



Perioperative Nursing Care of a Patient with Carotid Artery Stenosis Undergoing Carotid Endarterectomy

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Abstract: To summarize the perioperative nursing of a case of carotid artery stenosis undergoing carotid endarterectomy. The main nursing points are as follows: improving the evaluation and preparation before carotid endarterectomy, doing a good job of preoperative nursing, continuous dynamic monitoring during operation to improve surgical quality and safety, postoperative dynamic management, and preventive intervention to reduce the risk of complications. The continuous nursing strategy should be applied to improve the level of disease management and discharge guidance. After active treatment and symptomatic nursing, the patient recovered and was discharged from hospital on the 15th day after surgery.

Keywords: Carotid artery stenosis, Carotid endarterectomy, Perioperative nursing

1. Introduction

The carotid stenosis refers to a vascular disease that featured the reduction of the internal diameter of the carotid lumen due to various reasons, which affected the blood supply to the brain. The causes include atherosclerosis, carotid dissection, arteritis and other vascular inflammation, and congenital carotid dysplasia. Carotid artery stenosis is an independent risk factor leading to ischemic stroke. The more severe the stenosis, the higher the risk of stroke and the more severe the disease [1,2]. For patients with mild stenosis or who are not suitable for surgery, drug treatment can be used, but for patients with symptoms or severe carotid artery stenosis and poor drug treatment, carotid endarterectomy is an effective treatment [3,4]. Resection of thickened intima and plaques in carotid artery can restore lumen diameter, restore blood flow and improve blood supply to the brain, which is a method to prevent cerebral cataplexy caused by plaque shedding and has been proved to be an important measure to prevent ischemic cerebrovascular disease and prevent recurrence. Carotid endarterectomy is a high-risk operation with life-threatening complications. Perioperative nursing is very important. On November 3, 2024, a patient with carotid artery stenosis was admitted to the emergency intensive care unit of the First Affiliated Hospital of Henan Polytechnic University. Outpatient cervical angiography showed uneven thickening of the tunica media of both carotid arteries with plaque (multiple), right carotid artery stenosis (70%~99% stenosis rate), and right carotid endarterectomy was performed. After careful treatment and nursing, the patient recovered and was discharged from hospital on the 15th day after surgery and was in good condition at follow-up.



2. Clinical Data

General information

The patient, a 61-year-old male, was admitted to the hospital on November 3, 2024, due to carotid stenosis found after a month of elevated blood pressure. One month before admission, the patient felt general weakness, and the weakness of both lower limbs was obvious as lead injection. After hospitalization in Wenxian Hospital of Traditional Chinese Medicine, it was found that the blood pressure increased, the highest systolic blood pressure reached 180mmHg. Irbesartan and Nifedipine sustained release tablets were given orally, and the blood pressure was controlled to 150-160 mmHg. During hospitalization, bilateral carotid artery stenosis and left kidney cyst were found. He has a history of old cerebral infarction for more than 10 years, and has a legacy of poor speech and slightly poor flexibility of the left limb. When cholesterol was elevated for more than 10 years, atorvastatin calcium tablet was given orally daily. Denied history of hypertension and diabetes. Smoking history of more than 30 years, about a pack a day, occasionally drinking, a small amount. The chief complaint is that he is allergic to apples, peaches and pears, and has no other allergic history. Denied the history of typhoid fever, tuberculosis, hepatitis, infectious diseases. Deny the history of trauma, surgery and blood transfusion. Vital signs on admission: body temperature 36 °C, pulse 78 times/min, respiration 18 times/min, blood pressure 150/96 mmHg, physical examination clear consciousness, poor speech, bilateral pupils as large and round, diameter of about 2.5 mm, sensitive light reflex, free eye movement, no ophthalmia or diplopia. Left limb strength level four, right limb strength level five. Sleep at night, eating, bowel and urine normal. The patient's self-care ability score was 90, the stress injury score was 19, and the fall (fall bed) risk assessment was 45. Laboratory test results showed that potassium was 4.6 mmol/L and blood sugar was 9.8 mmol/L. Transcranial color Doppler ultrasound reports showed: right carotid artery extracranial lesions, right medial and lateral cervical branches open, stenosis (moderate) in the left internal carotid artery terminal segment, left middle cerebral artery N1 segment, and left anterior cerebral artery A1 segment. The right carotid endarterectomy was performed under general anesthesia on November 6, 2024. After surgery, the patient returned to the emergency intensive care unit, awake, conscious, able to speak, slurred speech, left limb muscle strength level 4, right limb muscle strength level 5, vital signs: Body temperature 36 °C, pulse 88 beats/min, respiration 13 beats/min, blood pressure 147/82 mmHg, blood oxygen saturation 99%, bilateral pupils and other large and equal circle, diameter of about 2.5 mm, sensitive to light reflex, postoperative anti-inflammation, anticoagulation, anti-platelet aggregation, improve nerve function, control blood pressure, ECG monitoring and oxygen inhalation and other comprehensive treatment, closely observe the changes in blood pressure and vital signs of the patient, do diet and activity guidance. Doing a good job of all kinds of care to prevent complications, the patient's condition is stable. On November 7, 2024, transcranial color Doppler ultrasonography was reviewed on the first day after surgery, showing moderate stenosis of the right carotid artery, terminal segment of the left internal carotid artery, N1 segment of the left middle cerebral artery and A1 segment of the left anterior cerebral artery (mild). MRI on the sixth day after surgery showed that the patient had no new symptoms and signs, recovered well, and was discharged from hospital on November 21.

