Waist hip ratio as a predictor of incident hospitalized heart failure: The ARIC Study

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Background: Obesity measured by BMI was associated with incident heart failure (HF) in a large population based study but less data exist on the role of central adiposity in the prediction of HF.

Methods: The ARIC cohort is a bi-racial population-based sample of those aged 45-64 years from 4 U.S. communities with ongoing follow-up starting in 1987 (N=15,792). After exclusion of prevalent HF, missing anthropometry, and poorly represented race groups, there were N=8,129 women and N=6,788 men. Waist girth was measured at the umbilicus and hip girth at the level of maximal protrusion of the gluteal muscles. Waist-hip ratio (WHR) was analyzed as gender-specific tertiles: cut points were WHR less than 0.86, 0.86–0.93, and greater than 0.93 for women; less than 0.94, 0.94-0.98, and greater than 0.98 for men. Incident HF was ascertained through annual contacts and review of medical record and death certificate codes. A first occurrence of either ICD-9-CM discharge code 428 ("heart failure", n=1,200) or heart failure from a death certificate (underlying cause of death, 428 or I50, n=6) was considered an incident event. Gender-specific multivariable Cox proportional hazard regression was used to estimate incidence of HF by tertiles of WHR, adjusted for history of CHD, established CHD risk factors, demographics and BMI.

Results: There were 1,206 incident HF cases over 13 years of follow-up. After adjustment for covariates the hazard ratio (HR) contrasting the 3rd and 1st tertiles of WHR was 1.94 (95 % CI = 1.46, 2.56) for women and 2.06 (95 % CI = 1.65, 2.58) for men. These estimates remained statistically significant after additional adjustment for BMI: HR = 1.63 (95 % CI = 1.21, 2.18) for women and HR = 1.66 (95 % CI = 1.29, 2.13) for men.

Conclusion: High WHR is associated with incident HF in men and women in this middle-aged cohort, even after adjustment for BMI. These results suggest that central adiposity – a correlate of impaired insulin sensitivity – be studied as an upstream predictor of HF. If replicated, these findings have implications for prevention.