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Case Report

Solitary fibrous tumor of the lung: a case report and review of the literature

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ABSTRACT

The present study describes the case of an asymptomatic 65-year-old male who presented with a Solitary Fibrous Tumor (SFT) in the lung during a physical examination. Enhanced computed tomography revealed a 1.5x1.5-cm mass in the lung; however, further physical examinations were normal. The patient underwent surgery due to the uncertain diagnosis and the possibility that the mass was malignant. Histopathological analyses of the tumor demonstrated the typical histological characteristics of an SFT. Immunohistochemical staining for B-cell lymphoma-2 and cluster of differentiation 34 were positive. The patient recovered and was discharged successfully. At the six-month post-surgery follow-up, no recurrence or metastasis were observed.

Keywords: Solitary fibrous tumor, Lung, Surgery

INTRODUCTION

A Solitary Fibrous Tumor (SFT) is a rare mesenchymal neoplasm arising from the pleura, which was initially described by Klemperer and Rabin in 1931.[1] Since their discovery, SFTs have been identified in a number of extrapleural locations, including the liver, retroperitoneum, kidney and thyroid. Furthermore, according to the study by Musyoki et al.,[2] the most common extrapleural sites of SFTs are the orbits and the extremities. The current study describes a case of an SFT in the lung of a 65-year-old male. The histopathological and clinical analyses, and a review of previous cases are also presented.

CASE REPORT

A 65-year-old asymptomatic male presented to the clinical college, Yangzhou University (Yangzhou, China) for a physical examination. The patient had a history of cigarette smoking and no history of diabetes mellitus, hypertensive disease or coronary disease.

Clinical analysis and surgery

An enhanced Computed Tomography (CT) scan of the chest revealed a 1.5x1.5 cm left lung mass (Figure 1). Other physical examinations, including an electrocardiogram, lung functional examination and transesophageal echocardiogram were normal. The serum concentrations of Na^+, K^+, Ca^{2+} and glucose were all within the normal limits. Distant metastasis was not found during magnetic resonance imaging (MRI) of the head and CT of the abdomen. Due to the possibility that the mass was malignant, a video-assisted thoracoscopic surgery was performed under general anesthesia on May 21, 2014. Intraoperatively, the tumor tissue was tough. The elliptic and well-circumscribed resected tumor was

measured to1.5x1.5x1.5 cm. Histopathological analyses of the tumor demonstrated the typical histological characteristics of an SFT (Figure 2). Immunohistochemical staining of the tumor cells was strongly positive for Cluster of Differentiation (CD) 34 and B-cell lymphoma (Bcl)-2 (Figure 3 and 4). The tumor cells were found to be negative for Smooth Muscle Actin (SMA), pan-cytokeratin, S-100, desmin, CD99, CD117, Epithelial Membrane Antigen (EMA) and the estrogen receptor protein. The diagnosis of an SFT was made based on the immunohistochemical findings and clinical features.

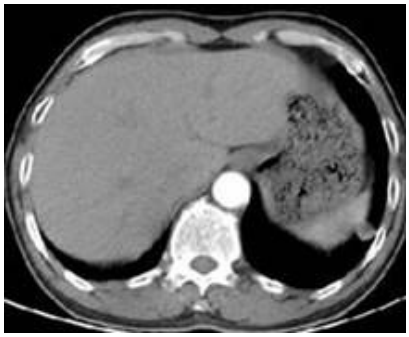

Figure 1: Enhanced CT scan of chest demonstrated a 1.5x1.5 cm left lung mass with an artery that feeding the growth of tumor.

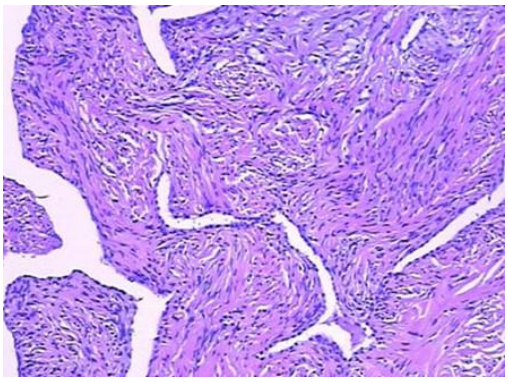

Figure 2: The tumor is composed of spindle cells and amorphous areas of collagen (HE stain 100x).

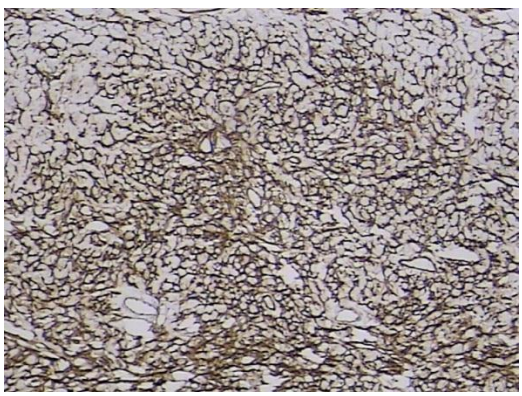

Figure 3: An immunohistochemical stain for CD34 performed on the lung tumor.

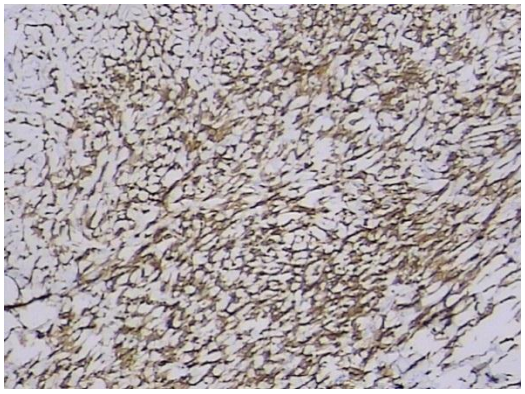

Figure 4: An immunohistochemical stain for Bcl-2 performed on the lung tumor.

