artery obstruction was a possibility but seems very unlikely as there was no suggestion of any vascular embarrassment. It is conceivable that mass hemolysis, possibly related to G6PD deficiency, may have occurred and saturated the splenic macrophages, causing functional hyposplenia. This mechanism has never been previously described.

What seems more likely is that some unidentified antigen-antibody immune complex saturated the RE cells, diminishing the spleen's ability to take up radiocolloid on the scan. There is recent evidence to support such a mechanism. Lockwood et al. (*8*) studied ten patients with vasculitis syndromes who were undergoing plasmapheresis. The investigators used heat-damaged and radionuclide-labeled IgG-coated autologous erythrocytes. These cells are taken up by, and bind to, splenic macrophages. Used in combination, they are felt to be a valid index of basic splenic macrophage function. The investigators found that splenic uptake of the label was markedly depressed before plasmapheresis. It increased up to 60%, however, following plasmapheresis and removal of the immune complexes associated with their primary illnesses. The authors concluded that saturation of splenic macrophages with immune complexes was unblocked by plasmapheresis, which could reverse hyposplenism within 48 hr. They commented that impairment of splenic function may be a common, if not general, phenomenon in patients with fulminating immune-complex disease.

Although immune-complex disease was not specifically identified in our case, it seems likely that some environmental antigen, infectious or otherwise, initiated his febrile illness and by this mechanism caused transient functional hyposplenia.

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Abnormal False-Positive Response of Exercise Ejection Fraction Due to the ROI: Fixed Compared with Variable

In a recent paper Sorensen et al. (*1*) have reported falsely abnormal ejection-fraction response to exercise in normal volunteers when the fraction is calculated using a fixed region of interest (FROI), compared with a calculation using a variable region of interest (VROI). With the latter, areas of interest are selected separately for end-diastole and end-systole.

Although early in the discussion they consider the response falsely positive when FROI is used, later they offer reasons why the response may be real. We think that most likely the FROI method has produced falsely abnormal results, for the following two reasons:

1. The FROI method as a rule gives a lower value for ejection fraction. This is because systole exposes an area of background that will not be subtracted out if only an end-diastolic ROI is used. The end-systolic count is therefore too high, and EF too low. A separate end-systolic ROI would avoid this error.

2. The left-ventricular region of interest at end-diastole almost always includes some of the lower part of the left atrium, and this will contribute to the ventricular end-systolic count when FROI is used. Increase in ejection fraction with exercise is usually due to increased left-ventricular contractility, which translates into lower end-systolic area, and therefore count. The unwanted atrial contribution (small but significant) therefore becomes proportionately larger during exercise if only the end-diastolic ROI is used.

We reviewed our experience with equilibrium gated blood-pool imaging, performed at rest and during maximal supine bicycle exercise in 21 consecutive unselected patients referred to us for assessment of coronary artery disease. Ejection fraction was calculated using both FROI and VROI. Response to exercise was considered normal if there was greater than 5% rise in ejection fraction at peak exercise using VROI. Nine of the 21 patients reviewed had a normal response to exercise by this criterion. In this group average resting ejection fraction was 0.55 (range 0.48-0.66),

TABLE 1.

		Variable ROI		Fixed ROI	
		average	(range)	average	(range)
Normal response (N = 9)	Rest	0.55	(0.48–0.66)	0.37	(0.27–0.52)
	Exercise	0.68	(0.62–0.75)	0.43	(0.29–0.62)
	Change	+23.6%		+16.2%	
Abnormal response (N = 12)	Rest	0.59	(0.39–0.67)	0.40	(0.26–0.53)
	Exercise	0.53	(0.33–0.69)	0.37	(0.18–0.57)
	Change	−10%		−7.5%	

which increased to an average of 0.68 (0.62–0.75) at peak exercise, a 23.6% change from the base line.

Using FROI in this group, the average and range of ejection fractions at rest and peak exercise were 0.37 (0.27–0.52) and 0.43 (0.29–0.62), respectively; this is a 16% change from the baseline. However, only four of these nine patients showed a significant rise in ejection fraction at peak exercise by this method; four gave no significant rise and one had a drop in ejection fraction. These results are consistent with the results obtained by Sorensen et al. and suggest that although both techniques have shown good reproducibility, the VROI method is more sensitive than FROI in demonstrating significant increases in ejection fraction with exercise.

In this review, 12 patients showed either no increase or a drop in ejection fraction at peak exercise with both techniques, but again the magnitude of change was greater when VROI was used, as shown in Table 1.

