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Impact of dietary beta-carotene on all-cause mortality according to the different clinical condition including decreased kidney function

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Objectives: Beta-carotene has been announced that was inversely associated with the risk of all-cause mortality, but the association in the subgroup was not clear yet. Herein, we aimed to evaluate the impact of beta-carotene on all-cause mortality according to the different clinical settings among the general population.

Methods: We used employing data from the 92,062 subjects of US National Health and Nutrition Examination Survey 1999-2015. The intake of beta-carotene was divided into the quartile; the first quartile group was regarded as the reference. The subgroup was made by 1) the presence of hypertension, 2) diabetes, 3) the status of alcohol consumption, 4) smoking status, and 5) estimated glomerular filtration rate (eGFR) 90 mL/min/1.73m^2, respectively. We used a multivariate Cox-proportional hazard model to identify the impact of beta-carotene on all-cause mortality.

Results: Among 36,747 subjects, there were 14,469 (39.4%), 4,704 (12.8%), and 15,804 (43.0%) subjects with hypertension, diabetes, and eGFR <90 mL/min/1.73m^2, respectively. There were 8,774 (23.9%) of ex-smokers and 13,694 (37.3%) of non-alcoholics, respectively. During 97.9±53.9 months, there were 4,465 (12.2%) death was detected. Greater intake of beta-carotene significantly reduced the risk for all-cause mortality in subjects without hypertension (adjusted hazard ratio [aHR] 0.81 in 4th quartile group [Q4]), without diabetes (aHR 0.85 in Q4), non-alcoholics (aHR 0.86 in Q4), and ex-smokers (aHR 0.79 in Q4), respectively. On the contrary, according to the eGFR, participants with eGFR <90 mL/min/1.73 m^2 had a beneficial effect of dietary beta-carotene (aHR 0.82 in Q4) compared to the participants with eGFR ≥90 mL/1.73 m^2 (aHR 1.00 in Q4).

Conclusions: Among the various medical conditions, decreased kidney function status was the only condition to predict the beneficial effect of dietary beta-carotene. More specified and targeted counseling for encouraging intake of beta-carotene needs to be considered especially for subjects with lower eGFR.