

# Using attenuation-corrected images in myocardial perfusion scintigraphy reduces the need for a rest study, both for computerized and manual interpretation

Trägårdh E, MD, PhD,<sup>1</sup> Minarik D, PhD,<sup>2</sup> Edenbrandt L, MD, PhD<sup>1</sup>

<sup>1</sup>Clinical Physiology and Nuclear Medicine, Skåne University Hospital, Malmö, Sweden, <sup>2</sup>Medical Radiation Physics, Skåne University Hospital, Malmö, Sweden

## Introduction

Stress myocardial perfusion scintigraphy (MPS) is widely regarded as a clinically useful non-invasive imaging modality for diagnosing patients with suspected coronary artery disease. However, localized soft-tissue attenuation by the breasts, lateral chest wall, and abdomen may create artefacts that mimic true perfusion abnormalities and decrease test specificity.

Attenuation in MPS may require comparison of stress and rest images to distinguish perfusion abnormalities from artefacts. If a stress study is considered normal, there is no need for a rest study. The purposes of the study were to 1) compare the accuracy of computerized determination of the need for a rest study when using non-attenuation corrected (NC) images or attenuation-corrected (AC) images and 2) compare the evaluations of physicians determining the need for a rest study when using NC images or NC+AC images.

## Methods

1261 patients admitted to MPS at Skåne University Hospital, Sweden in 2007 were included. The MPS studies were performed using a 2-day gated stress/non-gated rest Tc-99m-tetrofosmin protocol. Patients were stressed using either maximal exercise or pharmacological test with adenosine. Attenuation maps were generated from simultaneous transmission measurement using a Gd-153 multiple-line source.

Stress studies were interpreted by three physicians who judged each study as “no rest study necessary” or “rest study necessary” (evaluating NC+AC images). Agreement between 2 out of 3 physicians was considered gold standard. The EXINI heart™ software package was used to interpret the AC and NC images separately for each patient. For the comparison between the manual interpretations, the evaluations from the physicians (NC only vs. NC+AC) were used. McNemar was used for comparing the performance of computerized determination as well as the manual interpretation.

## Results

For the computerized determination of the need for a rest study, the sensitivity for NC only was 78%, and 86% for AC images. Specificity was 83% and 80%, respectively and accuracy 80% and 84%, respectively ( $p < 0.0001$ ).

For manual evaluation, the number of no-rest-study-required cases was significantly higher using the NC+AC studies compared to the NC studies (859 vs. 645 cases ( $p < 0.0001$ )). In 634 cases (50%) the evaluations for both NC and NC+AC stress images were no-rest-study-required and in 391 cases (31%) that a rest study was required. In 11 cases (1%), the physicians did not want a rest study when evaluating NC images, but wanted a rest study when evaluating NC+AC images. In 225 cases (18%), the physicians thought it was necessary to perform a rest study when evaluating NC images, but not when evaluating NC+AC images.

## Conclusions

Using AC images improves the detection of normal studies, thus the need for a rest study decreases. This was true both for computerized and manual interpretation. This approach could improve laboratory efficiency and reduce the radiation dose to the patient.

## Figure 1

An example of a study that was interpreted as “rest study necessary” when evaluating NC only (left), and as “no rest study necessary” when evaluating AC (right), both for manual and computerized interpretations.

## Disclosure

LE is a stockholder of EXINI Diagnostics.

