Eur J Cancer Clin Oncol, Vol. 19, No. 5, pp. 691–694, 1983.
Printed in Great Britain.

0277-5379/83/050691-04$03.00/0

Letter to the Editor

Space-occupying Lesions of the Heart: a Computed Tomography Approach

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THE DIAGNOSIS of tumors and thrombi of the heart [1–6] using a computed tomography (CT) technique has recently gained acceptance. In this letter we report our experience with CT in eight cases of tumors of the heart. Our data add justification to the use of CT in this situation.

A Siemens Somatom-2 CT scanner was used with a scanning time of 5 sec and 4–8 mm slice thickness. Rapid intravenous drip infusion of contrast material combined with a bolus technique was administered in all cases except one (allergic to iodine).

In four of our cases a right atrial lesion was identified, i.e. three myxomas and one angiosarcoma (Figs 1–4). Three cases represented a left atrial myxoma (Figs 5–7) and an eighth case was a metastatic hepatoma extending to the right atrium from the right lobe of the liver through infiltration of the inferior vena cava (Fig. 8).

In the cases of intraatrial masses CT has provided images of sufficient detail to study the localization of the masses and to estimate their size with reliable accuracy. Recent reports [1–9] have also shown that CT can produce images of normal cardiac structures and that it can be useful in the non-invasive evaluation of cardiac pathology.

Clearly the size of the space-occupying lesion in this series is a factor that favored the good quality of the CT images obtained. Other investigators using the same technique have adequately demonstrated intracavity masses (thrombi) of the heart far smaller than ours [2, 3, 6], suggesting that size is not a limiting factor.

The primary non-invasive imaging modality for studying the heart is echocardiography. The advantages and disadvantages of both CT and echocardiography have been stated [5]. Echocardiography is limited by relatively low spatial resolution and its inability to penetrate bone or lung. In addition, due to limitations in the direction of the echo projection, the atrial appendage and the right edge of the left atrium are difficult to investigate by echocardiography [3, 10]. In the case of CT the advantage is that it can explore completely every part of the heart. Furthermore, the method is not rendered ineffective by the thoracic cage and lungs. However, tumor movement with the heart cycle cannot be detected by CT. An EEG gating program may help to solve this problem [11]. The study of the tumor movement is possible by two-dimensional real-time echocardiography produced with a video-recording system.

An additional advantage of CT is its ability to characterize the density of a mass by its attenuation coefficient (CT number). Tomoda has already found differences in CT numbers between organized and fresh thrombi [3]. We have also demonstrated a calcific density within a right atrial myxoma (Fig. 4).

Pathologic confirmation of the nature of the intracavity filling defects was obtained in seven of our eight cases. However, the physical examination as well as the other studies supported the diagnosis of a left atrial myxoma in case No. 5.

This study, though limited to a small number

Accepted 4 November 1982.

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Abbreviations: Ao, aorta; AoD, descending aorta; AoR, aortic root; IAS, interatrial septum; M, mitral valve; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle; S, interventricular septum; ST, sternum; V, vertebral body.

of cases, indicates that masses within the atrium, right or left, can be reliably evaluated using a fast CT scanning technique. We suggest the use of CT as an additional help to the other established non-invasive examinations, such as echocardiography, in the investigation of heart disease.

