2**.

QOL

There was no significant difference in scores of GQOLI-74 between the two groups before inter-

Table 3. Scores of GQOLI-74 before and after intervention in the two groups ($\bar{x} \pm sd$)

Group	Material life condition	Social function	Physical function	Psychological function
Observation group (n=55)				
Before intervention	44.40±4.11	67.79±5.49	70.06±5.49	60.06±5.49
After intervention	57.44±5.50*,#	78.88±6.53*,#	81.97±6.55*,#	69.79±6.55*,#
Control group (n=55)				
Before intervention	43.95±4.96	67.58±6.06	69.69±5.70	59.88±6.63
After intervention	50.04±4.86*	72.20±6.55*	76.58±6.40*	64.30±5.99*

Notes: Compared with before intervention, *P<0.05; compared with the control group, #P<0.05.
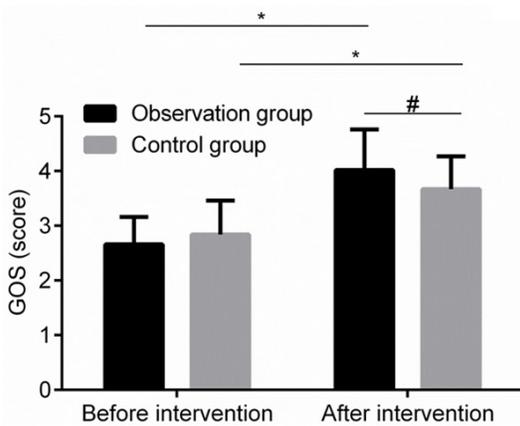
Figure 1. Comparison of GOS scores between the two groups before and after intervention. Compared with before intervention, *P<0.05; compared with the control group, #P<0.05. GOS: Glasgow Outcome Scale.

vention (all P>0.05). After intervention, scores of GQOLI-74 in both groups increased, and scores of GQOLI-74 in the observation group were higher than those in the control group (all P<0.05). See **Table 3**.

GOS score

Before intervention, the scores of GOS in the observation group and the control group were (2.66±0.50) and (2.84±0.62), respectively and there was no significant difference in scores of GOS between the two groups (all P>0.05). After intervention, the scores of GOS in the observation group and the control group were (4.02±0.74) and (3.67±0.60), respectively. After intervention, scores of GOS in both groups increased and scores of GOS in the observation group were higher than those in the control group (all P<0.05). See **Figure 1**.

Self-efficacy

There was no significant difference in scores of SUPPH between the two groups before intervention (all P>0.05). After intervention, scores of SUPPH in both groups increased and scores of SUPPH in the observation group were higher than those in the control group (P<0.05). See **Table 4**.

Mortality and complications

During hospitalization, there were one death (died of intracerebral hemorrhage) in the observation group and two deaths (died of intracerebral hemorrhage and pulmonary infection) in the control group. There was no significant difference in mortality between the two groups (P>0.05). The overall complication rate in the observation group was lower than that in the control group during hospitalization (P<0.05). See **Table 5**.

Discussion

The most commonly used treatment for brain tumors after diagnosis is surgical resection. However, postoperative patients need to stay in bed for a long time and have a high incidence of complications such as pulmonary infection, which can affect postoperative rehabilitation of patients [13]. Studies have shown that perioperative high-quality nursing has an obvious effect on preventing postoperative complications [14].

The results in this study showed that scores of HAMA and HAMD in both groups decreased and scores of GQOLI-74 in both groups increased after intervention, and the changes in the observation group were more significant. This suggested that perioperative high-quality

Table 4. SUPPH score of patients in both groups before and after intervention ($\bar{x} \pm sd$)

Group	Stress reduction	Making decision	Positive attitude
Observation group (n=55)			
Before intervention	30.03±4.24	8.10±1.77	47.60±5.40
After intervention	38.84±4.65[*,#]	13.22±1.36[*,#]	56.47±6.65[*,#]
Control group (n=55)			
Before intervention	29.78±4.30	7.95±1.80	47.49±5.05
After intervention	33.39±4.83[*]	10.90±1.65[*]	51.24±5.48[*]

Notes: Compared with before intervention, [*]P<0.05; compared with the control group, [#]P<0.05.

Table 5. Comparison of complications between the two groups (n, %)

Group	Pulmonary infection	Urinary tract infection	Cerebral hemorrhage	Hemiplegia	Overall rate
Observation group (n=55)	1 (1.82)	0 (0.00)	1 (1.82)	0 (0.00)	2 (3.64)[#]
Control group (n=55)	3 (5.45)	2 (3.64)	2 (3.64)	1 (1.82)	8 (14.55)

Note: Compared with the control group, [#]P<0.05.

nursing for patients undergoing brain tumor surgery can significantly alleviate their adverse psychological states such as anxiety and their QOL. This is because high-quality nursing given before, during and after brain tumor surgery is more specific and comprehensive. After surgery, targeted psychological guidance according to psychological changes of patients can significantly improve their postoperative adverse psychological states. Postoperative high-quality nursing focuses on the prevention of postoperative complications, which greatly reduces the risk of postoperative complications and is beneficial to the improvement of patients' QOL [15]. Influenced by cancer pain and the disease itself, combined with patients' concern about the surgical risk and prognosis, some patients may have different degrees of adverse psychology, and in severe cases, they may present with symptoms of anxiety or even depression. However, long-term adverse psychology is not only detrimental to the postoperative recovery, but also can affect the postoperative QOL of patients [16, 17]. Study by Meiklejohn et al. (2016) found that perioperative high-quality nursing contributed to improving postoperative negative states and emotions in patients undergoing malignant tumor surgery [18]. Study by Chiew et al. (2018) indicated that perioperative high-quality nursing measures was conducive to improving the postoperative QOL of patients [19].

"Self-efficacy", proposed by Stanford University psychologist Albert Bandura, mainly refers to the individual's perceptions about self-relevant abilities or expectations about one's ability to perform a behavior [20]. In this study, after intervention, scores of SUPPH in both groups increased and scores of SUPPH in the observation group were higher than those in the control group, indicating that perioperative high-quality nursing can significantly enhance the self-efficacy of patients undergoing brain tumor surgery compared with routine nursing. Study by Brockway et al. (2017) indicated that the effect of perioperative high-quality nursing model on postoperative self-efficacy of patients is more obvious [21]. In addition, this study found that the overall complication rate in the observation group was lower than that in the control group, and the GOS score in the observation group was higher than that in the control group. The results suggested that perioperative full-course high-quality nursing model would be more helpful for reducing the incidence of postoperative complications and improving the prognosis of patients. Study by Britt et al. (2017) also pointed out that perioperative high-quality nursing can more effectively prevent postoperative complications and reduce the incidence of postoperative complications [22].

However, this study was a single-center study with a limited sample size and no long-term follow-up. Further studies are needed to con-

firm the impact of high-quality nursing model on the long-term QOL and prognosis of patients undergoing brain tumor surgery.

In conclusion, perioperative high-quality nursing for patients undergoing brain tumor surgery can significantly alleviate their adverse or negative psychological states, reduce the incidence of complications, and help patients to improve their postoperative self-efficacy and QOL. and thus, have a better prognosis.

Disclosure of conflict of interest

None.

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