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Beyond survival: determinants of a composite one-year outcome of survival, functional status and cognitive integrity after transcatheter aortic valve implantation

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Introduction: Transcatheter aortic valve implantation (TAVI) now carries low procedural mortality, yet for octogenarians survival alone does not capture what they hope to gain: to stay independent and keep their mental faculties.[1] We examined which factors determine a composite of survival, functional status and cognitive integrity one year after TAVI.

Patients and Methods: We analyzed consecutive patients treated between January 2021 and September 2025 in a prospective single-centre registry, when geriatric assessment at listing became systematic, with complete one-year follow-up. A favorable composite outcome required survival at one-year, self-reported quality of life equal to or better than before TAVI, and no new cognitive impairment relative to baseline. Candidate determinants were age, sex, EuroSCORE II, NYHA class, renal function, ejection fraction, Katz index, Edmonton Frail Scale (EFS), baseline cognitive impairment and postoperative delirium. Independent associations were tested by multivariable logistic regression with bootstrap confidence intervals; discrimination was compared by area under the ROC curve (AUC).

Results: Of 604 patients (median age 80 years, IQR 76–84; 52.6% women; median EuroSCORE II 3.3%, STS 5.3%), 27.5% were functionally dependent (Katz index below 5, dependency in at least two activities of daily living), 25.2% frail (EFS ≥3), 39.6% cognitively impaired at baseline and 13.1% developed postoperative delirium. The composite outcome was achieved by 478 patients (79.1%); failures were due to death within one year in 77 (12.7%), new cognitive impairment in 29 and worsened quality of life in 23. The outcome was reached less often with functional dependency (63.3% vs 85.2%), delirium (55.1% vs 84.1%), frailty (68.4% vs 82.7%) or baseline cognitive impairment (74.1% vs 82.5%; all $p<0.05$), After adjustment, only functional dependency (OR 0.33, 95% CI 0.19–0.62) and delirium (OR 0.27, 95% CI 0.14–0.49) remained independent, whereas EuroSCORE II, renal function, ejection fraction, NYHA class and age did not. Geriatric variables discriminated better than EuroSCORE II (AUC 0.68 vs 0.63; full model 0.70); without delirium, dependency remained the only independent pre-procedural predictor (OR 0.34, 0.20–0.61).

Conclusion: One in five patients failed to achieve a patient-centred benefit one year after TAVI, and this failure was not captured by EuroSCORE II or other conventional predictors. Pre-procedural functional dependency and postoperative delirium were the only independent determinants, with geriatric variables outperforming surgical risk scores in discrimination. These findings challenge the adequacy of mortality-based risk models for patient selection in TAVI and support the systematic integration of functional assessment and delirium prevention into the care pathway.

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