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A novel risk score to predict mortality in patients with atrial fibrillation: the BLACCK (AF) death risk score

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Background Prior risk stratification schemes for atrial fibrillation (AF) have extensively focused on stroke as the principal outcome. However, an accurate estimation of the risk of death in patients with AF has received disproportional attention.

Purpose The aim of this study was to develop and validate a risk score for predicting mortality in patients with AF who underwent a hospitalization for cardiac reasons.

Methods The new risk score was developed and internally validated in 887 patients with AF, who were followed up for a median of 2 years. The outcome measure was all-cause mortality. Biomarker samples, echocardiographic data and renal function values were obtained at the date closest to hospital discharge. A Cox-model that determined the variables that significantly contributed to the prediction of all-cause mortality, was adapted to a risk points system through weighting of the model coefficients. The model was internally validated by bootstrapping, assessing both discrimination and calibration.

Results 311 all-cause deaths were reported during 1755 person-years of follow-up (incidence rate 17.7 events per 100 person-years). The most important predictors of death were N-terminal pro B-type natriuretic peptide (NT-proBNP), high-sensitivity troponin-T (hs-TnT), left atrial area indexed to body surface area (LAAi), prior cardiac arrest, kidney impairment, congestive heart failure and age, and were included in the BLACCK (AF) death risk score. The score was well-calibrated (observed probabilities adjusted to predicted probabilities) and showed good discriminative ability [c-index 0.87 (95% CI 0.85–0.90)]. The internal validation of the score reported minimal over-fitting (optimism-corrected c-index of 0.85). The 1, 2 and 3-year risk of death derived by the score’s total points may be calculated immediately through the nomogram (Figure 1).

Conclusions We developed a simple, well-calibrated and internally validated novel risk score for predicting 1, 2 and 3-year risk of death in patients with AF after a hospitalization for cardiac reasons. The BLACCK (AF) death risk score included both cardiac biomarkers and clinical information, performed well and may assist physicians in decision-making when treating patients with AF.