

A large myxoma of the right atrium demonstrated by thallium-201

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A rare case of right atrial myxoma in which thallium-201 gave a good delineation of the tumor was presented. In this case, the feeding arteries were seen to be highly developed on coronary arteriogram. The amount of blood containing thallium-201 supplied to the tumor through the feeding arteries was so great that the tumor was considered to be visualized by thallium-201 imaging.

Key words: Atrial myxoma, Thallium-201 accumulation, Feeding artery.

INTRODUCTION

CARDIAC MYXOMA is the most common primary tumor of the heart. Echocardiographic techniques have become the preferred approach to the diagnosis of atrial myxoma. In general, radionuclide imaging is less sensitive in detecting cardiac tumor than the echocardiographic procedure, but is considered clinically useful for differentiating the characteristics of tumors. We recently studied a patient with a right atrial myxoma, using several radiopharmaceuticals, echocardiogram and cardiac catheterization to clarify the cause of an abnormal accumulation of thallium-201 in the tumor.

CASE REPORT

A 72-year-old female was referred to our hospital for examination of an abnormal shadow in her chest X-ray. She was well and had no symptoms until then. On admission, physical examination revealed no abnormal findings except for the wide splitting of the first heart sound (S₁). The blood sedimentation rate was 70 mm/hr (Westergren), and C-reactive protein was 4.5 mm. The shadow in her chest X-ray was

ascertained to be caused by an old and inactive tuberculous lesion. A two-dimensional echocardiogram, which was attempted to evaluate the wide splitting of S₁, revealed an enlarged tumor of the right atrium. Both ventricles were normal in size and motion. The mitral and aortic valves and pericardium were normal (Fig. 1).

Radionuclide angiography performed with 20 mCi of Tc-99m-red blood cell showed a photon deficient area, suggesting the existence of a right atrial mass. Myocardial perfusion imaging taken with 3 mCi of thallium-201 clearly demonstrated an abnormal thallium-201 accumulation at the region corresponding to the photon deficiency in RNA, besides the homogenous myocardial thallium-201 uptake (Fig. 2). Coronary angiogram revealed that a huge amount of blood was supplied to the tumor by both the left circumflex (LCX) and right coronary artery (RCA), and a lot of contrast medium was transiently accumulated in the tumor, which looked like a tumor stain (Fig. 3). A tumor scintigram obtained 48 hours after the injection of Ga-67 citrate showed no abnormal accumulation of the tracer. A surgical resection of the right atrial tumor and ASD patch were performed on this patient. The right atrium was filled with a gelatinous mass and its pedicle was attached to the fossa ovalis. The tumor was pathologically diagnosed as myxoma. The postoperative course was uneventful. Thallium-201 emission computed tomography (SPECT) performed after surgery showed no abnormality (Fig. 4).

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DISCUSSION

Thallium-201 has been used for myocardial imaging and tumor detection.^{1,2} Concerning myocardial imaging, the initial distribution of radioactive thallium-201, a potassium analogue, depends on the flow of the blood. In addition, normal myocardial cells actively extract thallium via an exchange with intracellular potassium. Therefore, thallium-201 myocardial imaging is considered to be reliable in evaluating the viability of the myocardium.² In contrast to this, there has been little experience in visualizing cardiac tumor using thallium-201. A focal photon-deficient area indistinguishable from myocardial infarction or a region of increased uptake of thallium-201 was previously reported, as characteristic of cardiac tumor in thallium-201 imaging.³⁻⁵ The mechanisms responsible for these differences in uptake of thallium-201 are still unclear.^{6,7} In this case, the feeding arteries to the tumor were highly developed from LCX and RCA, whereas LCX could not be well visualized in the coronary angiogram. This finding suggested that the increase of blood supply via the feeding arteries to the tumor decreased the LCX blood flow, indicating that whether or not this atrial tumor was visualized depended on the quantity of the blood flow to the tumor containing thallium-201. Heller et al. described the usefulness of exercise thallium-201 imaging in diagnosing left atrial myxoma, because the findings of increased lung activity in the presence of normal left ventricular thallium-201 distribution and right ventricular hypertrophied dilation led to the suspicion of an atrial abnormality in that case.⁸ To the best of our knowledge, this report represents the first case of a benign atrial tumor visualized directly with thallium-201.

