

Severe Aortic stenosis: Is urgent transcatheter aortic valve replacement better than Balloon aortic valvuloplasty better than?

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Elective TAVR versus Urgent TAVR

Bianco et al. [1] report a single centre retrospective analysis of 1193 patients that underwent transcatheter aortic valve replacement (TAVR) over an 8-year period from 2011-2018; of which 247 (20.7%) were urgent and 946 were elective procedures. The authors compared the urgent and elective procedure and studied

in-hospital, short and mid-term survival and hospital readmissions. They reported that the 30 day mortality (6.5% vs 2.3%), acute kidney injury (2.8% vs 0.6%) and length of stay (12 vs 3 days) were all significantly higher in the urgent group vs those having elective TAVR procedures, respectively.

Freedom from readmission for heart failure at 1-year was lower for the urgent group (73.6% vs 83.4%), and the 1-year (79.0% vs 87.1%) and 5-year (39.6% vs 43.5%) survival was lower in this group vs the elective group, although this difference was eliminated after risk adjustment. The authors conclude although urgent TAVR is associated with increased periprocedural risk due to more co-morbid disease, outcomes and long-term survival support the consideration of urgent TAVR as a viable alternative for this patient population.

This is an important topic for cardiologists and cardiac surgeons because of the relative frequency of patients with severe aortic stenosis (AS) admitted to hospital with related symptoms and heart failure. Although most patients with heart failure can be medically managed with subsequent discharge and elective intervention, this may put them at a higher risk for recurrent heart failure and readmission. Moreover, acute heart failure and cardiogenic shock in severe AS are associated with poor prognoses, as well as an extremely high operative risk for surgical aortic valve replacement (SAVR) [2-4].

Institutional practices, local and logistic factors can affect patient selection and management approaches to severe aortic stenosis. Although TAVR is generally performed on an appropriate basis, there is still a need to determine how to best manage the list for TAVR as well as to develop benchmarks for the maximum acceptable waiting time for patients with severe AS pending intervention. In addition, the potential benefit of TAVR needs to be weighed against the periprocedural risks and the likelihood of futility.

Balloon aortic valvuloplasty – still an option?

Balloon aortic valvuloplasty (BAV) remains an option for temporary palliation and symptomatic relief in such patients. However, long-term survival after BAV alone remains poor, with a high occurrence of valvular restenosis[5]. BAV can also play an important role as a bridge to either surgical or TAVR in patients with AS requiring temporary haemodynamic stabilization. However, there may be significant delays between BAV and AVR or TAVR[6]. In a multicenter registry of 811 patients with severe AS who underwent BAV, at a median follow-up of 318 days, only 30.9% of patients undergoing BAV as a bridge to TAVR and 15.8% of patients undergoing BAV as a bridge to SAVR actually underwent AVR[7]. Additionally in this study, 56.5% of patients who underwent urgent/emergent TAVR had a prior history of BAV, suggesting that BAV may not be effective in preventing subsequent acute decompensation and need for urgent/emergent TAVR.

Ali et al. [8] compared strategies in the treatment of decompensated severe aortic stenosis. The authors hypothesised that undertaking urgent or emergency TAVR directly in such patients is safer and more effective than urgent or emergency balloon aortic valvuloplasty (BAV) followed by elective TAVR or surgical aortic valve replacement (SAVR). Between September 2014 and February 2018, 52 patients underwent urgent or emergency BAV and 87 underwent TAVR. Significant differences were noted between the two groups in 30-day all-cause mortality (88.5% BAV patients alive at 30 days, 97.7% TAVR patients) and 1-year all-cause mortality (44.2% BAV patients alive at 1 year, 88.5% TAVR patients). Patients in the BAV group who successfully underwent subsequent TAVR or SAVR all survived for 365 days, but there was no significant 1-year mortality difference compared with those who underwent urgent or emergency TAVR (100 vs. 88.5%; $P > 0.155$). These results suggest treatment of decompensated severe aortic stenosis with urgent or emergency TAVR may be associated with improved survival outcomes when compared with a strategy of performing BAV as a bridge to subsequent TAVR or SAVR.

Kolte et al.[9] examined outcomes and identified independent predictors of mortality among patients undergoing urgent/emergent TAVR. The Society of Thoracic Surgeons and the American College of Cardiology Transcatheter Valve Therapy (STS/ACC TVT) Registry linked with Centers for Medicare & Medicaid Services claims was used to identify patients who underwent urgent/emergent versus elective TAVR between November 2011 and June 2016. Of 40,042 patients who underwent TAVR, 3,952 (9.9%) were urgent/emergent. Device success rate was statistically lower, after urgent/emergent versus elective TAVR (92.6% vs. 93.7%). Rates of major and/or life-threatening bleeding, major vascular complications, myocardial infarction, stroke,

new permanent pacemaker placement, conversion to SAVR, and paravalvular regurgitation were similar between the 2 groups. Compared with elective TAVR, patients undergoing urgent/emergent TAVR had higher rates of acute kidney injury (AKI) and/or new dialysis (8.2% vs. 4.2%), 30-day mortality (8.7% vs. 4.3%), and 1-year mortality (29.1% vs. 17.5%). The authors conclude that urgent/emergent TAVR is feasible with acceptable outcomes and may be a reasonable option in a selected group of patients with severe AS.

AKI and new dialysis are more common following urgent/emergent versus elective TAVR. The causes of AKI after TAVR are many including hypotension/hypoperfusion during rapid pacing, contrast-induced AKI (CIAKI), bleeding and blood transfusions. Pre-procedure renal dysfunction, diabetes, impaired left ventricular function, are also more common in patients undergoing urgent/emergent TAVR and are associated with an increased risk of new dialysis after TAVR[11] Furthermore, patients requiring urgent/emergent TAVR may undergo pre-operative CT scans and cardiac catheterization within a short period of time, increasing the risk of CIAKI. However, after adjusting for baseline patient and procedural characteristics, Ferro et al. [11]found no significant difference in the adjusted odds of AKI/new dialysis between urgent/emergent vs elective TAVR, suggesting that the observed differences in the rates are related to differences in baseline clinical risk profile rather than the procedure itself. Use of 3-dimensional transoesophageal echocardiography and non-contrast imaging for pre-procedural AV annulus assessment may help decrease the risk of CIAKI/new dialysis in patients at increased risk of this complication, including those undergoing urgent/emergent TAVR[12-14].

In patients undergoing urgent/emergent TAVR, oxygen-dependent lung disease, immunocompromised status, pre-existing atrial fibrillation/flutter, higher baseline creatinine, concomitant mitral stenosis, non-femoral access, are associated with an increased risk of 1-year mortality. Several of these variables have also been shown to predict poor outcome following TAVR[15-16]. Thus, TAVR, especially as an urgent/emergent procedure, might be considered medically futile in patients with 1 or more of these comorbidities and such patients should be considered for emergency BAV as a palliative therapy or bridge to decision.

Conclusions

In patients with severe aortic valve stenosis presenting acutely, the haemodynamic instability and resistance to optimized drug therapy may require an urgent intervention. BAV remains a viable treatment option. Outcomes in patients bridged to AVR/TAVI are better than in patients treated with BAV alone. Owing to the high mortality of patients in this cohort without destination therapy, delays to progression to TAVR or AVR should be avoided. Urgent or emergency TAVR may be associated with improved survival outcomes when compared with BAV as a bridge to subsequent TAVR or SAVR. Urgent TAVR may be associated with increased peri-procedural risk but outcomes are acceptable and this approach is a viable alternative for this patient population.

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