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CASE REPORT

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Angiosarcoma of breast and chest wall complicated with tuberculous empyema: A case report

Xingchen Gao | Haiyan Liu | Feng Wang | Ziwei Xu | Yi Han | Shuku Liu

Thoracic Surgery Beijing Tuberculosis and Thoracic Tumor Research Institute, Beijing Chest Hospital, Capital Medical University, Beijing, China

Correspondence
Yi Han and Shuku Liu, Thoracic Surgery Beijing Tuberculosis and Thoracic Tumor Research Institute, Beijing Chest Hospital, Capital Medical University, Area1, Yard 9, Beiguan Street, Tongzhou District, Beijing, 010 101100, China.
Email: hanyeecn@163.com; liushuku@aliyun.com

Abstract

Angiosarcoma is a highly malignant endothelial tumor, accounting for 1% to 2% of soft tissue sarcomas. The most common site of the disease is the skin, accounting for approximately 60% of cases, especially the skin of the head. It can also occur in soft tissue, bone, and retroperitoneum. However, angiosarcomas of the breast and chest wall are rare. Here, we report a 44-year-old woman who was admitted to hospital with encapsulated empyema. She was subsequently diagnosed with angiosarcomas of the breast and chest wall with tuberculous empyema. At the same time, we also reviewed the current research progress in angiosarcoma of the breast and chest wall to explore better treatment options for these patients.

KEYWORDS

angiosarcoma, case report, empyema, tuberculosis

INTRODUCTION

Angiosarcoma is a highly malignant disease with unknown etiology. Diagnosis depends on pathology and immunohistochemistry. Conventional treatment methods include surgery, radiotherapy, and chemotherapy, although targeted therapy and immunotherapy are also being considered for the treatment of the disease. Tuberculous empyema is a common complication of pulmonary tuberculosis, which is often associated with poor prognosis. Although the symptoms of most patients are mild, there are still a small number of patients with serious complications. Although accurate diagnosis can be achieved at present, the optimal management of tuberculous empyema remains to be discussed.[1,2]

CASE REPORT

A 44-year-old female patient was diagnosed with tuberculosis in 2019 and received oral medication for 1 year. One month before this treatment, she felt chest tightness and shortness of breath, and a progressive enlargement mass was found on the left chest wall. Color Doppler ultrasonography was performed on the body surface mass, indicating that multiple hypoechoic could be seen on the left chest wall, among which the larger one was 8.2 × 3.9 cm, with clear boundary and irregular shape. No obvious blood flow signal was found inside. It was believed that the patient had effusion in the left thoracic cavity, which was considered as encapsulated empyema. The patient came to our hospital for further diagnosis and treatment. On December 14, 2021, the patient was admitted to our department as "wrapped empyema." Her symptoms were mild and she was in good physical condition, without cough, sputum, hemoptysis, fever, hoarseness, night sweats, fatigue, shortness of breath and emaciation, meantime without superior vena cava syndrome, arthralgia, and clubbing finger. At the same time, she denied hepatitis, hypertension, diabetes, no chemical substances, radioactive substances, or toxic substances exposure history. She also denied having hepatitis, high blood pressure, diabetes, exposure to chemicals, radioactive substances, or toxic substances. Physical examination showed that superficial lymph nodes were not touched, breath sounds were clear, and rale was not heard. Chest computed tomography (CT) on admission indicated left pleural

Xingchen Gao and Haiyan Liu contributed equally and are co-first authors.

effusion, left pleural thickening and adhesion with nodular protrusion, bone destruction of adjacent ribs, and left axillary lymph node enlargement. The patient's chest CT is shown in Figure 1. The d-dimer level was found to be 44.7 mg/L in the examination on December 15, 2021 and 36.93 mg/L in the re-examination. Therefore, the operation scheduled for the next day was suspended because of the possibility of thrombosis. After cardiology consultation, color Doppler ultrasound examination was performed on lower limbs, upper limbs, jugular veins, hepatic veins, and pelvic vessels, as well as a cardiac ultrasound examination. The possible thrombosis was ruled out and that the increase of D-dimer might be related to the primary disease was considered. The patient was then subcutaneously injected with low-molecular-weight heparin calcium, and the coagulation test was performed again on December 27, 2021 with d-dimer converted to 14.2 mg/L.

