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Congenital Heart Disease and Long-term Risk of Dialysis-requiring Chronic Kidney Disease: a Nationwide Population Study

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Background: Best evidence suggests that approximately 30-50% of adult patients with congenital heart disease (CHD) have impaired renal function. It is unknown to what extent this impairment is related to the development of dialysis-requiring chronic kidney disease (DRCKD) over a lifetime.
Aim: To examine the overall risk of DRCKD in the CHD population, with risk stratified by CHD severity, compared with the general population.
Methods: In this cohort study we used two nationwide population-based medical databases to identify individuals diagnosed with CHD in Denmark between 1963 and 1974 (before 15 years of age) and from 1977 to 2003 (at any age). Patients were followed from 1999 to 2012 for first episode of dialysis treatment for CKD using data from the Danish National Registry of Patients (DNRP: nationwide hospital discharge registry covering all Danish hospitals). DNRP dialysis coding provides a distinction between dialysis for CKD and dialysis for acute kidney failure. For each CHD subject we identified 10 controls from the general population, matched by sex and birth year. A unique personal identifier assigned at birth and used in all Danish public registries enabled virtually complete follow-up for migration, death or DRCKD. We computed cumulative incidences and hazard ratios (HR) of DRCKD.
Results: We identified 18,033 CHD subjects and 177,413 comparison cohort subjects. By 40 years of age, the cumulative incidence of DRCKD was 0.6% among CHD subjects and 0.1% among the control population. The HR of DRCKD among CHD subjects compared with controls was 7.2 (95% CI: 4.6-5.6). The HRs for mild, moderate and complex CHD were 2.3 (95% CI: 1.0-5.6), 6.6 (95% CI: 2.3-18.0), and 34 (95% CI: 11-105), respectively.
Conclusion: The incidence of DRCKD was increased in individuals with CHD compared with the general population. Although the absolute risk of DRCKD was low, this should be an important consideration for optimizing preventive and acute cardio-renal care for the adult CHD population.