

# Perioperative Nursing Care Experience of a Case of Postoperative Recurrent Grade II-I Left Frontal Astrocytoma

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**Abstract: Objective:** To investigate the effect and value of perioperative nursing intervention on postoperative recurrent grade II-I left frontal astrocytoma. **Method:** Nursing care procedures: left frontal lobe of the patient was occupied by a large space. Clinical teaching of nursing was strengthened. Preoperative, intraoperative and postoperative care and ward patrol were enhanced. Close attention was paid on consciousness, pupil, vital signs, body temperature, lungs condition, cranial and nerve function of the patient. Extra care was taken in keeping the incision clean and dry. Blood diffusion condition in wound was observed. Active cooperation with doctor was taken to prevent occurrence of pulmonary infection, urinary tract infection, pressure ulcer and other complication. **Results:** After operation, the patient had stable condition, clear mind and consciousness. There was no occurrence of epilepsy but intracranial hemorrhage. Pneumatosis was relieved. There was no infection and other complication. **Conclusion:** Application of comprehensive nursing intervention could effectively improve quality of life of patient and reduce incidence of postoperative complication in patients with brain tumor.

**Keywords:** Postoperative recurrent grade II-I astrocytoma, Perioperative period, Nursing care of complications, Quality of life

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## 1 Introduction

Astrocytoma originates from mutated astrocytes. It accounts for about 75% of neuroepithelial tumors. It can be divided into two types: localized astrocytoma and diffuse invasive astrocytoma. Clinically, WHO I–II astrocytoma are generally defined as low-grade astrocytoma. It takes about 2 years for patient to manifest clinical symptoms from the onset of the disease. Occurrence and development of the disease symptoms are related to increased intracranial pressure and compression of brain tissues surrounding tumor. The main cause that affects the disease course and prognosis of patient is malignancy progression of tumor<sup>[1,2]</sup>.

## 2 Case data

Patient XXX, male, 39 years old, has been engaged in painting work, was born and been living in Lu' An City, Anhui Province. Admission time: 22 May 2018. No history of allergy.

Chief complaint: Headache for 10 days after five years of left frontal astrocytoma surgery.

Current medical history: The patient was admitted to Branch of the Second Affiliated Hospital of Soochow University due to epileptic seizures and was diagnosed with space-occupying tumor at left frontal lobe. The tumor in left frontal lobe was resected under neurological navigation. Postoperative pathology was “grade II-I astrocytoma”. After operation, regular “temozolomide” chemoradiotherapy was given by Suzhou 100 Hospital. There was no obvious recurrence observed during annual head MR check up. Ten days ago, the patient had headache in the form of persistent swelling pain of the entire head without obvious cause. No nausea and vomiting. There was once severe

headache accompanied with fainting. There was no limb convulsion. MR review at the Branch of the Second Affiliated Hospital of Soochow University showed large space-occupying lesion in left frontal lobe. Recurrence was considered. In the past year, the patient felt deteriorated visual acuity in both eyes that his vision was blur sometimes and mentality was poor. Eating and sleeping were fine, urination and defecation were fine, and there was no obvious weight change.

The patient currently seeks for outpatient treatment in our hospital. Physical examination: body temperature 36.5C, pulse 65 times/min, breathing rate 18 times/ min, blood pressure 117/73mmHgr, normal body development, moderate nutrition, clear consciousness, 15 points of GCS score, fluent speech, equal size of bilateral pupils, diameter 2.5mm, sensitive response to light, a former curved surgical scar of 12cm was seen on left side of forehead, no leakage in cheek blowing, symmetric frontal striae, symmetric nasolabial fold, normal mouth opening, centered tongue, soft and non-resistant neck, no abnormality in cardiopulmonary auscultation, grade V limb muscle strength, normal muscle tension, and negative Babinski sign at both sides. Auxiliary examination: MR at external hospital showed irregular mass shadow in left frontal lobe, size was about 6.5\*5.4\*7.2cm, T1 and T2 showed mixed signals, DWI showed limited diffusion, enhanced scanning of T1 showed uneven enhancement, edge of the mass was not clear, finger pressure-like edema signals could be seen at the surrounding. A round-shaped abnormal signal nodule shadow was seen in the left basal ganglia, diameter was about 1cm, early T1 showed low signal shadow while T2 and FLAIR showed high signal shadow, DWI showed limited diffusion, enhanced scanning of T1 showed markedly enhancement and a little of edema signal around it. Obvious compression and narrowing (prominently in left ventricle) was seen in ventricular system. Midline structure of brain was right-biased. Postoperative recurrence of left frontal astrocytoma (111 grade) was confirmed in the patient. Surgery was performed as soon as possible.

