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

H Baumgartner

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 function 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 asymptomatic 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

Abbreviations: AS, aortic stenosis; BNP, brain natriuretic peptide; EF, ejection fraction; LV, left ventricular; NYHA, New York Heart Association
LOW FLOW–LOW GRADIENT AORTIC STENOSIS: THE MOST DIFFICULT PATIENT SUBSET

Patients with critical AS, as indicated by small aortic valve area, who present with a low gradient at low cardiac output have been identified as a high risk subgroup in several previous studies. Gradients are well known to be flow dependent and therefore must decrease when LV function and transvalvar flow decreases. Nevertheless, the majority of patients with notably reduced LV function still present with mean gradients > 40 mm Hg. Patients with gradients < 30 mm Hg have been reported to have a significantly higher operative mortality and worse long term outcome than those with higher gradients. Although the present study did not identify transvalvar gradient as a predictor of mortality, it was a predictor of early postoperative EF increase > 10% which in turn was a predictor of long term outcome. Thus, the data confirm at least indirectly the predictive value of a low gradient.

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 valve replacement. However, the difficult question as to whether there are patients in this subset of the AS population who should undergo conservative treatment and eventually heart transplantation because they have pseudosevere rather than truly severe stenosis still remains to be answered.

REFERENCES

episode of tuberculosis during childhood is
be considered: tuberculosis, radiation  
to be normal by computed tomography and
the coronary arteries (asterisk). The left  
dial calcifications (arrows) surrounding
that of the heart (arrows). Subsequently per- 
9 Bonow RO, Carabello B, de Leon AC, et al. ACC/AHA guidelines for the  
perform ECG gated multislice computed  
and severe left ventricular dysfunction.  
therapy, trauma, uraemia, and viral infec-
A 49 year old man with a history of  
ventricular hypertrophy and mortality after  
left ventricular hypertrophy and mortality after  
subgroup identified by preoperative relative wall thickness. J Am Coll Cardiol  
Aortic valve replacement in severe  
derived strain echocardiography in distinguishing severe from nonsevere valvular aortic  
surgery patients with mild or moderate aortic stenosis undergo concomitant  
A decision analysis approach to the surgical  
M Dewey  
S Eddicks  
B Hamm  
marc.dewey@charite.de  
To access video files visit the Heart website—  
http://www.heartjnl.com/supplemental

www.heartjnl.com