CHAPTER 27

Alcohol Addiction and its Cardiovascular Effects

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INTRODUCTION

According to data from the World Health Organization, cardiovascular diseases are still among the most common causes of death among adults in the world (1). Therefore, it is crucial to define the risk factors of CVDs. CVD risk factors are also valuable in that they are mainly controllable (2).

Since the effects of alcohol on the cardiovascular system have been the subject of research for a long time, there are many studies in the literature. However, the results of the studies are complicated (3). This may be because the alcohol used varies depending on multiple factors, such as the type and amount of alcohol used and the person's drinking style. At this point, differences in the design features of the studies (such as prospective, case-control), factors such as socioeconomic level or lifestyle, and measurement of alcohol consumption in different units, such as grams or standard drinks, make it difficult to compare studies (4). In current studies, low- or medium-risk use is 1-2 standard drinks/day, approximately 15 grams of ethanol per day for women and 30 grams per day for men. When the amount of alcohol is exceeded, the negative effects on the person increase as the amount of alcohol increases; in other words, the effects of alcohol are like a double-edged sword. While the risk mentioned is generally the risk of coronary heart disease (5,6,7). In the case of chronic use or addiction, alcohol is positively associated with the risk of systemic hypertension, atrial fibrillation (AF), heart failure, and hemorrhagic stroke (8-10).

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Tabel 1.

ALCOHOL ABUSE AND ADDICTION	
ACUTE	CHRONIC
• Arrhythmias (atrial or ventricular) • Myocardial inflammation • Arterial hypertension • Sudden cardiac death	• Hypertension • Atherosclerosis • Myocardial infarction • Oxidative stress • Alcoholic cardiomyopathy • Apoptosis, necrosis, hypertrophy and structural changes in cardiac cells

REFERENCES

1. WHO. Cardiovasculer diseases. https://www.who.int/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000-2019
2. Eray A, Ateş E, Set T. Yetişkin bireylerde kardiyovasküler hastalık riskinin değerlendirilmesi. *Türkiye Aile Hekimliği Dergisi*. 2018;22(1):12-19. doi:10.15511/tahd.18.00112
3. Chiva-Blanch G, Badimon L. Benefits and Risks of Moderate Alcohol Consumption on Cardiovascular Disease: Current Findings and Controversies. *Nutrients.* 2020;12(1):108. doi:10.3390/nu12010108
4. Emberson JR, Bennett DA. Effect of alcohol on risk of coronary heart disease and stroke: Causality, bias, or a bit of both?. *Vascular Health and Risk Management.* 2006;2(3):239–249. doi:10.2147/vhrm.s23239
5. Piano MR. Alcohol's effects on the cardiovascular system. *Alcohol research: current reviews*. 2017;38(2):219-241.
6. O'Keefe JH, Bhatti SK, Bajwa A, et al. Alcohol and cardiovascular health: the dose makes the poison…or the remedy. *Mayo Clinic Proceedings*. 2014;89:382-393. doi:10.1016/j.mayocp.2013.11.005
7. Chagas P, Mazocco L, Piccoli JDCE, et al. Association of alcohol consumption with coronary artery disease severity. *Clinical Nutrition.* 2017;36(4):1036-1039. doi:10.1016/j.clnu.2016.06.017
8. Larsson SC, Drca N, Wolk A. Alcohol consumption and risk of atrial fibrillation: a prospective study and dose-response meta-analysis. *Journal of the American College of Cardiology*. 2014;64(3):281-289. doi:10.1016/j.jacc.2014.03.048
9. Wood AM, Kaptoge S, Butterworth AS, et al. Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies. *The Lancet*. 2018;391(10129):1513–1523. doi:10.1016/S0140- 6736(18)30134-X
10. Larsson SC, Wallin A, Wolk A, et al. Differing association of alcohol consumption with different stroke types: a systematic review and metaanalysis. *BMC medicine*. 2016;14(1):1-11. doi:10.1186/s12916-016-0721-4
11. Lian C. Alcoholism: cause of arterial hypertension. *Bulletin of the Academy of Medicine.*1915;74:525–528.