Treatment process: left frontal craniotomy giant glioma resection was performed with assistance of neuro-navigation under static aspiration combined with general anesthesia. Brief process was as follows: laser was used for facial surface, an arc-shaped incision of 20cm was made at the left frontal area. The left frontal iliac bone flap was about 8cmX8cm. The tumor was

fish-flesh-like with interlapping red and white flesh, soft in texture, rich in blood supply and large in scope. Its anterior was adjacent to anterior of X-carbon skull base, its exterior was by the lateral fissure, interior was at the midline, and posterior was at anterior gyrus centralis. The tumor at left basal ganglia was successfully removed under guidance of navigation. Some tumor tissues were sent for rapid pathological examination and the findings showed accordance with recurrent glioma. After operation, the patient had equal bilateral pupils size and photoreaction diameter of 2.0mm was present. Tracheal intubation was reserved and the patient was returned to SICU. Postoperative CT examination showed hemorrhage and gas accumulation in surgical site that there was subdural hemorrhage on both sides of occipital region. Test results indicated abnormal coagulation function. Appropriate amount of human fibrinogen was supplemented, cryoprecipitate and plasma were infused to correct coagulation function. The patient was maintained in sedative state to avoid excessive hemodynamic fluctuation due to turbulence that would increase intracranial hemorrhage. Head wound care was strengthened. Smooth drainage in drainage tube was maintained. Treatment to stop bleeding, nourish nerves and prevent epilepsy and other symptomatic treatment were given. Upon stabilization of vital signs of the patient, sedative treatment was continued to reduce turbulence of the patient in order to reduce blood pressure fluctuation. Ventilator was applied to assist breathing of the patient. When the patient's condition was stable and coagulation function was restored to normal, tracheal tube was removed and phlegm was removed or sucked to avoid hypostatic pneumonia. Water and electrolyte levels of the patient were monitored. Stable inner circulation and good blood transfusion were maintained. Blood routine, biochemistry, coagulation function, 3P test were constantly examined. Vital signs monitoring was strengthened and head CT was reviewed if necessary. After surgery, there was no hiccup in the patient. Mind and consciousness were clear. The patient could have easy communication but had difficulties in using vocabularies and names. Bilateral pupil diameter was 2.5m and reflex response to light present. There was no leakage when blowing cheek, frontal striae were symmetric, eye closure was firm, tongue was centered, wound was dry without blood diffusion, neck was soft and non-resistant. Auscultation of lungs was clear. There was no obvious sound from lower

lungs. No abnormality in heart auscultation. All four limbs were active, limb muscles strength was normal, muscle tension was normal and Babsinki sign was negative at both sides. The patient was recommended to continue hospitalization for chemotherapy that the intracranial hematoma of the patient was not yet shrunk significantly. The patient requested to continue chemotherapy at local hospital of his residence due to economic reason. He was discharged.

Diagnosis: Postoperative recurrence of grade II-I left frontal astrocytoma

Diagnosis references: 1. Left frontal lobe tumor resection and postoperative radiochemotherapy history. 2. Postoperative pathology showed “grade III astrocytoma”. 3. Long-term engagement in painting work. 4. Physical examination: clear consciousness, 15 points of GCS score, fluent speech, equal bilateral pupil size with diameter of 2.5mm, sensitive response to light, an old curved surgical scar of 12cm was seen on left forehead, no leakage in cheek blowing, symmetric frontal striae, symmetric nasolabial folds, normal mouth opening, centered tongue, soft and non-resistant neck, normal cardiopulmonary auscultation, grade V limb muscle strength, normal muscle tension and negative Babsinki sign at both sides. 5. External hospital 2018-05-18WR showed an irregular mass shadow in left frontal lobe, size was about 6.6\*5.4\*7.2cm, T1 and T2 showed mixed signal, DWI showed limited diffusion, enhanced scanning of T1 showed uneven enhancement, edge of the mass was not clear, finger pressure-like edema signals could be seen at the surroundings. Abnormal round-shaped nodule shadow signal could be seen at left basal ganglia, diameter was about 1cm, T1 showed low signal while T2 and FLAIR showed high signal shadow, DI showed limited diffusion, enhanced scan of T1 showed obvious enhancement with a little edema signal at the surroundings. There was obvious compression and narrowing (left ventricle was the most prominent) in the ventricular system and the midline structure of brain was right-biased.

Discriminatory diagnosis: Intracranial space was occupied by a large space. Further identification with the following diseases is needed.

1. Postoperative recurrence of glioma: obvious surgical history of glioma and postoperative pathological results. Glioma with high malignancy can enlarge rapidly within a short period of time. Necrosis or cystic changes can be seen in parenchyma of tumor. Its growth speed is related to malignancy degree of the tumor.