3. Nursing

Preoperative Nursing

Psychological nursing

The psychological status of patients was assessed by communicating with them and observing their emotional states, which often included anxiety and fear. Introduce the necessity, safety and success rate of surgery to patients and their families, cite successful cases, enhance confidence, patiently answer questions, and relieve bad emotions.

Life nursing

Create a quiet, comfortable and clean ward environment for patients to ensure adequate rest and sleep and use sleep AIDS when necessary. Giving low salt, low fat, high protein, high vitamins and easy to digest food, such as lean meat, fish, fresh vegetables and fruits. Assist patients to do a good job of personal hygiene, keep the skin clean, keep the bowel smooth, stop smoking and limit alcohol, ensure patient safety, prevent accidents. Appropriate carotid artery compression training [5] but must take into account whether the stenosis plaque is



stable, for unstable plaque compression is strictly prohibited, appropriate compression training can help establish a good collateral circulation.

Disease observation

Closely monitor the patient's vital signs such as body temperature, blood pressure, heart rate and respiration, especially the blood pressure control in the appropriate range, large fluctuations or abnormal treatment in time. Paying attention to patients with headache, dizziness, visual impairment, limb numbness, slurred speech and other symptoms, abnormal symptoms indicate changes in the condition, timely report to the doctor.

Preoperative preparation

Assisting the patient to complete various preoperative examinations, such as blood routine, urine routine, liver and kidney function, coagulation function, electrocardiogram, etc., to ensure that the patient's physical condition meets the surgical requirements. Preparing the skin of the surgical area, usually the neck and upper chest, the day before the operation to help the patient bathe, haircut, clean the skin, shaving the hair of the surgical area to avoid skin damage. Instructing patients to take deep breathing and effective cough and sputum training to prevent postoperative lung infection and atelectasis. Patients with a history of smoking should be advised to quit smoking for more than 2 weeks. Patients should be informed of the time of fasting and water abstinence before surgery, generally 12 hours before surgery and 6 hours before water abstinence to prevent suffocation or aspiration caused by intraoperative vomiting [6]. The catheter was indwelled before surgery according to the doctor's advice, so as to avoid bladder filling during the operation, accidental injury to the bladder and facilitate postoperative observation of the condition. At the same time, the catheter was well cared for. Follow the doctor's advice to give prophylactic antibiotics, prepare the special drugs and instruments required during the operation, etc.

Intraoperative care

Accurately check the patient's information, assist the doctor to position the body, assist the patient to take the supine position, the head is tilted to the side, the shoulder is high, so that the neck is fully exposed, in order to facilitate the operation, pay attention to the comfort of the patient, avoid the pressure of nerves and blood vessels. During the operation, the blood and tissue debris in the operating field should be cleaned in time to keep the surgical field of vision clear. The patient's vital signs such as heart rate, blood pressure, oxygen saturation and respiration were continuously monitored and recorded every 5-10 minutes, and the monitoring frequency was timely adjusted according to the patient's condition and surgical progress. The amount of blood loss during the operation was accurately recorded, and the color, nature and amount of drainage fluid were observed to evaluate the circulatory function and renal perfusion of patients. Contact the ward nurse in advance, inform the patient of the operation and transport time, prepare for receiving, prepare the monitor, tracheotomy kit, etc. The cerebral blood flow velocity was monitored by TCD continuously during the operation, and any abnormality was found and treated in time.

