CLINICAL APPLICATIONS OF RADIONUCLIDE ANGIOCARDIOGRAPHY

Department of Surgery, Duke University Medical Center, Durham, North Carolina, U.S.A.

Robert. H. Jones, M. D.

Radionuclide angiocardiograms have been performed in over 1000 patients with a variety of cardiac disorders. Following intravenous administration of 30 mCi Tc-99m pertechnetate, precordial counts are recorded at 50 msec intervals during the initial transit of tracer through the heart. The Baird-Atomic System Seventy-Seven gamma camera was used for these studies because of the count rate of 400,000 counts per second and because of software development. Counts from individual cardiac chambers permit calculation of cardiac output and mean volume and transit times. Construction of a typical cardiac contraction during the five to ten heart beats during tracer passage through the left ventricle permits assessment of volume changes and wall motion of this chamber. Independent comparisons of radionuclide measurements with cardiac catheterization data have documented the accuracy of the technique. The noninvasive procedure has proven useful in initial evaluation of children with congenital heart disease and documents abnormal patterns of blood flow and quantitates intracardiac shunts. The simplicity of the technique makes it well suited for serial determinations before and after medical or surgical therapy and during different physiologic states. Examination of patients during maximal exercise has provided a large amount of hemodynamic information. Normal subjects increase ventricular volume and ejection fraction during exercise. Patients with myocardial ischemia increase end-diastolic volume, but cannot increase the stroke volume which results in a decrease in ejection fraction during exercise. Evaluation of cardiac function during exercise provides important information describing cardiac function which cannot be obtained by other techniques. Radionuclide angiocardiography is a valuable procedure which greatly aids the management of patients with cardiac disorders.