Myocardial perfusion and viability scintigraphy for assessment of the effect of intracoronary injection of autologous bone marrow cells in acute myocardial infarction

J.G. Fjeld, Oslo (NO), on behalf of the ASTAMI investigators (1)

There is new evidence of continuous regeneration of the myocardium, and that this regeneration is increased after myocardial infarction (2). There are also reports of a positive effect on this myocardial regeneration from intracoronary bone marrow cells. This positive effect is explained by stem cells giving angiogenesis, reduced apoptosis and reduced remodeling of the infarcted myocardium (3).

Patients with acute ST-elevation myocardial infarction of the anterior wall (i.e. the left anterior descending coronary artery, LAD) were randomized to percutaneous coronary intervention (PCI) and optimal medical treatment, or PCI and optimal medical treatment in combination with intracoronary injection of mononuclear bone marrow cells (mBMC). A randomized controlled trial was designed, were 50 PCI-treated patients on day 4-8 after their anterior wall infarct were assigned to bone marrow aspiration and, while a control group of 50 did not undergo mBMC- treatment. Bone marrow was aspirated from the iliac crest, the mononuclear cell fraction (mBMC) was isolated by density gradient centrifugation and injected intracoronary by a second PCI, using intermittent balloon inflation to ensure the absence of flow distal to the culprit lesion stent in LAD.

For assessment of treatment effect on left ventricular function, scintigraphic methods were used together with MRI and echocardiography. Baseline recordings were performed on day 4-7, except MRI which was performed after 2-3 weeks. The second recording, to evaluate treatment effect, was done after 6 months. The study design is shown in Figure 1, and the scintigraphic results in Table 1.

Figure 1
There were no significant differences between mBMC-treated and control patients in the LVEF, end diastolic volume and infarct size during the first 6 months after the infarct (Table 1). This was the same with all three imaging methods, although the size of the post infarct changes was different between the three modalities.

Table 1

The conclusion is that intracoronary administered mBMC, neither improved LVEF, nor reduced end-diastolic volume or infarct size. The results from myocardial perfusion gated SPECT were in accordance with results from MRI and echocardiography. The scintigraphic parameters from the study here presented will be used as background for a discussion of the clinical value of ECG-gated myocardial SPECT.

References