Postoperative care

After the patient is sent to the ward, the data of vital signs should be handed over with the anesthesiologist, and the tracheotomy kit should be prepared at the bedside. In case of emergency such as bleeding, the doctor can be notified to perform tracheotomy in time. After operation, the blood pressure should be closely monitored every 15 to 30 minutes, and the interval can be appropriately extended after stable operation. Generally, the blood pressure is prone to fluctuation for 24 to 48 hours after operation, and the blood pressure should be controlled within the appropriate range, with the systolic blood pressure generally controlled between 120 to 140 mmHg and the diastolic blood pressure between 80 and 90 mmHg [7]. Avoid excessive blood pressure leading to bleeding, and low blood pressure affecting cerebral perfusion. If the blood pressure is too high, immediately follow the doctor's advice to give 20% mannitol injection rapid intravenous drip to reduce the intracranial pressure, control the blood pressure with urapidil for injection, use a micro-pump infusion, accurately adjust the drug dose and speed to avoid blood pressure fluctuations. Raise the head of the bed about 30° to promote intracranial venous reflux, reduce brain edema, and reduce intracranial pressure. Avoid neck compression, excessive distortion or compression to prevent the impact of blood flow in the neck vessels. Do a good job of psychological care for patients, keep patients' emotional stability, avoid emotional agitation, reduce the factors that cause blood pressure fluctuations, explain the condition and treatment plan to patients, eliminate patients' fear and anxiety, and enhance their confidence in treatment. At the same time, closely monitor the heart rate,



heart rhythm and respiratory rate, rhythm and depth, and timely deal with abnormal situations. Regular monitoring of body temperature, postoperative body temperature may be due to absorption of heat and other factors slightly increased, generally not more than 38.5 °C, can be physically cooled, persistent high fever to investigate the cause of infection. Let the patient move his limbs regularly, observe the strength, sensation and mobility of the limbs, compare whether the bilateral symmetry, limb numbness, weakness, movement disorders, etc., indicating that there may be cerebral ischemia or nerve injury. Observe whether the patient has symptoms such as confusion, drowsiness, aphasia, etc., and deal with abnormalities in time. Keep the drainage tube unobstructed, avoid distortion, compression, folding, observe the amount, color, nature of the drainage fluid, and record it. Check regularly whether there is blood seepage, liquid seepage, dressing is dry, abnormal timely replacement treatment.

Postoperative Complications and Nursing

Bleeding and hematoma

Postoperative wound bleeding, blood accumulation in the neck tissue space to form hematoma, with the increase of emphysema, will produce pressure on the trachea, causing breathing difficulties and even asphyxia [8]. Closely observe the incision and drainage conditions, whether the drainage tube is unobstructed, and whether negative pressure suction is maintained [9]. If the drainage flow is excessive, the color is bright red, or the neck is rapidly swollen, the patient has difficulty breathing, etc., bleeding or hematoma should be considered, and the doctor should be notified immediately.

Prevention of infection

Check the surgical incision regularly, pay attention to whether the patient has fever, whether the wound is red, swollen, pain, fluid leakage, etc., if there is any abnormality, timely report treatment. Keep the incision dry and clean. If the incision dressing is wet, it should be replaced immediately under aseptic operation to ensure that the skin around the incision is clean. Follow your doctor's advice to use antibiotics to prevent infection. Take oral care twice a day to keep your mouth clean and prevent bacterial infections. Since the patient had an indwelling urinary tube, the urethral orifice was cleaned with normal saline twice a day, the urinary tube was properly fixed, the drainage was kept smooth, and the urinary system infection was prevented from being caused by urine reflux. The catheter was removed as soon as possible to reduce the risk of infection. Due to the older age of the patient, long-term smoking history and postoperative physical decline, the risk of respiratory infection should be encouraged to quit smoking, guide the patient to master deep breathing and effective cough and sputum, and regularly turn over and pat the patient's back to promote sputum discharge and reduce the risk of infection. According to the doctor's advice, budesonide suspension, n-acetylcysteine solution atomized inhalation, and ambroxol hydrochloride solution intravenously injected to moisten the airway, dilute sputum, facilitate coughing up, and prevent respiratory infection. Since the patient is in bed after surgery, it is necessary to take good skin care, keep the skin clean and dry, replace the sheets, bedding and other damp immediately, and turn over frequently to prevent the formation of pressure sores and prevent skin infections. Try to avoid cross-infection, such as reducing visits, and hand hygiene before nursing staff contact patients. Reasonable diet, enhance body resistance.

