What predicts risk and what defines outcomes in congenital heart disease?

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Disclosures: Author has nothing to disclose with regard to commercial support.

Received for publication Feb 1, 2017; accepted for publication Feb 6, 2017; available ahead of print March 6, 2017.

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J Thorac Cardiovasc Surg 2017;154:618-9

0022-5223/\$36.00

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<http://dx.doi.org/10.1016/j.jtcvs.2017.02.005>

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Central Message

Risk models can be important tools for assessment congenital cardiac programs. Use of morbidity measures and physiologic data can add to other models focused more exclusively on surgical complexity.

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Risk assessment in congenital heart surgery can help examine overall program performance. In the current issue of *The Journal of Thoracic and Cardiovascular Surgery*, Berger and colleagues¹ compare risk assessment based entirely on the patient's physiologic state at the time of intensive care unit (ICU) arrival (Pediatric Risk of Mortality [PRISM] score) with 2 methods of categorizing surgical complexity (Risk Adjustment for Congenital Heart Surgery [RACHS] and STAT), both as separate measures of risk assessment and in combination. The study found that mortality and morbidity could be predicted by PRISM, RACHS, or STAT and combining PRISM with either RACHS or STAT did not add to the predictive ability. One might ask the utility of another risk assessment model if it performs the same as current, simpler models. One answer is that the current study does address 2 important issues that can be helpful to understand program performance. The first is that it focuses not only on mortality, which has progressively declined in this population, but on new functional morbidity. The second is that it uses physiologic data that reflect the state of the patient on arrival to the ICU and not the type of operation alone.

It has become virtually obligatory to state that mortality rates for congenital heart surgery have fallen and that quality of survival has become paramount. The Perioperative Studies Working Group convened by the Pediatric Heart Network in 2009 emphasized the need to develop assessment tools for functional outcomes and the importance of using them as endpoints in studies of perioperative care.² The current study uses the Functional Status Scale (FSS). The FSS uses 6 domains (mental status, sensory, communication, motor function, feeding, and respiratory), each scored with a range from 1 (normal) to 5 (very severe dysfunction). A change of more than 3 points in the FSS from preoperative baseline to hospital discharge was considered an important decline in functional ability.

Although the FSS has been validated in other studies, the application to patients with congenital heart disease is both novel and important. The FSS can potentially be used as an outcome variable in studies of other predictive approaches and models.

Both morbidity and mortality are influenced by pre-, intra-, and postoperative care and events. RACHS and STAT are focused on operative anatomy, inherently emphasizing performance of the surgical team. The Society for Thoracic Surgery Congenital Heart Surgery Database Mortality Risk Model uses additional variables to develop a more comprehensive risk score.³ The Pediatric Cardiac Critical Care Consortium and others have developed their own focused quality measures. Models that assign risk starting at different time points in a patient's path and that reveal discrepancies between observed and expected outcomes may help an institution understand which elements of their overall team perform well and which might be targets for improvement. Although this is not directly addressed in the current study, it is one of the reasons that work like this can add to our tools for program improvement.

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