APPLICATION OF FOUR COMPLEXITY STRATIFICATION TOOLS (ARISTOTLE BASIC SCORE, RACHS-1, STAT MORTALITY SCORE, AND STAT MORTALITY CATEGORIES) TO EVALUATE EARLY CONGENITAL HEART SURGERY OUTCOMES OVER 16 YEARS AT A SINGLE INSTITUTION

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Background: Meaningful evaluation of quality of care must account for variations in the population of patients receiving treatment, or "case-mix". We have used four complexity stratification tools (**A**ristotle **B**asic Complexity Score **[ABC Score]**, **R**isk **A**djustment for **C**ongenital **H**eart **S**urgery-1 Categories **[RACHS-1 Categories]**, The **S**ociety of **T**horacic Surgeons - European **A**ssociation for Cardio-**T**horacic Surgery Congenital Heart Surgery Mortality Score **[STAT Mortality Score]**, and **STAT Mortality Categories**) to analyze mortality prior to discharge after congenital heart surgery over 16 years at a single institution. Our goal was not only to analyze our institutional results but also to evaluate the ability of each tool to predict mortality.

Methods: Complete and verified data on hospital mortalities that occurred after 8404 operations for congenital heart disease over 16 years in our institution were included. Each procedure was assigned a numeric score based of each tool. For evaluating the statistical predictability of each tool, we included only procedures that were scored by that tool. Receiver operating characteristic curves were calculated for each tool excluding procedure with less than 25 occurrences.

Results: Mean hospital mortality was 4.38%, with a range from 0% (aortic valvuloplasty) to 33% (Norwood). STAT Mortality Score had the highest discrimination for predicting mortality (C-index = 0.768). STAT Mortality Categories, RACHS-1, and ABC Score were weaker predictors of death (C-index: 0.750, 0.765, and 0.746 respectively). The Pearson correlation coefficient between a procedure's STAT Mortality Score and its actual mortality rate was r = 0.84. In the subset of procedures for which can be classified by all four complexity stratification tools (33 procedures), discrimination was highest for STAT Mortality Score (C-index = 0.776), followed by STAT Mortality Categories (C-index = 0.772), RACHS-1 (C-index = 0.765) and ABC Score (C-index = 0.721).

Conclusions: In this single institutional analysis, STAT Mortality Score had the strongest association with mortality. This single institutional analysis demonstrates a strategy for the application of complexity stratification that should be applicable on a multi-institutional basis.