Follow-up

The patient was discharged on the seventh day post-surgery, following an uneventful recovery. Six months post-surgery, the patient was asymptomatic and is currently being managed with close radiologic and clinical follow-up.

DISCUSSION

SFTs are spindle-cell neoplasms, which often originate from the pleura. The origin of SFTs was initially reported to be mesothelial.[1] However, in the subsequent decades, based on immunohistochemical analyses, it has become well established that SFTs arise from primitive fibroblast-like cells in the connective tissue.[2] The majority of SFTs exhibit benign features, with ~13-23% of SFTs reported to be malignant.[3] England et al.[3] have indicated that the criteria for the diagnosis of malignant SFTs should include: (i) Nuclear pleomorphism; (ii) high cellularity with crowded or overlapping nuclei; (iii) high mitotic activity, with >4 mitotic figures per 10 high-power fields; and (iv) pleomorphic giant cells and abnormal mitotic activity.[3]

In the early stage of an SFT, patients often do not exhibit obvious clinical symptoms. As the tumor grows, patients present with different symptoms that are dependent on tumor location, including shortness of breath, progressive dysphagia and hoarseness. Of note, few patients with SFTs present with hypoglycemia, which is termed Doege-Potter syndrome. It is a paraneoplastic syndrome characterized by the occurrence of hypoglycemia with an intrathoracic tumor.[4]

In recent years, the characteristics of SFTs have become increasingly recognized. It is not possible to determine whether a mass is benign or malignant using imaging examinations, including chest X-rays and CT. However, imaging examinations are beneficial for assessing extrapleural SFTs. Patsios et al.[5] reported a case of a 50-year-old patient with a lung SFT, who underwent lung wedge resection. Following intravenous contrast

administration and CT imaging, the tumor was found to be well-defined, homogeneous and exhibited soft tissue attenuation, slow growing nodules and avid heterogeneous enhancement. Preoperatively, the diagnosis of an SFT may be confirmed through fiber-optic bronchoscopy or image-guided percutaneous aspiration biopsy, combined with typical histomorphological findings, including atypical spindle-shaped and round neoplastic cells within variable quantities of collagen, as well as through immunohistochemical staining for positive CD34, CD99 and Bcl-2 expression and negative S-100, EMA and desmin expression. Baliga et al.[6] reported a case of a 42-year-old male, who underwent MRI-guided transthoracic Fine-Needle Aspiration Biopsy (FNAB) and a simultaneous core biopsy. Therefore, due to the peripheral location of the tumor, FNAB may be an effective method for the diagnosis of SFTs of the lung. In the present case, the tumor w determined to be benign based on CT imaging, thus FNAB was not performed. Hematoxylin and Eosin (H&E) staining of typical SFTs reveals spindle-shaped cells and amorphous areas of collagen. Furthermore, positive CD34, CD99 and Bcl-2 expression are important markers for the diagnosis of an SFT, with CD34 being the most sensitive and specific marker for SFTs. Only a few cases have reported the use of Positron Emission Tomography (PET)-CT for the diagnosis of SFTs.[7] Thus, to the best of our knowledge, PET-CT may be beneficial for the diagnosis of metastatic disease.[2]

The differential diagnosis of a lung SFT includes numerous malignant and benign tumors, including hemangiopericytoma, mesothelioma, monophasic synovial sarcoma, sarcomatoid renal cell carcinoma, spindle cell lipoma, fibrosarcoma, leiomyosarcoma and neurogenic tumors, including schwan-noma and malignant peripheral nerve sheath tumors.[6] Immunohistochemistry is significant for differentiating between these tumors. For example, leiomyosarcomas are CD34-negative and positive for SMA and desmin. Thus, the presence of different markers in leiomyosarcoma distinguishes it from an SFT.

The most successful treatment for SFTs is surgery. In the present case, two surgical approaches were prepared depending on the intraoperative frozen section. If the tumor was benign, a total tumor excision was to be performed. A lower left lung lobe resection was to be performed for a malignant tumor, as well as a lymph node dissection involving radical dissection of the mediastinum. In the present case, the tumor was identified as benign. The efficacy of surgery depends on the entirety of the tumor resection.[8] Previous studies have reported the use of adjuvant radiotherapy or chemotherapy for malignant SFTs; however, the effectiveness of such treatment has yet to be elucidated.[3] Metastases are usually blood-borne and have been identified in the liver, bone, brain, lungs and muscles.[2] Chen et al.[9] reported the case of a 78-year-old male who presented with a left gluteal soft tissue mass with a two-month history of a newly-diagnosed metastatic lung adenocarcinoma. H&E staining of the mass revealed an SFT containing metastases from the adenocarcinoma.[9] Furthermore, Schirosi et al.[10] reported that high p53 expression in SFTs may be significantly correlated with a poor prognosis. Due to the potential for metastasis and recurrence, long-term follow-up for several years is required. Watanabe et al.[11] described the case of a 57-year old female who was diagnosed with adenocarcinoma of the right, middle lung lobe and malignant visceral pleura SFT of the left, upper lung lobe. The patient received a median sternotomy. The study illustrated the importance of the diagnosis and treatment of two co-existing primary malignancies.[11]

In conclusion, the present study described a rare case of an SFT arising from the lung in a male patient. A tumor resection was successfully performed and the diagnosis of an SFT was determined based on the immunohistochemical findings. Long-term follow-up with radiological imaging is required to monitor the recurrence and metastasis of this type of tumor.

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Ethical approval: Not required

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