

Summary

Examination Concerning Dissociation of Left Ventricular Volume Calculation Value Based on Difference of Analytical Algorithm and Perfusion Tracer in Gated Myocardial SPECT

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According to improvement of SPECT system, ECG-gated SPECT with $^{201}\text{TlCl}$ have been applied to the left ventricular volumetry. In this study 24 patients without ischemia demonstrated by stress ($^{99\text{m}}\text{Tc-TF}$) and rest ($^{201}\text{TlCl}$) dual-isotope ECG-gated myocardial SPECT were enrolled. To evaluate left ventricular volumetry using ^{201}Tl ECG-gated SPECT data, the left ventricular end diastolic volumes (EDV) were compared between Quantitative Gated SPECT (QGS) and Emory Cardiac Toolbox (ECT) as well as between dual-isotopes based on the same ECG-gated data.

The EDV values with $^{99\text{m}}\text{Tc}$ data (EDV_{Tc}) using QGS were well correlated with those using ECT ($r = 0.96$, $p < 0.0001$). Both QGS and ECT demonstrated well correlation between EDV_{Tc} ($r = 0.98$, $p < 0.0001$) and the EDV value with ^{201}Tl (EDV_{Tl}) ($r = 0.93$, $p <$

0.0001). However, QGS processing induced significantly lower EDV_{Tl} compared with EDV_{Tc} . In contrast, EDV_{Tl} were significantly higher than EDV_{Tc} in ECT performance. The QGS errors subtracting EDV_{Tl} from EDV_{Tc} were more evident according to the left ventricular volume increase. On the other hand, ECT error showed no tendency associated with the left ventricular volume.

From these results, a careful strategy for selection of tracers and softwares should be necessary to assessment of quantitative values derived from ECG-gated SPECT data because of interaction with softwares, tracers, and subjects.

Key words: Gated myocardial SPECT, Left ventricular end diastolic volume, Quantitative Gated SPECT, Emory Cardiac Toolbox.