12. Puddey IB, Zilkens RR, Beilin LJ. Alcohol, blood pressure and hypertension. In: Preedy VR, Watson RR (eds.) *Comprehensive Handbook of Alcohol Related Pathology.* 1st ed. United States: Elsevier Academic; 2005. p. 607–626.
13. Day E, Rudd JHF. Alcohol use disorders and the heart. *Addiction*. 2019;114(9):1670-1678. doi:10.1111/add.14703
14. Piano MR, Thur LA, Hwang CL, et al. Effects of alcohol on the cardiovascular system in women. *Alcohol Research: Current Reviews*. 2020;40(2). doi:10.35946/arcr.v40.2.12
15. Fuchs FD, Fuchs SC. The effect of alcohol on blood pressure and hypertension. *Current hypertension reports*. 2021;23(10): 42. doi:10.1007/s11906-021-01160-7
16. Frezza M, di Padova C, Pozzato G, et al. High blood alcohol levels in women. The role of decreased gastric alcohol dehydrogenase activity and first-pass metabolism. *New England Journal of Medicine*. 1990;322(2):95–99. doi:10.1056/NEJM199001113220205
17. Seppä K, Laippala P, Sillanaukee P. Drinking pattern and blood pressure. *American journal of hypertension*. 1994;7(3):249–254. doi:10.1093/ajh/7.3.249
18. Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/ AAPA/ABC/ACPM/AGS/ APHA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/ American Heart Association Task Force on Clinical Practice Guidelines. *Journal of the American College of Cardiology*. 2017 Nov;71(19):e127-e248. doi:10.1161/hyp.0000000000000066.
19. Briasoulis A, Agarwal V, Messerli FH. Alcohol Consumption and the Risk of Hypertension in Men and Women: A Systematic Review and Meta-Analysis. *The Journal of Clinical Hypertension*. 2012;14(11):792-798. doi:10.1111/jch.12008
20. Roerecke M, Tobe SW, Kaczorowski J et al. Sex-specific associations between alcohol consumption and incidence of hypertension: a systematic review and meta-analysis of cohort studies. *Journal of the American Heart Association*. 2018;7(13):e008202. doi:10.1161/ JAHA.117.008202
21. Taylor B, Irving HM, Baliunas D, et al. Alcohol and hypertension: Gender differences in dose-response relationships determined through systematic review and meta-analysis. *Addiction.* 2009;104(12):1981-1990. doi:10.1111/j.1360-0443.2009.02694.x
22. Conen D. Alcohol and atrial fibrillation: The knowns and the unknowns discussed by David Conen MD MPH from McMaster University, Canada. *European Heart Journal*. 2019;40:796-797. doi:10.1093/eurheartj/ehz062
23. Ettinger PO, Wu CF, Cruz CD, et al. Arrhythmias and the 'Holiday Heart': alcohol associated cardiac rhythm disorders. *American heart journal.* 1978;95(5):555–62. doi:10.1016/0002-8703(78)90296-X
24. Gallagher C, Hendriks JML, Elliott AD, et al. Alcohol and incident atrial fibrillation—A systematic review and meta-analysis. *International journal of cardiology.* 2017;246:46–52. doi:10.1016/j.ijcard.2017.05.133
25. Kodama S, Saito K, Tanaka S, et al. Alcohol consumption and risk of atrial fibrillation: A meta-analysis. *Journal of the American College of Cardiology*. 2011;57(4):427-436. doi:10.1016/j.jacc.2010.08.641
26. Samokhvalov AV, Irving HM, Rehm J. Alcohol consumption as a risk factor for atrial fibrillation: A systematic review and meta-analysis. *European Journal of Preventive Cardiology*. 2010;17(6):706–712. doi:10.1097/HJR.0b013e32833a1947
27. Tu SJ, Gallagher C, Elliott AD, et al. Risk Thresholds for Total and Beverage-Specific Alcohol. Consumption and Incident Atrial Fibrillation. *Clinical Electrophysiology*. 2021;7(12):1561-1569. doi:10.1016/j.jacep.2021.05.013
28. Csengeri D, Sprünker NA, Di Castelnuovo A, et al. Alcohol consumption, cardiac biomarkers, and risk of atrial fibrillation and adverse outcomes. *European Heart Journal*. 2021;42(12):1170-1177. doi:10.1093/eurheartj/ehaa953
29. Frost L, Vestergaard P. Alcohol and risk of atrial fibrillation or flutter: a cohort study. *Archives of internal medicine*. 2004;164(18):1993-1998. doi:10.1001/archinte.164.18.1993

