Case complexity scores in congenital heart surgery: a comparative study of the Aristotle Basic Complexity score and the Risk Adjustment in Congenital Heart Surgery (RACHS-1) system.

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Abstract

OBJECTIVE:

The Aristotle Basic Complexity score and the Risk Adjustment in Congenital Heart Surgery system were developed by consensus to compare outcomes of congenital cardiac surgery. We compared the predictive value of the 2 systems.

METHODS:

Of all index congenital cardiac operations at our institution from 1982 to 2004 (n = 13,675), we were able to assign an Aristotle Basic Complexity score, a Risk Adjustment in Congenital Heart Surgery score, and both scores to 13,138 (96%), 11,533 (84%), and 11,438 (84%) operations, respectively. Models of in-hospital mortality and length of stay were generated for Aristotle Basic Complexity and Risk Adjustment in Congenital Heart Surgery using an identical data set in which both Aristotle Basic Complexity and Risk Adjustment in Congenital Heart Surgery scores were assigned. The likelihood ratio test for nested models and paired concordance statistics were used.

RESULTS:

After adjustment for year of operation, the odds ratios for Aristotle Basic Complexity score 3 versus 6, 9 versus 6, 12 versus 6, and 15 versus 6 were 0.29, 2.22, 7.62, and 26.54 (P < .0001). Similarly, odds ratios for Risk Adjustment in Congenital Heart Surgery categories 1 versus 2, 3 versus 2, 4 versus 2, and 5/6 versus 2 were 0.23, 1.98, 5.80, and 20.71 (P < .0001). Risk Adjustment in Congenital Heart Surgery added significant predictive value over Aristotle Basic Complexity (likelihood ratio chi2 = 162, P < .0001), whereas Aristotle Basic Complexity contributed much less predictive value over Risk Adjustment in Congenital Heart Surgery (likelihood ratio chi2 = 13.4, P = .009). Neither system fully adjusted for the child's age. The Risk Adjustment in Congenital Heart Surgery scores were more concordant with length of stay compared with Aristotle Basic Complexity scores (P < .0001).

CONCLUSIONS:

The predictive value of Risk Adjustment in Congenital Heart Surgery is higher than that of Aristotle Basic Complexity. The use of Aristotle Basic Complexity or Risk Adjustment in Congenital Heart Surgery as risk stratification and trending tools to monitor outcomes over time and to guide risk-adjusted comparisons may be valuable.