Contribution ID: **40** Type: **not specified**

Reconstruction Techniques (SPECT)

Thursday 30 August 2012 18:40 (20 minutes)

Abstract. Early image reconstruction techniques for SPECT are based on the analytical image reconstruction methods that assume the experimentally acquired projection data are ideal. That is, they are not contaminated by physical factors such as photon attenuation and scatter, instrumentation factors such as trade-off between resolution and detection efficiency, and the spatially variant collimator-detector response, and patient factors such as the size and configuration of the patients, respiratory and cardiac motions and the limitation of radiation dose to the patient. As a result, SPECT image quality has been suffered by poor spatial resolution and high level of image noise. The development of 3D and 4D quantitative SPECT image reconstruction methods in recent years has provided significant improvement in both the quality and quantitative accuracy of SPECT images. In this presentation, we will present the effects of the various image degrading factors for SPECT, the principles of quantitative SPECT image reconstruction, and examples of the significant improvements in the quality and quantitative accuracy from experimental, phantom and clinical studies.

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Session Classification: Software: