



## REVIEW

# Nursing Care of a Case of Mediastinal Tumor Resection Combined with Postoperative Thoracic Hemorrhage after Video-assisted Thoracoscopic Surgery (VATS)

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### ABSTRACT

**Objective:** To summarize the nursing experience of a patient with postoperative intrathoracic hemorrhage after thoracoscopic-assisted resection of the right upper mediastinal tumor through the original incision. **Methods:** Summarize the main points of nursing care of postoperative intrathoracic hemorrhage after thoracoscopic mediastinal surgery, including observation and nursing when internal hemorrhage occurs after operation, respiratory management, activity management and pain management measures. **Result:** After careful care, the patient recovered and discharged smoothly. **Conclusion:** It is particularly important to observe the overall observation and take timely corresponding nursing measures for patients with intrathoracic hemorrhage after thoracoscopic mediastinal surgery.

## 1. Introduction

Mediastinal tumors are a kind of thoracic tumors. Among them, mediastinal neurogenic tumors are one of the common mediastinal tumors, about 19-39% of mediastinal tumors<sup>[1]</sup>, and most of them are benign. The treatment methods are mostly surgery, and the prognosis are better. Thoracic tumors have a higher risk of thoracotomy and are highly traumatic. Postoperative patients are prone to multiple complications. Postoperative intrathoracic hemorrhage is a common and more serious complication, about 1.9%, and the mortality

rate after hemorrhage is about 4.7%<sup>[2]</sup>. Compared with traditional thoracotomy surgery, thoracoscopic surgery has obvious advantages in reducing surgical trauma and promoting postoperative recovery<sup>[3]</sup>, and the postoperative intrathoracic hemorrhage rate is about 0.5%<sup>[4]</sup>. In the treatment of mediastinal tumors, thoracoscopic surgery is the gold standard for the treatment of benign neurogenic tumors of the mediastinum<sup>[5]</sup>. On January 2, 2020, a patient with intrathoracic hemorrhage after thoracoscopic-assisted resection of the upper right mediastinal tumor with the original incision was admitted to our department. After careful treatment and care, he was discharged from

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the hospital on January 23, 2020. The report is as follows:

### **Clinical Data**

The patient, a male, 21 years old, underwent mediastinal tumor resection in Beijing Children's Hospital in 2005 (7 years old). Postoperative pathology showed posterior mediastinal schwannoma. Re-examination of chest CT at the Second Hospital of Daqing City on December 20, 2019 showed that there was a slight density of nodules in the posterior mediastinum, and the possibility of tumor recurrence was considered based on the medical history. On January 2, 2020, it was admitted to our department with mediastinal tumor. The enhanced CT on admission showed that the posterior mediastinum showed round-like nodules with a clear border, about 2.4\*2.0cm in size and 3.6cm in length. The atypical veins were compressed and moved forward, and the anterior edge of the 5 thoracic vertebrae was sclerotic. There were no clear nodules or consolidation in both lungs and chest cavity. Complete the examination, and under general anesthesia on January 6, 2020, the "thoracoscopic-assisted original incision right upper mediastinal tumor resection" was performed. The operation went smoothly. After the operation, a closed thoracic drainage tube was placed at the mid-axillary line of the 8th intercostal space to drain fluid. A closed thoracic drainage tube is placed at the mid-axillary intercostal line to induce air. About 190ml of thoracic drainage fluid was drawn out at 14 hours postoperatively. 550ml of bright red fluid was drawn from the 8th intercostal drainage tube after the patient got out of bed from 14:00 to 16:00 on the first day after surgery. Blood pressure 108/67mmhg, HR 97 beats/min, complexion Pale, clammy limbs, patient complained of no discomfort. Immediately give 2 units of Agkistrodon acutus hemagglutinin + 0.9% sodium chloride injection 50ml intravenously, and apply chest strap compression bandage. The patient's hemoglobin dropped to 119g/L (at 07:00 on the same day, 136g/L), he was asked to stay in bed, and 330ml of red liquid was drawn out again within 3 hours from 16:00 to 19:00. The patient's bleeding volume reached 1070ml on the first postoperative day. He was treated with hemostatic and fluid rehydration treatment, and the later drainage volume stabilized. The drainage tube was indwelled for 17 days after the operation, and the drainage fluid was about 150ml/d on the 2-17 day after the operation. The patient recovered well after careful care in our department and was discharged from the hospital on January 23, 2020.