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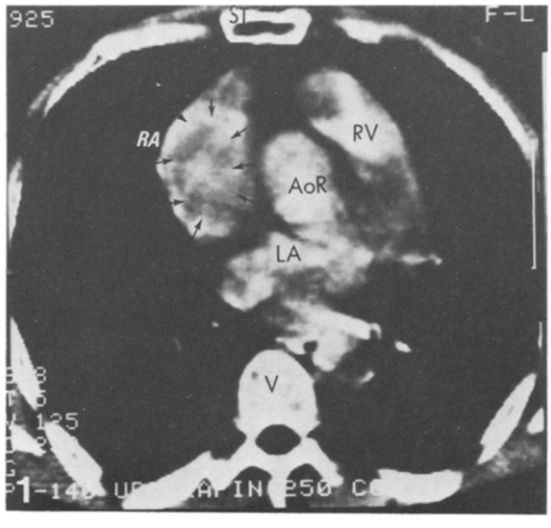
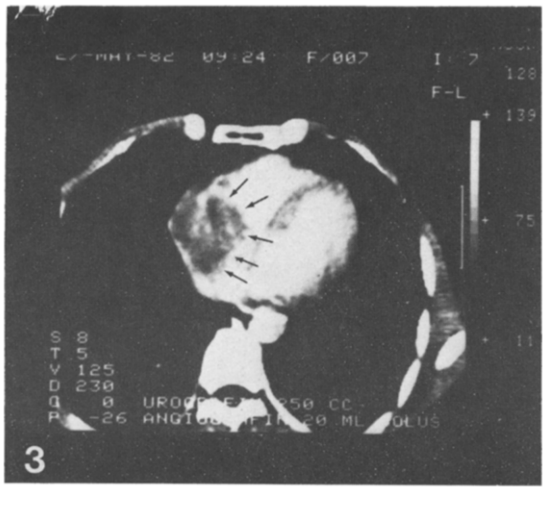




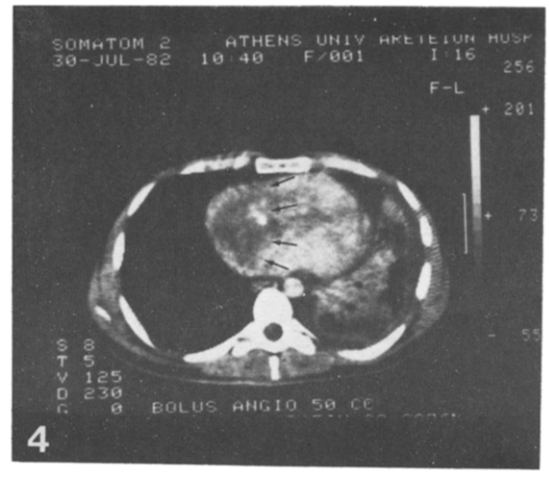
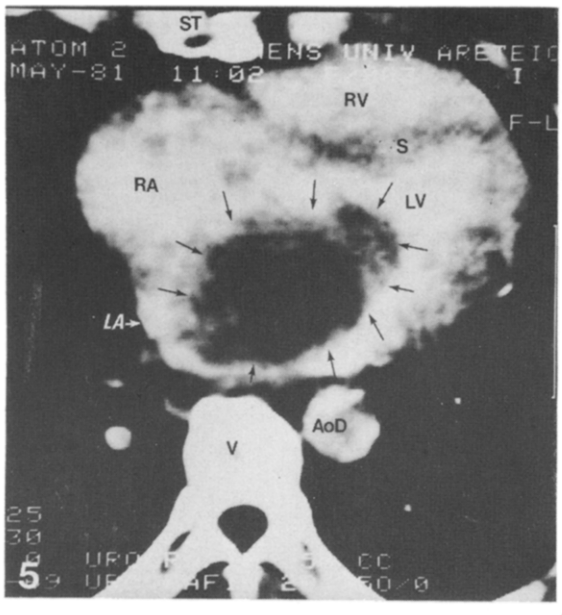


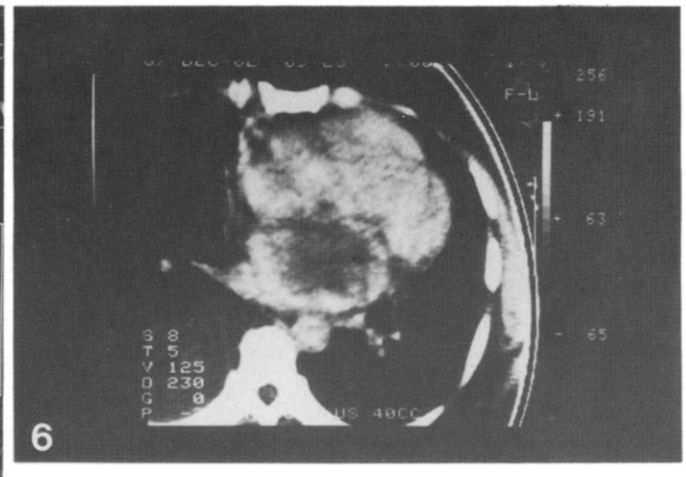
Fig. 1. Case No. 1: patient with a right atrial myxoma. CT scanning at the level of the aortic root shows a space-occupying lesion in the right atrium (arrows).

