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Background

Diabetes and heart failure (HF) promote atrial fibrillation (AF) and are associated with an increased risk of adverse cardiovascular (CV) events in patients with AF. Because of effective anticoagulation options, AF patients are now more likely to develop HF than a stroke or a systemic embolic event. Appropriate risk stratification of patients with AF should therefore not only consider the risk for stroke but also for HF events.

Methods

Patients with AF admitted to a tertiary academic center between 07/2005 and 07/2019 were identified through a search of electronic health records. The primary outcome of interest was CV death or hospitalization for HF (HHF). We used Cox regression models adjusted for age, sex, estimated glomerular filtration rate, diabetes, HF, body mass index, prior myocardial infarction, hypertension, CRP, LDL-C, and smoking.

Results

In total, 7,412 patients (median age 70 years, 39.7% female) were included in the present analysis and followed over a median of 4.5 years. Both diabetes (Adjusted (Adj.) hazard ratio (HR) 1.87, 95% confidence interval (CI) 1.55 to 2.25) and HF (Adj. HR 2.57, 95% CI 2.22 to 2.98) were significantly associated with CV death/HHF after multivariable adjustment. Compared to patients with diabetes, HF patients had a higher risk of HHF but a similar risk of CV and all-cause death. There was a robust relationship between CV death/HHF and NT-proBNP (Adj. HR for 1-unit increase in standardized log-transformed biomarker 1.86, 95% CI 1.67 to 2.07). NT-proBNP showed good discriminatory performance (AUC 0.78, 95% CI 0.77-0.80), and the addition of NT-proBNP to the covariates used for adjustment resulted in a significant AUC improvement ($\Delta=0.04$, $P < 0.001$). With least absolute shrinkage and selection operator logistic regression, the strongest associations for CV death/HHF were obtained for NT-proBNP (OR 2.69 per 1-SD in log-transformed biomarker), HF (OR 1.73), and diabetes (OR 1.65).

Conclusion

These findings suggest that the influence of diabetes and HF expand beyond the risk of stroke and systemic embolic events to CV death/HHF in an unselected AF patient population. NT-proBNP may provide improved risk assessment in AF patients.

Figure: Relationship between diabetes, heart failure, and NT-proBNP and cardiovascular outcomes.

