

# Commentary: Predictors of Postoperative Adverse Events after Cone Reconstruction for Ebstein's Anomaly

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## Abstract

Prediction scores and metrics are being increasingly utilized throughout the fields of cardiothoracic and congenital cardiac surgery to identify areas for perioperative optimization or guide therapeutic intent. Here, we review a novel submission by Yang and colleagues to the Journal of Cardiac Surgery identifying preoperative factors which predict adverse postoperative outcomes from cone reconstruction for Ebstein's anomaly.

Commentary: Predictors of Postoperative Adverse Events after Cone Reconstruction for Ebstein's Anomaly

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Running Head:

Adverse event prediction for Ebstein's anomaly.

## Abstract:

Prediction scores and metrics are being increasingly utilized throughout the fields of cardiothoracic and congenital cardiac surgery to identify areas for perioperative optimization or guide therapeutic intent. Here, we review a novel submission by Yang and colleagues to the *Journal of Cardiac Surgery* identifying preoperative factors which predict adverse postoperative outcomes from cone reconstruction for Ebstein's anomaly.

## Commentary:

Ebstein's anomaly (EA) is a rare congenital heart disease characterized by apical displacement of the tricuspid valve (TV) with atrialization of the right ventricle (RV). Right-to-left shunting and cyanosis may occur in the presence of an atrial communication. Cone reconstruction is a widely accepted technique that demonstrates favorable postoperative outcomes including: improved RV synchronization, exercise capacity, New York Heart Association (NYHA) functional class and degree of regurgitation<sup>1-3</sup>. Efforts to predict perioperative complications and prognosis are becoming increasingly important as healthcare resources are further constrained<sup>4</sup>. Yang and colleagues are to be commended on well-written manuscript evaluating the utility of preoperative percutaneous oxygen saturation as a predictive outcome following cone reconstruction of Ebstein's anomaly<sup>5</sup>.

In their single-institution, retrospective analysis of patients from 2010 to 2016, Yang et al. identified percutaneous oxygen saturation and Great Ormond Street (GOS) scores as independent risk factors for adverse events after cone reconstruction for EA based on multivariate logistic regression analysis. When plotted on ROC curves, oxygen saturation and GOS score rival other major scoring systems, however it would be worthwhile to know how this cohort's group STS-EACTS or STS morbidity score correlated to these findings<sup>4</sup>.

It is of particular interest to note the number of patients with evidence of atrial communication the adverse event group (12/13, 92.3%), even though this metric failed to reach statistical significance on univariate analysis ( $p=0.053$ ). The authors acknowledge the limitation in classifying the degree of inter-atrial communication. Quantification of any shunting may further justify the impact of systemic oxygen saturation by demonstrating the impact of more complex lesions.

Postoperative tricuspid regurgitation (TR) significantly improves after cone reconstruction, however RV function typically does not improve until much later<sup>6-8</sup>. Patients in the reported cohort who did poorly mostly had severe TR preoperatively, although this was not significant which may be related to a small sample size<sup>5</sup>. While all patients underwent preoperative echocardiography, the investigators do not comment on postoperative echocardiography data. Incorporation of postoperative echocardiography results and if available, perioperative right heart pressure data, would add clarification to the importance of their findings.

This article aims to identify reliable, reproducible and easily obtainable metrics for predicting postoperative outcomes for patients with Ebstein's anomaly undergoing treatment with cone reconstruction. We agree with the authors that such metrics are valuable for surgeons, intensivists and the entire pediatric intensive care team. Preoperative predictors can prepare teams for potential postoperative adverse events and help guide patients' families' expectations during recovery. However, it is important to temper the expectations of the predictive ability of simple tests in the construct of complex congenital cardiac lesions. Ultimately, this work is an important contribution as we collectively aim to improve patient outcomes by preparing for adverse events armed with readily available preoperative data.

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Figure:

Legend: Evan P. Rotar, MD, MS (left), and Irving L. Kron, MD (right)