## **2. Nursing**

### **2.1 Observation and Nursing of Postoperative Intrathoracic Hemorrhage**

Studies have shown that if the drainage volume is more than 200 ml/h, it may be active bleeding for more than 3 hours<sup>[6]</sup>. In addition, the expert consensus on the prevention and treatment of bleeding during the perioperative period of thoracic surgery indicated that the bleeding volume reached 500ml at 24 hours after operation, which means that the risk of active bleeding is higher<sup>[7]</sup>. The main causes of postoperative bleeding after mediastinal surgery include: large wounds in the chest surgery, adhesions between the anatomical position of the posterior mediastinal tumor and the surrounding tissues and the surface of the lungs. The separation process is likely to cause large-scale capillary damage and severe capillary bleeding after surgery. After the adhesion of the pleural surface is peeled off, the bleeding is not completely stopped, and the negative pressure in the chest is restored after the chest is closed, and the blood can continue to ooze; the effect of electrocoagulation is poor, and the vigorous activity after the operation of the eschar can cause bleeding or large area of blood<sup>[8]</sup>.

#### **2.1.1 Closely Observe the Patient's Vital Signs**

When the patient develops active internal bleeding, immediately monitor the patient's vital signs, pay attention to changes in blood pressure, heart rate, and respiration, and be alert to hypovolemic shock due to excessive blood loss. The shock index can estimate the patient's bleeding earlier. The degree of shock and shock are important indicators for early observation of bleeding<sup>[9]</sup>. While monitoring vital signs, record blood pressure and heart rate every 5-10 minutes, and calculate shock index (shock index=heart rate/systolic blood pressure, normal value is 0.5-0.8) to assess the degree of blood loss. 1.0-1.5 means mild shock (20-30% blood loss), 1.5-2.0 means moderate shock (30-50% blood loss), and >2.0 means severe shock (blood loss>50%)<sup>[10-11]</sup>.

#### **2.1.2 Be Alert to Hypovolemic Shock**

Hypovolemia triggers a series of pathophysiological reactions in the body's various system organs, which can lead to insufficient tissue perfusion, reduced cardiac output, cell metabolism disorders and functional impairment, and even hypovolemic shock, which seriously threatens the lives of patients.

(1) Observe skin changes: hypovolemia leads to the excitement of the sympathetic nerve-adrenal axis,

the release of catecholamine hormones increases and selectively shrinks the skin, muscles and visceral blood vessels. The peripheral blood vessels are first contracted to increase the amount of blood returned to the heart. The patient has pale skin, clammy, cyanosis, or insufficient capillary filling, reflecting the patient's insufficient circulating blood volume and insufficient peripheral tissue perfusion, suggesting that there may have been bleeding and hypovolemia. Immediately assist in bed rest, take the concave position, rub the body with hot water, add quilts to keep warm, and help the patient drink hot water. And report to the superior nurse and doctor for further treatment.

(2) Observe changes in urine output: Hypovolemia will excite the renin-angiotensin II-aldosterone system, strengthen the reabsorption of sodium and water in the renal tubules, reduce urine, and preserve body fluids. Normal adult urine volume should be more than 30ml/h. If it is lower than this, it should be considered whether there is bleeding. If the patient's urine volume is less than 25ml/h, it proves that the bleeding volume is large and shock may exist. Ask about the patient's intake and output status. The patient is completely anuritic from 10 am to 16 am. Two venous accesses are quickly established. During the infusion process, the infusion speed is adjusted according to the patient's urine output and the type of fluid input, while the hourly urine output is recorded. Give dietary education, assist the patient to take a small amount of oral rehydration and drink more than 2000ml.

### 2.1.3 Closely Observe and Record Changes in the Color, Nature, Amount and Temperature of the Drainage Fluid

(1) The patient's drainage fluid is bright red, the temperature of the drainage tube is close to the body temperature, and a small amount of mist appears in the drainage tube, indicating that active bleeding in the chest cavity is more likely. Observe and record the changes in the color, nature, and amount of the drainage fluid every 30 minutes, and closely monitor the bleeding of patients<sup>[12]</sup>.

(2) Check whether the drainage tube is properly fixed, keep the drainage tube unobstructed, squeeze the drainage tube regularly, and squeeze the thoracic drainage tube once every 30min to 60min to avoid clot blocking the tube and cause hemorrhage and affect clinical judgment. The squeeze method is as follows: one hand blocks the drainage tube at the proximal end of the chest cavity, and the other hand holds the drainage tube tightly and squeezes it toward the thoracic bottle with thenar force; hold the drainage tube with both hands about 10-15cm

from the chest cavity exit, The hands are connected back and forth, the back hand squeezes the drainage tube, the front hand quickly squeezes the drainage tube.

### 2.1.4 Pay Attention to Patient Examination Results

In patients with postoperative intrathoracic hemorrhage, CT examination generally indicates an increase in intrapleural effusion; the hemoglobin in routine blood examination is lower than normal, and every 10 g/L drop in Hb, the cumulative blood loss is about 400-500 ml, Hb<70/L, when, It suggests that the amount of bleeding is large<sup>[4]</sup>; the composition of the drainage fluid for routine examination of pleural fluid is similar to that of whole blood, or hemoglobin  $\geq 50\text{g/L}$ <sup>[13]</sup>.

