Primary Pulmonary Myxoid Sarcoma in an Asymptomatic 47-Year-Old Female

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Abstract: Primary pulmonary myxoid sarcoma (PPMS) is a rarely reported, low-grade malignant endobronchial tumor. We describe a case of PPMS in an asymptomatic 47-year-old female. We highlight the clinical and pathologic aspects of PPMS and its relationship with angiomatoid fibrous histiocytoma.

Keywords: myxoid sarcoma; fibrous histiosarcoma; lobectomy

1. Introduction

Primary pulmonary myxoid sarcoma (PPMS) is a low-grade lung sarcoma. PPMS was first described in 1999, is thought to exist on a continuum with angiomatoid fibrous histiocytoma (AFH), and, most recently, has been suggested to be a single diagnostic entity with AFH [1–4]. There are less than 40 reported cases of PPMS, with most displaying an EWSR1-CREB1 gene fusion [1,5–9]. Most reported cases have been in females [5]. This report describes a case of PPMS in an asymptomatic 47-year-old female.

2. Case Presentation

A 47-year-old female former smoker with a history of diabetes, hypertension, and hyperlipidemia was referred to the thoracic surgery clinic for evaluation of an incidentally found left-upper-lobe nodule. The patient had no respiratory symptoms at baseline and was able to ambulate without dyspnea.

On presentation the patient’s pulse oximetry was 99% on room air and she was normotensive. Respirations were unlabored and breath sounds were clear bilaterally. Chest computed tomography (CT) showed a 1.6 × 1.5 cm nodule in the central aspect of the left upper lobe adjacent to the bronchus (Figure 1). A PET scan showed hypermetabolic activity in the lung nodule with an SUV max of 2.7. There were no other foci of activity.

Pulmonary function testing showed an FEV1 of 2.5 L (87% of predicted) with a DLCO 103% of predicted. The tumor was clinically T1b N0 M0. A thoracoscopic left upper lobectomy and lymphadenectomy was performed.

Grossly, the specimen was a 2.1 × 1.3 × 1.1 cm, tan-white, firm nodule. On hematoxylin and eosin stain there was a well-circumscribed hypercellular spindle cell neoplasm in nodules with associated prominent lymphocytic infiltrate (Figure 2). Tumor cells were composed of bland-looking elongated cells in a myxoid/cartilaginous background with prominent fibrosis separating the nodules (Figure 3). The mitotic rate was less than 1/10 HPF. Twelve negative lymph nodes were submitted. Immunohistochemical stains showed that the tumor cells were positive for vimentin, patchy positive for EMA, focally positive for ALK, and negative for SMA, desmin, S100, HMB-45, keratin, and vascular markers. The tumor was not tested for the EWSR1-CREB1 fusion protein. The overall findings were consistent with PPMS.
Figure 1. Chest computed tomography (CT) without contrast showing the left-upper-lobe mass adjacent to the bronchus.

The patient was discharged on postoperative day two without complication. She was seen at one-year follow-up and was progressing well, without evidence of residual disease.

Figure 2. Low-power view showing fibrous pseudocapsule and a peritumoral cuff of lymphoplasmacytic infiltrate.
Figure 3. High-power view showing spindle and rounded cells with typically bland nuclei within a myxoid stroma.

3. Discussion

PPMS is a rarely reported intrapulmonary sarcoma, first described in 1999 by Nicholson et al. and classified as a lung mesenchymal tumor by the WHO in 2015 [1,10]. The tumor is often characterized by the oncogenic fusion gene EWSR1-CREB1. PPMS has generally been reported in females, with a median age of 44 [7].

The clinical presentation of PPMS is often non-specific. Patients may present with a cough and weight loss; however, up to half of PPMS masses are found incidentally [5,6]. Most tumors follow an indolent course, with low rates of recurrence or metastasis. However, metastasis to the kidney, brain, and contralateral lung have been described and outcomes are highly variable [8,9]. Surgical resection is currently the mainstay treatment, with one reported case of enucleation as the definitive treatment [6]. Close post-operative follow-up is recommended. The frequency and duration of follow-up is not well established.

PPMS has characteristic pathologic features. It is often a nodular, firm, circumscribed lesion with a grayish-white gelatinous appearance and an endobronchial component [7]. Microscopically, tumor cells are composed of spindle, round, stellate, or polygonal cells, with mild to moderate atypia [7]. They may have a partial fibrous pseudocapsule, and are characterized by an extensive myxoid stroma [7]. There is often a peritumoral cuff of lymphoplasmacytic infiltrate [5]. PPMS is notable for multinodular growth, as well as its dendritic-like morphology [5]. The EWSR1-CREB1 fusion protein is characteristic of PPMS and is found in more than 80% of the tumors. The EWSR1-CREB1 fusion protein has no established effect on prognosis [5]. In 60% of cases, PPMS tumors show weak and focal expression of EMA. The tumor classically stains negative for keratin, ALK, S100, desmin, CD34, and neural markers. However, its exact staining profile is incomplete. For example, there is one reported case of PPMS that stained strongly positive for desmin and had angiomatoid foci, and another reported case of PPMS stained positive for ALK [3,4]. PPMS overlaps with other soft-tissue and salivary-gland-type tumors, including intraskeletal myxoid chondrosarcoma, myoepithelial neoplasms, and inflammatory myofibroblastic tumors [2,3,9].

The literature suggests that PPMS and AFH are related on a continuum of tumors with similar histologic and genetic features, with a recent report by Kerper et al. submitting
that PPMS and AFH constitute a single diagnostic entity [2–4]. AFH is a slow-growing, circumscribed mesenchymal tumor often found on superficial extremities, mostly in children [11]. Grossly, AFH is described as a nodular, multicystic mass [12]. Histologically, AFH is characterized by a thick pseudocapsule with a cuff of lymphoblastic cells, irregular solid masses of histiocyte-like cells, cystic areas of hemorrhage, chronic inflammation, and low mitotic activity [12]. In 90% of cases, AFH tumors have the EWSR1-CREB1 fusion protein. AFH tumors often stain positive for desmin, ALK, EMA, CD68, and CD99 while staining negative for vascular endothelial markers as well as S100, cytokeratins, and lysozyme [12]. AFH has a low rate of recurrence and is treated with resection [5,8,13]. Rare cases of AFH in the lung have been reported. Notably, these AFH tumors have a marked inflammatory component with “angiomatoid” areas [8].

Numerous factors indicate that the patient’s tumor was consistent with PPMS. She was asymptomatic on presentation and had no evidence of residual or metastatic disease at follow-up. Her tumor had gross morphologic characteristics of PPMS and a location adjacent to the bronchus. Microscopic characteristics included a pseudocapsule, a prominent lymphocytic infiltrate, and staining weakly positive for EMA, as well as staining negative for keratin and S100. These findings are also consistent with AFH. While the patient’s tumor exhibited characteristics that have been used to differentiate PPMS from AFH, namely, staining negative for desmin and lacking “angiomatoid” areas, it also stained focally positive for ALK, which is typically seen in AFH and not in PPMS [3]. As noted above, the demarcation between PPMS and AFH is unclear, with overlapping characteristics suggesting that the two may be a single diagnostic entity [3].

4. Conclusions

PPMS is a rarely reported pulmonary sarcoma. Further research is needed to better understand its clinical aspects, as well as its close relationship with AFH. Greater insights into PPMS may help with disease prognostication and guide treatment.

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References


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