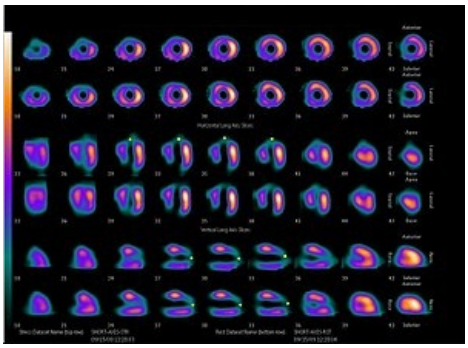
Myocardial perfusion scintigraphy

This method monitors the accumulation of radiopharmaceuticals in the tissue, which is higher when the monitored area is **perfused** better. We focus mainly on the **left ventricular muscle**. It is the most common cardiological examination in the field of nuclear medicine.

The examination can be performed **at rest and during exercise**, both physical and pharmacological (vasodilators, sympathomimetics). SPECT is used more often to monitor and evaluate the result, planar scintigraphy is also possible, although it has less spatial accuracy.



Myocardial necrosis of the left ventricle, anpicoanterior (marked by a yellow dot)

Indication

Patients with **suspected acute coronary syndrome** and **chronic ischemic heart disease** are most often indicated to be monitored for the extent of myocardial blood flow .

Myocardial perfusion scintigraphy plays an important role in the **prognosis** and further monitoring of myocardial status during and after treatment.

Radiopharmaceuticals

Radiopharmaceuticals with high affinity for myocardial structures are used.

99m Tc-MIBI (methoxyisobutylisonitrile) binds to mitochondria, of which there are many in the myocardium.

201 thallium - a cation, very similar to potassium, its first passage can be monitored, as well as (after 24 hours) the total distribution of potassium (or functional Na / K-ATPase) in the myocardium. The ischemic area shows slower uptake (slow *wash-in*) and retains the accumulated radiopharmaceutical (slow *wash-out*) for longer.

Implementation and output

After administration of the radiopharmaceutical, we monitor its accumulation in the heart. **Gated scintigraphy** can be used for this, which cooperates with the ECG , the recording is the same as for gated ventriculography (Radionuclide examinations of the heart). The **ECG gated SPECT**, which has a better explanatory value, can also be performed in the same way .

From the ECG gated SPECT we can obtain individual sections of the heart in three planes and 3D reconstruction. This output is excellent for monitoring the placement of a lesion in space. **Polar maps** compose a 3D image into a two-dimensional "floor plan" by the myocardium, as if we were looking at the heart from the apex. This output is sometimes called the *bull's eye* . Necrosis then manifests as a failure in a certain part of the circle. This image is usually supplemented by an indication of the course of the coronary arteries and thus finds out in which basin of which artery the ischemia occurred.

In cooperation with computer technology, it is possible to calculate the activity of the radiopharmaceutical in the blood and thus approximately determine the **volume of blood** flowing through the individual parts. It is also possible to objectively compare the results at rest and under load.

Links

Related articles

- Recommended examination procedure for suspected acute myocardial infarction
- Heart attack
- Ischemic heart disease

Bibliography

- KUPKA, Karel – KUBINYI, Jozef – ŠÁMAL,, et al. *Nukleární medicína.* 1. edition. vydavatel, 2007. 185 pp. ISBN 978-80-903584-9-2.