



# On Postoperative Nursing of Middle Meningeal Artery Embolization Combined with Hard Passage Puncture Drainage of Chronic Subdural Hematoma

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**Abstract:** Objective — To conduct analysis and summary on the nursing experience of 5 patients with chronic subdural hematoma treated by middle meningeal artery embolization and puncture and drainage of hard passage. Methods — 5 patients with chronic subdural hematoma were treated by middle meningeal artery embolization with puncture and drainage of hard passage based chronic subdural hematoma under local anesthesia. Besides, vital signs should be monitored, consciousness and pupil can also be observed, more attention was paid to postoperative nursing after embolization and hard channel puncture and drainage, as well as the prevention of complications. Results — 5 patients were well recovered after operation, and 1 patient developed urinary retention, which was relieved after given active nursing measures. Conclusion — Middle meningeal artery embolization with puncture and drainage for chronic subdural hematoma can be adopted to improve the quality of life of patients, enhance prognosis, as a result, avoiding recurrence. Top priority given to nursing after operation serves as the key to patients' rehabilitation.

**Keywords:** chronic subdural hematoma, middle meningeal artery embolization, hard passage puncture drainage, postoperative nursing

Chronic subdural hematoma is a common disease among middle-aged and elderly patients in neurosurgery, which is mainly caused by head trauma. Generally, numbness of limbs, headache, dizziness, nausea, vomiting and other intracranial hypertension symptoms will occur more than three weeks after the trauma. There are also patients with mental disorders, speech impairment, hemiplegia, cerebral hernia, and even death in severe cases[1]. Currently, hard passage hematoma puncture drainage is regarded as the main cure for chronic subdural hematoma, and the recurrence rate of postoperative hematoma stands at 2%-37%[2]. Patients with recurrent hematoma need to be treated again, which will not only increase the patient's pain, the risk of reoperation and hospitalization costs will be mounted, seriously affecting the patient's psychology and prognosis. Recent studies have discovered that the middle meningeal artery is closely pertinent to the occurrence and development of chronic subdural hematoma, and the recurrence of chronic subdural hematoma can be treated by embolization of the middle meningeal artery[3]. The current dual operation for patients with middle meningeal artery embolization with puncture and drainage of chronic subdural hematoma through hard passage can be achieved with requirements that nurses should be qualified enough to timely and accurately observe the changes of the condition after surgery. Besides, targeted postoperative nursing can be offered to actively and effectively prevent the occurrence of complications, so as to enable patients to better recover. From August 2020 to February 2021, the neurosurgery department of our hospital cured 5 patients with chronic subdural hematoma with increased intracranial pressure accompanied by limb weakness as the main symptoms. After the postoperative observation, prevention of complications, functional exercise and other active and effective nursing measures, the patient returned to normal physical conditions, limb weakness based symptoms were improved with obvious effect in prognosis. Nursing interventions are now reported as follows.

## 1. Clinical data

### 1.1 General information

The patients in this group were ranged from 68-84 years old, including 2 females and 3 males. Upon admission, all patients suffered from headache, dizziness, nausea, vomiting and other symptoms of intracranial hypertension, and physical examination found that all patients were accompanied by clinical symptoms of unilateral limb muscle weakness. CT scan of the head revealed chronic subdural hematoma with subfalcine hernia.

## **1.2 Methods**

Detailed preparation should be made before operation. All 5 patients were treated with femoral artery embolization combined with chronic subdural hematoma drainage under local anesthesia. Except for general nursing, the femoral artery puncture site of the patient was carefully taken care of, and the patient's drainage of chronic subdural hematoma through hard passage was closely observed. Proactive and effective preventive measures should be taken to reduce patients' pain and for their quick recovery.

## **1.3 Results**

The average duration of the stay of the 5 patients was (9±2) days. During the hospitalization, 1 patient developed a small hematoma at the puncture site of the groin, which was self-absorbed without treatment. One patient developed urinary retention. After active and effective nursing, the patient could urinate by himself, which reduced the patient's pain. None of the 5 patients had complications such as deep vein thrombosis of lower limbs and pulmonary infection. After early functional exercise, all the patients could take care of themselves.

## **2. Postoperative nursing**

### **2.1 Observation of conditions**

Patients' vital signs were closely monitored after operation, ECG monitoring was continued, and changes in heart rate, ECG, blood pressure, oxygen saturation and respiration were monitored per hour with accurate recording. Patient's consciousness, pupil, speech expression and changes of body muscle strength should be monitored. Upon any abnormal emergency, the doctor should be informed of in a punctual manner.

