Meeting abstract

1085 Left ventricular peak filling rate can be predicted by analyzing 3 basal short axis slices using cardiac magnetic resonance imaging

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Introduction

Heart failure with normal ejection fraction (HFNEF) is responsible for nearly 50% of all congestive heart failure admissions. Cardiac magnetic resonance imaging (CMRI) has emerged as a novel tool for evaluation of diastolic function because of improved image resolution and accuracy. One important CMRI parameter that has been utilized for assessment of diastolic function is the peak filling rate (PFR). However, quantification of PFR is a lengthy process (40 minutes) due to the conventional process of manual tracing of each diastolic frame from apex to base. It has been observed that the basal slices contribute significantly more towards ventricular filling than apical slices. We sought to determine if evaluation of PFR with limited basal slices correlates well with conventional method, offering a time-saving.

Hypothesis

We evaluate the hypothesis that PFR determined by analyzing 3 basal slices correlates well with conventional all-slice method.

Methods

We examined 136 subjects of the total 3,386 cohort of the Dallas Heart Study, a multi-ethnic, population based sample of adults aged 30–65 years. Subject population included wide range of underlying pathophysiology from normal to subjects with low aortic compliance (AC) and subjects with high LV mass. The conventional method for assessment of diastolic function was determined by analyzing all seven slices indexed to end diastolic volume. These calculations for diastolic function were repeated analyzing only 3 basal slices. LV mass was determined using short-axis slices by manually drawing epicardial and endocardial borders. Papillary muscles were included in the LV mass measurement. Aortic compliance was determined by conventional MRI measurement. MRI was performed using two comparable 1.5 Tesla MRI systems (Philips Medical systems). Briefly, short-axis breath-hold, ECG-gated cine MR images were obtained from the apex to the base of the left ventricle with prospective gating using TFE sequence. The typical parameters were following: 6 mm slice thickness, 4 mm gap, field of view of 33–40, temporal resolution of 40 msec, and matrix size of 256 × 256.

Results

The Pearson correlation coefficient between 3-slice method and conventional method was 0.903 for the entire group. In respect to the subgroups, the Pearson correlation coefficient was 0.904 (normal patients), 0.947 (low AC), and 0.823 (high LV mass).

Conclusion

Three basal slice evaluation of peak filling rate correlates significantly with conventional method. This finding allows for rapid and accurate measurement of diastolic function.