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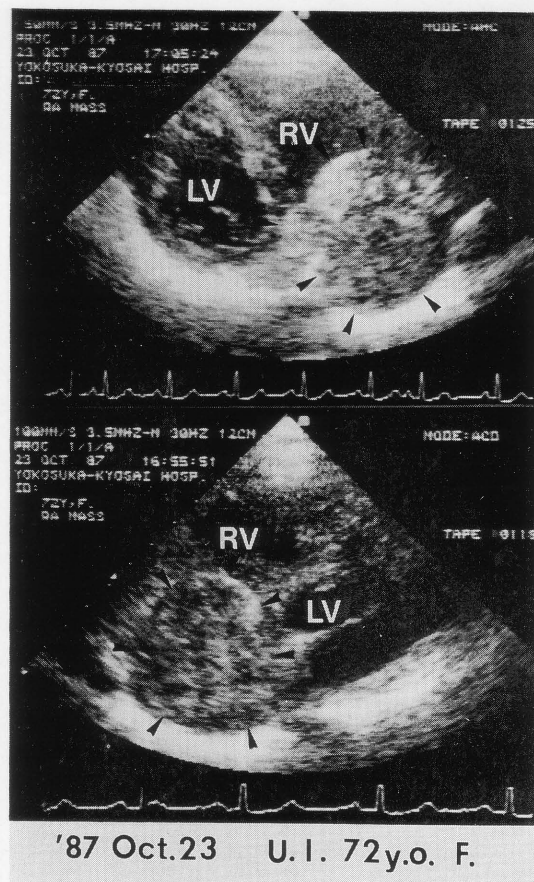


Fig. 1 Two-dimensional echocardiogram showing poorly movable tumor, 6 × 5.5 cm.

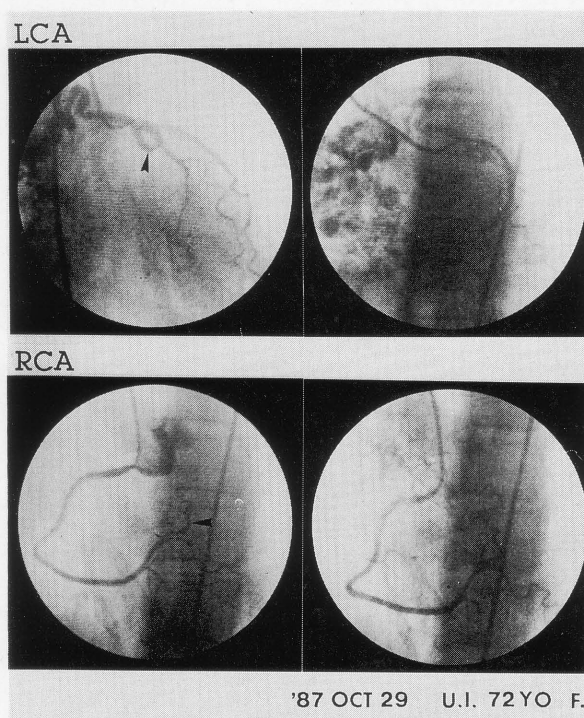


Fig. 3 Feeding arteries were highly developed from LCX and RCA (arrows), whereas the main trunk of LCX could not be clearly seen in the coronary angiogram.

