Renal insufficiency is associated with progressive increase in risk of cardiovascular death in patients without preexisting cardiovascular disease

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Introduction and aims

Chronic kidney disease has previously been observed to be associated with increased cardiovascular risk. Observations are however predominantly limited to patients with either severe or end-stage renal disease. We investigate the associated risk of diminishing renal function with cardiovascular death across all levels of non-dialysis dependent renal insufficiency.

Methods

Based on cross-referencing of data from numerous nationwide health care registers, patients with a recorded plasma creatinine measurement were identified in Denmark between 1997 and 2017. Patients with preceding cardiovascular disease, end-stage renal disease, age <18 years, and patients with events within a 30 days quarantine period after their first-time plasma creatinine measurement were excluded. Estimated glomerular filtration rates (eGFRs) were calculated from the first recorded plasma creatinine. Hazard ratios for two-year risk of cardiovascular death were computed for strata of renal function in a multiple Cox regression model with adjustment for age and gender, and cumulative incidences were estimated using the Aalen-Johansen estimator.

Results

In total 2,000,626 patients were identified. Median follow-up was 3.6 years (IQR 1.7 - 9.0 years). A total of 22,657 (0.01 %) cardiovascular deaths were recorded. Patients were predominantly female (54%), median age was 40 years (IQR 29 – 63 years), and median eGFR was 98 ml/min/1.73m2 (IQR 83 – 117 ml/min/1.73m2). Hazard ratios with confidence intervals of cardiovascular death were 0.85 [0.82- 0.89], 1.24 [1.18 -1.31], 2.02 [1.89 - 2.15], and 3.19 [2.91 - 3.49] for the eGFR strata 90-60ml/min/1.73m2, 59-45ml/min/1.73m2, 44-30ml/min/1.73m2, <30ml/min/1.73m2, respectively (eGFR >90ml/min/1.73m2 as reference).

Conclusion

In a nationwide cohort of non-dialysis treated patients without pre-existing cardiovascular disease, renal dysfunction was associated with progressive increase in risk of cardiovascular death in patients with eGFR < 60ml/min/1.73m2.
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