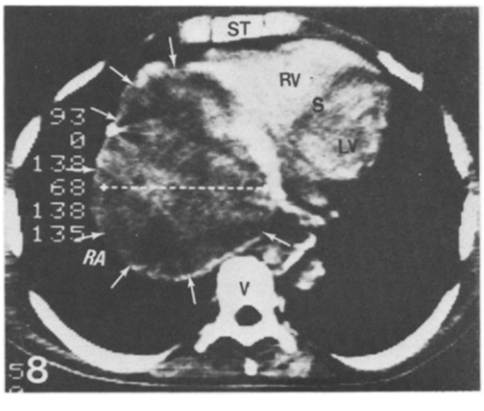
Fig. 2. Case No. 2: patient with a right atrial myxoma. CT scanning without contrast medium, illustrating the tumor (arrows) within the right atrium.

Fig. 3. Case No. 3: patient with a right atrial angiosarcoma. CT scanning at the level of the interventricular septum shows a filling defect occupying the entire cavity of the right atrium (arrows).

Fig. 4. Case No. 4: patient with a right atrial myxoma. CT scanning shows a low density mass filling the right atrium (arrows). Note the calcific density within the tumor and the pleural effusion on the left side secondary to the pulmonary embolism.







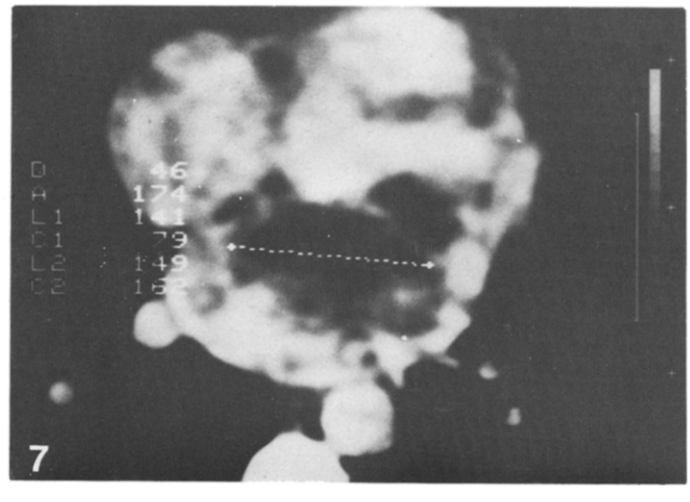


Fig. 5. Case No. 5: patient with a left atrial myxoma (?). CT scanning demonstrates a dilated left atrial cavity filled with a low density mass (arrows).

Fig. 6. Case No. 6: patient with a left atrial myxoma. CT scanning after bolus injection of contrast shows a low density mass within the left atrium, measuring 4.6 × 3.4 cm approximately. The density of the lesion is between 25 and 30 Hounsfield Units (HU:1000 scale).

Fig. 7. Case No. 7: patient with a left atrial myxoma. CT scanning following bolus injection of contrast shows a mass occupying the left atrium. Density measurements similar to the previous case. Note the right side pleural effusion.

Fig. 8. Case No. 8: patient with a right atrial metastatic hepatoma. CT scanning shows a huge right atrium occupied by a complexed density mass. Note a thin layer of contrast present between the tumor and the atrial wall. This image was obtained prior to left ventricular filling and this probably accounts for the low density visualized in the left ventricle.