within the fibrous capsule, a part of the fibrous capsule was thought to have become calcified like a ring (Fig 3).

Comment
Calcification is sometimes found in thymomas on CT. In particular, calcification is found in more than half of type B2 and type B3 thymomas [1]. Calcification is found more frequently in invasive thymomas than in noninvasive thymomas [2].

The pattern of calcification in thymomas is usually stippled or nodular [2]. A ring-shaped calcification is very rare, with only 3 cases reported to date.

Harris and colleagues [3] reported a type B2 thymoma with a calcified rim that was excised and classified as modified Masaoka stage Ila. They presented the CT and positron emission tomography findings. Tumor with a standard uptake value of 3.9 on positron emission tomography was found outside the calcified ring. Although they presented the pathologic findings, calcification in the specimen was not described. Low and associates [4] presented the chest roentgenographic and CT images of a thymoma with ring calcification. Their patient did not have invasion beyond the ring calcification on CT.

Siraj and coworkers [5] presented a case of invasive type B3 thymoma contained within the ring calcification. Although the calcification was ring shaped, the calcification was within the tumor, not on its rim.

In our case, the ring calcification was located on the edge of the tumor, and microscopically, the calcified layer was within the fibrous capsule layer. A part of the fibrous capsule was thought to have become calcified like a ring.

Based on previous reports and our case, ring calcification is found in type B2 or type B3 thymoma such as other patterns of calcification. The ring calcification is sometimes located within the thymoma and sometimes in the fibrous capsule. The pathologic and clinical significance of ring calcification in thymoma remains unknown because it is very rare. More cases need to be reported in the literature.

References
Laboratory findings were within normal limits, and electrocardiographic evaluation revealed no pathologic findings. Left ventricular size and function were normal during echocardiographic evaluation. Right cardiac chambers were slightly dilated, and pulmonary artery pressure was 40 mm Hg. There was no abnormal intra-cardiac left to right shunting.

The posteroanterior chest radiograph was normal. A multidetector computed tomography (CT) scan of the thorax was performed using intravenous nonionic iodinated contrast medium. The consecutive sections of the scan showed a circular tubular lesion anterior to the descending aorta starting from the left pulmonary hilum to the innominate vein. Density of the lesion was similar to the aortic content (Fig 1A). The image indicated a vascular connection between the left pulmonary artery and innominate vein. The patient was examined with a 1.5-T magnetic resonance imaging (MRI) vascular communication between the left pulmonary artery and the innominate vein, shown (Fig 1B) by axial T2-weighted and MRI angiography sequences in detail. Three-dimensional reconstruction from multiple images was also created (Fig 2A). The fistula was 11 mm in diameter and 6 cm in length. No other cardiac or vascular abnormality was detected. Hypoperfusion on the left upper lobe and lingula superior segment was discovered by pulmonary perfusion scintigraphy study in the nuclear medicine department (Fig 2B). No other invasive pulmonary or cardiac imaging study was performed.

A decision to close this vascular connection between pulmonary and systemic venous circuits with video-assisted thoracoscopy was made after obtaining informed consent from the patient. Because of an unsuccessful attempt at single-lung ventilation during anesthesia initiation, we performed a mini thoracotomy. The fistula between the left pulmonary artery and innominate vein was sutured. A wedge resection of the left lung was performed during the same session to exclude the diagnosis of interstitial lung disease, even if the pulmonary CT images were inconclusive. The final information gathered from pathologic examination of the lung biopsy was nonspecific inflammation of alveolar structures. The patient had no symptoms of dyspnea.
after the surgery. Postsurgical control echocardiogram revealed that pulmonary artery pressure was decreased to 30 mm Hg. The postoperative period of the patient was uneventful, and she was discharged on the seventh postoperative day. The patient's latest follow-up visit was 6 months after the operation, and no signs or symptoms were found.

Comment

A fistula between the systemic artery or vein and the pulmonary vessel is rare abnormal communication. A small number of cases were described in the literature before. They are usually congenital, but can be iatrogenic or traumatic or occur because of tumors or inflammatory diseases [3]. As our patient had no previous history of trauma, tumor or placement of a central venous catheter, this case was considered congenital.

The feeding arteries of a fistula can originate from abnormal aortic branches or subclavian, axillary, diafragmatic, mediastinal, or coronary arteries. Outflow of a fistula can be through the pulmonary artery, pulmonary vein, or both [4]. As stated earlier, this type of communication between the pulmonary artery and innominate vein is rare. According to the literature search performed during the preparation of this manuscript, only one similar case was reported [2].

The possibility of enlargement of the untreated fistula leading to high-output congestive heart failure and presenting with acute pulmonary symptoms owing to increased preload must be kept in mind in the management of the fistula [5, 6]. Treatment options should include surgical ligation and intravascular coil embolization with interventional techniques. In this case, the fistula between the left pulmonary artery and innominate vein was causing dyspnea, pulmonary hypertension, and mild right heart dilatation secondary to a shortcut between cardiac chambers creating volume overload.

CT images should be investigated carefully, because preaortic round lesions can be confused with lymph nodes, which can lead to misdiagnosis, as occurred in our case during an earlier CT evaluation by another radiologist. The continuity of this tubular structure in the consecutive images of the scan directs the physician to diagnosis. Axial images of the chest with MRI may show similar findings, but consecutively repeated angiographic sequences help to reconstruct the three-dimensional images. Moreover, coronal images of the chest may reveal the abnormal vascular communication. MRI angiography is as helpful as CT, but with the benefit of non-ionizing radiation [5].

Interstitial lung disease was suspected clinically and could not be ruled out as an etiology of the patient’s symptoms. Even if imaging studies were revealed the nature of anatomic and functional details of anomalous vascular structure connecting the pulmonary artery with innominate vein, the expectation of an alternative diagnosis directed us to perform a lung biopsy in addition to surgical ligation.

In conclusion, mediastinal arteriovenous fistula is a rare, congenital malformation of high variability. In this report, we describe an adult patient with chronic dyspnea owing to a fistula from the left pulmonary artery to the innominate vein. She recovered completely from her symptoms after the surgical ligation.

References


An Unexpected Complication of Titanium Rib Clips

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Surgical stabilization of the rib fractures has been successfully performed for the management of pain in multiple rib fractures, fixation of chronically painful nonunion, reduction of overriding ribs, and flail chest cases. Herein we report a patient who was treated with titanium rib clips after a motor vehicle accident leading to pulmonary parenchymal laceration and multiple painful rib fractures. Three of the rib clips were broken 4 months after the operation. The patient underwent the second operation for restabilization of the broken ribs. We review the relevant literature, with particular emphasis on the management of this complication.