

Poster presentation

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Are there innate differences in 3D derived ejection fraction between the sexes? A cardiovascular MRI study in ~5000 patients

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Introduction

It has long been assumed that ejection fraction (EF) is identical in male and females. Until recently, the fidelity and reproducibility of imaging techniques guaranteed virtual superimposition of EF, nullifying any gender differences were they to be present. The influence of gender on EF thresholds is unknown.

Hypothesis

Using high resolution 3D CV MRI, we tested the hypothesis that there will be differences in male vs female EF's.

Methods

A database composed of consecutive patients who underwent CV MRI scanning (GE, EXCITE 1.5 T, Milwaukee, WI) between 2004-2008 was interrogated to yield all patients with EF >55% and no valvular heart disease >1+, no CAD, HTN, or cardiomyopathy. EF was determined primarily by standard FIESTA 3D methodology or 2D when available. Patients were stratified only by gender and age. We performed two-sample *t* tests to analyze the data and considered differences significant at $P < 0.05$.

Results

A total of 3,962 consecutive patients were evaluated, from which 1203 (30%) with normal EF were identified. Mean age: 51 + 19 yrs; 49% males, 51% females. Mean EF for males: 63.6 ± 3.9; range: 56 - 70%, females: 64.3 ± 3.6; range: 56 - 70%, $p < 0.001$. Under the assumption that

EF >55% may not be appropriate for normal thresholds, EF >60% and 65% were also stratified but did not yield significant gender differences. Similarly, stratification by age categories (decades) did not reveal a significant difference. A subset of 150 pts with clinical CV disease, representing the entire range of EF (5% - 81%), underwent intra/inter-observer reproducibility for LVEF and was 0.13 and 0.85%, respectively.

Conclusion

Contrary to conventional doctrine, LV EF as measured clinically, using highly reproducible and accurate 3D CV MRI, is slightly lower for males than females as determined in the largest CV MRI database (3962 patients) to our knowledge to date examining this subject. Thus, beyond establishing normal ranges for LVEF, these observations have far reaching clinical implications in defining thresholds of normality, as well as belying potential, albeit subtle, intrinsic differences in contractile mechanisms. These results reveal normal thresholds for EF using CV MRI are influenced by gender.