

Prediction of mortality and mode of death by clinical risk score systems in 2.6 million patients with atrial fibrillation: a nationwide analysis

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Atrial fibrillation (AF) is associated with a higher mortality, but modes of death may vary and their respective predictors have been insufficiently defined. Charlson comorbidity index (CCI) is a tool to quantify multimorbidity and a strong estimator of mortality. The quantifiable frailty phenotype is also predictive of mortality and disability and claims data can be used to classify individuals as frail and non-frail using the Claims-based Frailty Index (CFI). We evaluated whether these tools may help to predict mortality and the different modes of death in AF.

Methods: Based on the France nationwide administrative hospital-discharge database, we collected information for all AF patients treated between 2010 and 2019 in France. Adverse outcomes were investigated during follow-up. CHA₂DS₂VASc score, CCI and CFI were calculated for each patient.

Results: Among 2,641,626 patients with AF, 670,541 patients died during

a follow-up of 2.0±2.3 years (median 1.1) (yearly rate 12.6%, 30.3% cardiovascular and 69.7% non-cardiovascular deaths). Death occurred more often in patients with higher CHA₂DS₂VASc, CCI and CFI scores. CCI was a better predictor of total mortality than CFI and CHA₂DS₂VASc score (see C-statistics in table); however, the CHA₂DS₂VASc score was a better predictor of cardiovascular mortality than CCI and CFI. By contrast, CCI was a better predictor of non-cardiovascular mortality than CFI and CHA₂DS₂VASc score. The optimal predictive performances were better for non-cardiovascular death than for cardiovascular death.

Conclusion: Multimorbidity assessed with CCI demonstrated better performances in predicting total mortality and non-cardiovascular mortality than CHA₂DS₂VASc score and Frailty assessed with CFI in AF patients. By contrast, CHA₂DS₂VASc score was a better predictor of cardiovascular mortality than CCI and CFI in these patients.

		ROC area (95% CI)	p vs CHA ₂ DS ₂ -VASc / Charlson
Total mortality	CHA ₂ DS ₂ -VASc	0.5944 (0.5937–0.5952)	– / <0.0001
	CHARLSON (CCI)	0.7134 (0.7128–0.7141)	<0.0001 / –
	Frailty index (CFI)	0.6875 (0.6869–0.6882)	<0.0001 / <0.0001
Cardiovascular death	CHA ₂ DS ₂ -VASc	0.6481 (0.6470–0.6492)	– / <0.0001
	CHARLSON (CCI)	0.6418 (0.6408–0.6429)	<0.0001 / –
	Frailty index (CFI)	0.6126 (0.6115–0.6138)	<0.0001 / <0.0001
Non-cardiovascular death	CHA ₂ DS ₂ -VASc	0.5505 (0.5497–0.5514)	– / <0.0001
	CHARLSON (CCI)	0.7085 (0.7078–0.7092)	<0.0001 / –
	Frailty index (CFI)	0.6890 (0.7077–0.7092)	<0.0001 / <0.0001