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Interaction of high sodium intake and central obesity on albuminuria in general population

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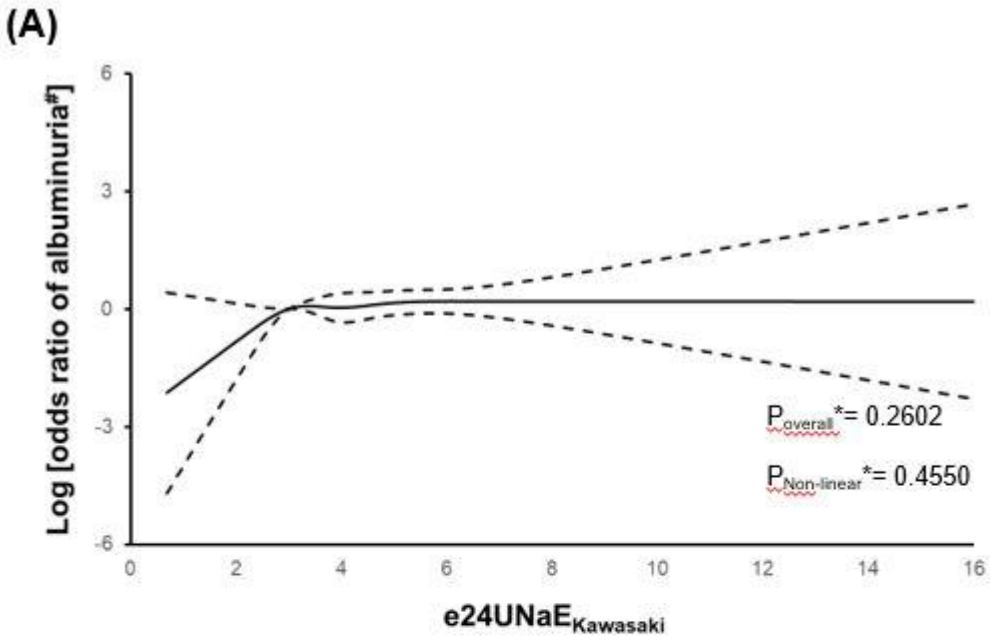
Objectives: Increased sodium intake or aberrant fat distribution is related to vascular endothelial dysfunction, which causes chronic cardiovascular disease. This study aimed to find the effect of possible interaction between a high-sodium diet and central obesity on albuminuria.

Methods: We conducted a nationwide, population-based interaction analysis using body roundness index (BRI) and Kawasaki method for estimating 24-h urinary sodium excretion (e24hUNaEKawasaki, g/day) as candidate indicators. A total of 6,509 participants were all native South Koreans aged ≥ 20 years without significant medical illness. They were divided into quintiles according to their $e24hUNaE_{Kawasaki}$ results and were subdivided by sex.

Results: Participants in the highest $e24hUNaE_{Kawasaki}$ quintile were more obese and had higher urine albumin:creatinine ratio. Multiple logistic regression, adjusted for various risk factors of CVD, demonstrated that both BRI (adjusted OR =1.413, 95% CI = 1.296-1.540) and $e24hUNaE_{Kawasaki}$ (adjusted OR = 1.248, 95% CI = 1.119-1.391) were significantly associated with albuminuria. Our analysis revealed that high-sodium diet had a stronger effect on the risk of albuminuria in participants with central obesity than in those without (adjusted RERI = 0.901, 95% CI = 0.874-0.929; adjusted AP = 0.243, 95% CI = 0.047-0.439; adjusted SI = 1.498, 95% CI = 1.016-1.981).

Conclusions: The results of our study demonstrate that both $e24hUNaE_{Kawasaki}$ and BRI are candidate predictors of albuminuria and that the synergistic interaction of high sodium diet and central obesity may be associated with the development and progression of vascular endothelial dysfunction in the kidney.

Figure 1. Multiple logistic regression analysis of albuminuria#-specific risk with restricted cubic splines



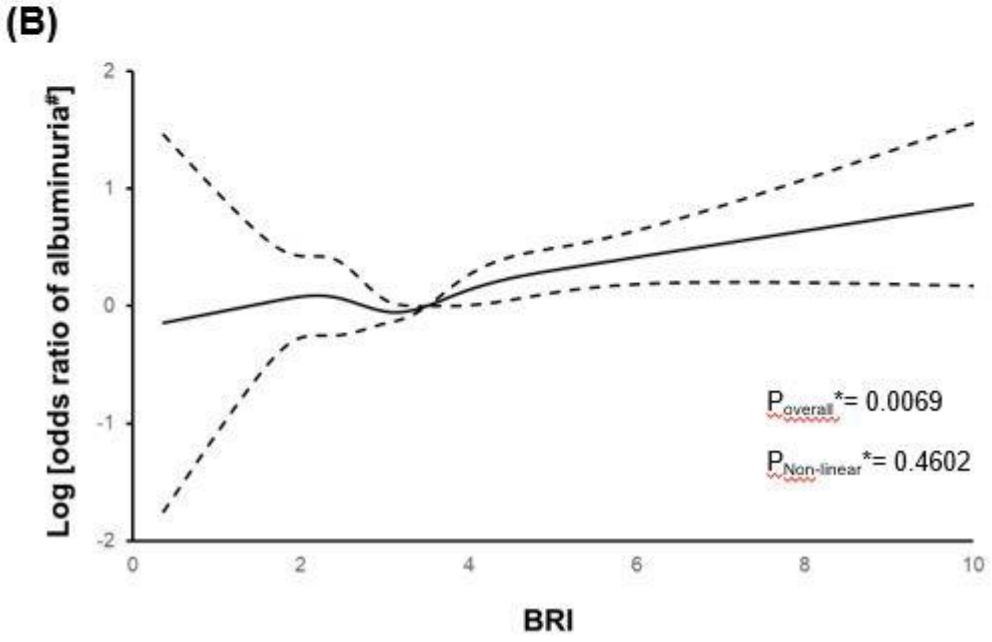


Table 1. Interaction effect analysis of central obesity and high sodium intake on albuminuria

	Unadjusted		Adjusted*	
Measure	Estimate	95% CI	Estimate	95% CI
RERI	1.084	1.078–1.089	0.901	0.874–0.929
AP	0.278	0.224–0.332	0.243	0.047–0.439
SI	1.716	1.140–2.293	1.498	1.016–1.981

*Adjusted age, sex, smoking history, systolic blood pressure, diastolic blood pressure, white blood cell, fasting plasma glucose, hemoglobin A1c, aspartate aminotransferase, alanine aminotransferase, triglyceride, and LDL-cholesterol

If there was no biological interaction, the 95% CI of RERI and AP contains 0, and the 95% CI of SI contains 1.

AP, attributable proportion of the interaction; RERI, relative excess risk because of the interaction; SI, additive interaction index of synergy