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Impact of low flow on long-term survival in patients with severe aortic stenosis and preserved left ventricular ejection fraction: a cardiac catheterization study

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Background: Previous studies suggested that a low flow defined as an indexed stroke volume (SVi) < 35 ml/m² may be an important determinant of outcome in patients with severe aortic stenosis (AS). However, its quantification using echocardiography may be subject to error measurement. The aim of this study is to determine the impact of low SVi determined during cardiac catheterization on long-term survival among patients with severe aortic stenosis and preserved LV ejection fraction.

Methods and Results: Between 2000 and 2010, 768 patients with preserved LVEF (>50%) and severe AS (valve area ≤1cm²) without other valvular heart disease underwent cardiac catheterization. SVi was derived from catheterization data.

Mean age was 74±8 years, 42% were female, 46% had coronary artery disease, and mean LVEF was 72±10%. Overall, low SVi was found in 27% (n=... of AS patients.

As compared to patients with normal SVi, those with decreased SVi were significantly older (p<0.001) and had more frequently atrial fibrillation (p<0.001). In addition, they had lower LVEF (p<0.001; aortic valve area (p<0.0001), mean pressure gradient (p=0.001), systemic arterial compliance (p<0.0001) and higher systemic vascular and pulmonary resistances (p<0.0001).

Ten-year survival was significantly reduced in patients with lower SVi as compared to those with normal SVI (41±5% vs. 63±3%; p=0.007). After adjustment for all other risk factors, SVi was independently associated with long-term survival (hazard ratio: 0.97, 95% CI: 0.95-0.99; p=0.01).

Conclusion: Low SVi measured invasively is frequent in patients with severe AS and preserved LVEF and is a powerful and independent predictor of survival. SVi should be systematically measured and used as an additional parameter for risk stratification of patients with severe AS.

0196

« Step by step » expansion of Edwards SAPIEN XT prosthesis during transcatheter aortic valve implantation

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Objectives: To evaluate feasibility, safety and advantage of underexpansion of Edwards SAPIEN XT prosthesis during transcatheter aortic valve implantation (TAVI).

Methods: We retrospectively analyzed 157 transfemoral TAVI procedures performed between October 2012 and December 2013 in the University Hospital of Rouen. Thirty-six (22.9%) patients had intentional underexpansion of the EDWARDS SAPIEN XT prosthesis since more than 20% area oversizing was anticipated by Computed tomography (CT) assessment of aortic annulus. Underexpansion of Edwards SAPIEN XT prosthesis was performed by reducing the volume of fluid within the valve deployment balloon. The Primary endpoint was aortic regurgitation (AR) at the end of the procedure.

Results: Mean age was 83.4±5.8 years and the mean logistic EuroSCORE of 15.4±9.6%. The initial fluid volume used for valve deployment was 90±14±3 mL of the theoretical total volume (TTV) without significant difference among the 3 sizes of prostheses (90.2±3.1%, 89.5±2.6%, and 84.8±3.2% for 23, 26, and 29-mm valves, respectively). AR immediately after the first inflation was grade ≤1 in 20 (55.6%) pts, grade II in 9 (25%) pts, and grade III in 7 (19.4%) pts. Stent diameter measured immediately after first inflation represented 94.2±4.1% of the prosthesis theoretical diameter. Post-dilatation was deemed necessary in 14 cases (39.4%). At the end of the procedure, AR was ≤ grade I in 34 (94.4%) patients and grade II in 2 remaining patients. After post-dilatation, one patient presenting with fatal aortic annulus rupture. Other procedures were safe without stroke, myocardial infarction, or prosthesis migration.

Conclusion: Our study suggest that underexpansion of Edwards SAPIEN XT prosthesis is feasible during transfemoral TAVI procedures when more than 20% area oversizing is anticipated by CT. However, post-dilatation is mandatory in about 40% of cases to reduce significant residual aortic regurgitation but can be complicated by aortic annulus rupture.

0298

Influence of gender on mortality and perioperative outcomes in patients undergoing transcatheter aortic valve implantation: insights from the France 2 registry

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Aim: Transcatheter aortic valve implantation (TAVI) is an alternative to surgical aortic valve replacement for high-risk patients. The relative event rates following TAVI have not yet been well described and seem to differ between genders. We sought to determine gender imbalances in TAVI patients with regard to baseline presentation, management, and prognosis.

Methods and results: A total of 3,972 patients underwent TAVI and were prospectively included in the FRANCE 2 registry.

Women (n=1967) presented with older age and lower rates of coronary artery disease, chronic obstructive pulmonary disease, renal failure, and arrhythmia, though higher prevalence of hypertension and congestive heart failure (43.7% vs. 39.7%; p=0.010). EuroSCORE was similar between genders. Women presented with smaller aortic annulus and were implanted with smaller bioprostheses.

At 1 month, mortality rates were similar between genders. Multivariate analysis revealed the following independent predictors for 1-month all-cause mortality: female gender; New York Heart Association (NYHA) Class III or IV; transapical approach; moderate to severe postprocedural aortic regurgitation. We observed a specific interaction between gender and EuroSCORE, confirming EuroSCORE as less capable to discriminate women in order to establish 1-month mortality. Women presented with lower 1-year mortality rates than men (19.3% vs. 23.7%; p=0.021). Female gender was an independent predictor of 1-year survival (HR: 0.71, 95% CI: [0.57-0.88]).

Conclusion: Men and women exhibited several differing baseline characteristics, as well as procedural and clinical outcomes. Notably, Euroscore proved inconvenient for 1-month survival prediction in women. Women also presented with an 18.5% decrease in 1-year all-cause mortality compared to men.
There is currently no consensus on the duration of monitoring required after TAVI. Between October 2009 and November 2013, 371 consecutive patients underwent transmemorial TAVI in our institution, all performed using the Edwards SAPIEN-XT prosthesis and local anesthesia:

All the patients were monitored in intensive care unit for at least 24 hours after TAVI. We excluded 12 Patients implanted with a CoreValve, 14 patients who died before discharge, and 8 patients who were not discharged d straight home.

