

Research and Reviews: Journal of Zoological Sciences

Prevention of Cardiovascular Diseases

Revathi K¹, Anila G², Sravan Kumar P³, Varsha B⁴

¹M. Pharmacy, Gokaraju Rangaraju College of Pharmacy, Hyderabad, Telangana, India

²B Pharmacy, Nalanda College of Pharmacy, Nalgonda, Telangana, India

³Msc, Nizam College, Basheerbagh, Telangana, India

⁴B-tech, Graphic Era Unibversity, Dehradun, India

Review Article

Received: 11/07/2016

Revised: 22/07/2016

Accepted: 28/07/2016

***Corresponding author:** Revathi K, Gokaraju Rangaraju College of Pharmacy, Hyderabad, Telangana, India; Tel: 919533484346; E-mail: revz.pharm@gmail.com

Keywords: Cardiovascular disease, Blood vessel, atheroma, arteries, arrhythmias, Congenital heart disease

ABSTRACT

Cardiovascular diseases are the diseases of the heart (cardiac muscle) or blood vessels (vasculature). It is mainly caused due to the development of atheroma - a fatty deposit within the inside lining of arteries. The lifestyle factors that can reduce the risk of forming atheroma are smoking; choosing healthy foods; a low salt intake; regular physical activity; keeping your weight and waist size down; drinking alcohol in moderation. The mostly commonly occurring cardiovascular diseases are Coronary artery diseases (narrowing of the arteries), Heart attack, Abnormal heart rhythms or arrhythmias, Heart Failure, Heart Valve disease, Congenital heart disease, Heart muscle disease, pericardial disease etc. ACE inhibitors, Aldosterone inhibitors, Angiotensin receptor blockers, beta blockers, calcium channel blockers are the commonly used drugs for the treatment of cardiovascular diseases.

INTRODUCTION

CARDIOVASCULAR SYSTEM

The Cardiovascular system, also called the Circulatory system or the vascular system. It is an organ system that permits blood to circulate and transport nutrients (such as amino acids and electrolytes), oxygen, carbon dioxide, hormones, and blood cells to and from the cells in the body. The study of the blood flow is called hemodynamics [1-8]. The study of the properties of the blood flow is called hemorheology [9-11]. The circulatory system divided into 2 systems: the cardiovascular system, which distributes blood, and the lymphatic system. The cardiovascular system consists of the heart, blood vessels, and the approximately 5 liters of blood that the blood vessels transport. The cardiovascular system is powered by the body's hardest-working organ-the heart.

Etiology of Cardiovascular Diseases

There are many risk factors that contribute to the development of cardiovascular disease such as poor diet, lack of physical activity and smoking etc. The lifestyle factors that can reduce the risk of forming atheroma are smoking; choosing healthy foods; a low salt intake; regular physical activity; keeping your weight and waist size down; drinking alcohol in moderation [12-16]. It is mainly caused due to the development of atheroma - a fatty deposit within the inside lining of arteries and high blood pressure, Many of the risk factors for cardiovascular disease cause problems because they lead to atherosclerosis [17-20].

Arrhythmia

A condition in which the heart beats with an irregular or abnormal rhythm. During an arrhythmia, the heart can beat too fast, too slow, or with an irregular rhythm. A heartbeat that is too fast is called tachycardia [21-

^{24]}. A heartbeat that is too slow is called bradycardia. During an arrhythmia, the heart may not be able to pump enough blood to the body ^[25-27].

Congenital Heart Disease

Congenital heart disease is a general term for a range of birth defects that affect the normal workings of the heart. The term "congenital" means the condition is present at birth. Congenital heart disease is one of the most common types of birth defect ^[28-31]. Congenital heart defects change the normal flow of blood through the heart. There are many types of congenital heart defects. They range from simple defects with no symptoms to complex defects with severe, life-threatening symptoms.

