Comparison of Gated SPECT, Echocardiography and Angiography Ejection Fractions
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Abstract

Background: Gated stress studies with Thallium previously suggested that SPECT overestimated the ejection fraction (EF) obtained with other modalities, limiting its use.

Objective: To compare EF obtained from stress gated SPECT (pharmacologic) using Technicium99m with EF estimated by transthoracic echocardiography (TTE) or cardiac catheterization (angio).

Methods: From a university-based outpatient stress lab, 502 stress tests performed over 14 months were reviewed; 126 gated pharmacologic stress tests were analyzed. Contemporaneous TTEs were available in 114, and angios in 26 of the studies. The stress nuclear protocols included a slow walk and the stress agent was regadenonosn in the majority of the studies. Mean EF reported from the post-stress gated SPECT, TTEs, and angios were tested with ANOVA. The absolute variance in EF between each two groups was averaged and compared using a 2-tailed student t test to the other groups.

Results: The mean EF obtained from SPECT, TTE and angio were 64 ± 12%, 58 ± 9% and 53 ± 6% respectively (P < 0.01). The absolute variance in SPECT-TTE and SPECT-angio were 9.2 ± 6.4% and 10.3 ± 7.7% respectively (P < 0.05 vs TTE angio); TTE-angio absolute variance was 5.6 ± 4.8%.

Discussion

Studies have conflicted with regards to reliability of gated SPECT-derived left ventricular volumes and ejection fractions. Although lack of correlation has been suggested, overestimation of ejection fraction has also been described. In this study we found a tendency for SPECT to overestimate the ejection fraction in post-stress gated studies compared with echocardiography and cath. Although several factors may have contributed to this observation, it is possible that the SPECT EF is augmented by the vasodilator effect of the stress pharmacologic agent. Further studies are needed to better qualify these findings. Meanwhile, given the importance of accurate quantification of a resting ejection fraction, especially as it relates evaluation of significant of valvular abnormalities or device therapy in heart failure, reliance on a SPECT derived ejection fraction may cause undue delay in therapy.

Ejection fraction obtained by stress SPECT imaging may overestimate the true resting EF and cause delay in therapy.

References