Primary tumors of the heart are very rare [1], and 80% are benign. Cardiac hemangiomas are extremely rare, constituting only 2.8% of primary cardiac tumors [2], and despite advanced imaging techniques, exact preoperative diagnosis is still difficult. To our knowledge, a number of case reports have described the imaging findings of cardiac hemangiomas [3-5], and we describe a further case, detailing the dual-phase dynamic CT findings.

Case Report

A 48-year-old man presented with mild dyspnea, first experienced four months earlier.

Chest radiography revealed a round retrocardiac mass shadow [Fig. 1A], and to elucidate its natures, dual-phase helical chest CT of the region between the thoracic inlet and the diaphragm was performed using the following parameters: 120 kVp, 200 mA, 8-mm beam collimation, 0.75 sec gantry rotation time, 12 mm table feed per rotation, and an 8-mm reconstruction interval. Each CT phase lasted 24 seconds at deep inspiration during a single breath-hold. A bolus of 100 mL of iodinated contrast material, 68% iopromide (Ultravist 370; Schering AG, Berlin, Germany), was injected through the antecubital vein at a rate of 3 mL/sec.

Early arterial-phase CT performed 20 seconds after starting the injection of contrast medium depicted a 6 x 4 cm well-demarcated soft-tissue mass attached to the left atrium [Figs. 1B, 1C] and containing speckled enhancing foci [arrowhead]. Demarcation between the mass and adjacent structures such as the esophagus or pericardium was not, however, clear.

Delayed-phase CT was performed with a scan delay of 80 seconds and the same parameters used during the arterial phase. The images obtained demonstrated dense...
peripheral enhancement (Figs. 1D, 1E), similar to that of adjacent vessels, a finding which may help distinguish cavernous hemangioma from other soft tissue tumors at CT.

To evaluate cardiac function, two-dimensional echocardiography was performed, demonstrating decreased systolic function of the left ventricle. The calculated ejection fraction had decreased to 32%. The results of blood tests, esophagography, and esophagoscopy were all within normal limits. The preoperative differential diagnosis included Castleman’s disease, localized fibrous tumor of the pleura, neurogenic tumor, and esophageal leiomyoma.

Exploratory thoracotomy revealed the presence of a 6 × 5 × 4-cm encapsulated mass, which was excised by means of autopericardial patch repair. The mass was hypervascular and attached to the postero-inferior wall of the left atrium (Fig. 1F). The histological diagnosis was cavernous hemangioma (Fig. 1G).

The postoperative course was uneventful. During the two-year follow-up period, the patient remained asymptomatic, and echocardiographic examinations showed no evidence of recurrence.

Discussion

Cavernous hemangioma is an uncommon neoplasm. It occurs most commonly in the liver, though also in skeletal muscle, bone, the salivary glands, the spleen, and, rarely, the heart [6]. The symptoms, clinical course, and prognosis of a cardiac cavernous hemangioma depend on the location and size of the mass. In the heart, a tumor may arise from any part of the pericardium, myocardium, or ventricular cavity [7]. A subendocardial location is, however, most frequent [8], and though a single, sessile or polypoid mass varying between 2 mm and 3.5 cm in diameter is usual [8, 9], one that is multiple or pedunculated is also possible [10]. These tumors are

![Fig. 1. A 48-year-old man with dyspnea.](image)

**A.** Chest radiograph in erect posteroanterior view at admission shows a retrocardiac mass shadow (arrows).

**B, C.** Early arterial phase CT images show a heterogeneously enhancing mass lesion between heart and descending thoracic aorta (arrows). Note the brightly enhancing foci (arrowhead).
usually well defined and not extensive, and histologically, are distinguished by the formation of large, cavernous vascular spaces embedded in scant connective tissue stroma (8). A mass may exhibit central necrosis and calcification (10, 11).

Symptoms are related to a tumor’s location. The most frequent is dyspnea on exertion (8), as in our case, though patients are occasionally asymptomatic. Pericardial effusion may be associated, and in previously reported cases (10, 11), physical examination has revealed arrhythmia, systolic murmurs, and hepatomegaly or ascites due to congestive heart failure.

In some cases, cardiac catheterization or two-dimensional echocardiography has been used for the diagnosis of cavernous hemangioma of the heart (8), though CT is more useful. At CT, a cavernous hemangioma demonstrates peripheral or diffuse contrast enhancement, similar to that of adjacent vessels or muscle (3, 6), and there may be several small foci of calcification (3). In our case, early arterial-phase CT images depicted a heterogeneously enhanced mass lesion between the heart and descending thoracic aorta. Well-enhanced speckled foci were apparent, and the mass and adjacent structures such as the esophagus and pericardium were not clearly demarcated. In addition, the margin of the mass and the wall of the left atrium were sometimes indistinct. Delayed-phase CT images demonstrated dense peripheral enhancement very similar to that of adjacent vessels.

The only successful approach to the complete treatment of cardiac cavernous hemangioma is surgical excision, though lesions may be so extensive that resection
is impossible. In such cases, the prognosis is usually poor [8].

In conclusion, a cavernous hemangioma is a very rare benign primary cardiac tumor. In the case we describe, for which we detail the CT findings, the lesion appeared at early arterial-phase imaging as a speckled enhancing mass attached to the left atrium, and at delayed-phase imaging, dense peripheral enhancement was observed. In a patient in whom these findings were observed, a diagnosis of cardiac cavernous hemangioma is suggested.

References
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