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RISK STRATIFICATION FOR ISOLATED TRICUSPID VALVE SURGERY: STILL ON THE WAY

To the Editor:

We read with interest the recent study by Färber and colleagues,[1] which found that classic surgical risk stratification with the Society of Thoracic Surgeons or European System for Cardiac Operative Risk Evaluation II scores failed to predict perioperative mortality for isolated tricuspid valve surgery if there was evidence of severe liver dysfunction and the Model for End-Stage Liver Disease (MELD) scoring system might be useful to assist in risk stratification for these patients.

As we know, patient selection is very critical for favorable outcomes after tricuspid valve surgery or intervention. The historical high mortality of isolated tricuspid valve surgery was partly due to late referral to surgery, resulting in right heart failure and end-organ damages such as liver and renal dysfunction. Thus, accurate risk stratification is useful to identify the high-risk subgroup. However, the paucity and heterogeneity of isolated tricuspid valve surgery led to difficulty in establishing a special risk stratification system.

The MELD scoring system initially was developed for patients undergoing transjugular intrahepatic portosystemic shunt procedures[2] and further for patients with end-stage liver disease.[3,4] Subsequently, Suman and colleagues[5] found that MELD score was significantly associated with hepatic decompensation and mortality after cardiac surgery using cardiopulmonary bypass in patients with cirrhosis. Ailawadi and colleagues[6] used the MELD score to predict mortality for tricuspid valve surgery, although 85.7% of the patients in their study had various concomitant surgeries.

Färber and colleagues[1] first used the MELD score for isolated tricuspid valve surgery in a relatively large cohort. However, both their and our studies suggested that the etiology of isolated tricuspid valve surgery was highly heterogenous.[1,7] Notably, 1 parameter of the MELD score is international normalized ration (INR).[3] We speculated that part of patients in their study may receive warfarin for left-sided mechanic valve replacement or chronic atrial fibrillation.[8,9] Would this increased INR due to warfarin administration influence the MELD score and further influence the accuracy of risk prediction for this subgroup? Actually, the simplified MELD score has been reported by Tsuda and colleagues.[10] They suggested to remove the INR parameter from the formula to predict mortality for tricuspid valve surgery, although 93.6% of patients in their study also had various concomitant surgery. In our previous study, we found that higher simplified MELD score was an independent risk factor for composite adverse outcomes rather than mortality.[8] Thus, the simplified MELD score has also not been widely validated for predicting mortality of isolated tricuspid valve surgery.

The ideal risk stratification for isolated tricuspid valve surgery is still on the way. Many efforts have been made in this field. A simple clinical risk score based on the Society of Thoracic Surgeons database was established to predict mortality and major morbidity after isolated tricuspid valve surgery.[11] That clinical risk score enrolled 9 parameters, including age, sex, stroke, hemodialysis, chronic lung disease, ejection fraction, New York Heart Association functional class, reoperation, and status. Recently, the TRI-SCORE was reported as a new risk score for in-hospital mortality prediction after isolated tricuspid valve surgery.[12] It ranged from 0 to 12 points and included 8 parameters: age $\geq$70 years, New York Heart Association functional class III or IV, right-sided heart failure signs, daily dosage of furosemide $\geq$125 mg, glomerular filtration rate <30 mL/min, elevated bilirubin, left ventricular ejection fraction <60%, and moderate/severe right ventricular dysfunction. However, these scoring systems were somewhat complex and some parameters were subjective. With the development of transcatheter tricuspid valve repair or replacement, more hemodynamic data of isolated tricuspid regurgitation and right heart failure were obtained by right heart catheterization.[13,14] Some effects were also made to investigate special molecular mechanism of right ventricular failure.[15] In the future, the risk scoring system may integrate multidimensional parameters, including symptomatic, echocardiographic, hemodynamic, and molecular variables, to accurately predict the risk of isolated tricuspid valve surgery and intervention.

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