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Polyunsaturated Fatty Acids and Risk of Adverse Kidney Outcomes

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Objectives: Although many studies have reported polyunsaturated fatty acids (PUFA) as significant predictors of cardiovascular disease, little is known about the relationship between PUFA levels and chronic kidney disease (CKD). We explored this issue in the UK Biobank cohort.

Methods: First, to evaluate the association between PUFA levels and incident CKD, a prospective observational cohort of 78,950 participants who did not have CKD and measured their plasma PUFA levels at baseline was constructed from the UK Biobank cohort. The main predictors were the quartiles of plasma PUFA, omega-3 (ω-3) PUFA, omega-6 (ω-6) PUFA, docosahexaenoic acid (DHA), and linoleic acid (LA). The primary outcome was incident CKD based on ICD-10 and OPCS-4 codes. Second, the association of PUFA levels with kidney failure requiring replacement therapy (KFRT) in 7,233 participants with preexisting CKD at baseline was evaluated. The outcome in this analysis was the onset of KFRT based on ICD-10 and OPCS-4 codes.

Results: In the cohort without CKD, during 927611.4 person-years of follow-up (median 12.0 years), incident CKD occurred in 4.4% of participants. In the Cox regression model, compared with quartile 1 of total PUFA levels, the adjusted hazard ratios (95% confidence intervals) for quartiles 2, 3, and 4 were 0.83 (0.75-0.91), 0.83 (0.74-0.93), 0.67 (0.58-0.76), respectively. This inverse relationship was consistently observed for all PUFA types: ω-3 PUFA, ω-6 PUFA, DHA, and LA. In the cohort with CKD, the total PUFA levels were not associated with a lower risk of KFRT. However, among the PUFA types, only higher DHA levels showed a significantly lower association with KFRT.

Conclusions: Among individuals without CKD, higher plasma PUFA levels and all four PUFA components were associated with a lower risk of incident CKD. In individuals with CKD, only ω-3 component, DHA, was associated with a lower risk of KFRT.

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