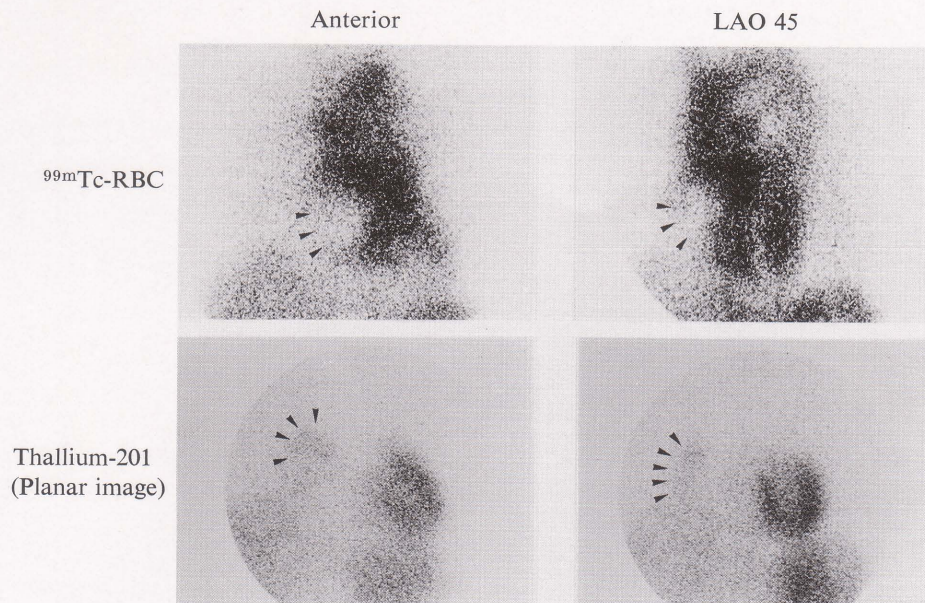


Fig. 2 A photon deficient area (arrows) in the right atrium was shown by radionuclide angiography (upper panel), and abnormal thallium-201 uptake (arrows) was clearly seen in the region corresponding to the photon deficient area (lower panel).

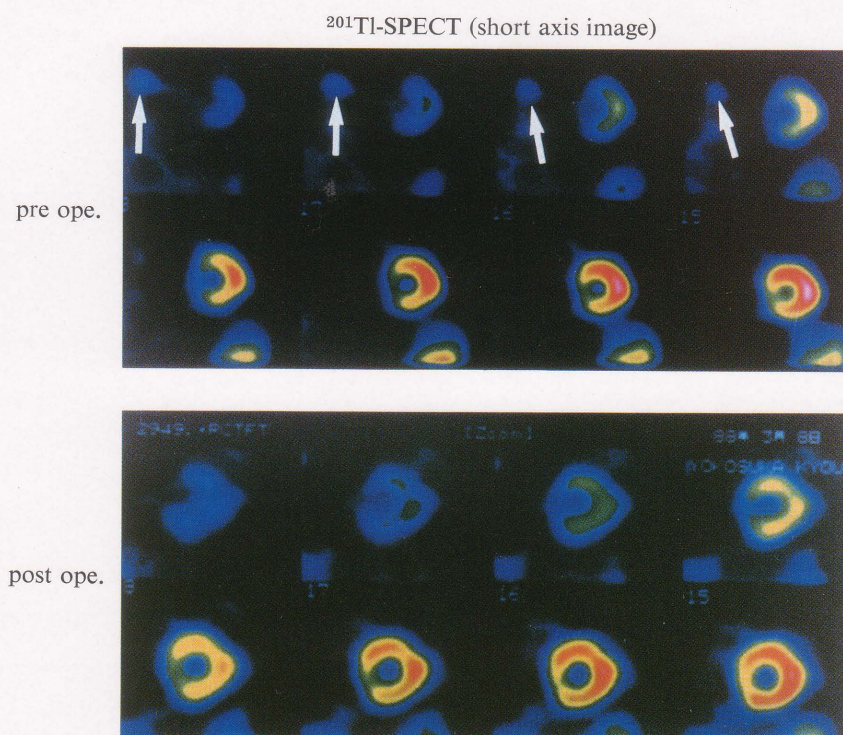


Fig. 4 Short axis image of thallium-201 SPECT. Abnormal thallium-201 uptake by the tumor (arrows) was seen before the operation, but not after.

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