

# Myocardial perfusion scintigraphy - criteria of SPECT/CT protocol selection.

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**Key words:**

myocardial perfusion, nuclear medicine, SPECT/CT, image quality

**Background:**

Myocardial perfusion imaging with  $^{99m}\text{Tc}$ -MIBI by SPECT/CT plays a major role in the diagnosis of coronary artery disease (CAD) as a non-invasive test to assess perfusion in cardiomyocytes. The exam allows to assess the severity of the disease, the effectiveness of the therapy, and has a prognostic value. One disadvantage of this imaging method is the relatively long SPECT acquisition time. The possible solution to this problem is shortening of the examination time by improving the quality of imaging and changing the acquisition parameters. The use of SPECT/CT with cadmium-zinc telluride (CZT) technology may improve scanning parameters including reduction of acquisition time, however maintenance of high-quality imaging is required.

**Aim:**

The aim of the study was to check the possibility of implementation of a new myocardial perfusion imaging protocol with reduced acquisition time.

**Material and methods:**

We compared two protocols of myocardial perfusion SPECT/CT with  $^{99m}\text{Tc}$ -sestamibi using different acquisition and reconstruction parameters. Two scans for one patient was done firstly as an 8 minutes protocol, the second was shortened to 6 minutes. The acquisition was performed on a CZT camera one after the other. Then CT scan for attenuation correction was performed according to the standard SPECT/CT procedure. The analysis was performed on planar perfusion reconstruction of the SPECT myocardium. The volume of the greatest distribution of radionuclides in the heart was selected semi-automatically on the obtained coronary images. For both protocols, three measurements were performed at the same locations and similar volumes in each measurement, calculating the number of counts, mean, standard deviation (SD) and volume. The measured volumes gradually increased in the measurements. The SD standardized to the volume of 1 ml was considered an important parameter of the differentiation capacity of regions with a lower uptake of  $^{99m}\text{Tc}$ -sestamibi in cardiomyocytes. All images were assessed by two nuclear medicine specialists in order to confirm the quality of the imaging.

**Results:**

Performed examination of one patient with confirmed myocardial ischemia indicated a 10.48% decrease in SD/ml and 23.62% decrease in the number of counts of the measured volume. The amount of decrease in SD/ml significantly reduced the possibility of diagnosis of small ischemia regions in 6 minutes protocol in comparison with 8 minutes protocol.

**Conclusion:**

On the basis of comparative analysis performed by nuclear medicine specialists, the 8-minute protocol was selected as the standard SPECT/CT myocardial perfusion procedure due to better image quality and greater resolution for small ischemic area of myocardium.

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