Atherosclerosis

Atherosclerosis is defined as narrowing and thickening of arteries without causing symptoms. It can happen in any part of the body ^[32-40]. Around the heart, it is known as coronary artery disease, in the legs it is known as peripheral arterial disease. The narrowing and thickening of the arteries is due to the deposition of fatty material, cholesterol and other substances in the walls of blood vessels. The deposits are known as plaques. The rupture of a plaque can lead to stroke or a heart attack.

Cardiomyopathy

Chronic disease of the heart muscle is called as Cardiomyopathy. In cardiomyopathy, the heart muscle becomes enlarged, thick, or rigid ^[41-46]. In rare cases, the muscle tissue in the heart is replaced with scar tissue. As it worsens, the heart becomes weaker and it will be unable to pump blood through the body and maintain a normal electrical rhythm. This can lead to heart failure or arrhythmia. In turn, heart failure can cause fluid to build up in the lungs, ankles, feet, legs, or abdomen.

Myocardial Infraction

Myocardial infraction is also called heart attack. It is caused when the flow of blood to the heart becomes blocked, it may lead to tissue damage and can even be life-threatening. A number of different factors may increase risk for a heart attack, including high blood pressure, high cholesterol, and diabetes etc.

Myocardial ischemia

The reduced blood flow is usually the result of a partial or complete blockage of your heart's arteries (coronary arteries). Myocardial ischemia, also called cardiac ischemia, can damage your heart muscle, reducing its ability to pump efficiently.

DRUGS USED IN THE PREVENTION OF CARDIOVASCULAR DISEASES

Beta Blockers: Atenolol, Carvedilol, Metoprolol, Nadanol, Propranolol, Timolol

Calcium Channel Blockers: Amlodipine, Bepridil, Felodipine, Isradipine, Nicardipine, Nifedipine, Nimodipine

ACE Inhibitors and ARBs: Benazepril, Captopril, Enalapril, Vasotec, Fosinopril, Lisinopril, Prinivil, Moexipril

Fibrates: Clofibrate, Fenofibrate, Gemfibrozil

Statins: Atorvastatin, Fluvastatin, Lovastatin, Pravastatin, Rosuvastatin, Simvastatin

CONCLUSION

Cardiovascular system is an organ system that permits blood to circulate and transport nutrients (such as amino acids and electrolytes), oxygen, carbon dioxide, hormones, and blood cells to and from the cells in the body. Cardiovascular diseases are caused due to the development of atheroma - a fatty deposit within the inside lining of arteries. It can be prevented by choosing healthy foods; a low salt intake; regular physical activity; keeping your weight and waist size down; drinking alcohol in moderation. If it is ignored it may lead to heart failure or arrhythmia.

