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## Late cardiac death in patients undergoing transcatheter aortic valve replacement: incidence and predictors of advanced heart failure and sudden cardiac death.

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#### Abstract

**BACKGROUND:** Little evidence exists of the burden and predictors of cardiac death after transcatheter aortic valve replacement (TAVR).

**OBJECTIVES:** The purpose of this study was to assess the incidence and predictors of cardiac death from advanced heart failure (HF) and sudden cardiac death (SCD) in a large patient cohort undergoing TAVR.

**METHODS:** The study included a total of 3,726 patients who underwent TAVR using balloon (57%) or self-expandable (43%) valves. Causes of death were defined according to the Valve Academic Research Consortium-2.

**RESULTS:** At a mean follow-up of 22 ± 18 months, 155 patients had died due to advanced HF (15.2% of total deaths, 46.1% of deaths from cardiac causes) and 57 had died due to SCD (5.6% of deaths, 16.9% of cardiac deaths). Baseline comorbidities (chronic obstructive pulmonary disease, atrial fibrillation, left ventricular ejection fraction ≤40%, lower mean transaortic gradient, pulmonary artery systolic pressure >60 mm Hg; p < 0.05 for all) and 2 procedural factors (transapical approach, hazard ratio [HR]: 2.38, 95% confidence interval [CI]: 1.60 to 3.54; p < 0.001; presence of moderate or severe aortic regurgitation after TAVR, HR: 2.79, 95% CI: 1.82 to 4.27; p < 0.001) independently predicted death from advanced HF. Left ventricular ejection fraction ≤40% (HR: 1.93, 95% CI: 1.05 to 3.55; p = 0.033) and new-onset persistent left bundle-branch block following TAVR (HR: 2.26, 95% CI: 1.23 to 4.14; p = 0.009) were independently associated with an increased risk of SCD. Patients with new-onset persistent left bundle-branch block and a QRS duration >160 ms had a greater SCD risk (HR: 4.78, 95% CI: 1.56 to 14.63; p = 0.006).

**CONCLUSIONS:** Advanced HF and SCD accounted for two-thirds of cardiac deaths in patients after TAVR. Potentially modifiable or treatable factors leading to increased risk of mortality for HF and SCD were identified. Future studies should determine whether targeting these factors decreases the risk of cardiac death.

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**KEYWORDS:** aortic stenosis; heart failure; sudden cardiac death; transcatheter aortic valve implantation; transcatheter aortic valve replacement

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