

Comparison of image reconstruction algorithms in myocardial perfusion scintigraphy

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The purpose of this study was to compare the clinical utility of two image reconstruction algorithms in myocardial perfusion SPECT (single-photon emission computed tomography): filtered back-projection (FBP) and ordered subset expectation maximization (OSEM). A rest/stress one-day protocol with ^{99m}Tc -MIBI or tetrofosmin was performed on 102 consecutive patients who underwent coronary angiography. After SPECT data acquisition, images were reconstructed with FBP and OSEM algorithms. We assessed diagnostic performance (sensitivity, specificity and accuracy) in detecting coronary artery stenosis and evaluated regional tracer uptake with a 4-point scoring system. Although there were no significant differences in diagnostic performance between FBP and OSEM reconstruction, the OSEM method yielded higher uptake in the RCA area than the FBP method by reducing the count-loss artifact due to hepatic uptake of the tracers. In addition, regional uptake in the LCX area was significantly lower in the OSEM image than in the FBP image; this phenomenon was observed mainly in patients with coronary stenosis and/or infarction in the LCX territory. In conclusion, OSEM and FBP offered comparable diagnostic performance in stress myocardial perfusion SPECT. The OSEM method contributed to reduction of the count-loss artifact in inferior and posterior walls and to easy recognition of hypoperfusion in the LCX area.

Key words: myocardial perfusion scintigraphy, image reconstruction, OSEM algorithm, Tc-99m-MIBI, Tc-99m-tetrofosmin