

Case Report

Anesthetic Management for the Resection of a Large Intrathoracic Mass Case Report

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Abstract

Introduction: Fibromatosis tumors are low-grade malignant sarcomas known for their local invasion and high recurrence rates. The presence of a large mass can compress surrounding structures or adhere to blood vessels, complicating perioperative anesthetic management. This report discusses the case of a patient with a large intrathoracic mass that was successfully removed, highlighting the challenges faced in perioperative anesthesia.

Case Presentation: We present the case of a 54-year-old man who sought surgical treatment for a fibromatosis tumor, displaying symptoms such as exertional dyspnea and orthopnea. A preoperative CT scan revealed a large mass on the left side. The patient underwent a left posterolateral thoracotomy, resulting in the excision of a 3.6 kg tumor. During the surgery, he experienced hemorrhagic shock, which was addressed with fluid resuscitation and blood transfusion. Following the procedure, he spent four days in the ICU before being moved to the thoracic surgery department, where he was discharged on postoperative day 18 without any complications.

Conclusion: Complete surgical resection of large chest wall tumors is potentially curative and should be prioritized. Moreover, combining double thoracotomy with preoperative angiography enhances outcomes and reduces complications.

Keywords: Intrathoracic mass; Anesthetic management; Case report

Introduction

The thoracic cavity is an enclosed space bordered by the spine, ribs, and sternum. It primarily contains the lungs and the mediastinum, which houses the heart, major blood vessels, trachea, and esophagus, as well as vessels, nerves, and lymphatic structures [1]. The presence of a large mass can compress the intrathoracic structures, with clinical signs depending on both the organ from which the tumor originates, and the organ being compressed. Moreover, fibromatosis tumors characterized by local invasion and frequent recurrence. They are considered low-grade malignant sarcomas [1].

The anesthetic specificity of pulmonary surgery is selective ventilation [2]. However, the presence of a large mass that compresses other structures or adheres to blood vessels makes perioperative anesthetic management even more challenging.

We report the case of a patient presenting with a large intrathoracic mass successfully removed, for whom perioperative anesthetic management was delicate.

Case Presentation

A 54-years-old man with hypertension treated with Amlodipine, a chronic smoker with a 40-pack-year who quit 5 months ago, presenting for surgical management of fibromatosis tumor.

The pre-anesthetic evaluation found mild exertional dyspnea that had worsen over the past 6 months, orthopnea, with absent breath sounds on the left, dry cough, chest pain, respiratory rate of 20 cycles per minute, and oxygen saturation of 94% on room air, cardiovascular examination revealed a functional capacity less than 4 metabolic equivalents of task (MET), no exertional angina, Blood Pressure at 123/65 mmHg, and a heart rate of 82 beats per minute.

During the staging evaluation, a CT scan of the chest revealed a left large tumor-like mass measuring 159 x 123 mm, retracted appearance of the right hemithorax leading to a trans mediastinal hernia of the left hemithorax with traction on the trachea, abundant left pleural effusion, associated with necrotizing obstructive pneumonia of the lower left lobe, and no visible adenomegalies (Figure 1).

Moreover, to prepare the patient for anesthesia, the evaluation of cardiac function was unremarkable, with a normal ECG and Transthoracic echocardiography, and the biological tests showed no abnormalities.

The patient was admitted to the operating room for the surgical resection of a thoracic mass under general anesthesia in the right lateral decubitus position. Monitoring was initially performed in the supine position, a peripheral intravenous line was established, along

with a central line in the right internal jugular vein, and a right radial arterial line. A lumbar epidural catheter was placed at the D7 level for postoperative analgesia.

The patient was stable before induction, with a heart rate of 88 bpm, blood pressure of 123/65 mmHg, respiratory rate of 20 breaths per minute, and oxygen saturation of 99% on 2 L/min nasal cannula. Induction was initiated with 240 mg of propofol, 60 mg of rocuronium, and 260 micrograms of fentanyl. Following induction, intubation was performed with a right-sided selective endotracheal tube to exclude the left lung. The patient was then repositioned in the right lateral decubitus position.

A standard left posterolateral thoracotomy was done entering the 6th intercostal space. The findings included a huge, well-encapsulated, firm, smooth-surfaced intrathoracic tumor covering the whole left thoracic cavity with total collapse of the left lung, associated with an abundant left pleural effusion. The tumor was carefully dissected from its surrounding structures and excised as shown in Figure 2.

During the operation, the patient experienced hemorrhagic shock due to bleeding at the surgical site. Transfusion with fluid resuscitation and norepinephrine was initiated. Simultaneously, the surgeon sought the source of the bleeding to perform surgical hemostasis. The mass was massive and in contact with the subclavian region, which caused panic among the medical team due to the risk of subclavian artery or vein rupture. Fortunately, the bleeding originated from a small bronchial vein and was quickly controlled. The patient was stabilized after receiving 4 units of blood and 1000 ml of saline solution.

