J Atheroscler Thromb, 2016; 23: 1028-1029.
doi: 10.5551/jat.ED041

Editorial

Impact of Heavy Alcohol Consumption on Impaired Endothelial Function

Hisashi Adachi

Department of Community Medicine, Kurume University School of Medicine, Fukuoka, Japan

See article vol. 23: 1047-1054

Heavy alcohol consumption increases the risk of hypertension[1], arrhythmia, atrial fibrillation[2] in particular, and cardiovascular diseases such as stroke[3]. Impaired endothelial function is considered to contribute to the development of cardiovascular diseases[4, 5]. Many efforts have been made to assess vascular endothelial function, and one of the most promising methods is the measurement of endothelium-dependent flow-mediated vasodilation (FMD) using high-frequency ultrasonographic imaging and transient occlusion of the brachial artery[6]. FMD indicates nitric oxide production from endothelial cells. Increasing evidence has indicated that endothelial function as assessed by FMD may serve as an independent predictor of cardiovascular events[4, 5].

The impact of heavy alcohol consumption on impaired endothelial function has not been elucidated in the Japanese general population. In the current issue of *Journal of Atherosclerosis and Thrombosis*, Tanaka *et al.*[7] have demonstrated that heavy alcohol consumption may be an independent risk factor of endothelial dysfunction in Japanese men. They found that alcohol (ethanol) consumption of ≥46.0 g/day was associated with a lower mean value of %FMD and a higher proportion of low %FMD compared with never drinkers. In contrast, light drinking may have had a beneficial effect on endothelial function, although this association was not significant.

Previously, effects of alcohol intake on endothelial function in men were evaluated by a randomized controlled trial[8]. This trial determined whether reducing alcohol intake in moderate-to-heavy drinkers (40–110 g/day) would improve conduit artery endothelial function as assessed by postischemic brachial artery FMD. Although the participants reduced their alcohol intake from 72.4 to 7.9 g/day, substantial reduction in alcohol intake in healthy moderate-to-heavy drinkers does not improve endothelial function as measured by postischemic FMD of the brachial artery or biomarkers of endothelial function such as E-selectin, endothelin-1, and von Willebrand factor. These biomarkers are often used as markers of endothelial function. Like these, the few human studies to date that have investigated the effects of alcohol on endothelial function have focused on postischemic FMD of the brachial artery[9]. Although blunted FMD responses have been reported in alcoholic subjects, it is interesting to note whether acute administration of alcohol or short-term interventions to reduce alcohol intake have had no effect to either improve or impair FMD. Further studies in humans assessing acute and longer term dose-related effects of alcohol on endothelial function in both conduit and resistance vessels are required if the relevance of the findings from *in vitro* and *in vivo* animal studies are to be understood in the context of the complex interrelationship of alcohol with cardio-cerebrovascular diseases.

Conflicts of Interest

None.

Address for correspondence: Hisashi Adachi, Department of Community Medicine, Kurume University School of Medicine, 67 Asahi-machi, Kurume, Fukuoka, 830-0011, Japan
E-mail: hadac@med.kurume-u.ac.jp
Received: February 29, 2016
Accepted for publication: March 1, 2016

References

1) Tsuruta M, Adachi H, Hirai Y, Fujiura Y, Imaizumi T. Association between alcohol intake and development of hypertension in Japanese normotensive men: 12-year follow-up study. Am J Hypertens 2000; 13: 482-487
2) Sano F, Ohira T, Kitamura A, Imano H, Cui R, Kiyama M, Okada T, Yamagishi K, Sankai T, Tanigawa T, Kario K, Iso H. Heavy alcohol consumption and risk of atrial fibrillation. The Circulatory Risk in Communities Study (CIRCS). Circ J 2014; 78: 955-961
3) Ikehara S, Iso H, Yamagishi K, Kokubo Y, Saito I, Yatsuya

H, Inoue M, Tsugane S; JPHC Study Group. Alcohol consumption and risk of stroke and coronary heart disease among Japanese women: the Japan Public Health Center-based prospective study. Prev Med 2013; 57: 505-510
4) Yeboah J, Folsom AR, Burke GL, Johnson C, Polak JF, Post W, Lima JA, Crouse JR, Herrington DM. Predictive value of brachial flow-mediated dilation for incident cardiovascular events in a population-based study: the multi-ethnic study of atherosclerosis. Circulation 2009; 120: 502-509
5) Shechter M, Shechter A, Koren-Morag N, Feinberg MS, Hiersch L. Usefulness of brachial artery flow-mediated dilation to predict long-term cardiovascular events in subjects without heart disease. Am J Cardiol 2014; 113: 162-167
6) Inoue T, Matsuoka H, Higashi Y, Ueda S, Sata M, Shimada KE, Ishibashi Y, Node K; Vascular Failure Workshop Group. Flow-mediated vasodilation as a diagnostic modality for vascular failure. Hypertens Res 2008; 31: 2105-2113
7) Tanaka A, Cui R, Kitamura A, Liu K, Imano H, Yamagishi K, Kiyama M, Okada T, Iso H; for the CIRCS Investigators. Heavy alcohol consumption is associated with impaired endothelial function: The Circulatory Risk in Communities Study (CIRCS). J Atheroscler Thromb 2016; 23: 1047-1054
8) Zilkens RR, Rich L, Burke V, Beilin LJ, Watts, GF, Puddey IB. Effects of alcohol intake on endothelial function in men: a randomized controlled trial. J Hypertens 2003; 21: 97-103
9) Puddey IB, Zilkenz RR, Kroft KD, Beilin LJ. Alcohol and endothelial function: a brief review. Clin Exp Pharmacol Physiol 2001; 28: 1020-1024