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A Case of Angiomyolipoma of the Posterior Upper Mediastinum

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ABSTRACT

Angiomyolipoma (AML) is uncommon outside the kidney, and it rarely occurs in mediastinum. This article presents a case of posterior upper mediastinal AML with a review of the literature on angiomyolipoma. A 56-year-old woman was referred to our hospital with 8-month history of cough and chest pain. Radiology showed a mass in the posterior upper mediastinum. Left thoracotomy was done for surgical removal of the tumor. Pathologic findings revealed an AML tumor in the left paravertebral and posterior upper mediastinal regions with massive infiltration of the intercostal nerves and subtle invasion of the adjacent thoracic spinal canal. This case is the third reported AML of posterior upper mediastinum. To prevent misdiagnosis, it is suggested that AML could be considered for the differential diagnosis of mediastinal tumors.

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INTRODUCTION

Angiomyolipoma is well known to occur in the kidney; however, other body sites may also be affected and liver is the most extrarenal site for this tumor. The tumor has been rarely found in the mediastinum(1), and only seven cases of primary or secondary mediastinal AML have been reported. Tuberosclerosis is associated with renal angiomyolipoma in one third of instances; this concurrence was seen in hepatic angiomyolipoma; however, coincidence of tuberosclerosis with mediastinal angiomyolipoma has not been reported. These tumors grow insidiously and may become large in size. They are usually encapsulated and have

a well-defined border. Although they are not usually infiltrative, there are plenty of reports on the involvement of lymph nodes and extension to the adjacent organs, nerves, and vessels. The tumor is usually found accidentally, or it causes compressive effect on airways. It can be severely hemorrhagic. In the majority, total resection of tumor leads to cure. Histopathology reveals a characteristic highly vascular tissue containing adipose tissue and smooth muscle cells. There are unusual morphological patterns, which cause misdiagnosis. In immunohistopathologic study, smooth muscle cells (SMC) are often positive for HMB-45, Actin, and Desmin (2).

In this report we present a case of massive tumor in posterior upper mediastinum.

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CLINICAL SUMMARY

A 56-year-old woman presented with eight-month history of nonproductive cough and vague chest pain. Chest x-ray showed a mass in the left paravertebral area adjacent to the apex of the left lung. Chest CT-scan with contrast showed a heterogenous soft tissue mass with a tiny intracanalicular extension (Fig 1,2).

Fig 1.A left paravertebral lobulated mass in CT-scan

Lateral pedicles of vertebrae were eroded and there was pleural thickening near the mass with a left-sided pleural effusion. Vascular structure, aorta, trachea, and abdomen were normal.

Physical examination and Laboratory tests were normal. Rigid bronchoscopy showed external compression on the trachea and left main bronchus.

The patient underwent posterolateral thoracotomy through the fourth intercostal space; a well-defined 6cm measured mass with a lobulated surface was found in the posterior mediastinum.

The tumor also involves paravertebral region of the third intercostal space. As the tumor was highly vascular, the first manipulation of tumor caused a massive bleeding, so that the size of the tumor was reduced in half.

Further exploration showed severe adhesion of the tumor to the adjacent intercostal muscles, vessels and nerves. The adjacent intervertebral foramen was dilated due to the erosive effect of the mass. The tumor was resected as completely as possible with no macroscopic residues. The patient discharged from hospital in healthy condition.

PATHOLOGIC FINDINGS

Sections from formalin-fixed paraffin-embedded blocks were stained by H&E stains. Thin sections of paraffin blocks were processed via standard avidin-biotin-peroxidase method (LSAB2 Kit, DAKO). The antigen retrieval process consisted of heating at 120°C for 10 minutes in tris buffer (PH=9), in an autoclave for muscle specific Actin, Desmin, and CD31 or in microwave for HMB45. The primary antibodies are summarized in Table 1.

Table 1. Antibodies used in this study

Antibody	Clone	Source	Dilution
Muscle specific Actin	HHF-35	DAKO	1/200
Desmin	D33	DAKO	1/100
CD31	JC/70A	DAKO	1/40
Melanosome	HMB-45	DAKO	1/50

Fig 2. Extension of lateral paravertebral mass into the spinal canal.

Fig 3.

Fig 4.

Fig 5.

Fig 6.

Fig 7.

Fig 8.

-Macroscopy

At first, two small fresh specimens were sent to our department and frozen sections were prepared. The samples were yellowish cream, irregular in shape, and smooth on one side. There was no evidence of malignancy on frozen section, which consisted of mature adipose tissue and dilated congested vessels. Partially capsulated tumoral mass, measuring 6×3×2.5cm with yellowish-gray to brown in color and slightly lobulated surface, was sent to our department. The tissue had been fixed in 10% formalin.

Intercostal nerves were attached to the tumor at the periphery of the mass. The tumor was soft to elastic in consistency. On cross-section the tumor was solid and consisted of yellowish fat and scattered brownish-gray regions of muscular and vascular components.

-Microscopy

The H&E stained slides show well-defined encapsulated tumor composed of mixture of adipocytes, blood vessels, and bundles of smooth muscle fibers; these bundles were predominantly located in perivascular regions (Figure 3,4,5,6).

