

JOINT POSITION STATEMENT

On the basis of current information, the American Society of Nuclear Cardiology and the Society of Nuclear Medicine recommend that, when available and technically feasible, attenuation correction should be used in addition to electrocardiography gating with single photon emission computed tomographic (SPECT) myocardial perfusion imaging to maximize its diagnostic accuracy and clinical usefulness.

American Society of Nuclear Cardiology and Society of Nuclear Medicine joint position statement: Attenuation correction of myocardial perfusion SPECT scintigraphy

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INTRODUCTION

The Society of Nuclear Medicine (SNM), founded in 1953, and the American Society of Nuclear Cardiology (ASNC), founded in 1993, are professional medical societies whose missions are 3-fold: (1) to facilitate optimal delivery of nuclear medicine/nuclear cardiology services through professional education, (2) to support research, and (3) to establish standards and guidelines for training and practice. Recently, both societies recognized attenuation correction of myocardial perfusion single photon emission computed tomography (SPECT) studies as a potentially important means of distinguishing attenuation artifact from coronary artery disease, and they issued a statement to this effect.¹ Since that publication, additional scientific studies have been published. Manufacturers have substantially improved commercially available and validated attenuation correction approaches, and there is now a growing acceptance of the technology by clinicians. As a result, the boards of ASNC and the SNM have determined that, in the interest of the highest-quality patient care, a new statement should be made regarding attenuation correction.

JUSTIFICATION

Following its initial description and demonstration,² multiple investigators have shown that attenuation correction adds to the diagnostic accuracy of stress myocardial perfusion SPECT.³⁻⁷ Single-institution trials were followed by independent multicenter trials by use of different hardware/software approaches that clearly demonstrated the utility of attenuation correction.⁸⁻¹³ In a prior joint statement, the SNM and ASNC concluded that “the objective technique of attenuation correction has become a method for which the weight of evidence and opinion is in favor of its usefulness.”¹ At that time, however, concerns regarding the level of validation and quality-control aspects of the existing commercial systems limited the emphasis that could be included in the statement.

The ability to accurately perform attenuation correction with validated commercial hardware/software solutions by use of strict quality-control measures enhances the interpretive confidence and accuracy of SPECT myocardial perfusion imaging. With recent publications further validating attenuation correction by using a variety of methods including electrocardiography (ECG)-gated SPECT imaging,¹⁰⁻¹⁶ there has been growing clinical acceptance of attenuation correction by practitioners. Recent investigations have also demonstrated the possibility for stress-only imaging in selected patients, therefore improving laboratory efficiency.¹⁷⁻¹⁹

As a result of these developments, several manufacturers now have commercial hardware/software approaches that have been clinically validated and have

implemented quality-control schemes in association with attenuation correction. ASNC and the SNM thus believe a more supportive statement of the utility of attenuation correction is justified.

PREREQUISITES

There are important prerequisites for the incorporation of attenuation correction into routine clinical practice; these prerequisites cover acquisition, processing, and interpretation.¹

1. High-quality transmission scans and sufficient transmission counts with low cross-talk from the emission radionuclide are essential to reduce the propagation of noise and error into the corrected emission images.
2. Quality-control procedures for image registration should be used for projection data acquired by use of sequential transmission-emission imaging protocols (eg, computed tomography–SPECT systems).
3. Motion correction, scatter correction, and resolution recovery should be used with attenuation correction.
4. Attenuation correction should be employed concurrently with ECG-gated SPECT imaging.
5. Technologists must have adequate training in the acquisition and processing of attenuation-corrected studies. Physicians must have adequate training in the interpretation of attenuation-corrected images.
6. Physicians should view and interpret both uncorrected and corrected images.

CLINICAL SIGNIFICANCE

It is the position of ASNC and the SNM that incorporation of attenuation correction in addition to ECG gating with SPECT myocardial perfusion images will improve image quality, interpretive certainty, and diagnostic accuracy. These combined results are anticipated to have a substantial impact on improving the effectiveness of care and lowering health care costs.

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