Review Article

CARDIOVASCULAR DISORDERS: A MAJOR DEATH PROBLEM- IT'S PREVENTION AND TREATMENTS

N. K. Mishra¹*, K.A. Chowdary², Gitanjali Mishra³

1.Yalamarty Pharmacy College, YalamartyNagar, Tarluwada, Visakhapatnum, A.P.-530052

2. St.Ann's College of Pharmacy, Cantonment, Vizianagaram-535003, India3. Departments of Zoology, Berhampur University, Berhampur, Ganjam, Orissa-760010, India

Corresponding author: Dr. Nikunja Kishor Mishra

ABSTRACT

Cardiovascular disease (CVD) is an abnormal functioning of the heart or blood vessels. Heart disease (HD) is a general term for a variety of heart conditions. The most common form of HD in women is coronary heart disease (CHD), also called coronary artery disease (CAD) because it involves the coronary arteries. Other types of CVD include hypertension, congestive heart failure (CHF), stroke, congenital cardiovascular defects, hardening or narrowing (atherosclerosis) of the blood vessels, including the coronary arties, and other diseases of the circulatory system. Diabetes, hypertension, high cholesterol, obesity, lack of exercise, smok¬ing, increased age, and family history are risk factors for cardiovascular (or heart) disease. Death rates from cardiovascular disease declined more than 30% from 1998 to 2008, the American Heart Association recently reported. A 2007 study showed that between 1999 and 2005, death rates for heart failure and heart attack decreased by nearly half—thanks to greater use of cholesterol controlling drugs, blood thinners and angioplasty.

Key words: Hypertension, Angioplasty, Obesity, cholesterol

INTRODUCTION

Heart disease (HD) is the leading cause of death in the United States. Heart or coronary artery disease is a form of CVD that accounts for more deaths in the United States (Table-1) than cancer, unintentional injuries, and other diseases combined. Approximately 83.6 million American adults—greater than one in three—have one or more types of CVD. Of that total, 42.2 million are estimated to be age 60 and older.¹

The causes and prevention of heart disease have been studied for years, and new information is emerging. For the last several decades, saturated fat and cholesterol have been thought to be major contributors to coronary artery disease, and therefore people are typically advised to strictly limit these in their diet.

WHAT ARE THE SIGNS AND SYMPTOMS

The symptoms vary depending on the type of heart disease. For many people, chest discomfort or a heart attack is the first sign. Someone having a heart attack may experience several symptoms, including: Chest pain or discomfort that doesn't go away after a few minutes. Pain

or discomfort in the jaw, neck, or back. Weakness, light-headedness, nausea (feeling sick to your stomach), or a cold sweat. Pain or discomfort in the arms or shoulder. Shortness of breath. **RISK FACTORS FOR CARDIOVASCULAR DISEASES**

1. Hypertension:

Hypertension is defined as an average systolic blood pressure greater than or equal to140 mmHg or an average diastolic blood pressure of greater than or equal to 90 mmHg. High blood pressure is both a risk factor for many forms of CVD, and is a disease in itself. High blood pressure occurs when increased pressure within the vascular system is exerted against the walls of the arteries. This is usually caused by hardening of the arteries with plaque. The heart has to work harder, enlarges, weakens and eventually fails. African-American women also are at greater risk for severe complications from hypertension, such as stroke and heart failure.²

2. Cigarette smoking:

According to the American Heart Association, cigarette smoking is the "most important preventable cause of premature death in the United States."³ Smoking leads to the accumulation of plaque in the arteries; this build-up blocks blood flow and can cause coronary heart disease and heart attacks.³ As a stimulant, nicotine causes increased blood pressure and heart rate. The Carbon monoxide in cigarette smoke displaces oxygen in the blood which decreases oxygen level in blood. Smoking damages the linings of arteries and reduces beneficial levels of high-density lipoproteins. It causes platelets to become sticky and increases blood thickness.

3. Elevated Total Cholesterol:

Cholesterol is a member of the fat family. It is essential to the body and needed for the following functions: digestion of fat, helps the skin produce Vitamin D, helps develop adrenal and sex hormones, and insulates nerve tissue in the brain and spinal cord. In excess, cholesterol can clog arteries and increase risk of CVD. High serum cholesterol is defined as 240 mg/dl and is one of the major risk factors for CVD. The body produces its own supply of cholesterol, and also obtains some from foods rich in saturated fats (mostly animal sources) that individuals consume. Low-density lipoproteins (LDLs) carry cholesterol from the liver to organs and tissues that require it. Excess amounts are deposited in the arteries. For this reason, LDLs are considered bad cholesterol. Lowering blood cholesterol levels reduces heart attack risk and helps to clean out diseased arteries.