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Demonstration of a Left-Atrial Myxoma on the Paradox Image

The paradox image (*1*) is useful in the detection of left-ventricular aneurysms. We recently performed a gated heart-pool scan on a patient with a known left-atrial myxoma, and although it was well seen on the cine display, it was more convincingly demonstrated on the paradox image. We believe that this has not been reported previously.

A 51-year-old man was referred to a cardiologist 2 yr before the diagnosis of left-atrial myxoma was established. When first seen, he complained of episodic dyspnea not related to exertion. At this stage a mitral systolic murmur was heard, and the provisional diagnosis was alcoholic cardiomyopathy with functional mitral incompetence. It was not until his third hospital admission that a mitral diastolic murmur was heard. A subsequent echocardiogram demonstrated a left-atrial myxoma.

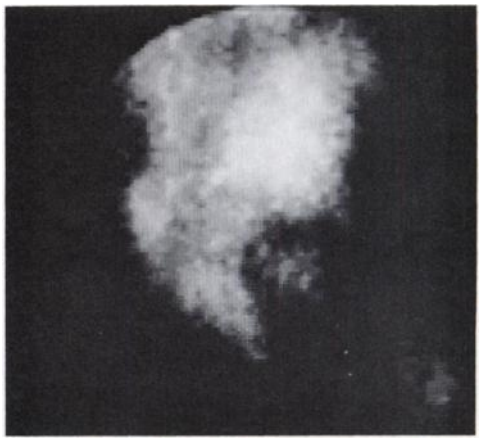

FIG. 2. LAO view (45°) at end-systole when myxoma has returned to left atrium and no photon-deficient area is seen in left-ventricular cavity.

The gated heart-pool study showed an enlarged pulmonary artery consistent with pulmonary hypertension. A photon-deficient area representing the myxoma was seen in the cine display in both the anterior and 45° LAO blood-pool scans (Figs. 1 and 2). However, the myxoma was more convincingly seen on the paradox image (Fig. 3). The tumor was subsequently removed; it had been attached by a long pedicle to the endocardium of the inferior border of the interatrial septum. A postoperative study confirmed that the area of "paradox" was no longer present (Fig. 4).

The paradox image is a computer-generated image obtained by subtracting the left-ventricular end-diastolic image from the left-ventricular end-systolic image. This option is now incorporated in many computer programs for gated heart-pool imaging. Holman et al. (*1*) recently reviewed the paradox image in the evaluation of regional wall dyskinesia and stressed the care needed in defining the systolic and diastolic planes of the mitral valve.

Atrial myxomas are rare but are important because they are a curable form of heart disease. Echocardiography is the preferred

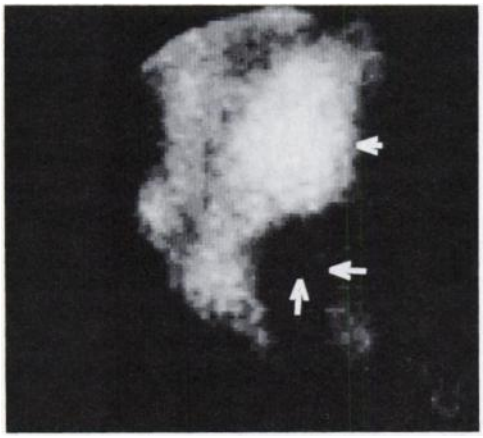

FIG. 1. LAO view (45°) of early diastole when myxoma has prolapsed into left-ventricular cavity and is seen as a photon-deficient area (large arrows). Small arrow indicates enlarged pulmonary artery.

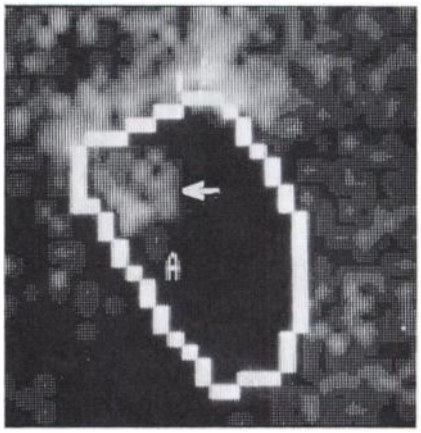

FIG. 3. Left-ventricular paradox image, in 45° LAO view, shows discrete area of positivity at base of left ventricle (arrow), which represents the myxoma.