

Normal stress databases in myocardial perfusion scintigraphy – how many subjects do you need?

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Conclusions

We conclude that the commonly used 30-40 individuals for making a normal stress database might not be enough due to the rather high coefficient of variation (CV). We propose that normal stress databases should consist of at least 50 subjects.

Purpose

Commercial normal stress databases in myocardial perfusion scintigraphy (MPS) commonly consist of 30-40 individuals. The aim of the study was to determine how many subjects are needed.

Methods

Four normal stress perfusion databases were developed: non-corrected images (NC) for male, NC for female, attenuation-corrected images (AC) for male and AC for female subjects. Patients who underwent 99mTc MPS at Skåne University Hospital in 2008 were considered. Patients were included if they had a normal test result (neither fixed nor reversible perfusion defects, normal ejection fraction, and normal end diastolic volume). Patients with diabetes, coronary artery disease, previous myocardial infarction, previous revascularization, ECG signs of myocardial infarction, paced rhythms and left bundle branch block were excluded. Finally, 126 male and 205 female subjects were included. The normal database was created by alternately computing the mean of all normal subjects and normalizing the subjects with respect to this mean, until convergence. Coefficients of variation (CV) were created for increasing number of included patients in the four different normal stress databases. To measure the variation between databases for a certain database size, we created 1000 normal databases from bootstrap samples drawn from the full data set. The CV between these databases was measured at each pixel, and we report on the mean coefficient.

Results

The figure shows CV for different database sizes. Normal stress databases with <25 subjects had a high CV. A marked decrease in CV was seen between 25 and 50 subjects (for NC male, CV decreases with 29%). For databases >50 individuals, there were only a slight change in CV (for NC male, CV decreases with 12%).

