What influences the outcome of valve replacement in critical aortic stenosis?

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Even patients with severely reduced left ventricular function and critical aortic stenosis can improve notably following valve replacement.

The outcome of severe aortic stenosis (AS) is extremely poor once patients develop symptoms. In contrast, outcome becomes favourable when such patients undergo aortic valve replacement. Although results of available studies are not consistent in all aspects, preoperative severity of symptoms, presence of left ventricular (LV) dysfunction, and presence of coronary artery disease have been found to be major predictors of operative and long term mortality in most of them.

EARLY SURGERY AND THE OUTCOME OF VALVE REPLACEMENT

Since severe symptoms and development of LV dysfunction are associated with a worse outcome following valve replacement, surgery should be performed early, before these characteristics occur. The question is: how early is early enough to guarantee an optimal long term outcome? There is general agreement that surgery should be performed immediately when symptoms occur even if they are only mild. In valvar heart disease in general, preservation of myocardial function has been identified as one of the major requirements to keep long term mortality and morbidity as low as possible. To achieve this goal valve replacement may, under certain circumstances, even be recommended in patients who are still asymptomatic. However, whereas development of irreversible left ventricular dysfunction is a major concern in asymptomatic patients with regurgitant lesions, this appears to be very uncommon in asymptomatic AS. Thus, observation of left ventricular size and function during the asymptomatic phase of severe AS is of minor importance. Nevertheless, there is agreement that the rare asymptomatic patient with already reduced LV dysfunction should undergo valve replacement (class IIa indication).

There has been debate for many years over whether severe LV hypertrophy, which may be accompanied by myocardial fibrosis, increases operative risk and precludes an optimal long term outcome after valve replacement for AS. Although several retrospective studies reported the early and late prognostic importance of the extent of preoperatively increased LV mass there is insufficient evidence to justify elective surgery in asymptomatic patients just because LV mass has reached a certain cut-off. Since sudden death is very unlikely in truly asymptomatic patients, as is impaired LV function, current practice guidelines list the symptomatic patient with severe AS as the only class I indication for valve replacement. Unfortunately, patients frequently do not immediately present following occurrence of symptoms and some countries struggle with significant waiting times for heart surgery. This symptomatic yet unoperated phase of the disease puts patients at risk of sudden death and also at risk of further deterioration of their symptomatic state or LV function, which may again preclude an optimal outcome following valve replacement. Thus, risk stratification in asymptomatic patients is of critical importance. A positive stress test, particularly when symptoms are documented (abnormal blood pressure response and ST-T changes have less positive predictive value), and the presence of moderate or severe valve calcification together with an observed rapid haemodynamic progression (increase > 0.3 m/s in peak transaortic velocity within one year), have been shown to identify high risk patients who are likely to develop problems in the near future and in whom elective surgery may be recommended (class IIa indications). We recently reported that plasma concentrations of neurohormones such as brain natriuretic peptide (BNP) and N-terminal (NT) BNP may predict symptom-free survival in AS as well as the outcome of valve replacement.

Considering preoperative neurohormone concentrations, age, New York Heart Association (NYHA) class, aortic valve area, ejection fraction (EF), and presence of coronary artery disease, we found that neurohormone values, EF, and NYHA class predicted survival; neurohormone values predicted postoperative symptomatic status; and neurohormone values and preoperative EF predicted postoperative EF by univariate analysis. By multivariate analysis, NT BNP was the only independent predictor of outcome. Thus, assessment of neurohormones may gain importance for determining timing of surgery in asymptomatic AS, although this requires further confirmation by larger studies.

WHAT INFLUENCES OUTCOME OF LATE VALVE REPLACEMENT IN CRITICAL AORTIC STENOSIS WITH NOTABLY REDUCED LV FUNCTION?

Unfortunately, we still encounter patients with critical AS who have been diagnosed late in an...
advanced symptomatic state and who present with already notably reduced LV function. What is the outcome of valve replacement in these patients? So far, the largest experience in this patient group has been published by Connolly et al. They reported the outcome of 154 patients with critical AS and preoperative EF < 35%. Additional bypass surgery was performed in 51%. Perioperative mortality was 9%. Although this mortality rate was higher than in the overall population with aortic valve replacement, it was nevertheless acceptable. Mean (SD) EF increased from 27 (6)% to 39 (14)%.

In conclusion, the study by Vaquette and colleagues once more confirms the message that even patients with severely reduced LV function and critical AS can improve notably with heart transplantation because they have pseudosevere rather than truly severe stenosis still remains to be answered.

REFERENCES

The most likely cause of the armoured heart.

episode of tuberculosis during childhood is considered. In the patient presented here the diagnosis was tuberculosis, radiation therapy, trauma, uraemia, and viral infection among the different causes of pericardial calcifications have been reported (http://www.heartjnl.com/supplemental). Diverse diagnostic tools are available for the management of patients with valvular heart disease. A report of the American College of Cardiology/American Heart Association task force on practice guidelines (committee on management of patients with valvular heart disease). J Am Coll Cardiol 1998;32:1486–88.


Images in Cardiology

Armoured heart

A 49 year old man with a history of tuberculosis during childhood was referred to our department for a routine check up. The chest radiograph (left panel) showed circumferential calcification of the heart (arrows). Subsequently performed ECG gated multislice computed tomography (right panel) confirmed pericardial calcifications (arrows) surrounding nearly the entire heart without involving the coronary arteries (asterisk). The left ventricular ejection fraction was estimated to be normal by computed tomography and transthoracic echocardiography (to view video footage visit the Heart website—http://www.heartjnl.com/supplemental). Different causes of pericardial calcifications have to be considered: tuberculosis, radiation therapy, trauma, uraemia, and viral infections. In the patient presented here the episode of tuberculosis during childhood is the most likely cause of the armoured heart.

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To access video files visit the Heart website—http://www.heartjnl.com/supplemental

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