### **2.2 Postoperative nursing of middle meningeal artery embolization via femoral artery puncture**

#### **2.2.1 Observation and nursing of puncture site**

The patient returned to the ward after surgery and checked the patient's wound dressing at groin puncture site for subcutaneous hematoma and bruising. Sandbags were placed at the puncture site for 6 hours to achieve hemostasis. In order to avoid the sandbag slipping and hematoma at the puncture site, patients were given elastic elastic Velcro self-adhesive tape to fix the sandbag after surgery, so that the sandbag is not easy to slip to reduce the anxiety of patients. Elastic Velcro self-adhesive tape can be adjust for tightness according to the weight and thinness of patients, so as to avoid the failure to fix the sandbag if it is too loose, and to avoid the possibility of blood circulation and deep venous thrombosis of lower limbs if it is too tight.

#### **2.2.2 Limb immobilization nursing**

After surgery, patients were instructed to strictly keep the limbs straight on the puncture side for 12hours of immobilization, and 24 hours in bed. During the period of immobilization, violent activities of the braking limbs or forced coughing should be avoided, so as to prevent subcutaneous hemorrhage, hematoma or blood clot shedding at the puncture site, resulting in thrombosis[4]. Attention should be given to listen to the main complaint of the patient, 1 patient developed waist discomfort. After the patient was given a soft pillow for the waist, the patient was assisted to turn over to the puncture side, and the limbs on the puncture side were kept straight to relieve the waist discomfort.

#### **2.2.3 Observation of dorsal foot artery**

The pulse of dorsal foot artery, skin temperature and color of both lower limbs were monitored and compared with that before surgery. If the pulse of dorsal foot artery was weakened or disappeared, skin temperature was reduced, and color was purple, the doctor should be informed in time to exclude excessive compression of puncture site and influence of reflux.

#### **2.2.4 Dietary nursing**

After surgery, patients were given food with rich nutrient with high contents of fibre and protein that can be easily absorbed. Milk, soy milk and other gas-producing foods should be avoided to prevent increased abdominal pressure and intestinal flatulence, which will affect the comfort level of patients.

In this group, 1 patient did not brake strictly when turning over due to poor compliance. Self-removal of the sandbags resulted in a hematoma at the groin puncture site. After the arterio-venous ultrasound examination of the lower limbs, the hematoma was small and was self-absorbed without special treatment.

### **2.3 Nursing after hard passage puncture of chronic subdural hematoma**

#### **2.3.1 Drainage tube based nursing**

After puncture of hard channel chronic subdural hematoma, the drainage tube was connected to the threaded anti-

reflux drainage bag with a three-way connection, and the threaded anti-reflux drainage bag could be tightly connected with the screw of the three-way. The anti-reflux drainage bag can prevent the drainage fluid from flowing back, causing retrograde intracranial infection. On the way of patients returning from the operating room to the ward, the tees should be closed to avoid excessive drainage. After returning to the ward, the patients should be placed on the bed, and the height of the drainage bag should be adjusted to make the drainage bag equal for drainage, and then the tees should be opened to control the postoperative drainage speed. 12h later, the drainage bag is placed 10~15CM lower than the puncture site, and continuous low drainage is given, which is conducive to the drainage of residual blood or rinse fluid in the hematoma cavity. Besides, excessive drainage and low cranial pressure can be avoided, resulting in intracranial hemorrhage in the surgical area[5]. If smooth drainage fails, the tube can be squeezed slightly to prevent clots from clotting. If no drainage continues, the doctor should be informed to give urokinase in time to dissolve the blood clot, or sodium chloride injection to flush the drainage tube to smooth the hematoma drainage. After surgery, the drainage bag should be properly fixed on the head of the bed, the drainage tube and the drainage bag should be marked with the name of the pipeline and the time of the tube placement.

There was 1 patient in this group who had headache accompanied by nausea and vomiting after surgery. The doctor was notified punctually, and head CT examination was performed to exclude rebleeding. The patient was given intermittent clamping of the drainage tube, the drainage bag was slightly raised, and the drainage speed was slowly controlled, and the patient's symptoms were improved.

### **2.3.2 Functional exercise**

All patients developed decreased muscle strength of unilateral limbs before surgery. Based on and the concept of rapid rehabilitation, surgery was conducted to give passive activities and massage to the affected limbs after surgery. Due to the composite surgery, patients were required to stay in bed. During the stay in bed, patients should be encouraged to move to bed as soon as possible, and the patient should be guided for proper conducts. The range of head movement should be restricted appropriately to ensure enough space for the pipeline and avoid excessive pulling, which may cause the pipeline to protract and cause intracranial infection. The volume of subdural hematoma is usually larger and compresses the brain tissue, after puncture and drainage of hard channel hematoma, local brain tissue will collapse and subdural effusion will occur. Balloon blowing can indirectly increase the intracranial pressure of the patient by deep inhalation, bulging the cheek and blowing hard, so that the brain tissue expands to facilitate the absorption of subdural fluid[6], and also exercise the lung function.