30. Cha MJ, Oh GC, Lee H, et al. Alcohol consumption and risk of atrial fibrillation in asymptomatic healthy adults. *Heart Rhythm*. 2020;17(12):2086-2092. doi: 10.1016/j.hrthm.2020.07.010
31. Conen D, Albert CM. Alcohol consumption and risk of atrial fibrillation: how much is too much?. *Journal of the American College of Cardiology*. 2014;64(3):290-292. doi:10.1016/j.jacc.2014.04.038
32. Huang S, Li J, Shearer GC. Longitudinal study of alcohol consumption and HDL concentrations: A community-based study. *The American journal of clinical nutrition*. 2017;105(4):905–912. doi:10.3945/ajcn.116.144832
33. Kwon YJ, Kim SE, Park BJ, et al. High-risk drinking is associated with dyslipidemia in a different way, based on the 2010–2012 KNHANES. *Clinica Chimica Acta*. 2016;456:170–175. doi:10.1016/j.cca.2016.03.009
34. Laonigro I, Correale M, Di Biase M, et al. Alcohol abuse and heart failure. *European journal of heart failure*. 2009;11(5):453–62. doi:10.1093/eurjhf/hfp037
35. Amor-Salamanca A, Guzzo-Merello G, González-López E. et al. Prognostic impact and predictors of ejection fraction recovery in patients with alcoholic cardiomyopathy. *Revista Española de Cardiología (English Edition)*. 2018;71(8):612-619. doi:10.1016/j.rec.2017.11.032
36. Klatsky AL. Alcohol and cardiovascular diseases: where do we stand today? *Journal of internal medicine*. 2015;278(3):238–50. doi:10.1111/joim.12390
37. Fernández-Solà J. The effects of ethanol on the heart: alcoholic cardiomyopathy. *Nutrients*. 2020;12(2):572. doi:10.3390/nu12020572
38. Ram P, Lo KB, Shah M, et al. National trends in hospitalizations and outcomes in patients with alcoholic cardiomyopathy. *Clinical Cardiology*. 2018;41(11):1423–1429. doi: 10.1002/clc.23067
39. Guzzo-Merello G, Segovia J, Domínguez F, et al. Natural history and prognostic factors in alcoholic cardiomyopathy. *JACC Heart Fail*. 2015;3(1):78–86. doi:10.1016/j.jchf.2014.07.014
40. Mirijello A, Tarli C, Vassallo GA, et al. Alcoholic cardiomyopathy: What is known and what is not known. *European journal of internal medicine*. 2017;43:1-5. doi:10.1016/j.ejim.2017.06.014
41. Ronksley PE, Brien SE, Turner BJ, et al. Association of alcohol consumption with selected cardiovascular disease outcomes: A systematic review and meta-analysis. *BMJ*. 2011; 342:d671. doi:10.1136/bmj.d671
42. Zhang C, Qin, YY, Chen Q, et al. Alcohol intake and risk of stroke: a dose–response meta-analysis of prospective studies. *International journal of cardiology*. 2014;174(3):669-677. doi: 10.1016/j.ijcard.2014.04.225
43. Mukamal KJ, Chiuve SE, Rimm EB. Alcohol consumption and risk for coronary heart disease in men with healthy lifestyles. *Archives of internal medicine*. 2006;166(19):2145–2150. doi: 10.1001/archinte.166.19.2145
44. Ikehara S, Iso H. Alcohol consumption and risks of hypertension and cardiovascular disease in Japanese men and women. *Hypertension Research*. 2020;43(6):477–481. doi:10.1038/s41440-020-0417-1
45. Templeton AH, Carter KL, Sheron N, et al. Sudden unexpected death in alcohol misuse: an unrecognized public health issue? *International Journal of Environmental Research and Public Health*. 2009;6(12):3070-3081. doi:10.3390/ijerph6123070
46. McKeon A, Frye MA, Delanty N. The alcohol withdrawal syndrome. Journal of Neurology Neurosurgery and Psychiatry. 2008;79(8):854–62. doi:10.1136/jnnp.2007.128322
47. Hawley RJ, Major LF, Schulman EA, et al. Cerebrospinal fluid 3-methoxy-4-hydroxyphenylglycol and norepinephrine levels in alcohol withdrawal: correlations with clinical signs. *Archives of general psychiatry*. 1985;42(11):1056–62. doi:10.1001/archpsyc.1985.01790340034005
48. Stokes M, Abdijadid S. *Disulfiram*. Treasure Island (FL): StatPearls Publishing; 2017.
49. Petersen EN. The pharmacology and toxicology of disulfiram and its metabolites. *Acta Psychiatrica Scandinavica*. 1992;86(S369),7-13. doi:10.1111/j.1600-0447.1992.tb03309.x
50. Jerónimo A, Meira C, Amaro A, et al. Cardiogenic shock caused by disulfiram. *Arquivos Brasileiros de Cardiologia*. 2009;92:e43-e45. doi:10.1590/S0066-782X2009000300016