2. Malignant meningioma: age of onset is significantly lower than that of benign meningioma. Common first symptoms are sedation and cephalic disease. Tumor is mostly located at convex surface of brain and beside sinusoidal sinus. Its growth is rapid. It can develop to the surroundings and easily invade brain tissue and skull and extracranial metastasis may occur. Extensive necrosis can occur within the tumor and appears with irregular shape, unclear border, incomplete capsule, uneven signal, prominent peritumoral edema, absence of calcification and uneven enhancement of tumor after imaging enhancement.

3. Brain tumor metastases: lung tumor, digestive tract tumor and kidney cancer are common. These can occur at any time of the primary tumor. Onsets are mostly chronic but courses of disease often progress rapidly. Site of disease is mainly at area with abundant blood supply such as blood supply area of middle cerebral artery. It also prone to occur at junction of gray matter and white matter. It is characterized by single or multiple abnormal signal foci which may have necrotic areas or bleeding sites and stricter edema at the surroundings. Solid part is obviously enhanced after enhancement.

4. Cerebral edema: frequent history of otitis media with typical fever and intracranial infection. After formation of capsule, it appears as cystic on W. Cystic fluid and necrotic area are visible in the center. Wall of capsule is obviously enhanced after enhancement. Edema in the surrounding are prominent.

Combining medical history, surgical history and previous pathological results of the patient, it was considered more likely to be postoperative recurrence of astrocytoma.

### **3 Nursing care**

#### **3.1 Pre-operative nursing care**

##### **3.1.1 Psychological nursing care**

It was given because frontal astrocytoma recurred five years after surgery and the patient might have fear of surgery. Patient's family were encouraged to spare more accompanies. Disease-related knowledge and surgical procedures were explained to the patient and his families to resolve worries and concerns of the patient and to establish confidence in overcoming the disease<sup>[3]</sup>.

##### **3.1.2 Seizures prevention nursing care for patient**

Intensive care was given to the patient. Mental state of

patient was observed. Warning signs were used. Patient and his families were reminded to avoid falls and tongue bite in the patient<sup>[4]</sup>. The patient was guided to take anti-epileptic drugs strictly according to doctor's prescription. Adverse reaction after medication was monitored.

### 3.1.3 Improvement of preoperative preparation

Preparation was improved to assist the patient to complete preoperative examination, drug allergy test, blood preparation and etc. The patient fasted for 12 hours before surgery and banned from water consumption for 6 hours before surgery. Skin preparation was performed in the morning of surgery day, vital signs were checked and matters needing attention were informed to the patient.

## 3.2 Postoperative nursing care

1. After observation of vital signs, the patient was admitted to intensive care unit after surgery. While the patient had not waking up to general anesthesia, he was positioned without pillow and head was turned to side to prevent aspiration mistake. After the patient had awoken, bed was raised 20–30° to facilitate drainage in epidural drainage tube. Consciousness, pupils, vital signs and incision dressing were closely monitored. Manifestations of intracranial pressure elevation and hydrocephalus were observed, which included headache, nausea, vomiting, elevated blood pressure, seizures, abnormal behavior, blurred vision or double vision. Wardroom of the patient was remained quiet to minimize mental stimulation. Needs of the patient were fulfilled in a timely manner to ensure adequate sleep and rest of the patient. Food and water consumption were prohibited for 6 hours after surgery. Subsequently, diet plan was changed to liquid diet and gradually transited to general diet. Principle of diet based on high protein, high vitamin and easy digestible diets<sup>[5]</sup>.

2. Vision of the patient deteriorated with no visual distortion. Ophthalmologic examination of anterior segment of eyes showed that lens was still transparent and subpupil reticulum was flat and smooth. Edge of optic disc was not distinct, it was pale red in color. There was light reflection by macula. Auxiliary examination was carried out to check field of view and tubular view of right eye. The patient was not able to sit for a long time for examination, and observation of left side was not performed. Optic pressure was considered.

3. Head drainage tube nursing care for perioperative indwelling epidural drainage tube in the patient. Incision

dressing of the patient, color, properties and volume of drainage fluid were closely monitored. Drainage tube was properly fixed in place. Pulling and traction of the drainage tube were avoided. During outbound examination, the drainage tube was clamped to prevent backflow of drainage fluid. Drainage fluid in epidural drainage tube of the patient was bloody. Volume of drainage fluid was 20 mL on the third day after surgery. The epidural drainage tube was removed<sup>[6]</sup>.