REFERENCES

1. Altura BM, et al. Genotoxic Effects of Magnesium Deficiency in the Cardiovascular System and their Relationships to Cardiovascular Diseases and Atherogenesis. *J Cardiovasc Dis Diagn*. 2016;S1:008.
2. Afroz R, et al. Honey-derived Flavonoids: Natural Products for the Prevention of Atherosclerosis and Cardiovascular Diseases. *Clin Exp Pharmacol*. 2016;6:208.
3. Maksimovich IV. Transcatheter Cerebral Revascularization in the Treatment of Atherosclerotic Lesions of the Brain. *Brain Disord Ther*. 5:209.
4. Mohri T, et al. Factors Affecting Recurrence of T1 and T2 Tongue Cancer Undergoing Intraoral Resection. *Otolaryngology*. 2016;6:224.
5. Hardip Sandhu. Cardiovascular Diseases Associated with Pregnancy: Early Assessment Using Non-Invasive MicroRNA Profiling. *Clinics Mother Child Health*. 2015;12:212.
6. Borchevkin D, et al. Method of Photoplethysmography Diagnostics of Domesticated Animals Cardiovascular Diseases. *J Veterinar Sci Technol*. 2016;7:287.
7. Aksoy H and Sebin SO. *H. pylori* and Cardiovascular Diseases. *Gen Med (Los Angel)*. 2015;S1:007.
8. Ajdukovic J. The Role of NLRP3 Inflammasome in Cardiovascular Diseases. *J Clin Exp Cardiol*. 2015;6:399.
9. Berezin. Are Endothelial Cell-Derived Microparticles Predictive Biomarkers in Cardiovascular Diseases?. *Atheroscler open access*. 2015;1:e101.
10. Dorobantu FL, et al. Giant Lipoma Originating from the Right Ventricular Infundibulum - A Case Report. *J Clin Exp Cardiol*. 2015;6:379.
11. Zafar R. A New Insight into Pathogenesis of Cardiovascular Diseases: Stress Induced Lipid Mediated, Vascular Diseases. *J Cardiovasc Dis Diagn*. 2015;3:206.
12. Askari R, et al. Quinine Syncope Diagnosed by Life Vest. *Clin Exp Pharmacol*. 2015;5:172.
13. Abd-Elbaky AE, et al. Associations of Serum Omentin and Apelin Concentrations with Obesity, Diabetes Mellitus Type 2 and Cardiovascular Diseases in Egyptian Population. *Endocrinol Metab Syndr*. 2015; 4:171.
14. Zafar R. An Insight into Pathogenesis of Cardiovascular Diseases. *J Cardiovasc Dis Diagn*. 2015;3:197.
15. Shokeen D and Aeri BT. Risk Factors Associated with the Increasing Cardiovascular Diseases Prevalence in India: A Review. *J Nutr Food Sci*. 2015;5:331.
16. Zafar F, et al. Drug Utilization Pattern in Cardiovascular Diseases: A Descriptive Study in Tertiary Care Settings in Pakistan. *J Bioequiv Availab*. 2015;7:59-62.
17. Hanefeld M, Pistrosch F, Schulze J, Rothe U. The Metabolic Syndrome and Cardiovascular Diseases: An Update of Medical Treatment. *J Metabolic Syndr*. 2014;3:160.
18. Dave MB. Pioglitazone: A Better Choice of Drug in the Pre-diabetic Patients with High Risk of Cardiovascular Diseases. *J Diabetes Metab*. 2014;5:447.
19. Skultetyova D, et al. The Impact of Blood Pressure on Carotid Artery Stiffness and Wave Intensity in Patients with Resistant Hypertension after Renal Sympathetic Denervation. *J Hypertens*. 2014;3:157
20. Ritu M and Manika M. Blood Homocystiene and Lipoprotein (A) Levels, Stress and Faulty Diet as Major Risk Factors for Early Cardiovascular Diseases in Indians. *J Cardiovasc Dis Diagn*. 2014;2:163
21. Han J, Choi J, Bhang SH. Stem Cell Therapy in Cardiovascular Diseases: The Reparative Mechanisms of Mesenchymal Stem Cells for Myocardial Infarction Treatment. *J Cell Sci Ther*. 2014;5:167
22. Patel NKJ, Edla S, Golwala S, Asti D, Patel N, et al. Metabolic Syndrome and its Impact on Cardiovascular Diseases. *J Metabolic Syndr*. 2014;3:142
23. Soejima H, et al. The Changes of Biomarkers by Telmisartan and their Significance in Cardiovascular Outcomes: Design of a Trial of Telmisartan Prevention of Cardiovascular Diseases (ATTEMPT-CVD). *J Clin Trials*. 2014.
24. Refaat B, et al. Islamic Wet Cupping and Risk Factors of Cardiovascular Diseases: Effects on Blood Pressure, Metabolic Profile and Serum Electrolytes in Healthy Young Adult Men. *Altern Integr Med*. 2014;3:151.
25. Vasco VRL, et al. Hunting the Risk NPY and ACE Polymorphisms as Predictors of Cardiovascular Diseases: Case Report and Review of the Literature. *Intern Med*. 2014;S11:004.

