Editorial

Understanding the Association Pattern of Body Mass Index with Risk of Mortality among Participants with Diabetes

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Weight loss is recommended for overweight or obese adults with type 2 diabetes mellitus (T2DM) with "a evidence."[1] However, evidence on the association between obesity and mortality in patients with diabetes remains controversial. Previous studies of body mass index (BMI) and mortality among individuals with diabetes suggested inverse[2], J- or U-shaped[3], or linear associations.[4] Recently, two systemic review and meta-analysis studies investigating the relationship between BMI and all-cause mortality in patients with T2DM found a nonlinear association.[5,6] Kwon et al.[5] demonstrated U-shaped relationship with a BMI nadir of 28–30 kg/m² in the meta-analysis including 16 cohort studies. Likewise, Zaccardi et al.[6] reported a nonlinear relationship between BMI and all-cause mortality in both men and women, with a BMI nadir of 31–35 kg/m² and 28–31 kg/m², respectively in a systemic review including 21 cohort studies. Based on these meta-analysis findings, obese individuals with T2DM may have better outcomes than their counterparts with normal weight. Thus, "obesity paradox" may exist in this association.

Lee et al.[7] examined the association of BMI with the risk of major adverse cardiovascular events (MACE) and all-cause mortality in 48,438 participants (male, 58.1%; median age, 56.1 years) with diabetes from the Korean National Health Insurance Service-National Health Screening Cohort from 2002 to 2003. Median follow-up was 10.7 years, during which 7,360 MACE and 5,766 deaths occurred. Compared to those with normal weight (BMI, 18.5–22.9 kg/m²), those with overweight (BMI, 23.0–24.9 kg/m²) and obesity class I (BMI, 25.0–29.9 kg/m²) had respectively 9% and 7% lower risk for MACE and 26% and 33% lower risk for all-cause mortality. Even when deaths occurring less than 3 years after the index date were excluded, individuals with underweight (BMI < 18.5 kg/m²) had 65% higher risk for all-cause mortality, while those with overweight, obesity class I, or obesity class II (BMI ≥ 30 kg/m²) had respectively 25%, 31%, and 23% lower risk for all-cause mortality compared to those with normal weight. Risk of cardiovascular death was 1.5 times higher in individuals with underweight, while 20% and 23% lower in those with overweight and obesity class I, respectively. In the subgroup analyses, this association pattern of BMI categories with all-cause mortality was consistent regardless of age groups, smoking status, concomitant hypertension, or use of hypoglycemic medication.

This pattern of all-cause mortality with respect to BMI categories in Korean patients with diabetes suggests that overweight or obesi-

ty in patients with diabetes may be beneficial regarding risk of all-cause mortality compared to lean or normal weight patients. Therefore, the findings of Lee et al.'s study[7] may also reflect "obesity paradox." However, these findings should be cautiously interpreted. Authors addressed several limitations such as potential of inaccurate diagnoses, non-differentiation of diabetes types, and incomplete control of confounding factors including weight change, central obesity, duration of diabetes, and severity of diabetes. Not only these limitations, other factors influencing on reverse-causation such as undiagnosed chronic diseases and the order of BMI measurement and diabetes diagnosis[4] were not taken into account. The obesity paradox may be explained by several possibilities. Patients who are underweight or with normal weight may have long-standing diabetes compared to their overweight or obese counterparts and then, be at higher risk for poorer prognosis.[5] Individuals with higher genetic predisposition to diabetes may be more prone to developing diabetes and diabetes complications at lower BMI categories.[2] Different adiposity types may play a role in these mechanisms. Individuals with a higher BMI with lower mortality may be physically fit with highly functional adiposity types.[8] Given evidence for BMI ranges for lowest mortality in patients with diabetes, management strategies for normal weight and underweight patients with diabetes need to focus on improving cardiorespiratory fitness and maintaining their weight status.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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