On December 28, 2021, under general anesthesia, the patient underwent left breast mass resection, left pleural stripping, chest wall repair, and lung repair. The procedures were as follows: after the success of the general anesthesia, the towels were routinely disinfected. The chest was entered through the upper edge of the sixth rib with the patient in dorsal supine position, and the purulent cavity within the adipose tissue on the surface of pectoralis major fascia was probed. The cavity contained a large amount of black liquid and necrotic tissue. The necrotic tissue was scraped off the surface of pectoralis major fascia after aspirating the pus. A hard nodule was palpated in the breast tissue, excised, and a frozen section was sent to pathology for evaluation. Further exploration of the cavity showed that part of pectoralis major muscle and ribs were damaged, which were removed at the same time. The defects formed by excision of pectoralis major muscle and part of ribs were repaired with patches. After suturing the wound, the patient was changed to right decubitus position. The 7th intercostal incision was made to explore the chest and the parietal pleura were shown to be hard and thickened, and adherent to the surrounding tissues. The parietal pleura were peeled off from chest wall, the visceral pleura were peeled off from lung surface, the purulent cavity was emptied completely, and the minor damage of lung tissue was sutured and repaired. Hemostasis in the chest was assured and no air leakage was detected in lung section and bronchial stump. A single lumen drainage tube was placed until the surgical procedure was completed. The operation and removed tissue are shown in Figure 2. Intraoperative pathological diagnosis: chest wall mass, right breast mass, chest wall nodule, and damaged rib were all cancerous tissues. Combined with morphology and immunohistochemistry, angiosarcoma was considered. The immunohistochemical results were, ER (−), PR (−), HER2 (−), P120 (+), E-cadherin (−), CKpan (+), KI67 (30%), GATA3 (−), vimentin (+), CD34 (focal +), CD31 (+), CR (−), and SMA (−). Lymphocyte hyperplasia and massive necrosis were found in the cystic wall tissue of fibrous association adipocytes in chest wrapping. The results of Mycobacterium molecular pathology were TB-DNA (+, lower than the lower limit of drug resistance detection), Mycobacterium gene test (−), acid-fast staining (−), and PAS (−), which supported the diagnosis of tuberculosis combined with molecular nucleic acid detection. Hematoxylin and eosin (H&E) staining and immunohistochemical photos of surgical specimens of patients are shown in Figures 3 and 4, respectively.

After the operation, she was returned to intensive care unit (ICU) for further treatment. On the third day of ICU

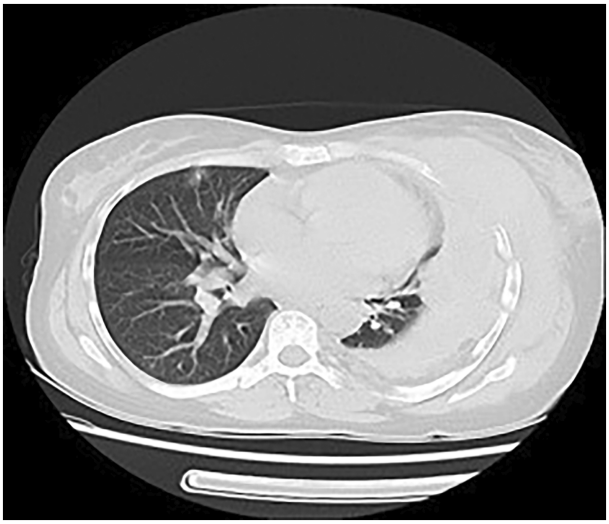

FIGURE 1 Computed tomography (CT) chest demonstrates left pleural effusion.

