Non-cardiac surgery in patients with severe aortic stenosis: time to revise the guidelines?

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This editorial refers to ‘Perioperative risk of major non-cardiac surgery in patients with severe aortic stenosis: a reappraisal in contemporary practice’, by T. Tashiro et al., on page 2372.

Many patients undergoing major non-cardiac surgery have a high risk of perioperative cardiovascular complications. Several studies have identified variables that are associated with this increased perioperative cardiovascular risk, including arrhythmias, heart failure, recent myocardial infarction, and ischaemic heart disease. Aortic stenosis (AS) is not always included in cardiac risk prediction models, because it is regularly underdiagnosed and therefore also under-represented in databases and the resulting risk assessment tools. Nevertheless, severe AS is the most prevalent valvular heart disease in the elderly, many of whom regularly require non-cardiac surgery.

Patients with AS have an obstruction in the outflow tract that gradually results in left ventricular myocardium hypertrophy. Initially, the cardiac output and left ventricular end-diastolic volumes are preserved, permitting patients to stay asymptomatic. Eventually, however, the concentric left ventricular hypertrophy and reduced compliance of the myocardium leads to diastolic dysfunction. At that point, patients develop symptoms of dyspnoea or chest pain due to the increased diastolic pressure of the left ventricle. In addition, the AS causes systemic hypotension and reduction of coronary flow reserve. When patients in this condition are exposed to the haemodynamic stress of a major surgical procedure, they are at higher risk of decompensated heart failure.

Therefore, the European Society of Cardiology (ESC), European Association of Cardio-Thoracic Surgery (EACTS), and American College of Cardiology (ACC)/American Heart Association (AHA) Guidelines dedicate special sections to decision-making in non-cardiac surgery for patients with severe AS. These guidelines recommend postponing non-cardiac surgery if the valve has not been evaluated within 1 year. The ESC/EACTS guideline recommends proceeding with non-cardiac surgery in asymptomatic patients that are at low or moderate surgical risk for the non-cardiac surgery, whereas in high risk patients, the patients’ risk for surgical aortic valve replacement is decisive (Figure 1A). These recommendations are largely based on small and old observational studies.

Tashiro et al. now present a large contemporary study of patients with severe AS undergoing moderate to high risk non-cardiac surgery. By linking >500 000 echocardiograms with their surgical database, the authors were able to identify 256 patients with severe AS. These patients were matched to patients without AS based on age, gender, and year of surgery. There was no significant difference in 30-day mortality (5.9% vs. 3.1%, P = 0.13). The rate of major adverse cardiovascular events (MACE; death, stroke, myocardial infarction, ventricular tachycardia/fibrillation, and heart failure) was higher in the severe AS group (18.8% vs. 10.5%, P = 0.01), mainly due to higher rates of heart failure. In addition, emergency surgery was shown to be the strongest predictor of 30-day mortality.

This important study has several implications for perioperative management of patients with severe AS and may even lead to revision of the aforementioned guidelines. The perioperative mortality rate was lower than previously reported. Therefore, the authors speculate that the threshold to proceed with the non-cardiac surgical procedure without treating a severe AS could be lowered. There are several potential reasons for the relatively low rate of mortality in this study, including improvements in surgical and anaesthesia techniques compared with earlier studies. However, outcomes in the symptomatic group (n = 106) were markedly worse than in the asymptomatic group (n = 150). In asymptomatic patients and their matched controls, mortality and MACE rates were practically equal (~3% and 10–12%, respectively) in both patients with and without AS. On the other hand, in the patients with symptoms, MACE rates at 30 days were significantly higher compared with their controls (28.3% vs. 8.5%, P < 0.001), although the difference in mortality (9.4% vs. 3.8%) did not reach statistical significance (P = 0.097). This suggests that the excellent outcomes of patients...
Figure 1 Decision-making in severe aortic stenosis for patients who require non-cardiac surgery. (A) Based on the current ESC/EACTS guidelines.7 (B) Suggested decision-making flowchart when the study by Takashiro is incorporated.12 AS, aortic stenosis; BAV, balloon aortic valvuloplasty; SAVR, surgical aortic valve replacement; TAVI, transcatheter aortic valve implantation.
with severe AS might be restricted to asymptomatic patients. This strengthens the guidelines noting that the non-cardiac surgical management of patients with severe AS mainly depends on the presence of symptoms.\textsuperscript{5, 7} This is further supported by a recent study that found that the presence of symptoms was a predictor of worse outcomes.\textsuperscript{13}

Only when the prolonged AS results in considerable physiological changes and apparent symptoms of dyspnoea or chest pain should clinicians consider treatment of this condition prior to non-cardiac surgery. In those patients with symptomatic severe AS, transcatheter aortic valve implantation (TAVI) could serve as an alternative to surgical aortic valve replacement and should be preferred over balloon aortic valvuloplasty.\textsuperscript{14} Careful intraoperative monitoring and an intensive team effort with the anesthesiologist is recommended in these severe AS patients undergoing non-cardiac surgery.

In a field where randomized trials are unlikely and observational evidence is scarce, the study of Tashiro et al. shows that moderate or high risk non-cardiac surgery in patients with severe, asymptomatic AS can be performed safely. Until now, the existing evidence on non-cardiac surgery in patients with severe asymptomatic AS was largely based on one study describing low to moderate non-cardiac surgical procedures.\textsuperscript{15} With the results of the study by Tashiro et al., non-cardiac surgery of any risk should rarely be postponed because of the presence of asymptomatic severe AS (Figure 1B). With these new important insights, it might be time to revise the guidelines.

**Conflicts of interest:** none declared.

**References**


