

Assessment of Efficacy of 2D Echo and Contrast Echo in Detection of Thrombus.

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Abstract

Background: As echo is widely used to screen patients with coronary disease or heart failure at risk for LV thrombus, optimization of diagnostic strategies for thrombus detection is of substantial importance. Hence; we planned the present study to assess and compare the efficacy of 2D echo and contrast echo in detection of thrombus. **Subjects and Methods:** The present study included assessment and comparison of 2D echo and contrast echo in detection of thrombus. A total of 25 patients were included in the present study. Detailed demographic data and biochemical profile of all the patients was obtained. All the patients underwent both 2D echo and contrast echo. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software. **Results:** 2D echo detected thrombus in 3 percent of the cases while the contrast echo detected thrombus in 12 percent of the cases. Significant results were obtained while comparing the prevalence of thrombus as detected by 2D echo and contrast echo. **Conclusion:** Efficacy of contrast echo is significantly higher than that of 2D echo in detecting LV thrombus.

Keywords: Contrast Echo, Thrombus.

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Introduction

Use of UCAs in echocardiography is not new. The utility of a strategy of echo contrast administration based on a-priori clinical risk for thrombus rather than non-contrast echo image quality is unknown. As echo is widely used to screen patients with coronary disease or heart failure at risk for LV thrombus, optimization of diagnostic strategies for thrombus detection is of substantial importance.^[1-3] Since the ultrasound characteristics of micro-bubbles are distinctly different from those of the surrounding blood cells and cardiac tissue, the backscatter that they produce result in intense echocardiographic signals, which are proportional to the blood volume. Thus, the LV cavity is enhanced compared with the surrounding heart muscle (which has relatively lower myocardial blood volume).^[4-6] Hence; we planned the present study to assess and compare the efficacy of 2D echo and contrast echo in detection of thrombus.

Subjects and Methods

The present study was conducted in the department of cardiology and it included assessment and comparison of 2D echo and contrast echo in detection of thrombus. A total of 25 patients were included in the present study. Detailed demographic data and biochemical profile of all the patients was obtained.

Inclusion Criteria

- Age above 18 years.
- Patients presenting with clinical history and examination findings suggestive of Acute Myocardial Infarction.

All the patients underwent both 2D echo and contrast echo. All the results were compiled in Microsoft excel sheet and were analysed by SPSS software. Chi-square test and Mann Whitney U test were used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

Results

Table 1: Demographic data.

Parameter	Value
Mean age (years)	52.5
Males	15
Females	10
Mean BMI (Kg/m ²)	27.6

Table 2: Distribution of subjects according to presence of hypertension, diabetes and dyslipidemia.

Parameter		Value
Diabetes mellitus	Present	10
	Absent	15
Hypertension	Present	12
	Absent	13
Dyslipidemia	Present	11
	Absent	14

In the present study, a total of 25 patients were analyzed. Mean age of the patients of the present study was 52.5 years. Among these 25 patients, 15 were males while the remaining 10 were females. Mean BMI of the patients of the present study was 27.6Kg/m². 2D echo detected thrombus in 3 percent of the cases while the contrast echo detected thrombus in 12 percent of the cases. Significant results were obtained while comparing the prevalence of thrombus as detected by 2D echo and contrast echo.

Table 3: Prevalence of LV thrombus by 2D Echo and contrast Echo.

LV thrombus	2 D Echo	Contrast Echo	p- value
Number of patients	1	3	<0.05 (Significant)
Percentage of patients	4	12	