The remaining 337 patients were discharged at home, 121 (36%) within 3 days (early discharge group) and 216 (64%) more than 3 days after TAVI (conventional discharge group).

The primary end point combined death and re-hospitalization at 30 days. All adverse events were adjudicated according to the Valve Academic Research Consortium-2.

The incidence of early discharge rose from 0% in 2009 to 53.2% of cases in 2013. Before (plutôt prior to?) TAVI, patients in the early discharge group were less (Mann-Whitney, NYHA, mPAP, ejection fraction, and less renal failure (creatinine: 102.1±41.0 vs. 113.3±58.9 mmol/L, p=0.04), less atrial fibrillation (33.1% vs. 46.3%, p<0.02), and less previous balloon aortic valvuloplasty (11.6% vs. 23.1%, p<0.01) than those in the conventional discharge group. In contrast, patients in the early discharge group were more likely to have a pacemaker before TAVI (16.5% vs. 8.3%, p=0.02).

After multivariable analysis, pacemaker before TAVI (OR 0.44; 95% CI 0.19-0.93, p=0.04), previous balloon aortic valvuloplasty (OR 2.26; 95% CI 1.0-4.64, p=0.03), transfusions (OR 9.6; 95% CI 2.36-38.94; p<0.002), and delta creatinin (OR 0.99; 95% CI 0.98-0.99; p=0.02) were independent predictive factors of early discharge. The primary end-point occurred in 7 (5.8%) patients in the early discharge group and in 16 (7.1%) patients in the conventional discharge group without significant difference (p=0.60). No patients died in the early discharge group at 30-day follow-up.

The results of our study suggest that early discharge is feasible and safe after TAVI using the Edwards-SAPIEN XT prosthesis in selected patients.

0081

Prevalence and determinants or right ventricular dysfunction in severe aortic stenosis

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Introduction: systolic pulmonary artery pressure (sPAP) is a well known predictor of outcome in patients with valvular heart disease. In spite of this fact, limited data are available regarding the assessment of RV function in patients with aortic stenosis (AS).

Aim: of this study is therefore to evaluate the prevalence and the determinants of RV dysfunction in severe AS patients

Methods: 201 patients (mean age: 79.7±8.7, male sex 55.5%) with severe AS underwent 2D echocardiography and speckle tracking echocardiography (STE) for the evaluation of left ventricular and RV function, aortic valve gradients and sPAP. A tricuspid annular plane systolic excitation (TAPSE) ≤17mm was used to define reduced RV ventricular function.

Results: RV function was impaired in 48 patients (24%). Patients with reduced TAPSE had an impaired LV ejection fraction (LVEF) (49.2±15.4 vs 57.9±10.9%, p<0.0001), significantly altered STE parameters (GLS: –10.3±3.9 vs –13.2±3.5%, GCS: –7.0±3. vs –10.4±4.9%, GRS: 18.7±11.6 vs 28.4±15.6, all p<0.01) and a higher sPAP (48.4±15.8 vs 40.9±12.7, mmHg, p<0.002) with respecto to patients with a normal RV function. Correlates of a reduced TAPSE were: LVEF (β=0.35, p<0.0001), LV global longitudinal, circumferential and radial strain (β=0.40, β=0.40, β=0.37 respectively, all p<0.01), LV indexed stroke volume (β=0.44, se=0.001), IntNtroBNP (β=0.51, p<0.0001) and sPAP (β=0.27, p<0.0001). At Kaplan-Meier survival curve, a TAPSE ≤17mm was associated with a reduced survival in patients with AS (Log Rank test, p=0.034).

Conclusions: In patients with severe AS, RV function impairment is frequent and is associated with a poor prognosis. The correlations of TAPSE highlight the RV-LV interdependence in AS patients. Further studies will clarify the real and independent prognostic value of RV function in severe AS patients and test for the RV reverse remodelling after treatment of the AS.

0085

Risk stratification in severe aortic stenosis: the importance of ventriculo-arterial interplay

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Introduction: in patients with aortic stenosis (AS), the occurrence of adverse outcomes does not always correspond to the classical markers of hemodynamic severity. Moreover, the evaluation of outcomes in these patients is often biased by considering surgery as a censor event at follow-up analysis. Aim of the present study is therefore to evaluate the determinants of prognosis in patients with severe AS, independently from the treatment modality (aortic valve replacement/medical therapy).

Methods: 220 patients (mean age: 79.8±8.6 years, male sex: 119, 54%) with severe AS (aortic valve surface <1cm² or ≤0.6cm²/m²) underwent standard echocardiography to characterize aortic valve gradient and biventricular function. Hospitalization for cardiac cause, heart failure, overall death, but not intervention on the aortic valve were considered as major adverse cardiac events (MACEs).

Results: after a mean follow-up period of 7.8 months, the predefined MACEs occurred in 57 patients (26%). At Cox regression analysis, LVESV (HR 1.20, p=0.0025), age (HR 0.79, p=0.03), female sex (HR 1.43, p=0.05) and a ZV>3.2 mmHg/ml/m² (HR 3.53, p=0.0001) were the strongest predictors of events.

Conclusions: In patients with severe AS, a ZV >3.2 mmHg/ml/m² is the strongest predictor of prognosis, independently from the treatment modality. The ventriculo-arterial interplay has thus a fundamental role in AS, defining the natural history of the disease and suggesting that a careful reduction of LV afterload could be very useful in the clinical management of these patients.