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Transcatheter Aortic Valve Replacement

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Abstract

Transcatheter aortic valve replacement (TAVR) may be performed in non-surgical patients with symptomatic severe calcific aortic stenosis (AS). The United Kingdom Transcatheter Aortic Valve Implantation (TAVI) Registry followed prospectively 870 high-risk patients with a mean age of 82 years, with severe symptomatic AS undergoing 877 TAVI procedures [1]. Survival was 92.9% at 30 days, 78.6% at 1 year, and 73.7% at 2 years [1]. Of 442 persons with severe AS at increased surgical risk, mean age 82 years, 78 were treated with medical management, 107 with aortic valve replacement (AVR), and 257 with TAVI [2]. At 30-month follow-up, adjusted mortality was 49% significantly lower for AVR compared with medical treatment and 62% significantly lower for the TAVI group versus the medical treatment group. At 12 months, 92.3% of AVR patients, 93.2% of TAVI patients, and 70.8% of the medically treated group were New York Heart Association (NYHA) functional class I or II [2].In the Placement of Aortic Transcatheter Valves (PARTNER) trial, 699 high-risk patients with severe AS with a mean age of 84 years were randomized to AVR or TAVI [3]. Mortality was 3.4% for the TAVI group versus 6.5% for the AVR group at 30 days (p not significant) and 24.2% for TAVI patients versus 26.8% for AVR patients at 1 year (p not significant). Major stroke was 3.8% for TAVI patients versus 2.1% for AVR patients at 30 days (p not significant) and 5.1% for TAVI patients versus 2.4% for AVR patients at 1 year (p not significant). Major vascular complications at 30 days were 11.0% for TAVI patients versus 3.2% for AVR patients (p<0.001). New-onset atrial fibrillation was 16.0% after AVR and 8.6% after TAVI (p=0.001). Major bleeding was 19.5% after AVR and 9.3% after TAVI (p<0.001). At 1-year, there were similar improvements in cardiac symptoms for both groups [3]. In the PARTNER trial, among inoperable patients with severe AS, compared with medical treatment, TAVI caused significant improvements in health-related quality of life maintained for at least 1 year [4]. At 2-year follow-up of 699 high-risk patients with severe AS in the PARTNER trial, all-cause mortality was 33.9% for TAVI and 35.0% for AVR (p not significant) [5]. Stroke was 7.7% for TAVI and 4.9% for AVR (p not significant). Moderate or severe paravalvular aortic regurgitation was 6.9% for TAVI and 0.9% for AVR (p<0.001) and was associated with increased late mortality [5]. At 2-year follow-up of 358 persons with a mean age of 83 years, with inoperable severe AS in the PARTNER trial randomized to TAVR or to standard therapy with balloon aortic valvuloplasty performed in 82% of this group, 43% of TAVR patients and 68% of standard therapy patients were dead (p<0.001) [6]. Incidences of cardiac death at 2 years were 31% for TAVR patients versus 62% for standard therapy patients (p<0.001) [6]. Incidences of stroke at 2 years were 14% for TAVR patients versus 6% for standard therapy patients (p=0.01) [6]. The rates of rehospitalization at 2 years were 35% for TAVR patients versus 73% for standard therapy patients (p<0.001) [6]. Echocardiographic data showed an increase in aortic valve area and a reduction in aortic valve gradient with no increase in paravalvular aortic regurgitation [6]. Their results suggest the reduction in death in patients with TAVR may be limited to patients without extensive comorbidities.Low flow in patients with severe AS independently predicts mortality [7]. At 2-year follow-up of 180 patients with a mean age of 84 years with low-flow inoperable severe AS in the PARTNER trial, the mortality was 76% in the medically treated patients versus 46% in the TAVR treated patients (p<0.001) [7]. At 2-year follow-up of 350 patients with a mean age of 84 years with low-flow severe AS in the PARTNER trial, death occurred in 40% in AVR treated patients versus 38% in the TAVR group (p not significant) [7]. In the inoperable group in the PARTNER trial, at 2-year follow-up, death in persons with a normal stroke volume index was 38% with TAVR versus 53% with medical management (p<0.001) [7]. One-third of 270 patients undergoing a CoreValve TAVI needed a permanent pacemaker implanted within 1 month [8]. Periprocedural atrioventricular block, balloon predilation, use of larger CoreValve prosthesis, increased interventricular septum diameter, and prolonged QRS interval were independently associated with need of implantation of a permanent pacemaker [8]. In 138 patients undergoing TAVI, mean age 79 years, without previous history of atrial fibrillation, new-onset atrial fibrillation developed in 44 patients (32%) at median time of 48 hours after TAVI [9]. At 12-month follow-up, stroke or systemic embolism occurred in 15.9% for persons with new-onset atrial fibrillation versus

3.2% for persons without atrial fibrillation (p=0.023) [9].In 358 patients, a modified procedure of transapical TAVI with a balloon-expandable prosthesis had a low incidence of relevant prosthetic regurgitation [10]. Cumulative survival was not dependent on post-procedural regurgitation rate in this study [10]. At 42-month follow-up of 339 persons with a mean age of 81 years who had TAVI because they were inoperable or considered at very high surgical risk, 188 (56%) were dead [11]. Causes of late death in 152 persons were noncardiac comorbidities in 59%, cardiac death in 23%, and unknown in 18% [11]. At follow-up of 535 days in 198 persons who had TAVI with use of a Core Valve prosthesis, moderate/severe aortic regurgitation was the most powerful independent risk factor of all-mortality (hazard ratio=4.89, p<0.001) and of cardiovascular mortality (hazard ratio=7.90, p<0.001) [12]. Of 451 patients who had TAVR, 132 (29%) had moderate or severe mitral regurgitation after TAVR [13]. At 30-day follow-up, persons with moderate or severe mitral regurgitation had a higher incidence of death (adjusted hazard ratio=2.10, p=0.02). However, the incidences of death after 30 days were similar in those

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