

**Risk stratification for congenital heart surgery in adults – Are the Aristotle Complexity score models appropriate?**

*Hörer J., Vogt M., Brenguier V., Rau M., Wottke M., Cleuziou C., Prodan Z., Kasnar-Samprec J., Schreiber C., Lange R.  
German Heart Center Munich an der Technischen Universität München, Munich, Germany*

**Introduction:** The predictive power of the Aristotle Basic Complexity (ABC) and the Aristotle Comprehensive Complexity (ACC) score for hospital mortality after congenital heart surgery has been demonstrated for children, but not for adults. We sought to evaluate the ABC, and the ACC score for adults, and to improve the discriminative power of the ACC score by adding risk factors, specifically present in adults, and not considered in the ACC score.

**Methods:** Data of all consecutive patients aged 16 or more who underwent surgery for congenital heart disease between 2005 and 2008 at our institution were collected. ABC and ACC scoring were performed according to the Aristotle Institute guidelines (Denver, USA). The impact of 5 potential risk factors for hospital mortality, not considered in the ACC score, was analyzed by logistic regression modeling. The odds ratios of significant risk factors were added to the ACC score to compile the modified ACC score. The discriminatory power of the scores was assessed using the area under the receiver operating characteristics (AuROC) curve.

**Results:** 770 procedures, performed on 495 patients during 538 operations were eligible for scoring. Hospital mortality was 2.4%. Among potential risk factors not considered in the ACC score, NYHA class >II ( $p=0.003$ , OR=5.4), systemic right ventricle ( $p=0.064$ , OR=4.4), and single ventricle ( $p=0.001$ , OR=8.6) were significant predictors for hospital mortality. Mean ABC, ACC, and modified ACC scores of the operations were  $6.6\pm 2.3$ ,  $9.0\pm 3.7$ , and  $10.6\pm 5.6$ , respectively. The prognostic significance of the ABC and the ACC score is low when judged by the AuROC curve: AuROC of ABC score = 0.661 (95% CI 0.567-0.755,  $p=0.047$ ); AuROC of ACC score = 0.755 (95% CI 0.668-0.841,  $p=0.002$ ). The best discriminative power is reached by the modified ACC score: AuROC of modified ACC score = 0.852 (95% CI 0.770-0.933,  $p<0.001$ ).

**Conclusions:** Adults requiring surgery for congenital heart defects present with additional risk factors that are not present in children. Hence, the ABC, and ACC scores are not useful for risk stratification in adults. The modified version of the ACC score discriminates well between patients with higher or lower risk for hospital mortality since risk factors, specifically present in adult patients are considered.