Etiology

BMI and cardiorespiratory fitness predicted mortality in older adults

Clinical impact ratings: ★★★★★★✩ ★★★★★★✩

Question
In older adults, do measures of adiposity and cardiorespiratory fitness predict mortality?

Methods

Design: Prospective cohort study with mean follow-up of 12 years.

Setting: Health care clinic in Dallas, Texas, USA.

Patients: 2603 persons ≥ 60 years of age (mean 64 y, 80% men) who completed a treadmill exercise test with ≥ 85% of age-predicted maximal heart rate and had body mass index (BMI) ≥ 18.5 kg/m².

Risk factors: Fitness (total treadmill time) and measures of adiposity (BMI, percentage of body fat, fat-free mass, and waist circumference).

Outcome: All-cause mortality identified through the National Death Index and death certificates.

Main results

Risk for death decreased with increasing levels of fitness (Table). BMI had a J-shaped association with mortality (Table). Persons with abdominal obesity (waist circumference ≥ 88 cm in women and ≥ 102 cm in men) had increased mortality, but this did not differ from those with normal waist circumference when adjusted for fitness (Table). Percentage of body fat and fat-free mass were not associated with mortality.

Conclusion

In older adults, body mass index and cardiorespiratory fitness were predictors of mortality.

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fitness is a strong predictor of all-cause mortality in older persons. They also showed increased risk for mortality associated with obesity defined by waist circumference ≥ 88 cm in women or ≥ 102 cm in men, and by BMI ≥ 35 kg/m². The strengths of this study lie in its high-quality measurements of adiposity, fitness, and mortality. Stratification by fitness (bottom 20% vs the rest) and adiposity groups suggested an increased mortality risk with being unfit, independent of weight status. Although increasing adiposity was not associated with increased mortality in the “fit” 80% of the population, the small size of the cohort makes conclusions uncertain. Further, the “fit” 80% of the population is a potentially heterogeneous group; the results from Wannamethee and colleagues tell us that it is important to take muscle mass into account to understand the true effect of increased BMI.

The results of these 2 studies suggest that obesity is a useful marker of increased risk for mortality in older persons. Although both studies showed statistically significant results for BMI and waist circumference, both suggested that waist size is the stronger predictor of mortality in older persons. Interestingly, neither study showed an association between mortality and percentage of body fat, suggesting that it is not necessary for clinicians to measure at this level of sophistication. Neither study showed a relation between overweight and mortality, further confirming this lack of risk. In persons with the lowest muscle mass or the lowest cardiorespiratory fitness, any mortality risk associated with excess weight was essentially eclipsed. This finding indicates the importance of preservation of muscle mass and fitness in older persons and the extent to which low levels of these markers indicate underlying frailty and ill health. However, the studies show that it is also important to continue to pay attention to obesity in older persons.

Neither study was able to address the causal pathways between obesity and mortality, which probably include decreased physical activity, cardiorespiratory fitness, and muscle strength. Future studies should move from analyzing the effect of 1 factor independent of others to analyzing joint effects because the latter better represent the causal mechanisms at work. This approach is especially important in older persons, in whom a lifetime of causal cycles will have occurred.

In the third study, Reeves and colleagues conducted a large cohort study, following 1.2 million women over an average 5 to 7 years to evaluate cancer incidence and mortality. They showed a clear rela-

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