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Gated Radionuclide Biventriculography

In contrast to conventional radiographic ventriculography—where a high-volume pressure injection of hyperosmolar contrast agent is required to visualize and evaluate the volume of one side of the heart at a time (1,2)—the radionuclide angiogram (3,4) is a physiologic, safe, non-invasive procedure that is easy to perform and to repeat without undesirable side effects or discomfort to the patient.

Following the i.v. injection of an intravascular tracer such as Tc-99m-labeled human serum albumin, the passage of radioactivity through the heart is monitored by a scintillation camera and images are sequentially recorded to be assessed qualitatively and/or quantitatively.

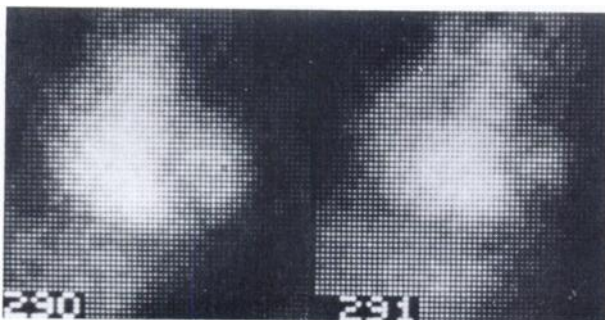


FIG. 1. Gated radionuclide biventriculogram in LAO projection in diastole (left) and systole (right) to demonstrate the hugely enlarged right ventricle.

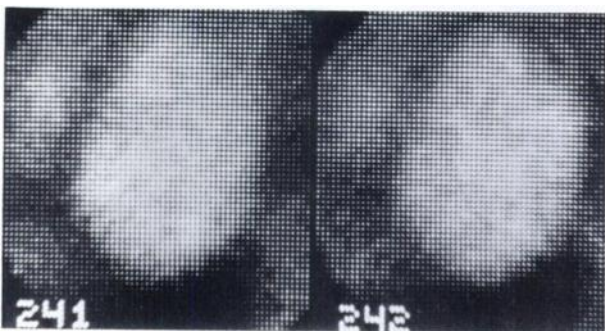


FIG. 2. Gated radionuclide biventriculogram in LAO projection in diastole (left) and systole (right) to illustrate the markedly enlarged left ventricle.

On a qualitative basis, the obtained scintiphotos are used to estimate the sizes of cardiac chambers and great vessels and to detect congenital or acquired anatomic abnormalities.

For quantitative analysis, the output of the scintillation camera is interfaced to a computer system. By introducing a physiologic gating signal (e.g., electrocardiographic), the data are obtained only during selected portions of the cardiac cycle. By summation of the obtained information over several cardiac cycles, mean cardiac scintiphotos are obtained for selected portions of each heart beat. When this procedure is applied to end-systole and end-diastole, information is obtained regarding regional wall motion (5), ventricular volume, and ejection fraction.

This gated radionuclide technique has a major advantage that has not received enough recognition: it permits simultaneous evaluation of both right and left ventricles regarding their size (Figs. 1 and 2) and calculation of the ejection fraction of each ventricle (6,7). Accordingly, this technique fully deserves to be called Gated Radionuclide Biventriculography instead of the less descriptive terms currently used.

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Segmental Analysis of Tl-201 Stress Myocardial Scintigraphy: The Problem of Using Uniform Normal Values of Tl-201 Myocardial Uptake

The method of quantitation of regional Tl-201 myocardial uptake, described by Lenaers et al. (1) is very similar to the Tl-201 scintimetry (2) which was designed to relate the regional Tl-201 minimum uptake to the myocardial maximum uptake (= 100%). This method has proved to be valid for comparing Tl-201 regional uptake with (a) the grade of coronary artery stenosis, and (b) the regional left-ventricular motion pattern (2). As we have shown, with the subject at rest, each anatomically defined region of the left ventricular myocardium has its own normal Tl-201