4. Nursing care of hemorrhage and gas accumulation at surgical site. After surgery, subdural hemorrhage occurred on both sides of occipital region. Test results indicated abnormal coagulation function. Appropriate amount of human fibrinogen was supplemented. Cryoprecipitate, plasma and other coagulation corrective factors were infused. The patient was remained sedate to avoid excessive hemodynamic fluctuation due to turbulence that would increase intracranial hemorrhage. Head wound nursing care was strengthened. Smooth drainage in drainage tube was maintained. Treatment to stop bleeding, nourish nerve, prevent epilepsy and other symptomatic treatment were given. On the second day of infusion, vital signs of the patient were stable. Sedation was continued to reduce irritability and blood pressure fluctuation. On the third day of infusion, subdural hemorrhage occurred on both sides, it was slightly increased compared with previous one. There was a little bleeding in posterior area of right ventricle with no big difference compared with the previous one. Follow-up showed sinusitis on the right side. Head CT was re-examined, intracranial condition was stable. Mild sedation was given appropriately to avoid hemodynamic fluctuation due to turbulence. Meanwhile, smooth flow in head drainage tube was maintained. Drugs to nourish nerve and prevent epilepsy were given.

5. Nursing care of ventilator. Breathing of the patient was assisted with ventilator, and to remove tracheal tube as soon as possible upon stabilization of the patient's condition and restoration of coagulation function. Phlegm was removed or sucked to avoid hypostatic pneumonia. Water and electrolyte levels of the patient were monitored. Stable inner circulation was maintained. Plain scanning of head was performed to examine postoperative changes of left frontal lobe. There were hemorrhage and gas accumulation at the surgical site. Consciousness of the patient was sound and spontaneous breathing was well. Training of ventilator removal was given and time to

remove intubated tracheal tube was assessed. Internal environment was observed. Low protein status was corrected, enteral nutrition was released, and body energy requirement was supplemented.

6. Observation and nursing care of infection. Body temperature changes of the patient was closely observed after surgery. Signs of infection in central nervous system, respiratory system, urinary system and wound were monitored, especially infection in central nervous system. Aseptic procedures were performed strictly. Backflow of drainage fluid was avoided. Antibiotics were given to patients after surgery. Aerosol inhalation was given to assist sputum drainage of the patient to prevent lung infection<sup>[7]</sup>.

7. Prevention of epilepsy. After surgery, anti-epileptic drug sodium valproate of 0.2g was given to the patient for 3 times a day. The patient was guided to take medication and reduction and stopping of medication were not allowed without approval. Post-medication reaction of the patient was observed. Tongue depressor and warning sign were prepared at bedside of the patient. Observation and handling of seizures were informed to family members of the patient. The patients did not develop epilepsy after surgery.

8. Discharge instructions were informed to the patient and family. Strenuous exercise was prohibited. Medical advice should be sought timely if discomfort symptoms arise. Diet should be balanced and should avoid spicy and irritating food. Daily life should be regular and to ensure good and adequate rest. Work and rest should be in balance and to avoid staying up late. Emotion stability should be maintained. Emergency handling measures for seizures were introduced to the patient and his family. When going out alone, the patient should always attach his personal files card containing name, disease, home address, contact information and etc. The patient was requested to have regular follow-up and CT review at the hospital after 1 month<sup>[8]</sup>.

## 4 Discussions

Glioblastoma belongs to highly malignant tumor. It has a poor overall prognosis. Patients with intracranial hypertension symptom have higher risks of surgical complication and postoperative tumor recurrence. Complications include uncontrollable epilepsy, central nervous system infection, intracranial hemorrhage, short-term memory impairment and hemiplegia. Ventriculoperitoneal shunting is still required after surgery. If tumor is not completely removed, continuous monitoring of postoperative tumor recurrence is recommended. ① Observation of consciousness and

pupil should be emphasized. Consciousness, pupil, vital signs, speech and physical activity of patient should be closely monitored. Chief complaint of patient should be given great concern. If patient shows symptoms of high intracranial pressure or seizures, doctor should be promptly informed for examination and handling.

② Nursing care of epidural bleeding. Re-bleeding and poor drainage can lead to intracranial hematoma, so it is necessary to ensure smooth drainage. In particular, sensitivity of response to light and whether pupils are of equal size in the patient should be closely monitored. Any abnormal pupil size in the patient should be promptly notified to doctor, and to assist the doctor to perform CT scan to determine presence of intracranial hemorrhage in the patient and subsequent treatment.

③ Nursing care of infection. Medical staff should strictly follow aseptic procedures. Regular indoor disinfection should be carried out. Accompanying staff and visits should be limited. Urinary catheter should be replaced regularly. Meanwhile, regular massage, turn over, back patting should be performed to avoid tumor recurrence and damage in other systems. ④ Regular follow-up after discharge from hospital for timely understanding of prognosis of the disease. This poses significance for early detection of tumor recurrence and other multi-organ damage.

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