

Summary

Clinical Application of Gated SPECT Imaging to Regional Function Assessment: Current Status and Limitations

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It is likely that clinical applications of ECG-gated single-photon emission computed tomography (SPECT) are established in nuclear cardiology practice because of the improved diagnostic accuracy of gated SPECT imaging for the detection of coronary artery disease and because this technique enables not only simultaneous assessment of myocardial perfusion and function but also improvement of risk stratification of coronary patients. Although a gated approach with SPECT imaging has been demonstrated to have high reproducibility and reliability for quantifying global function, there are several limitations in appropriate processing of 4-dimensional data for quantitative assessment of regional function. Even if limited spatial and temporal resolutions and a lack of attenuation and scatter corrections are disregarded, sufficient data collection, image-quality control, and

precise application of algorithms to gated SPECT data are prerequisite. The results of several kinds of quantitative analysis of regional cardiac function, such as regional wall motion (distance deviation of the inner myocardial border), regional ejection fraction, percent wall thickening, and percent count increase with or without self-normalization have been reported. Further clinical application of quantitative regional function assessment by a gated SPECT technique, however, requires standardization of data acquisition, data analysis, and data presentation with appropriate quantitative parameters; production of a standard map using quantitative values; and validation study by comparison with results of visual analysis and other modalities in a large-scale patient population.

Key words: Gated myocardial SPECT, Quantitative analysis, Regional function.