Echocardiographic Findings in 102 Centenarians
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Background: Number of centenarians has been on the rise. In 2015, 72,000 centenarians lived in the United States and this number is expected to surpass 1 million by 2060. Cardiovascular disease (CVD) remains the most common cause of death in this population. However, studies of CVD in this population are relatively scarce and there is evidence that CVD is underreported in the oldest old. The goal of this study was to explore the morphologic and functional cardiac abnormalities in centenarians as evaluated by echocardiography. Methods: We retrospectively reviewed the echocardiograms of 102 consecutive centenarians aged 100 to 105 (mean 100.4 ± 1.4) years at the time of referral (85% women, 87% hypertensive, 17% diabetic, 25% hyperlipidemic, body surface area 1.2:2.1 (1.6 ± 0.2) m², body mass index 15.1:47.2 (24.9 ± 4.5) kg/m², 33% overweight, 12% obese) referred to our laboratory for echocardiography between 2010 and 2017. Results: The following CVD were present by history: heart valve 56%, coronary artery disease 23% (prior PCI 7%, prior CABG 2%), peripheral arterial disease 7% and cerebrovascular accident 24%. Echocardiographic atrial fibillation was present in 32%. Echocardiographic abnormalities included left ventricular (LV) dilatation (1%), concentric remodeling (4%), LV hypertrophy (46%) including 18% with severe LV hypertrophy, regional wall motion abnormality (21%), decreased LV ejection fraction (21%), abnormal (other than age-appropriate) indices of diastolic function (50%), atrial (LA) dilatation (60%), right ventricular dilatation (17%), tricuspid regurgitation peak velocity ≥3 m/sec (49%), and pericardial effusion (9%). Mild, moderate and severe aortic stenosis was present in 14%, 12%, and 16%, respectively. Mild or moderate calcific mitral stenosis was noted in 9%. Significant (≥mild) regurgitation was noted in mitral (37%), aortic (13%) and tricuspid (40%) valves. Conclusion: Structural and functional cardiac abnormalities are commonly noted among centenarians referred for echocardiography. Overall, at least one echocardiographic abnormality was noted in 99% of the centenarians studied.

A Comparison of Long-Term Mortality Prediction Using Two Methods of EF Assessment from the National Echo Database Australia (NEDA)
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Background: Echocardiography (echo) is well established in the evaluation of Left Ventricular Ejection Fraction (LVEF). Traditional methods rely on geometric assumptions not valid in all patients, whereas other measures suffer from challenges in image quality that may undermine their anatomic and geometric superiority. We evaluated the prognostic impact of two established methodologies for calculating LVEF: Basal long axis 2D Teicholz method (Teich) and the Apical Biplane Method of Disks (MOD).

Methods: NEDA contains echo measurement data (years 1997 -2017 inclusive) from laboratories (N=10) across Australia (>530,000 echos) with linkage to the National Death Index (NDI). Data from 352,844 individuals (186,820 men, 60.8±18.0 years and 166,024 women, 60.9±19.2 years) had a mean follow up of 5.4 years per person and 63,142 fatal events. We compared Teich (with linked echo and survival data in 145,785 cases) and MOD (102,850 cases) in predicting all-cause mortality at various time points (1-year and 5-year) across the full distribution of LVEF values. This included all cases, and those with the lowest quintile of LVEF (<5%). Results: In age- and sex-adjusted Cox Proportional Hazard Models, both methods performed well in delineating the risk of all-cause mortality for all cases. The Teich method performed slightly better: Adjusted HR for mortality in the lowest versus highest quintile of LVEF was 1.89 (95% CI 1.80 to 1.98) for MOD vs 2.00 (95% CI 1.93 to 2.07) for Teich (p<0.001 for all outputs). The sensitivity and specificity of age- and sex-adjusted multiple logistic regression models using Teich were superior in predicting all-cause mortality. For example, the sensitivity and specificity of the model using Teich to predict 5-year mortality in 14,175 cases was 72.2% and 78.5%, respectively (adjusted odds ratio for the lowest versus highest quintile of LVEF being 2.63, 95% CI 2.29 to 3.00; p<0.001). This compared to a sensitivity and specificity of 66.3% and 75.9%, respectively (equivalent adjusted odds ratio 2.16, 95% CI 1.86 to 2.59; p<0.001) derived from 15,192 cases with MOD. Conclusion: LVEF (an age- and sex-adjusted) is a powerful predictor of short- to long-term mortality with a steep gradient of increasing risk in those individuals with a LVEF ≤55%. However, in like-for-like comparisons, within a large population, Teich appears to be a stronger correlate of mortality both within the entire spectrum of LVEF values and, specifically, among those with impaired EF. For an individual patient, the best method for EF assessment may be dependent on initial image quality.