Alcohol Consumption and Myocardial Remodeling in Elderly Women and Men

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Alcohol was used daily in ancient societies primarily for purposes of preventing or reducing contaminated water utilization, although its altering effects on mood and behavior have also been determinant factors for its use by humans since the dawn of civilization. In modernity, alcoholic beverages are more frequently used for recreational, social, and other purposes, although even before industrial production and mass distribution became available, chronic heavy alcohol consumption has led to disabling and fatal health problems, including severe damage to the brains, heart, and liver, as well as a myriad of incapacitating psychological, socioeconomic, and emotional conditions. From a public health perspective, alcoholism can affect entire communities and represents an important cause of disease burden worldwide.

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blood pressure, prevalence of diabetes mellitus and coronary vascular disease, economic status, or smoking. The authors suggest that women are more sensitive than men to the toxic effects of alcohol on cardiac function. Interestingly also, a U-shape relationship between alcohol intake and parameters of LV structure and function could not be documented.

Previous population cross-sectional studies have reported that LV concentric remodeling was observed to advance with increasing age, blood pressure, and hemoglobin A1c levels.11,12 Although according to Laplace’s law, the concentric remodeling pattern may function as a compensatory mechanism to lower wall stress levels in response to pressure overload, alterations of coronary blood flow, even in the presence of normal coronary arteries,13 may contribute to reduce regional myocardial fiber shortening (myocardial strain) commonly seen in patients with concentric LV remodeling. In this regard, data from previous epidemiological studies indicate that LV concentric remodeling predicts incident heart failure14 and other cardiovascular events.15,16

In contrast to concentric remodeling, the data from Gonçalves et al6 demonstrate that LV relative wall thickness was reduced and end diastolic diameter augmented with increasing alcohol intake. This indicates alcohol consumption might lead to an increased LV eccentricity and not eccentric remodeling because mean LV ejection fraction and LV end diastolic diameter were still within normal limits. Interestingly, the study’s results also suggest that nondrinker status is associated with concentric remodeling. Therefore, one might speculate that light to moderate alcohol consumption may counteract the effect of traditional risk factor burden that commonly lead to concentric remodeling. Because low to moderate alcohol consumption have salutary effects on the risk of heart failure compared with nondrinkers or heavy drinkers and because the primary phenotype of heart failure with preserved ejection fraction is LV concentric remodeling, one may hypothesize based on the article by Gonçalves et al. that one of the protective mechanisms associated with mild to moderate alcohol consumption may be the induction of mild LV eccentricity. Further longitudinal research is required to investigate whether mild to moderate alcohol consumption specifically protects against the development of heart failure with preserved ejection fraction through preventing concentric LV remodeling in the general population.

Also in relation to concentric remodeling, previous data from the Multi-Ethnic Study of Atherosclerosis show that women have higher systolic function than men characterized by higher LV ejection fraction, systolic myocardial shortening (strain), and torsion.11 Moreover, in women, LV ejection fraction is maintained in the face of greater myocardial interstitial fibrosis assessed by T1 mapping, whereas, in men, LV ejection fraction is reduced with progressive fibrosis.18 Those studies also suggest that in women, LV ejection fraction is maintained by a compensatory mechanism involving enhanced torsion.18 In this regard, in a recent experimental study, being female attenuated cardiac remodeling induced by pressure overload.19 In contrast with these findings from a general population, the author’s study obtained in a similar prospective study demonstrates that in women heavy alcohol intake is associated with lower LV ejection fraction and a tendency for worse LV global longitudinal strain, suggesting that women is more sensitive than men to the toxic effects of alcohol in part through a direct cardiac effect of alcohol on myocardial contractility.

In summary, light to moderate alcohol intake is associated with lower incident heart failure when compared with nondrinkers or heavy alcohol consumption. Heavy alcohol consumption induces increased LV eccentricity, whereas in nondrinkers, the lack of alcohol consumption may be associated with concentric remodeling in elderly men and women. Elderly women have higher systolic function than men in the general population but may experience reduced systolic function in association with increased alcohol intake. Given the evidence of this thought-provoking study, further research is required to investigate the mechanisms underlying the association of alcohol intake with cardiac geometry, systolic function, and incident heart failure.

Disclosures

None.

References


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