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Imaging protocols

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The myocardial perfusion tracers currently available (i.e. thallium-201 and 99mTc-labelled tracers as Sestamibi and tetrofosmine) allow the physician to choose between several imaging protocols.

The most common protocol with thallium-201 is the stress-redistribution, preceding the redistribution imaging by the re-injection of an additional amount of tracer (74 MBq) in the case of severe perfusion defects on stress images. If the clinical question is mainly the assessment of residual viability, the rest-redistribution protocol seems more accurate.

Due to the lack of significant redistribution, 99mTc-labelled tracers require two different sets of acquisition after separate injection: at stress and at rest. The two conditions can be obtained either in the same day (single-day protocol) or in two different days (dual-day protocol). In diagnostic patients, the stress condition is frequently obtained first; in the case of normal stress images (i.e. normal perfusion and function), the rest study can be skipped.

In some institutions, a combination of thallium-201 and 99mTc-labelled tracers protocols are performed (dual-isotope): thallium-201 is injected at rest and images are acquired 10 min after injection; then, the stress test is performed and either sestamibi or tetrofosmine are injected at peak stress and acquired 30 to 45 min after injection. This protocol allows for a shorter time to complete a rest-stress evaluation (90' min) compared to a stress-redistribution protocol with thallium (3 to 4 hours) or to a single-day protocol with 99mTc-tracers (4 to 5 hours).

ECG-gated acquisition can be obtained with all protocols; it is suggested to have gated images both at stress and rest, to assess the effect of the stress test on LV volumes and function (i.e. to detect the presence of stress-induced stunning, an indirect sign of severe and extensive CAD).

In the recent years, new software developments allow for the reconstruction of images with reduced count statistic; this could be used to have study acquired with a reduced time/frame compared to standard acquisitions (thus allowing for fast acquisitions, short protocol time and improved patients comfort). Alternatively, a reduced amount of tracer can be injected, with a standard time for acquisition, thus allowing a reduced radiation burden to both patients and operators.

References

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