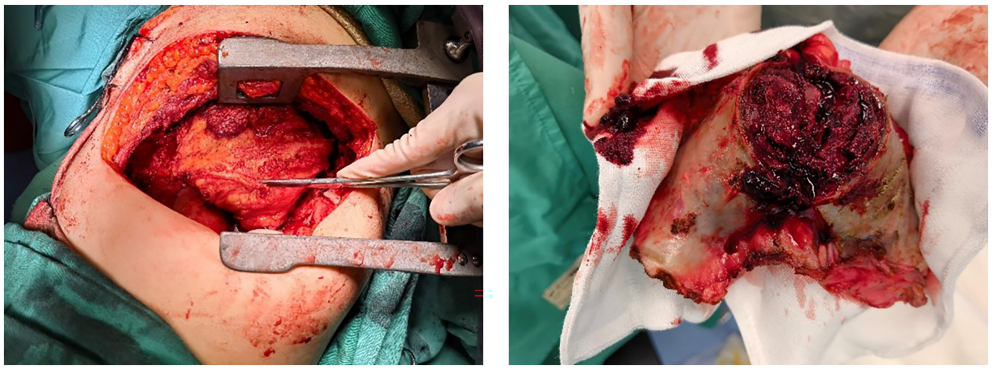

FIGURE 2 The operation and removed tissue.

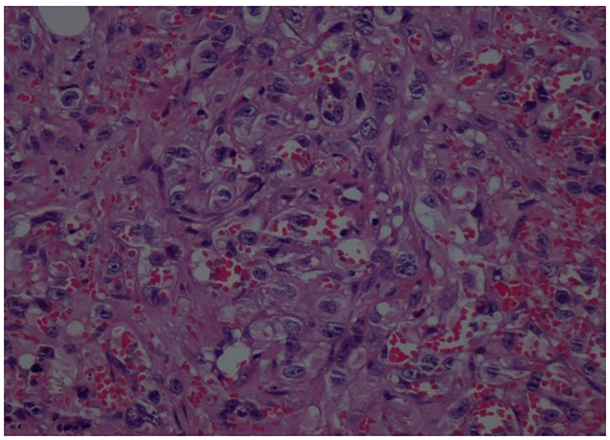

FIGURE 3 Micrograph of a section of cancerous tissue with H&E, 200×.

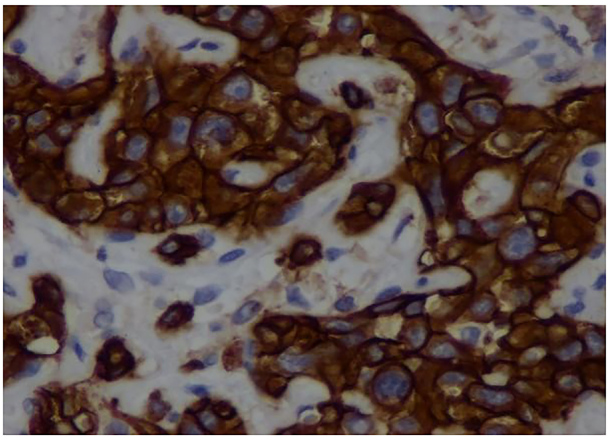

FIGURE 4 Rapid pathology suggests tumor tissue. Immunohistochemical staining, 400×.

hospitalization, she underwent emergency thoracotomy for hemostasis, considering the leakage of blood in the chest. During the operation, a large number of clots were seen in the thoracic cavity, and no obvious hemorrhagic spots were found after clearance. On January 4, 2022, she was transferred back to our ward, during which she received intermittent symptomatic supportive treatment such as anti-infection and fluid replenishing. Regular blood routine examination showed a gradual decrease in hemoglobin, and intermittent blood transfusion was given considering the presence of intrathoracic bleeding. From January 7, 2022 to January 10, 2022, she developed symptoms of shock and was treated with emergency fluid rehydration and blood transfusion. The consultation opinion considered that the postoperative apical bleeding was associated with primary angiosarcoma, and the risk of rash radiotherapy or drug treatment, such as anlotinib under the condition of continuous bleeding, was high. Conservative observation and treatment were recommended, and the patient was then referred back to local hospital for observation and treatment.