26. Greco OT, et al. Cardiomyopathy and Cell Therapy: Ejection Fraction Improvement and Cardiac Muscle Mass Increasing, after a Year of Bone Marrow Stem Cells Transplantation, by Magnetic Resonance Image. *J Stem Cell Res Ther.* 2013;S6:008.
27. Alawieh A, et al. Metabolomics in Cardiovascular Diseases: Biomarkers Quest. *J Data Mining Genomics Proteomics.* 2013;S2:e001.
28. Elio G, et al. LOX-1 and its Implications on Cardiovascular Diseases a Possible New Perspective Target on Atherosclerosis. *J Clin Exp Cardiol.* 2013;4:232.
29. Izumi Y. Therapeutical Potential of Microvesicles in Cardiovascular Diseases. *J Genet Syndr Gene Ther.* 2013;3:e107.
30. Nishant T, et al. Pharmacogenomics- Personalized Treatment of Cancer, Diabetes and Cardiovascular Diseases. *J Pharmacogenomics Pharmacoproteomics.* 2011;2:107.
31. Srilatha B. High Risk Factors of Cardiovascular Diseases in Type 2 Diabetes. *J Diabetes Metab.* 2011;2:164.
32. Loh LC, et al. Undiagnosed COPD in Patients with Established Cardiovascular Diseases: Prevalence, Symptoms Profiling and Functional Status. *J Pulmonar Respirat Med.* 2011;1:107
33. White HS, et al. Mechanisms of Action of Human Aldehyde Dehydrogenase Bright Cells in Therapy of Cardiovascular Diseases: Expression Analysis of Angiogenic Factors and Aldehyde Dehydrogenase Isozymes. *J Stem Cell Res Ther* 2011;S1:001
34. Lavoie M, et al. Blood Glutathione Peroxidase Activity in Relation with the Risk of Cardiovascular Diseases in Obese Women. *J Diabetes Metab* 2011;2:136
35. Demer LL and Tintut Y. Vascular calcification: pathobiology of a multifaceted disease. *Circulation* 2013; 117:2938-2948.
36. Paloian NJ and Giachelli CM. A current understanding of vascular calcification in CKD. *Am J Physiol Renal Physiol* 2014;307:F891-900.
37. Sage AP, et al. Regulatory mechanisms in vascular calcification. *Nat Rev Cardiol* 2010; 7: 528-536.
38. Kapustin AN, et al. Vascular smooth muscle cell calcification is mediated by regulated exosome secretion. *Circ Res* 2015;116:1312-1323.
39. New SE and Aikawa E. Role of extracellular vesicles in de novo mineralization: an additional novel mechanism of cardiovascular calcification. *ArteriosclerThrombVascBiol* 2013;33:1753-1758.
40. Cui L, et al. Characterisation of matrix vesicles in skeletal and soft tissue mineralisation. *Bone* 2016;87: 147-158.
41. Doherty TM, et al. Calcification in atherosclerosis: bone biology and chronic inflammation at the arterial crossroads. *Proc Natl Acad Sci U S A* 2003;100:11201-11206.
42. Aikawa E, et al. Osteogenesis associates with inflammation in early-stage atherosclerosis evaluated by molecular imaging invivo. *Circulation* 2007;116:2841-2850.
43. Jahnen-Dechent W, Heiss A, Schäfer C, Ketteler M, Fetuin-A regulation of calcified matrix metabolism. *Circ Res* 2011;108:1494-1509.
44. Schinke T and Karsenty G. Vascular calcification—a passive process in need of inhibitors. *Nephrol Dial Transplant* 2000;15:1272-1274.
45. Wallin R, et al. Arterial calcification: a review of mechanisms, animal models, and the prospects for therapy. *Med Res Rev* 2001; 21: 274-301.
46. Tsang HG, et al. Large animal models of cardiovascular disease. *Cell BiochemFunct* 2016; 34: 113-132.