After removal the tumor weighed 3.6 kg. The lung air leaks were repaired with vicryl 4/0 and the chest was closed up in layers after hemostasis with warm normal saline irrigation was done, leaving a size 32 Fr chest tube in the chest.

The mass was successfully removed as a single block (figure2), with no complications. Subsequently, we began ventilating the left lower lobe, which was collapsed. The patient was then transferred to the ICU for further care after being reintubated with a standard 7.5 mm tube. After 4 days in the ICU, he was transferred to the thoracic surgery department without complications. He was eventually discharged home on postoperative day 18 for outpatient follow-up.

Discussion

Aggressive fibromatosis or sarcoma of low-grade malignancy is the currently preferred terminology due to its locally infiltrative potential and risk of recurrence despite radical excision, it represents 0.3% of all solid tumors and less than 0.03% of all tumors and with a reported incidence of 2–4 cases per million of population. Fibromatosis tumors generally occur within the ages of 15–60 years. They have been found to have a predilection for females, with a 3:1 female-to-male ratio [1].

Fibromatosis tumors of the chest represent 20% of all extra-abdominal fibromatoses. Fibromatosis tumors can originate at every site of the chest, most commonly in the shoulder girdle. The intrathoracic manifestation is extremely rare and probably arises from the pleura or the subpleural mesenchymal cells [3].

Intra-thoracic tumors are mainly asymptomatic. True intra-thoracic fibromatosis tumors are generally asymptomatic until the

tumor becomes too large, with compression of the surrounding organs. Sixty percent of the reported intrathoracic fibromatosis tumors were greater than 10 cm at the time of diagnosis.

Chest pain due to nerve involvement, dyspnea, cough due to compression of the airways and shortness of breath, tenderness, chest wall swelling, and dysphagia are the major symptoms. Limitation of shoulder motion, sweating, cyanosis, paresthesia and pain indicate the involvement of the brachial plexus. Symptoms are usually present for an average of 12–16 months before the discovery of the tumor. According to the reports in the literature, the average tumor size ranged from 2.5 to 27 cm (mean 16.6 cm), and the tumor weights ranged from 680 to 5200 g [3].

In our case, during the surgery, a hemorrhagic shock occurred due to a rupture of a small bronchial vein, which was quickly controlled. However, since the tumor was very large, reaching the apex, the risk of rupture of the subclavian, pedicle, or other large vessels was high. Therefore, we need to find an approach to prevent this catastrophic situation, which could jeopardize the patient's vital prognosis.

Surgical resection is a cornerstone in the treatment of fibromatosis tumors, but these tumors can be challenging to remove completely due to their hypervascular characteristics and the presence of collateral vessels. Significant hemorrhage can arise from their vascularity, making it crucial to assess tumor blood supply preoperatively to ensure a safe resection without bleeding complications. Overall operative mortality rates range from 1.5% to 12%, largely due to hemodynamic fluctuations associated with decompressing the heart, great vessels, and airway, as well as bleeding [4].

Preoperative angiography is a crucial technique for identifying key feeding vessels. In a study by England et al [5], five patients were noted to have aberrant vessels, which included a branch of the bronchial artery and a phrenic artery. Guo et al. [6] reported five patients with pleural SFTs that exhibited multiple feeding vessels stemming from the internal mammary, bronchial, inferior phrenic, and intercostal arteries. There have also been reports of abnormal blood supply originating from the celiac trunk.

Preoperative percutaneous embolization can be beneficial in reducing perioperative blood loss [4]. Additionally, it is recommended that surgery be completed within a 24-hour timeframe to further minimize blood loss [6].

In our case, the surgeon accessed the tumor through a standard left posterolateral thoracotomy, which complicated the resection of the apex. The literature indicates that a better approach for facilitating tumor resection is the double thoracotomy. This technique provides improved exposure of the tumor and its anatomical relationships, particularly with the subclavian vessels, through the apical thoracotomy, along with a basal thoracotomy for tumor delivery [7].

Another technique worth discussing is extracorporeal circulation, primarily used in cardiac surgery. Extracorporeal circulation (ECC) allows for the replacement of both cardiac pump function and respiratory function. Consequently, it can also be applied in pulmonary surgery, especially when there is a risk of rupture of major vessels. [kawahito] This highlights the importance of preoperative angiography, which maps the tumor's nourishing arteries and its

vascular relationships. This information can help select the most appropriate surgical technique for these patients, ultimately improving their prognosis.

Conclusion

complete surgical resection of large chest wall tumors with intrathoracic extension is potentially curative and should be considered the preferred treatment approach. The combination of double thoracotomy and preoperative angiography with embolization can significantly enhance surgical outcomes and help prevent severe complications, such as hemorrhagic shock resulting from vessel rupture. While extracorporeal circulation (ECC) may offer benefits, its application is restricted to tumors in close proximity to major vessels, such as the aorta and vena cava. Overall, meticulous planning and the use of appropriate techniques are crucial for optimizing patient prognosis in these complex cases.

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