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Kidney Function, Kidney Function Decline, and the Risk of Dementia in Older Adults

A Registry-Based Study

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Study Question

Are there links between impaired kidney function, rapid kidney function decline, and risk for incident dementia?

What Is Known and What This Paper Adds

Some studies suggest an association between chronic kidney disease and cognitive impairment. This investigation's results show that lower baseline kidney function and steeper decline in kidney function are associated with an increased risk for incident dementia.

Methods

For this historical prospective health care–based cohort study, the investigators analyzed data from the Stockholm Creatinine Measurements (SCREAM) project including 329,822 residents of Stockholm who accessed any health care services between 2006 and 2011, were ≥65 year old at the time, and had no baseline history of dementia or kidney replacement therapy. Plasma creatinine levels were used to calculate estimated glomerular filtration rate (eGFR). Repeated eGFR measurements during the first year of observation were used to estimate the rate of eGFR decline. The primary study outcome was the first recorded diagnosis of all-cause dementia or the initiation of anti-dementia drugs (donepezil, rivastigmine, galantamine and/or memantine). The secondary study outcomes were the first recorded diagnosis of Alzheimer and vascular dementia. Royston-Parmar models were used to investigate the association of baseline kidney function and subsequent decline and incident dementia.

Results and Study Limitations

Overall, 18,983 individuals (5.8%) developed dementia during the follow-up period (median duration, 5 years). The incidence rate for dementia was 6.56 cases per 1,000 person-years in persons with eGFRs of 90–104 mL/min/1.73 m^2, but it was 30.28 cases per 1,000 person-years in those with eGFRs <30 mL/min/1.73 m^2. The Royston-Parmar models confirmed that individuals with lower eGFR values had a greater likelihood of developing dementia. The models also confirmed that individuals with an eGFR decline rates steeper than 1 mL/min/1.73 m^2 per year, had a greater likelihood of developing dementia. Risk magnitude was greater for vascular dementia than for Alzheimer. From a public health perspective, as many as 10% of the dementia cases (95% confidence interval [CI], 6%–14%) were attributed to eGFRs <60 mL/min/1.73 m^2. The present study's limitations include the reliance on diagnostic codes recorded for administrative purposes, and the fact that many community-dwelling older individuals may have had undiagnosed dementia. Furthermore, the present study had a relatively short follow-up period, and the eGFR testing protocols were non-standardized, reflecting routine care.

Table Baseline eGFR Values and Dementia Risks

eGFR range	Hazard ratio (95% CI) for incident dementia
90–104 mL/min/1.73 m^2	*Reference*
60–89 mL/min/1.73 m^2	1.16 (1.08–1.26)
30–59 mL/min/1.73 m^2	1.71 (1.54–1.91)
<30 mL/min/1.73 m^2	2.62 (1.91–3.58)

Relationships between baseline eGFR values and likelihood of developing dementia.

Study Funding and Competing Interests

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A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The corresponding author(s) of the full-length article and the journal editors edited and approved the final version.