DISCUSSION

Angiosarcoma is a rare malignant endothelial cell tumor of vascular or lymphatic origin. It is highly invasive[3] and has a high rate of local recurrence and metastasis.[4,5] Currently, the pathogenesis of angiosarcoma is not clear. Specific risk factors include chronic lymphedema, history of radiation, environmental carcinogens, and genetic syndromes.[3,6] Common clinical manifestations of angiosarcoma patients include abdominal discomfort, nausea, vomiting, etc.[7] These clinical manifestations are not specific and are difficult to distinguish from other diseases. Ultrasound, CT, and other imaging methods have little effect on the diagnosis of angiosarcoma. Microscopic morphological observation and immunohistochemical analysis of specimens from puncture or intraoperative resection are the key to the diagnosis of angiosarcoma. The morphological features of angiosarcoma are heterogeneous, which challenges the identification of angiosarcoma.[8] Immunohistochemical analysis of angiosarcoma showed that angiosarcoma often presented vimentin, factor-VIII-related ANTIGEN (factor-VIIIRA), CD31, CD34, and vascular endothelial growth factor (VEGF). CD31 and CD34 were more sensitive and specific markers.[9] At present, there is no consensus on the treatment of angiosarcoma, and radical resection combined with adjuvant radiotherapy is considered to be the best treatment.[10] Despite the risk of secondary angiosarcoma caused by radiotherapy, the benefits outweigh the disadvantages. Chemotherapy is used to treat patients who have metastasized and are inoperable, and targeted therapy and immunotherapy are expected to be studied for angiosarcoma.

Angiosarcoma of the breast is rare with unknown etiology. It may occur spontaneously as primary angiosarcomas and are common in women ages 20 to 40 years. They may also occur secondary to lymphedema or after radiation therapy for breast cancer.[10] The proportion of breast cancer patients undergoing radiotherapy who developed secondary angiosarcoma was not significantly related to the type of surgery, but rather to the presence of lymphedema during radiation.[11] The expansion of indications for postoperative radiotherapy for breast cancer and the increasing use of adjuvant radiotherapy after breast cancer have strengthened the association between radiotherapy and angiosarcoma of the breast.[12] The most common symptom is pleurisy chest pain and the next are shortness of breath, hemoptysis, and cough. It is similar to mesothelioma histologically, whereas mesothelioma has a more homogenous arrangement, lower cellular heterogeneity, and no red blood cell (RBC) in the intracytoplasmic lumen.[13] Immunohistochemically, CD31 is the most sensitive and specific marker.[14] Other markers such as cytokeratin and CD34 can also be found in these patients. Several studies have reported cases of tuberculous empyema with angiosarcoma, in which elevated d-dimer levels were found.[15–17] In previous studies, angiosarcoma of the thoracic wall was associated with a variety of risk factors, including a history of radiation therapy[18] and asbestos exposure,[19] among which some studies reported a possible association between the disease and tuberculosis. Aozasa et al.[20] found that all five patients with chest wall

angiosarcoma were associated with tuberculosis. Hattori[21] reports a detailed pathologic description of an autopsy case of thoracic angiosarcoma following a long period of tuberculous empyema. Zhang et al.[18] reviewed and analyzed 26 cases in combination with previous studies, including 9 cases from Japan, all of which were related to empyema.

In this report, vimentin (+), CD31 (+), CD34 (+), and Ki67 positivity was 30%. The diagnosis of angiosarcoma was considered based on the immunohistochemical results and pathologic diagnosis. The patient did not have a history of radiation, but had a history of tuberculosis. Therefore, we believe that chest wall angiosarcoma in this patient may be related to tuberculous empyema, whereas breast angiosarcoma may be related to other unknown factors. At present, complete surgical resection is the first and optimal method for the treatment of angiosarcomas. A study[22] reported that patients who undergo surgical resection survive for at least 15 years. Angiosarcomas are invasive and prone to metastasis. Patients with intractable sublesions during surgery, therefore, complete surgical resection is difficult to achieve.[23] There are no unified, standard, and effective treatment schemes for angiosarcomas.[9] Indeed, surgery combined with radiotherapy may be ideal treatment for angiosarcomas; radiotherapy alone has the worst prognosis, the efficacy of chemotherapy needs further evaluation.[24] The patient in this study was unable to receive radiation and targeted therapy because of their physical limitations and had only surgical resection. The treatment of angiosarcomas warrants further research. The purpose of this study is to provide new information about angiosarcoma of the breast and chest wall and its diagnosis and treatment for clinical reference.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ORCID

Yi Han https://orcid.org/0000-0002-9318-4499

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