

Performance of the automated motion correction program for the calculation of left ventricular volume and ejection fraction using quantitative gated SPECT software

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The effectiveness of the automated motion correction software (INSTILL, Philips Medical Systems Co. Ltd., Andover, USA) proposed by Matsumoto et al. to prevent motion artifact in quantitative gated SPECT, was tested with a technetium-99m point source and cardiac phantom. INSTILL well corrected the error due to point source movement during acquisition up to a distance of 5 pixels (32.8 mm) in the right and caudal directions, as well as with a distance of up to 7 pixels (45.9 mm) of oblique (caudal-right 45 degree) movement inside the coronal plane. End-diastolic volume (EDV), end-systolic volume (ESV) and ejection fraction (EF) were also well adjusted with INSTILL, for up to 3 pixels (19.7 mm) movement of the dynamic cardiac phantom during acquisition in the right, caudal and oblique directions. The respective maximum error with one, two and three pixel movement was 9, 24 and 23 ml in EDV, and 8, 22 and 21 ml in ESV. The maximum error of EF was 3% in all conditions without INSTILL. After using INSTILL, the maximum residual errors of both EDV and ESV were 7 ml and that of EF was 3% in all conditions. Quantitative gated SPECT software with INSTILL will calculate EDV, ESV and EF against movement of patients in the coronal plane. INSTILL is therefore concluded to be a reliable software for motion correction in clinical use.

Key words: quantitative gated SPECT, automatic motion correction, EDV, ESV, EF