Optimising one-day myocardial perfusion studies on Infinia Hawkeye 4

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Introduction

According to EANM/ESC procedural guidelines for myocardial perfusion imaging, attenuation and scatter compensation have shown to improve image quality and the interpretation of patient studies. Attenuation correction without scatter compensation is not recommended. However, our initial patient studies gave the impression of more noise in the images when applying both attenuation and scatter correction, especially in the low count stress studies, compared to our validated myocardial studies. Image noise may cause false positive studies.
The aim of this study was to optimise our one-day myocardial protocol on Infinia Hawkeye 4 by phantom studies.

Material and methods

Our routine is a one-day stress-rest protocol with ^{99m}Tc-tetrophosmin, 250-300 MBq for the stress study and three times higher activity for the rest study.
We used a SPECT-phantom for comparing the image quality on Infinia Hawkeye 4 with two other cameras, none with the possibility of attenuation or scatter compensation. The phantom studies on Infinia Hawkeye 4 included acquisitions with both CT transmission and scatter window, and CT transmission without scatter window, but with a more narrow energy window of 15 %, instead of 20 %, around the photo peak of ^{99m}Tc.
We are continuing with more phantom studies.

Results

Our results so far show that phantom studies on Infinia Hawkeye 4 with both attenuation and scatter correction gave more noise and more defects compared to studies acquired with the other cameras, and confirmed the impression from the patient studies. Scatter correction introduces artefacts in the phantom image with a size comparable to a sphere with diameter 19.1 mm. Studies with only attenuation correction combined with an energy window of 15 % gave images similar to those obtained with our routinely used cameras.

Conclusion

Phantom studies verified that applying scatter correction in addition to attenuation correction on Infinia Hawkeye 4 introduces noise in our one-day myocardial perfusion studies. So far, our solution to reducing the noise has been, in contrast to general recommendations, to use attenuation correction without simultaneous scatter correction, but with a narrower energy window.
Our optimisation study continues.