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Association between dietary magnesium intake and incident chronic kidney disease

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Objectives: To evaluate relationship of dietary magnesium intake with the development of chronic kidney disease (CKD)

Methods: This observational prospective study screened 210,965 European adults aged 40-70 who underwent dietary questionnaire from April 2009 to June 2012 in UK Biobank cohort. Participants with underlying CKD or implausible energy intake were excluded. Dietary magnesium intake was assessed through online 24-hour recall dietary questionnaire and adjusted for energy intake using residual method. The participants were categorized into quartile according to energy-adjusted dietary magnesium intake. Primary outcome was incident CKD diagnosed through ICD-10 and OPCS-4 codes. Incident CKD defined as eGFR <60 mL/min/1.73 m² was also assessed as an additional primary outcome in the sub-cohort with primary care creatinine follow-up data.

Results: A total of 114,916 participants was included in the final analysis. The median age was 57.0 (IQR, 50.0-63.0) years and 56.8 % were female. Median magnesium intake amount per person was 345.6 (IQR, 296.8-402.5) mg/day. During a 1,095,128.6 person-year follow-up, CKD outcome occurred in 3,337 patients. Incidence of CKD was progressively lower in patients with higher magnesium intake (3.2%, 2.9%, 2.8%, and 2.7% in Q1-4, respectively). Cox regression analysis revealed that the hazard ratios (HRs) for incident CKD decreased in a stepwise manner towards higher magnesium intake quartiles (2Q: HR, 0.89; 95% CI, 0.81-0.98; 3Q: HR, 0.87; 95% CI, 0.79-0.95; 4Q: HR, 0.84; 95% CI, 0.76-0.92) relative to 1Q (P for trend <0.001). This association was maintained even after adjustments were made for confounding factors. Similar results were observed with eGFR-defined CKD outcome (2Q: adjusted HR [AHR], 0.75; 95% CI, 0.64-0.89; 3Q: AHR, 0.73; 95% CI, 0.61-0.87; 4Q: AHR, 0.70; 95% CI, 0.58-0.85) relative to 1Q (P for trend <0.001).

Conclusions:

Higher intake of dietary magnesium may relate with lower risk of incident CKD in adults with normal kidney function.

Table. Incident rates and hazard ratios for incident CKD according to dietary magnesium intake