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Association between body mass index, waist circumference and clinical outcomes in Korean advanced chronic kidney disease patients

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Objectives: This study analyzed the association between body mass index (BMI) and waist circumference (WC) with all-cause death, 3-point major cardiovascular event (MACE), end-stage kidney disease (ESKD) and total composite events in nation-wide cohort of Korean advanced chronic kidney disease (CKD) patients.

Methods: This nationwide cohort study, using the National Health Insurance Database, included adult health examinees who received two or more check-ups from 2009 to 2012. Among them, CKD patients (N=325,657, stage G3a, G3b and 4) were identified. Patients were classified into three groups for BMI (<18.5, 18.5-25 [reference] and ≥25) and four groups for WC (female;<75cm or male;<85cm [WC1], female;75cm≤WC<85cm or male;85cm≤WC<95cm [reference], female;85cm≤WC<95cm, male;95cm≤WC<105cm [WC2] and female;≥95cm, male;≥105cm [WC3]). Risks were evaluated using Cox proportional hazard analysis.

Results: Patients (58.6±7.7 years) had mean eGFR of 54.32±5.83ml/min/1.73m2. The underweight (BMI<18.5) group had increased risks of death [HR 1.757, 95% CI (1.573-1.964)] and total events [HR 1.244, (1.144-1.353)]. Overweight (BMI≥25) group showed lower risks of death [HR 0.888, (0.86-0.917)], ESKD [HR 0.855, (0.788-0.927)] and total events [HR 0.975, (0.956-0.995)]. However, the risk was increased for 3-point MACE [HR 1.056, (1.031-1.081)]. For the association between WC and clinical outcomes, the low WC group (WC1) had increased risk of death [HR 1.129, (1.089-1.17)] and reduced risk for 3-point MACE [HR 0.92, (0.894-0.947)]. In higher WC groups, increased risks were observed for death [WC2: HR 1.052, (1.008-1.098), WC3: HR 1.32, (1.213-1.437)], 3-point MACE [WC2: HR 1.071, (1.038-1.104), WC3: HR 1.104, (1.036-1.176)] and total events [WC2: HR 1.049, (1.022-1.077), WC3: HR 1.12, (1.062-1.181)].

Conclusions: In CKD patients, both lower BMI and WC were risk factors for mortality and ESKD. However, higher BMI group exhibited better outcome than the reference group, while higher WC groups exhibited poorer outcomes. As increased WC is more specifically related to central obesity we need different approaches for BMI and WC interpretation.