PERICARDIAL TUMOR COMPARED WITH PERICARDIAL EFFUSION

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Enlargement of the pericardial space is most frequently due to effusion, and less frequently, pericarditis. One of the more rare causes is tumor or cyst of the pericardium. In 1945 Mahaim (*1*) was able to find in the literature only 84 primary tumors which included 19 cysts. Metastatic tumors to the pericardium probably occur 20–40 times as frequently as primary ones (*2*), but specific statistics are not available. We encountered an interesting case of a massive pericardial tumor that appeared as an asymmetrical distention of the pericardial sac.

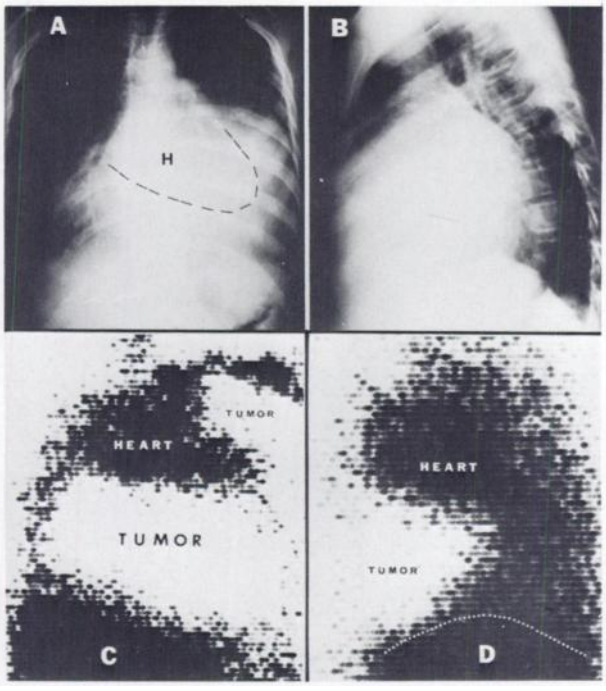

FIG. 1. Cardio-pericardial silhouette extends from right midlung field to left lateral wall (A). In lateral view, mass extends nearly to posterior wall (B). Relatively avascular tumor mass separates cardiac blood pool from hepatic blood pool and left upper lung in anterior (C) and left lateral (D) views. Cardiac blood pool is markedly elevated.

CASE REPORT

Clinical findings. A 13-year-old boy who had been healthy until 2 weeks before the examination was hospitalized for severe malaise and nausea. He was in acute respiratory distress, unable to lie flat. His blood pressure was 104/84 and pulse rate 130/min with normal peripheral pulses. In a semirecumbent position pulsations of the internal jugular veins were seen. The cardiac impulse was displaced upwards and laterally and was most prominent between the second and third intercostal spaces. Heart sounds were muffled but no murmurs were heard. His liver extended 5 cm below the right costal margin.

Ancillary findings. At the time of admission to the hospital, initial laboratory examinations were normal including routine blood examination and urinalysis, electrolyte profile, and blood urea nitrogen. An electrocardiogram demonstrated diffuse abnormality of repolarization but was considered nonspecific. Radiograph of the chest revealed a massive cardio-pericardial silhouette (Fig. 1) which extended from the right midlung field to the left chest well and from the diaphragm to the second intercostal space. In the lateral view it extended from the sternum to the vertebrae.

Blood pool scan. The study was performed with $^{99m}TcO_4^-$. In the anterior view the cardiac blood pool was markedly elevated and separated from the liver blood pool by a large avascular region (Fig. 1).

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The blood pool was also separated from the upper left lung by an avascular area. In the lateral view the elevated cardiac blood pool could be identified. The avascular region which separated the heart and liver extended well posteriorly. The interpretation was probable pericardial tumor.

Hospital course. On fluoroscopic examination of the chest, vigorous cardiac pulsations were seen along the upper right border of the mediastinal density and a pulsating double density was observed behind the heart on the left side. Surgery revealed a large, partially cystic mass that extended from the right chest, between the heart and diaphragm and encircled the posterior and left lateral aspects of the heart. Approximately 75% of the tumor was removed. By histologic examination the mass proved to be a fibrosarcoma originating from the pericardium. After surgery the child received radiation therapy but died 2 months later.

Autopsy revealed disseminated tumor in the chest and extension through the diaphragm behind the xyphoid into the peritoneal cavity. The right lung was completely atelectatic. Although the pericardial space was obliterated, microscopic examination did not demonstrate penetration of the myocardium by the tumor.

DISCUSSION

On a chest radiograph an enlarged cardiac silhouette may represent pericardial effusion, cardiac hypertrophy, cardiac dilatation, or neoplasm. Radionuclide imaging of the cardiac, pulmonary, and hepatic blood pools together with other radiological techniques will frequently resolve this diagnostic problem. Cardiac blood pool scanning is usually performed to determine the presence or absence of pericardial effusion. Wagner, et al (*3*) established three criteria for diagnosing pericardial effusion: (A) discrepancy between the transverse diameter of the heart as determined by radiograph and scan, (B) reduction in absolute diameter of the cardiac image, and (C) a greater than normal zone of decreased activity between the heart and liver. The halo of decreased activity around the periphery of the heart is relatively uniform in width except in instances of loculation (*4*), or excessive effusion. In the latter case the band of radioactivity may become wider between the heart and lungs than between the heart and liver because of the restricted movement of the heart superiorly by the aorta, pulmonary artery, superior and inferior vena cava, and pulmonary veins (*5*).

An eccentric area of decreased radioactivity in the region of the pericardial sac may be caused by a tumor arising from the heart. Robinson, et al (*6*) reported such a case due to a hemangioendothelioma arising from the right atrium, and Bonte, et al (*7*) described a myoma of the right atrium proximal due to the inferior vena cava that produced an eccentric area on a pericardial scan.

In a previous example of a tumor arising within the pericardium, the mass measured about 6 cm in diam and displaced the heart to the left (*8*). The blood pool scan which demonstrated an area of decreased activity between the right atrium and right lung would have appeared similar in the case of a loculated effusion. As shown in Fig. 1, however, the possibility of an effusion displacing the heart to this extent is extremely remote, and only a mass lesion such as a neoplasm arising from the pericardium or mediastinum could present this radionuclide image.

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