Cerebral hemorrhage and cerebral infarction

The use of anticoagulant and antiplatelet drugs can easily cause cerebral hemorrhage. Intraoperative plaque shedding and postoperative cerebral thrombosis are easy to cause cerebral infarction. Cerebral hemorrhage and cerebral infarction can cause hemiplegia, aphasia, consciousness disorder and other symptoms, poor recovery, and even death, so it is very important to prevent cerebral hemorrhage and cerebral infarction [10]. After surgery, vital signs should be closely monitored, the dosage and usage of drugs should be adjusted timely according to changes in blood pressure, and the patient's consciousness, pupil, and language function should be closely observed. Strictly follow the doctor's advice to give anticoagulant drugs, antiplatelet drugs, pay attention to observe the patient's skin mucous membranes, gums and other signs of bleeding. After surgery, patients are encouraged to exercise in bed as soon as possible and follow the principle of gradual progress to prevent the formation of deep vein thrombosis. Give a low-salt, low-fat, high-vitamin, high-protein diet, eat more fresh vegetables, fruits, whole grains, etc., keep stool unobstructed, avoid forced defecation.



Hyperperfusion syndrome

After the operation, the blood pressure should be strictly controlled at the normal low level, the general systolic blood pressure should be controlled between 120 and 140 mmHg, and the diastolic blood pressure should be controlled between 80 and 90mmHg. Timely adjust the type and dose of antihypertensive drugs according to blood pressure fluctuations to avoid sudden rise and fall of blood pressure. Keep the patient's emotional stability, avoid tension and excitement and other adverse emotions, keep the stool unobtrusive, avoid forced defecation, increase abdominal pressure, and then lead to increased blood pressure, causing hyperperfusion syndrome. Conditions permit continuous monitoring of cerebral blood flow velocity with TCD after surgery, and close observation of patients with symptoms of hyperperfusion syndrome such as headache, dizziness, nausea and vomiting, and disturbance of consciousness, and timely treatment of abnormalities.

Nerve injury

Surgery may damage the recurrent laryngeal nerve, vagus nerve, etc., resulting in hoarseness, difficulty swallowing and other symptoms. Observe the patient's voice and swallowing and notify the doctor in time if any abnormality is found. Inform the patient that hoarseness will slowly recover and there is no need to worry too much. Eating can be seated or semi-lying position, the food into mud, paste, easy to swallow, and not easy to cause choking, aspiration, avoid eating soup water, too dry or rough food, eat small meals, do not lie down immediately after eating.

Discharge Instruction

After discharge, the patient should pay attention to rest, live a regular life, ensure adequate sleep, 7-8 hours a day, go to bed early and get up early, avoid staying up late and overwork, and keep the living environment quiet and comfortable. Smoking will damage the vascular endothelium, aggravate atherosclerosis, drinking may affect the efficacy of drugs or lead to blood pressure fluctuations, so it is recommended to quit smoking, as little as possible or no alcohol. Strenuous exercise and excessive neck activity should be avoided in the short term after surgery to prevent wound cracking and bleeding. According to their own recovery, under the guidance of the doctor gradually increase the amount of activity, such as walking, jogging, etc., but to avoid heavy physical labor and neck torsion. Keep a regular diet, reduce the intake of salt and fat, avoid salty vegetables, pickled products, fried food, animal offal, fat and other high-salt and high-fat foods, reduce the risk of hypertension and cardiovascular disease, eat more fresh vegetables and fruits, such as spinach, celery, bananas, supplement vitamins and minerals, improve immunity, keep stool smooth. Take medications such as aspirin, clopidogrel, or warfarin long-term as advised by your doctor to prevent blood clots from forming. Paying attention to observe whether there is subcutaneous bleeding, bleeding, blood in urine, black stool and other bleeding tendency, if there is abnormal medical treatment. Timely review, generally 1 month, 3 months, 6 months after discharge need to be reviewed, and then every 6 months review. Discomfort should be seen at any time, so that the doctor can adjust the treatment plan in time.

4. Conclusion

Carotid artery stenosis (CAS) will bring various harms to the body, such as the loss of blood supply and function to the brain, the temporary loss of vision, stroke and cerebral infarction, etc. Carotid endarterectomy is an effective treatment, by opening a window between the carotid intima and the outer membrane, to strip the intima and make the blood flow unobstructed, suitable for patients with moderate to severe carotid artery stenosis. By improving the preoperative assessment and preparation of the carotid artery, including strict condition observation, psychological nursing, life nursing, preoperative preparation, close cooperation with the doctor during the operation, continuous and dynamic monitoring of TCD, improving the quality and safety of surgery, implementing individualized nursing and dynamic management, and taking various measures to prevent complications, the patient obtained successful treatment and nursing. The patient recovered and was discharged after 19 days in hospital.

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