Type 2 diabetes and chronic kidney disease combinations in heart failure across the ejection fraction spectrum: clinical associations, medication use, and cause-specific outcomes: A contemporary, real-world analysis of the Swedish Heart Failure Registry

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Background

Heart Failure (HF) often coexists with type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD), which increase the risk of mortality and HF hospitalization. Several drug classes recommended in HF have been shown to reduce cardiorenal morbidity and mortality in CKD and/or T2DM, but real-world studies report low use and frequent discontinuation.

Aims

In a real-world HF population, to report:

i) The prevalence of T2DM and CKD and their combination across ejection fraction (EF) categories;

ii) HF medication use, in particular mineralocorticoid receptor antagonists (MRA);

iii) Estimated cause-specific event rates and multivariable-adjusted risks for death, HF hospitalization (HHF) and end-stage renal disease (ESRD).

Materials and Methods

Data sources

Patients from the Swedish Heart Failure Registry registered 2017-2023

80 clinical variables

Statistics Sweden: socioeconomic data

National Patient Registry: comorbidities and outcomes
Cause of Death Registry

4 groups

no CKD/no T2DM, CKD only, T2DM only, both CKD/T2DM

Outcomes

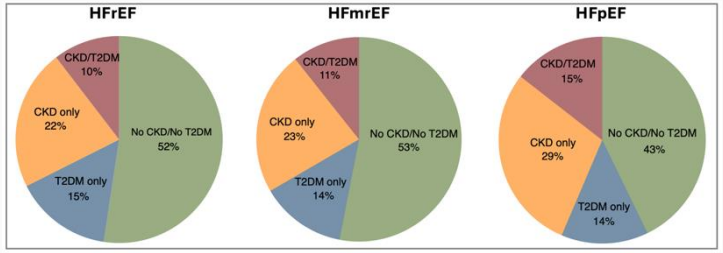
Primary: all-cause death,

Secondary: cardiovascular death, first of a composite of first HF hospitalization and cardiovascular death, first HF hospitalization, and end-stage renal disease (ESRD).

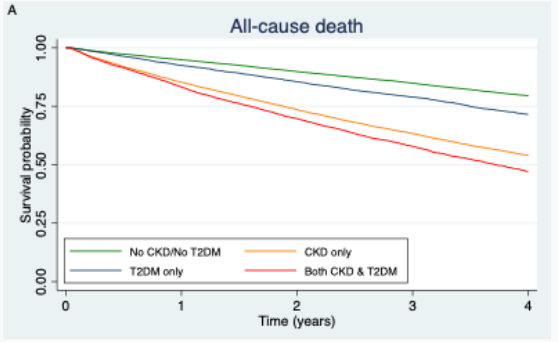
Results

54,341 patients (34% females, mean age 73 years)

52% HFrEF, 26% HFmrEF, 21% HFpEF

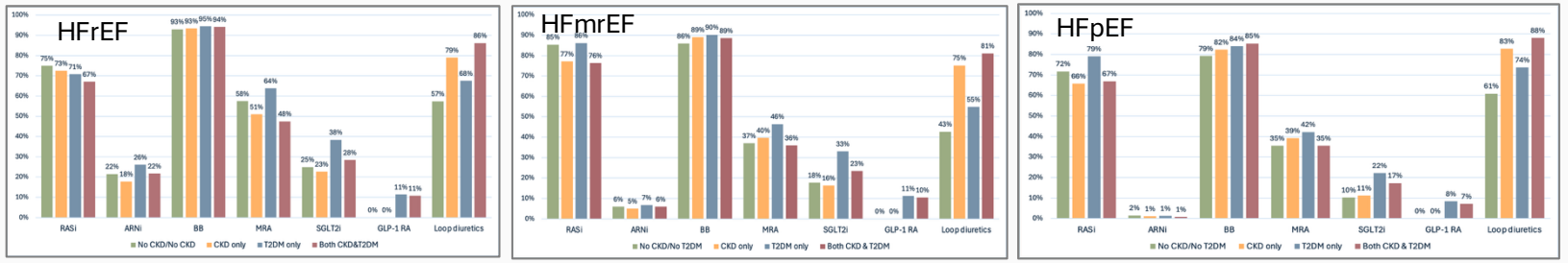


Patient population according to CKD/T2DM.



Kaplan-Meier curve.

Independent risks of mortality and HF outcomes were significantly increased in the presence of CKD/T2DM, ranging approximately +30% for T2DM only, +55% for CKD only, and +75% for CKD/T2DM. For ESRD, T2DM alone did not significantly increase risk; CKD alone increased it threefold, and CKD with T2DM increased it sixfold.



Use of medications according to CKD/T2DM.

	All-cause death			CV death			First HHF/CV death			First HHF			ESRD	
	rEF	mrEF	pEF	rEF	mrEF	pEF	rEF	mrEF	pEF	rEF	mrEF	pEF	rEF	mrEF
No CKD/No T2DM	5.3	5.4	8.2	2.8	2.5	3.7	9.0	5.9	8.1	7.3	4.4	6.0	0.2	0.2
CKD only	14.8	14.9	18	9.2	8.2	9.7	21.1	16.8	19.8	16.4	12.7	14.5	0.6	0.5
T2DM only	7.7	8.2	10.7	4.0	4.2	4.9	13.2	10.9	11.9	11.0	8.1	8.7	0.2	0.3
Both CKD & T2DM	17.9	18.3	21.1	10.1	9.0	9.8	28.5	24.1	25.6	23.7	19.3	19.8	1.3	1.0

Event rates for each outcome of interest according to ejection fraction (N/100py).

Conclusions

CKD was more common in HFpEF, but it was more harmful and was associated with reduced MRA use in HFrEF.

CKD was a strong and T2DM a moderate independent risk factor for all outcomes.

HF-related outcomes had much higher event rates compared with ESRD, even in patients with CKD.

Our results inform MRA implementation strategies and potentially contribute to planning of future trials of drugs targeting aldosterone.

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