Treatment of Severe Aortic Stenosis

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Severe valvular aortic stenosis (AS) is an aortic valve area of less than 1.0 cm². Angina pectoris, syncope or near syncope, and congestive heart failure (CHF) are the 3 classic manifestations of severe AS. Patients with symptomatic severe valvular AS have a poor prognosis [1-4]. Ross and Braunwald found that the average survival rate was 3 years after the onset of angina pectoris in patients with severe AS [2]. Ross and Braunwald reported that the average survival rate after the onset of syncope in patients with severe AS was 3 years. Ross and Braunwald showed that the average survival rate after the onset of CHF in patients with severe AS was 1.5 to 2 years. In a prospective study, at 19-month follow-up (range 2 to 36 months), 90% of 30 patients with CHF associated with unoperated severe AS and an abnormal left ventricular ejection fraction (LVEF) were dead [5]. At 13-month follow-up (range 2 to 24 months), 100% of 18 patients with CHF associated with unoperated severe AS and an abnormal LVEF were dead [5]. At 20-month follow-up of 40 elderly patients with severe AS, CHF, syncope or angina, pectoris was present in 36 of 37 patients (97%) who developed new coronary events and in none of 3 patients (0%) without new coronary events [1].

Prophylactic antibiotics are not recommended to prevent bacterial endocarditis in patients with AS [6]. Patients with CHF, exertional syncope, or angina pectoris associated with severe AS should undergo aortic valve replacement (AVR) promptly. Valvular surgery is the only definitive therapy in these patients [7]. Medical therapy does not relieve symptoms and does not relieve the mechanical obstruction to left ventricular outflow and does not relieve symptoms or progression of the disorder.

American College of Cardiology (ACC)/American Heart Association (AHA) class I indications for AVR in patients with severe AS are 1) symptoms, 2) undergoing coronary artery bypass surgery, 3) undergoing surgery on the aorta or other heart valves, and 4) a LVEF less than 50% [7]. Although the ACC/AHA guidelines do not recommend AVR in patients with asymptomatic severe AS and normal LVEF, there are data suggesting otherwise [8-12]. Pai et al. found in their database that 99 of 338 patients (29%), mean age 71 years, with asymptomatic severe AS had AVR during 3.5-year follow-up. Survival at 1, 2, and 5 years was 67%, 56%, and 38%, respectively for nonoperated patients and 94%, 93%, and 90%, respectively for those who had AVR [8]. In the unoperated group, beta blocker use significantly reduced mortality by 48%, and statin use significantly reduced mortality by 48%.

Severe asymptomatic AS was present in 622 patients, mean age 72 years, at the Mayo Clinic [9]. Of the 622 patients, 166 (27%) developed symptoms and had AVR. Another 97 patients (16%) had AVR in the absence of symptoms. At 3-year follow-up, 52% of the 622 patients had developing symptoms, undergone AVR, or died. The most important risk factor for 10-year mortality was absence of AVR (hazard ratio=3.53, p<0.001).

Of 197 consecutive patients with asymptomatic severe AS, early AVR was performed in 102 patients (52%) [10]. The estimated actuarial 6-year all-cause mortality rates were 2% for AVR and 32% for the conventional treatment group (p<0.001). Despite being asymptomatic, patients with very severe AS have a poor prognosis [11]. Early elective AVR should be considered in these patients.

Of 73 patients with severe AS who did not undergo AVR, 15 (14%) died at 15-month follow-up [12]. Of these 73 patients, symptoms were thought to be unrelated to the AS in 31 patients. Exercise stress tests for symptoms were performed in only 4% of the 42 asymptomatic patients.

Asymptomatic patients with low-gradient severe AS and normal LVEF with reduced stroke volume index had at 46-month follow-up aortic valve events similar to those with normal stroke volume index [13]. Of 248 patients with severe AS and a normal LVEF, 94 had a low-gradient (<30 mm Hg mean gradient) (group 1), 87 had a moderate gradient (30-40 mm Hg mean gradient) (group 2), and 67 had a severe gradient (>40 mm Hg mean gradient) (group 3) [14]. Symptoms were present in 49% of group 1 patients, in 55% of group 2 patients, and in 60% of group 3 patients (p not significant). At 45-60-month follow-up, the incidence of AVR or death was 71% for group 1, 77% for group 2, and 76% for group 3 (p value not significant). Kaplan-Meier survival curves for time to death in all 3 groups were significantly better for patients with AVR versus no AVR [14]. E/E1 mean was an independent predictor of time to death in patients who did not receive AVR [15].

 Percutaneous heart valve implantation may be performed in non-surgical patients with end-stage calcific AS. In the Placement of Aortic Transcatheter Valves (PARTNER) trial, 699 high-risk patients with severe AS, mean age 84 years, were randomized to AVR or (transcatheter aortic valve replacement) TAVR [16]. All-cause mortality was 3.4% for the TAVR group versus 6.5% for the AVR group at 30 days (p value not significant) and 24.2% for the TAVR group versus 26.8% for the AVR group at 1 year (p value not significant). Major stroke was 3.8% for the TAVR group versus 2.1% for the AVR group at 30 days (p value not significant) and 5.1% for the TAVR group versus 2.4% for the AVR group at 1 year (p value not significant). Major vascular complications at 30 days were 11.0% for the TAVR group versus 3.2% for the AVR group (p<0.001). At 1-year, there were similar improvements in cardiac symptoms for both groups. In the PARTNER trial, among inoperable patients with severe AS, compared with standard care, TAVR caused significant improvements in health-related quality of life maintained for at least 1 year [17].

On the basis of the available data, AVR should be performed in operable patients with severe AS. However, TAVR should be performed in non-operable patients with symptomatic severe AS to improve survival and quality of life compared with medical management.

The 2012 expert consensus document on TAVR recommends

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TAVR in patients with severe, symptomatic calcific stenosis of a trileaflet aortic valve who have aortic and vascular anatomy suitable for TAVR and a predicted survival of more than 1 year, and who have a prohibitive surgical risk with an estimated 50% or greater mortality or irreversible morbidity at 30 days or other factors such as frailty, prior radiation therapy, porcelain aorta, and severe hepatic or pulmonary disease [18]. TAVR is a reasonable alternative to surgical AVR in patients at high surgical risk (PARTNER Trial Criteria STS ≥ 8%) [18].

References