Assessing left atrial size to predict mortality in the overweight and obese population

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Background: Left atrial (LA) size provides important prognostic information. A larger LA is associated with a higher risk of death or cardiovascular complications. LA size is generally measured by indexing LA volume to body surface area (BSA). For individuals with a higher BSA, particularly those with obesity, this may lead to an underestimation of true LA size. Alternate indexation methods of measuring LA size have been proposed for this population. There is limited data showing if these indices provide better prognostic value compared to the standard BSA indexation in the overweight and obese population.

Purpose: To determine and compare the performance of various LA size indices in predicting all-cause mortality.

Methods: We obtained data from the National Echocardiography Database of Australia (NEDA), a large, observational registry, capturing routinely acquired echocardiographic data from individuals with potential or established heart disease. Our study outcome was all-cause mortality and LA size was our predictor variable. We evaluated ten indices for LA size: LA volume (obtained at time of scan), and LA volume indexed to BSA, idealised BSA, height\(^\text{1.83}\), \(^\text{2.7}\), \(^\text{1.83}\), weight, body mass index (BMI), and estimated lean body mass. From the original NEDA dataset, we excluded observations with: missing values for LA volume, height, weight, and ejection fraction (EF); date of examination is after the census date; and indication of valvular disease. Finally, we selected only the earliest observation for each individual and obtained a sub-population with overweight and obesity for analysis (n = 113,786). We conducted a receiver operating characteristic (ROC) analysis and calculated the summary statistic of the area under the curve (AUC) to compare the accuracy of the ten LA size indices in predicting all-cause mortality.

Results: In the overweight and obese population, all the LA indices had similar predicting accuracy for all-cause mortality (Figure 1). Raw LA volume and LA volume/BMI had slightly lower AUC: AUC [95% confidence interval] values were 0.61 [0.605-0.614] and 0.61 [0.607-0.616], respectively. Other indices, including LA volume/BSA, LA volume/weight and LA volume/height, had equivalent predictive accuracy (0.62~0.63) for all-cause mortality (Figure 2).

Conclusion: Overall, all LA size indices performed similarly in predicting all-cause mortality in this overweight and obese population, except for LA volume/BMI. Our results found no superior indexation method (including allometric ones) to the current practice (i.e., LA volume/BSA) in this population.
ROC curves of indices

AUC, 95% confidence intervals of indices