Follow the doctor's instructions to check the patient's blood routine urgently, assist in taking CT of the chest at the bedside, and follow up the auxiliary examination results in time to further confirm the diagnosis.

## 2.2 Other Care

### 2.2.1 Activity Management

Due to the pain and the wound of the laparoscopic surgery is in the patient's third intercostal space, which is close to the shoulder joint, the patient is afraid of activities affecting wound healing and other factors. Studies have shown that actively or actively assisting shoulder movements can help prevent postoperative complications<sup>[14]</sup>. Proper limb exercises help prevent deep vein thrombosis and reduce complications such as respiratory tract infections<sup>[15]</sup>. When patients have heavy bleeding, they should rest in bed, avoid large-scale activities, and focus on bed activities.

(1) Upper extremity exercise: Instruct patients to exercise through bilateral arm abduction, uplift, and bilateral shoulder joint forward and backward rotation. At the same time, care should be taken to avoid pulling the chest tube and other drainage lines, and proceed gradually until the preoperative mobility is restored.

(2) Lower extremity exercise: Instruct the patient to exercise the lower extremities on the bed, such as ankle pump exercise, the lower extremities take turns in flexion, extension, and elevation, knees bend and feet push the bed to raise the hips, etc., 3-4 times a day, 10-each time 15 min.

### 2.2.2 Respiratory Function Exercise

(1) Give pillows and raise the head of the bed 30°, which not only facilitates breathing, but also helps to

reduce wound tension and prevent the wound from bleeding again due to excessive tension.

(2) Instruct patients to exercise their respiratory function. Methods such as deep breathing and abdominal breathing can help reduce the rate of lung infection in patients after chest surgery<sup>[16]</sup>. Decreased lung function is also a major factor in the occurrence of complications after minimally invasive lung surgery<sup>[17]</sup>. Increasing the postoperative abnormally reduced functional residual capacity, which is the lung volume, can effectively reduce the occurrence of postoperative pulmonary complications, and the effective measures for exercise include deep inhalation exercises. Instruct patients to take deep breaths and abdominal breathing 4-6 times a day, 20 minutes each time; a three-chamber breathing trainer can also be used, 10-15 minutes each time, 4-6 times a day. How to use: Let the patient inhale deeply to generate upward airflow in the air cavity. When the airflow velocity is large enough, the measuring buoy will rise. The breathing exerciser adopts a similar blocking structure to form breathing resistance, so that the patient's lungs are fully expanded when breathing<sup>[18]</sup>.

(3) For patients with internal hemorrhage, blood vessels may have ruptured or Jiaojia has fallen off in the chest cavity. Instruct patients to avoid coughing and sputum as much as possible, use cough medicine appropriately, and use negative pressure suction for patients with more sputum.

### 2.2.3 Pain Management

Bleeding can easily cause anxiety and fear in patients and increase the risk of pain<sup>[19]</sup>. The pain can also cause tension, cramps, etc., which may also increase the bleeding tendency. Appropriate use of analgesics to relieve pain is conducive to rapid recovery of patients after surgery. The APS/ASRA/ASA guidelines suggest that various modes or drug analgesia are recommended for postoperative pain in adults, and patient-controlled analgesia is recommended<sup>[20]</sup>. The SFAR postoperative analgesia guidelines recommend the prescribing of strong tablets (morphine). Or oxycodone) is used orally in patients, and type 2 cyclooxygenase inhibitors can be used in combination with no contraindications<sup>[21]</sup>.

(1) Pay attention to the psychological changes of patients, comfort the patients in time, and do a good job in educating the patients' family members to reduce the psychological pressure of the patients. Avoid anxiety and fear caused by bleeding and increase pain.

(2) Give patients postoperative use of self-controlled analgesia pump, the duration is 48-72h, and self-regulate according to their own conditions. Routine postoperative

administration of parecoxib sodium intravenous injection + paracetamol and oxycodone tablets orally.

(3) Use chest and abdomen straps to fix the chest of the patient, pressurize the bandage, and reduce the wound pain caused by the increase in tension caused by the activity.

### 3. Summary

The mortality rate of postoperative bleeding is significantly higher than that of intraoperative bleeding<sup>[22]</sup>, and with the development of surgical technology, the application of laparoscopic surgery in thoracic surgery gradually dominates, and the nursing requirements for laparoscopic surgery have become more stringent. Laparoscopic surgery has a small wound, the wound exudation is not obvious, and postoperative bleeding is difficult to find. This requires our nurses to observe carefully during the nursing process, master the signs of internal bleeding or active bleeding, detect them early, determine them in time, and take corresponding nursing measures in time to cooperate with the doctor in the next operation and treatment. Once discovered not in time, the loss to the patient, the follow-up treatment and the degree of care will be more complicated. Therefore, early detection, early determination, and early treatment are the basic requirements for nurses.

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