### **2.3.3 Observation of the wound at the puncture site of the head**

Attention to the clean and dry condition of the wound dressing of the patient. If there is any abnormal exudation, notify the doctor immediately for corresponding treatment.

## **2.4 Prevention of postoperative complications**

### **2.4.1 Prevention of deep vein thrombosis of lower limbs**

After surgery, patients with immobilization of the right lower limb and indwelling of drainage tube for epidural hematoma should stay in bed. Patients are prone to lower extremity deep vein thrombosis during bedridden. After surgery, patients should be informed that to drink more water can effectively reduce blood viscosity, avoid the occurrence of lower limb deep vein thrombosis, and can also quickly discharge the contrast agent, so as to avoid kidney damage caused by the contrast agent of middle artery embolization. More water can accelerate the shrinkage of the brain swelling, so that the brain tissue pressure hematoma cavity, which is conducive to unobstructed drainage. By teaching patients the maximum dorsiflexion and plantar flexion of ankle joint for 5 seconds and 5-10 minutes of ankle pump exercise each time, deep vein thrombosis of lower limbs can be effectively prevented[7]. Since the patients in this group were older with poor memory and understanding, the patients and accompanying personnel were given two-dimensional code and diagram of ankle pump movement video, to obtain better implementation effect for the patients.

### **2.4.2 Prevention of urinary retention**

Urinary retention is one of the most common complications after total cerebrovascular angiography, with an incidence of 22.4%~36.2%, mostly acute urinary retention[8]. The patient had to stay in bed strictly for 24 hours after the combined operation, and 1 male patient in this group developed urinary retention. After water intake, renal function, psychological factors, surrounding environment and whether the change of body position caused urinary retention were evaluated for patients after surgery, timely health education and psychological counseling for the patient were offered for patients to eliminate the psychological factors of tension. Patients were shielded in private part, and local massage was given to patients, perineum was washed with 40~50°C warm water, and urination was stimulated. Patients failed to relieve urine by themselves. The patient was able to urinate on his own after consultation with a physician and intervention with caiselo.

Studies have shown that the use of kaiserol can accelerate intestinal peristalsis, stimulate the contraction of the detrusor muscle of the bladder reflex, and promote the urination of patients[9].

### 2.4.3 Prevention of pulmonary infection

The majority of patients with chronic subdural hematoma are middle-aged and elderly people, and middle-aged and elderly patients are frequently seen accompanied by various chronic diseases, including underlying pulmonary diseases, so the most common postoperative complication with a high incidence is pulmonary infection[10]. After the operation, patients were taught to cough effectively. Cough is a self-protective reflex, which can remove foreign bodies and respiratory secretions and resist the occurrence of lung infection. Patient should be instructed to hold his breath for 1 to 2 seconds while inhaling deeply and then cough forcefully to effectively drain the sputum. The oral cavity is connected with the trachea and throat, so it is necessary to strengthen the attention to oral hygiene. After surgery, pay attention to the color and secretions of the oral mucosa of patients, and select personalized mouthwash suitable for patients for oral nursing, so as to avoid lung infection caused by inadequate oral cleaning.

Incidence of maximum age was 84 years old with chronic obstructive pulmonary emphysema, patient's age and basic diseases after the trauma of surgery should be strictly stay in bed for 24 hours, easily complicated with lower limb deep vein thrombosis and pulmonary infection, nurse after bed activities, encourage patients during sports, actively cooperate with ankle pump during the stay in bed for giving patients turn back, encourage effective in patients with cough and expectoration, There were no complications.

### 2.5 Drug based nursing

Puncture and drainage with atorvastatin calcium tablets in the treatment of chronic subdural hematoma with hard channel can better promote the absorption of residual hematoma, reduce intracranial air accumulation and improve the prognosis of patients [11]. Since atorvastatin calcium is mainly metabolized by the liver, and the main adverse reactions refer to gastrointestinal reactions, headache and dizziness, the nurses should distinguish adverse drug reactions or changes in intracranial pressure according to the patient's situation, and pay attention to monitoring the liver function of the patient.

## 3. Conclusion

There are an increasing number of senile elderly in our country, and accordingly, patients with chronic dural hematoma also increases subsequently. Recent studies have demonstrated that middle meningeal artery embolization with puncture and drainage of hard passage for chronic subdural hematoma is an ideal choice for the treatment of chronic subdural hematoma[12]. However, this new technology fails to receive popularity in China, and our hospital has carried out this new technology of compound surgery with the courage of innovation. With the development of new technology, postoperative nursing is of great significance. The vigorous observation and deliberate nursing for the 5 patients and the proactive education and prevention of possible complications in this group effectively promoted the rehabilitation of patients. The life quality of the patients was greatly improved with enhancement of prognosis.

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