4. Physical inactivity:

The American Heart Association recommends at least 150 minutes of moderate exercise per week (or 75 minutes per week of vigorous exercise) to promote cardiovascular fitness, since regular physical activity reduces the risk of dying from CVD.⁴ Exercise lowers risk by helping decrease blood pressure and increase HDL levels. Exercise maintains desirable weight and prevents or controls diabetes. A minimum of 20 minutes of moderate physical activity is recommended, three or more times a week.

5. Overweight or Obesity:

Body weight of more than 30% over recommended weight is called obesity and is a known risk factor for CVD. Obesity can have significant effects on the body, especially the cardiovascular system; coronary heart disease, hypertension, and stroke are some of the major effects of obesity.⁵ Excess weight contributes to high cholesterol levels, high blood pressure, and increases the strain on the heart. The distribution of fat is also an indicator of CVD. Fat collected in the upper body is more dangerous than that collected around the hips.

6. Diabetes Mellitus:

Diabetes mellitus (DM) is a group of diseases marked by high levels of blood glucose resulting from inadequate insulin production or insulin action. Diabetes mellitus (DM) is a group of diseases marked by high levels of blood glucose resulting from inadequate insulin production or insulin action.

7. Age:

Heart disease risk increases with age. The risk of heart attack increases after age 65.

8. Gender:

Men have a higher risk for CVD than do women, especially earlier in life. By age 75, the gender gap nearly disappears.

DIFFERENT MAJOR TYPES OF CARDIOVASCULAR DISEASE





Fig.1:A-Hypertention, B-Myocardial Infraction, C- Angina pectoris, D- Congestive Heart Failure (CHF) E- Atherosclerosis

1. Hypertension:

Hypertension (Fig.1A) or high blood pressure (HBP) is a chronic medical condition in which the blood pressure in the arteries is elevated. It is a major risk factor for cardiovascular disease and is present in 69% of patients with a first myocardial infarction, in 77% of patients with a first stroke, in 74% of patients with chronic heart failure, and in 60% of patients with peripheral arterial disease. Mild hypertension can be lowered with lifestyle changes, while severe hypertension usually requires treatment with medications, in addition to lifestyle changes.

Volume 5, Issue 4, 2016

2. Myocardial Infarction (MI):

Myocardial Infarction (Fig.1B) occurs in the presence of coronary thrombosis, when a vessel delivering blood to the heart muscle is blocked. A person having a heart attack should be transported to an emergency room as quickly as possible. Most people who die from a heart attack die within 2 hours of the first symptoms.

3. Angina pectoris:

Angina pectoris (Fig.1C) is chest pain that occurs when the heart does not get all the oxygen it requires. Angina may also occur as shoulder, neck, arm, hand, or back pain; it is a warning that the load on the heart should be reduced.

4. Congestive Heart Failure (CHF):

Congestive Heart Failure (Fig.1D) occurs when the heart cannot maintain its regular pumping rate and force. Fluid accumulates in the lungs, and interferes with breathing. This condition is called pulmonary edema.

5. Atherosclerosis:

Atherosclerosis (Fig.1E) is a slow, progressive process that may begin in childhood. Arteries become narrowed by deposits of fat, cholesterol, and other substances; the resulting plaques accumulate on arterial walls. Arteries become less elastic, usually because of plaque, restricting blood flow and making the artery vulnerable to blockage by blood clots or rupture. When a thrombus blocks an artery, it can deprive a major organ of required blood and oxygen, leading to heart attack (from coronary thrombosis) or stroke (from cerebral thrombosis).

HOW IS HEART DISEASE DIAGNOSED

The doctor can perform several tests to diagnose heart disease, including chest X-rays, coronary angiograms, electrocardiograms (ECG or EKG), and exercise stress tests. Ask your doctor about what tests may be right for you. Coronary angiogram involves inserting a catheter through major arteries into the heart; inject a dye through the catheter to determine the presence of obstructions in targeted arteries. Stress tests use electrocardiograms (EKG) and are taken while the patient is exercising to record the electrical activity of the heart and show abnormalities.

Condition	Prevalence	Deaths
Angina Pectoris	7.8 million	-
Atrial Fibrillation	2.7 million – 6.1 million	15,434
Coronary Heart Disease	15.4 million	386,324
Heart Attack (Myocardial	7.6 million	125,464
Infarction)		
Heart Failure	5.1 million	56,410
Hypertension	77.9 million	61,672
Stroke	6.8 million	128,842

Table-1: Major Cardiovascular diseases and death occurs in the United States¹

PHARMACOLOGICAL MANAGEMENT

Anti-platelet drugs: All patients with coronary heart disease (CHD) should take 75–150 mg/day of aspirin unless contraindicated. Clopidogrel can be taken instead of aspirin when aspirin is contraindicated. Clopidogrel should be considered in combination with aspirin in patients who have recurrent cardiac ischemic events.

