4) Heart

Clinical Evaluation of Heart Scan

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The heart scan visualizes the approximate shape and size of heart or pericardium using radioisotopes. The scan figure displays either heart pool, heart muscle, or pericardium according to the radio-pharmaceuticals used and the way of administration.

The heart pool scan uses a particular radiopharmaceuticals that stay long injection. The culating blood after intravenous injection. The scan figure has a less advantage in the sharpness of the image than that of X-ray radiography, but the former shows a distinct advantage in procedures concerning safety and easiness over the latter. The pericardial scanning is demonstrated after intrapericardial administration of particular radio-pharmaceutials remaining there for long time. However, the procedure needs the puncture of pericardium, sometimes resulting in a misfortune. This fact reduces the clinical value of the pericardial scanning below the X-ray radiography. The myocardial scanning can be safely applied on a serious illness of the heart. The electrocardiogram is recognized as the most useful weapon for examining the heart. But it is considered that the electrocardiogram fails to make a correct diagnosis on about 20% of the patients with myocardial infarction. This suggests that additional information to the results of electrocardiogram is needed.

In 1954 Burch et al. said that ^{86}Rubidium localized at the myocardium in a short time after intravenous injection. In 1962 Carr et al. reported that heart could be displayed by photoscan using ^{86}Rubidium to dog following intravenous injection. They failed to show the myocardial infarction of a patient. But, they could succeeded in displaying it on scan by using ^{203}Hg-chlormerodrine which accumulated in it. In 1964, they showed the myocardial infarction of dogs and patient on scan by using ^{131}Cesium.

^{131}Cesium does not accumulate in the lesion but in a normal myocardium. This fact is demonstrated on scan by a low active area corresponding to the lesion. ^{131}Cesium has a physical half life of 10 days and emittes 20.4 Kev by an electrocapture. The chemical form used in scan is cesium chloride. Myocardial scan has been performed on more than 130 patients. These scan figures of hearts can be classified into ten types according to the extent of the density of dots on scan. A myocardial infarction is demonstrated by a partial lower density of dots surrounded by the high density of heart image. The good correlation is shown concerning the site of the infarction predicted by both an electrocardiogram and myocardial scan. The hypertensive cardiac disease and myocarditis showed a low density of dots, on a scintigram of heart. The result suggests that ^{131}cesium is a useful radiopharmaceutical for myocardial scan which supplys an additional information concerning an ischemic heart disease.