

¹German Heart Institute of Berlin, Cardiothoracic and Vascular Surgery, Berlin, Germany²Independent Scholar, Berlin, Germany

Background. Two-dimensional (2D) echocardiography is widely accepted method for the assessment of left ventricular (LV) morphology and function after myocardial infarction and for initial preoperative evaluation of patients planned for surgical ventricular repair (SVR). Magnetic resonance imaging and cardiac computer tomography (CT) provide more accurate measurements, but not always available.

Methods. Patients (n = 179, mean age 62.6 ± 11 years, 23.5% women) with LV anteroapical aneurysm due to myocardial infarction were examined by echocardiography and CT before SVR. LV end-diastolic and end-systolic volumes (LVEDV and LVESV) and ejection fraction (EF) obtained by two methods were compared pairwise. Prognostic role for the prediction of all-cause death was assessed for preoperative parameters in multivariate Cox regression model adjusted for patient age, sex, NYHA class, diabetes mellitus, renal failure, atrial fibrillation and arterial hypertension.

Results. There was a strong correlation for preoperative LVEDV and LVESV measured by echocardiography and CT ($r=0.85$, $r=0.87$, $p<0.0001$), however volumes obtained by echocardiography were smaller compared to those by CT (Table) with higher difference in patients with more dilated LV, as demonstrated by Bland-Altman analysis (Fig.). No significant difference in mean preoperative EF was observed with moderate correlation between two methods ($r=0.67$, $p<0.0001$). In total 68 patients died during median follow up of 5.3 years (IQR: 1.7-8.7 years) after SVR. Comparable predictive value was demonstrated for LVEDV measured by CT and echocardiography (for 10 ml increase HR = 1.04, $p=0.004$ and HR = 1.06, $p=0.0001$), as well as for LVESV (for 10 ml increase HR = 1.04, $p=0.001$ and HR = 1.07, $p=0.0001$) and for EF (for 5% increase HR = 0.83, $p=0.004$ and HR = 0.81, $p=0.004$).

Conclusion. In patients with LV aneurysm 2D-echocardiography may be used for the assessment of LV volumes and function and have similar prognostic role compared to CT in patients evaluated for SVR. Underestimation of LV volumes by echocardiography must be considered, especially in patients with more dilated LV.

Comparison of CT and echocardiography

Parameter	CT	Echo	Mean difference	p-value
LVEDV, ml	289 ± 104	222 ± 81	67 ± 56	<0.0001
LVESV, ml EF, %	198 ± 97 34 ± 12	149 ± 67 35 ± 9	49 ± 51 -0.9 ± 9.2	<0.0001 0.215

Abstract Figure. Bland-Altman plots for LVEDV and LVESV