Some vessels had a thick wall with some degree of hyalinization of media layer, while others were thin-walled, dilated, and congested. There were several regions of hemorrhage. Smooth muscle cells were typically spindle-shaped and dispersed among the fat in longitudinal bundles.

The sections of peripheral nerves were trapped in the tumor. There was neither hypercellularity pleomorphism nor mitotic activity. These all findings point to the diagnosis of angiomyolipoma with infiltration of intercostal nerves. On immunohistochemistry, there was strong and diffuse staining of the spindle-shaped myocytes with Actin (Fig7) and Desmin (Fig 8), while staining for HMB-45 was negative. CD31 delineated the vascular component.

DISCUSSION

The histopathologic findings were so characteristic that almost no other differential diagnosis could be considered for the tumor, which was consisted of differentiated smooth muscle cells, adipocytes, and vascular elements. Regarding immunohistochemistry results, the presence of the smooth muscle was proved by strong positivity with Actin and Desmin. On immunohistochemical studies, HMB-45 is characteristically positive in AML, although in our study it was negative.

The majority of AMLs are focally positive for HMB-45; mainly smooth muscle is stained with this marker in epitheloid pattern (3,13). Sensitivity and specificity of HMB-45 in diagnosis of AML were reported 88% and 100% respectively by Zavala et al. Therefore, they suggested utilizing a panel of markers to increase the sensitivity of immunohistochemistry for AML are as follows: Actin, HMB-45 or Melan-A, and microphthalmia transcription factor (4). Frishman stated the sensitivity of 92% for this maker (16). Abdulla showed that 3 AMLs out of 6 were negative for HMB-45 (5). The case presented here is the third case to be described in the posterior upper mediastinum and the eight case of mediastinal AML that has been reported since 1985. Two cases of posterior mediastinal angiomyolipoma had been reported by Fukuzawa et al.(6) and Sakadia et al. (12), the later was located in the thoracic spinal cord which involved the superior part of posterior mediastinum, it is possible that the origin of this tumor was in the mediastinum and spinal cord was invaded secondarily. In three reported AML of posterior upper mediastinum, the age of patients ranged from 56 to 72 years old (the average age was 60 years old) and 2 patients were female. The presentations of tumor ranged from an incidental finding to signs of tracheobronchial compression and involvement of the thoracic spinal nerves.

Table 2. Summary of mediastinal angiomyolipoma reports.

Case No.	Age/ gender	Site of involvement	Presentation	Clinical course	Reference/ year
1	NA*	Central mediastinum	NA*	NA	Bertrand G, et al./1984 (7)
2	35/M	Ventrolateral thoracic spinal canal	NA	Recovered	Von Hanweh R,et al./ 1985 (8)
3	63/F	Right paravertebral upper mediastinum	Incidental finding	NA	Fukuzawa J,et al. /1992(6)
4	23/F	Anterior mediastinum , adjacent to pericardium	Incidental finding	NA	Hayashi K, et al./ 1994(9)
5	NA*	Intrapericardial from right atrium with severe adhesion to the origin of IVC	Severe dyspnea	NA	Tsai CC,et al./ 1992(10)
6	53/F	Mediastinal tumor	NA	NA	Watanabe S, et al./1997(11)
7	72/M	T3-T5, ventral aspects, with extesion to thoracic cavity, posterior mediastinum	Neurological symptoms	Recovered	Sakaida H, et al./ 1998 (12)
8	56/F	Posterior upper mediastinum	Cough, Chest pain	Recovered	Present case

*NA: Not Available

Regarding the pathogenesis of mediastinal AML, some researchers believe that it originates from the primitive pleuropotential cells which exist anywhere in the mediastinum or spinal canal (12), but general consensus is on a pericytic origin, arising from perivascular epitheloid cells called PECOMA. The latter theory can aid to justify the extrarenal sites of tumor such as liver, vagina, spermatic cords, lymph nodes, oral cavity, spleen, palate, Fallopian tubes, and lungs, as well as the mediastinum(14,15).

Awareness of the probable presence of the tumor in the mediastinum, especially the involvement of the adjacent thoracic spinal cord is valuable to the clinicians, thoracic surgeons, neurosurgeons, radiologists, and pathologists.

This infiltrative tumor might be presented with various symptoms and different levels of severity. Sometimes complete resection of tumor needs the collaboration between a thoracic surgeon and a neurosurgeon. Risk of hemorrhage is noteworthy point which may be spontaneous or due to needle biopsy or surgical manipulation, and could be fatal.

Nowadays, by means of modern and precise radiological techniques the tumor can be diagnosed preoperatively. Even some believe that in the presence of characteristically radiological presentations, surgical diagnosis is rarely indicated in asymptomatic patients, as one case of mediastinal AML was radiological diagnosed before surgery.

Pathologic diagnosis is very difficult in small needle biopsy specimens or frozen sections as the varied cell morphology in AML(from mature adipose and smooth muscle to epitheloid monomorphic type) is seen. Differential diagnosis varied from reactive lesions to leiomyosarcoma and liposarcoma. As it is explained before immunohistochemical staining is of great help when the diagnosis is uncertain.

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