History of heart failure and chronic kidney disease and the risk for all-cause death after COVID-19 during the three first waves in comparison to influenza outbreaks in Sweden

V. Ritsinger[1], J. Bodegard[2], R. Kristofi[3], M. Thuresson[4], D. Nathanson[5], T. Nystrom[6], J.W. Eriksson[3], A. Norhammar[1]

[1]Karolinska Institute, Cardiology Unit, Department of Medicine, Karolinska University Hospital Solna, Stockholm, Sweden, Stockholm, Sweden; [2]AstraZeneca, Oslo, Norway; [3]Uppsala University, Department of Medical Sciences, Clinical Diabetes and Metabolism, Uppsala, Sweden; [4]Statisticon AB, Uppsala, Sweden; [5]Karolinska Institute, Department of Medicine, Huddinge, Stockholm, Sweden; [6]Karolinska Institute, Department of Clinical Science and Education, Södersjukhuset, Stockholm, Sweden

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Background: Infection with SARS-CoV-2 (COVID-19) affects people globally causing hospitalisation and reduced life expectancy. To improve future preventive measures there is a need of extensive analysis on contributing risk factors for severe COVID-19 outcome.

Purpose: To explore how cardiorenal disease (CRD; heart failure and/or chronic kidney disease) impacted mortality in patients hospitalised for COVID-19 during the three first waves in Sweden in comparison to previous influenza outbreaks and with a sex perspective.

Methods: All patients in Sweden with a main hospital diagnosis of COVID-19 (January 2020-September 2021) or influenza (January 2015-December 2019) with previous CRD were identified in registries and compared with a reference group free from CRD but with COVID-19 or influenza. Associated risk of all-cause death during the first year was analysed using adjusted Cox proportional hazards models.

Results: In COVID-19 patients with and without prior history of CRD (n=44,866) mean age was 79.8 years (SD 11.8) and 43% were women. In influenza patients (n=8897) mean age was 80.6 (SD 11.5) years and 45% were women. COVID-19 vs. influenza was associated with higher mortality risk the first two waves (HR 1.53; 95% CI 1.45–1.62, p<0.001 and 1.52; 1.44–1.61, p<0.001) but not in the third wave (1.07; 0.99–1.14, p=0.072). The cumulative incidence of all-cause death was increased in COVID-19 patients and in influenza patients if CRD was present (Figure 1). Further, CRD was an independent risk factor for all-cause death after COVID-19 in men and women (men: 1.37; 1.31–1.44, p<0.001, women: 1.46; 1.38–1.54, p<0.001). At ages <70 years women with CRD had a similar mortality rate as men with CRD while at ages ≥70 years mortality rate was higher in men (Figure 2).

Conclusions: Outcome after COVID-19 is worse if CRD is present. In women at ages <70 years the presence of CRD attenuates the protective effect of female sex. Further COVID-19 was associated with higher mortality risk than influenza during the first two waves.

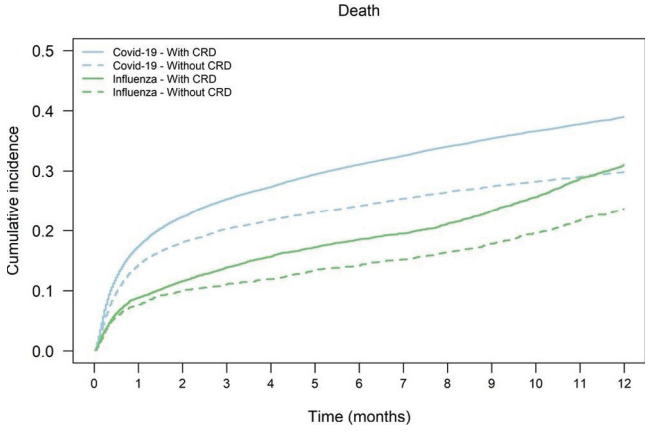

Figure 1. Cumulative incidence of all-cause death

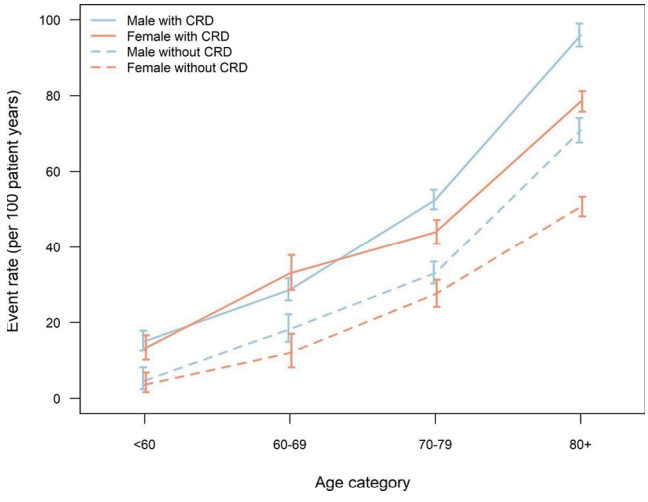

Figure 2. Death rate by sex and age groups