Myocardial Perfusion SPECT Imaging in Patient with Left Bundle Branch Block

Case report

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A 71-y-old man with LBBB and episodes of typical chest pain was referred for gated myocardial perfusion SPECT. Cardiac risk factors included age, male gender and obesity. Resting ECG showed sinus rhythm with LBBB pattern. An echocardiogram revealed enlargement of the left ventricle and reduced systolic function with pathological septal movement due to the LBBB, but also antero-apical hypokinesia was noted. LVEF was 54%.
The patient underwent gated myocardial perfusion SPECT with a 1-d rest-stress protocol. For the rest study 370 MBq of 99mTc-sestamibi were injected intravenously in fasting conditions. After one hour gated perfusion imaging was performed in the supine position by use of single-head gamma-camera (Siemens e.cam Signiture series).

For the stress study 925 MBq of the tracer were injected 3 min after the infusion of dipyridamole at 0,56 mg/kg.
After dipyridamole injection, the patient experienced chest pain and headache. ECG showed profound ST depression in infero-lateral leads comparing to the baseline ECG.

Baseline ECG and at the moment of peak dipyridamole effect (sestamibi injection) during the first myocardial perfusion SPECT
Gated SPECT data were analyzed with 4D-MSPECT software. Myocardial perfusion was assessed visually and semiquantitatively by using 17-segment 5-point scoring system.

Reversible perfusion defects (myocardial ischemia) were detected in basal anterolateral segment, mid and basal inferior and mid inferolateral segments, affecting app. 24% of LV.

TID index (transient ischemic dilatation) was increased and measured 1.23, suggesting multi vessel disease.
Stress gated images revealed moderate hypokinesia in segments with perfusion defects and mild hypokinesia at rest. This finding (decreased LVEF and new wall motion abnormalities at stress) was in favor of myocardial stunning.

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<th>EDV</th>
<th>ESV</th>
<th>LVEF</th>
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<tr>
<td>Stress</td>
<td>187ml</td>
<td>120ml</td>
<td>36%</td>
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<tr>
<td>Rest</td>
<td>163ml</td>
<td>86ml</td>
<td>47%</td>
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The patient was referred to coronary angiography, which showed multi vessel involvement with plaques on proximal LAD, distal RCA and 1st OM, intermediate lesion on proximal RCA and 99% stenosis on Ramus. PCI was done with stenting to Ramus.
Eight months later he's been complaining of atypical chest pain and second gated myocardial perfusion SPECT was done. During the dipyridamole infusion he experienced severe chest pain with ischemic ST changes on ECG in infero-lateral leads, which subsided when intravenous aminophylline and two inhalations of trinitroglycerin (NTG) were given.

Baseline ECG

Dipyridamole effect (sestamibi inj.)
during the second myocardial perfusion SPECT
Myocardial perfusion SPECT imaging revealed severe and extensive myocardial ischemia in the apex, anterior wall, mid anteroseptal and apical septal and inferior segments, affecting app. 36% of LV. Fixed perfusion defects were registered in mid and basal inferior segments.
Distribution of the ischemic area in the vascular territories of the coronary arteries

Myocardial perfusion during stress, rest and reversibility in 17-segment model of the LV
Gated SPECT images displayed in 2-dimensional and 3-dimensional formats showed global hypokinesia of the LV with severe hypokinesia of the anterior wall after dipyridamole that improved to moderate hypokinesia at rest. Inferior wall in both studies was hypokinetic.
The patient underwent immediate second coronary angiography that displayed significant stenosis of the left main coronary artery.

When compared to the first CA, fast progression of the native disease on left main was disclosed. Patient was recommended for CABG.