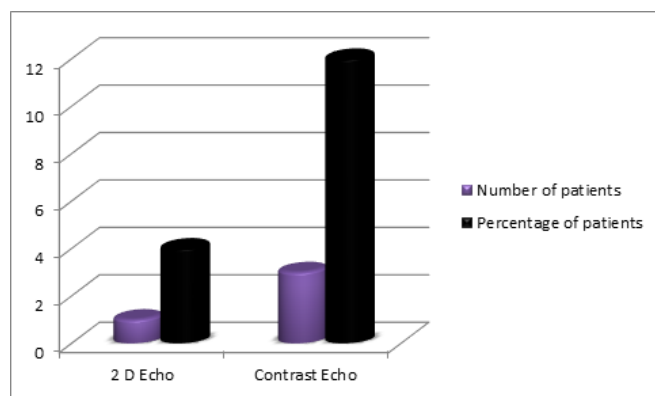


Figure 1: Prevalence of LV thrombus by 2D Echo and contrast Echo

Discussion

The present study was conducted with the aim of comparing the efficacy of 2D echo and contrast echo in detection of thrombus. A total of 25 patients were analyzed. Mean age of the patients of the present study was 52.5 years. Among these 25 patients, 15 were males while the remaining 10 were females. Larsson MK et al determined its ultrasonic diagnostic features, we evaluated the endocardial border delineation as visualized in a porcine model and the concomitant effect on physiological variables. Three doses of the novel polymer-shelled CA (1.5 ml, 3 ml, and 5 ml [5 × 108 microbubbles (MBs)/ml]) and the commercially available CA SonoVue (1.5 ml [2–5 × 108 MBs/ml]) were used. Visual evaluations of ultrasound images of the left ventricle were independently performed by three observers who graded each segment in a 6-segment model as either 0 = not visible, 1 = weakly visible, or 2 = visible. When comparing the endocardial border delineation capacity for different regions SonoVue showed significantly higher segment scores for base and mid, except for the mid region when injecting 1.5 ml of the polymer-shelled CA. Neither high nor low doses of the polymer-shelled CA significantly affected the investigated physiological variables. This study demonstrated that the novel polymer-shelled CA can be

used in contrast-enhanced diagnostic imaging without influence on major physiological variables.^[7]

In the present study, mean BMI of the patients of the present study was 27.6Kg/m². 2D echo detected thrombus in 3 percent of the cases while the contrast echo detected thrombus in 12 percent of the cases. Significant results were obtained while comparing the prevalence of thrombus as detected by 2D echo and contrast echo. de Haan S et al compared LVEF assessment by CMR and echocardiography in a heart failure population and evaluated effects on eligibility for device therapy. 152 patients (106 male, mean age 65.5 ± 9.9 years) referred for device therapy were included. During evaluation of eligibility they underwent both CMR and echocardiographic LVEF assessment. CMR volumes were computed from a stack of short-axis images. Echocardiographic volumes were computed using Simpson's biplane method. The study population demonstrated an underestimation of end-diastolic volume (EDV) and end-systolic volume (ESV) by echocardiography of 71 ± 53 ml (mean ± SD) and 70 ± 49 ml, respectively. This resulted in an overestimation of LVEF of 6.6 ± 8.3 % by echocardiography compared with CMR (echocardiographic LVEF 31.5 ± 8.7 % and CMR LVEF 24.9 ± 9.6 %). 28 % of patients had opposing outcomes of eligibility for cardiac device therapy depending on the imaging modality used. They found EDV and ESV to be underestimated by echocardiography, and LVEF assessed by CMR to be significantly smaller than by echocardiography.^[8] Pellikka PA et al in 2018 determined the intermodality variability of LVEF measured by echocardiography, gated single-photon emission computed tomography (SPECT), and cardiovascular magnetic resonance (CMR) in patients with left ventricular dysfunction. International multicenter diagnostic study with LVEF imaging performed at 127 clinical sites in 26 countries from July 24, 2002, to May 5, 2007, and measured by core laboratories. Secondary study of clinical diagnostic measurements of LVEF in the Surgical Treatment for Ischemic Heart Failure (STICH), a randomized trial to identify the optimal treatment strategy for patients with LVEF of 35% or less and coronary artery disease. Left ventricular ejection fraction was measured by a core laboratory for each modality independent of the results of other modalities, and measurements were compared among imaging methods using correlation, Bland-Altman plots, and coverage probability methods. Association of LVEF by each method and death was assessed. RESULTS A total of 2032 patients (mean [SD] age, 60.9 [9.6] years; 1759 [86.6%] male) with baseline LVEF data were included. Correlation of LVEF between modalities was r = 0.601 (for biplane echocardiography and SPECT [n = 385]), r = 0.493 (for biplane echocardiography and CMR [n = 204]), and r = 0.660 (for CMR and SPECT [n = 134]). Bland-Altman plots showed only moderate agreement in LVEF measurements from all 3 core laboratories with no substantial overestimation or underestimation of LVEF by any modality. The percentage of observations that fell within a range of 5% ranged from 43% to 54% between different

imaging modalities. From the results, they concluded that there was substantial variation between modalities in LVEF determination by core laboratories.^[9]

Conclusion

Under the light of above mentioned data, the authors conclude that efficacy of contrast echo is significantly higher than that of 2D echo in detecting LV thrombus. However; further studies are recommended.

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