Anti-coagulants:

Warfarin is recommend in patients who have had an MI (Myocardial Infarction), who is at high risk of systemic thromboembolism because of atrial fibrillation, mural thrombus or previous embolisation. It may sometimes be combined with aspirin and/or clopidogrel, but in this circumstance patients should be closely observed for signs of bleeding. The need for warfarin should be reviewed after 3 months.

Angiotensin converting enzyme inhibitors (ACE inhibitors):

ACE inhibitors like captopril, enalapril, and lisinopril decrease the conversion of angiotension I to angiotensin II (ATII). This reduces peripheral vascular resistance and promotes both natriuresis and hyperkalemia, since a reduction in ATII leads to a reduction in aldosterone. These medications work by expanding blood vessels and reducing resistance inside them. By doing this, ACE inhibitors allow blood to flow more easily and reduce the workload on the heart and helpful in CHF and Hypertention and Angina pectoris.

Beta blockers:

Beta-blockers are prescribed in all patients having post-MI, especially in patients at high risk of recurrent events, unless contraindicated.⁶ Beta adrenergic blockers such as propranolol, metoprolol or atenolol are typical first-line agents for treating the hypertension.

Statin therapy: Statins are the drugs that are used to lower the level of cholesterol in the blood. Too much cholesterol can cause fatty tissue (atheroma) to build up and narrow the coronary arteries. Statin therapy is given for all patients with CHD. The marketing products are atorvastatin, fluvastatin, lovastatin, pitavastatin, pravastatin, rosuvastatin and simvastatin.

Short-acting nitrate:

All patients should be prescribed a short-acting nitrate, unless contraindicated, and provided with a written action plan for chest pain.⁷ Sodium nitroprusside breaks down non-enzymatically to form nitric oxide. It is an extremely potent arteriolar and venous dilator that is used intravenously for rapid control of hypertensive crises and for blood pressure control during operations.

Calcium channel blockers: Non-dihydropyridine group (e.g. diltiazem, verapamil) may be used as anti-anginal agents for patients in whom beta-blocker therapy is contraindicated, provided there is no evidence of CHF.⁸

ADOPTING A HEART-HEALTHY LIFESTYLE TO PREVENT CVD





Fig.2: Healthy dairy foods for Healthy Heart (A, B)

Heart disease is the number one killer of both men and women in the United States. But for many people, heart disease can be preventable. Even if you're at high risk due to family history or other factors, you can lower that risk by making healthy lifestyle choices.

Volume 5, Issue 4, 2016

Additional heart-healthy measures can include:

- Maintaining a healthy weight by taking more fruits, vegetables, whole grains, and other high-fiber foods, along with fewer processed foods (Fig.2)
- Quitting smoking
- Getting regular exercise
- Reducing stress
- Limiting alcohol intake
- Regular Aerobic exercise

CONCLUSION

CVD is becoming a major death problem world wide now-a-days. Though medications are available but the death rate is very high. This can be overcome by maintaining healthy life style and avoiding the risk factors for cardiovascular diseases.

ACKNOWLEDGEMENT

I am grateful to Y.V.V.Viswanandh, Chairman; Yalamarty Pharmacy College YalamartyNagar, Tarluwada, Visakhapatnam.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

REFERENCES

- 1. Heart Disease and Stroke Statistics—2010 Update,
- 2. National Heart, Lung, and Blood Institute. Morbidity and Mortality: Chart Book on Cardiovascular, Lung, and Blood Diseases. Available at: http://www.nhlbi.nih.gov/resources/docs/2009_ChartBook.pdf. Date accessed: October 4, 2011.
- 3. American Heart Association. "Why Quit Smoking?" Available at: http://www.heart.org/HEARTORG/GettingHealthy/QuitSmoking/QuittingSmoking/Why-Quit-Smoking_UCM_307847_Article.jsp. Date Accessed: October 4, 2011.
- 4. American Heart Association. American Heart Association Guidelines. Available at: http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/StartWalking/American-Heart-Association-Guidelines_UCM_307976_Article.jsp. Date Accessed: October 4, 2011.
- 5. Centers for Disease Control and Prevention. "Obesity and Overweight for Professionals: Health Consequences." Available at: http://www.cdc.gov/obesity/causes/health.html. Date Accessed: October 4, 2011.
- 6. National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand. Guidelines for the management of acute coronary syndromes 2006. Med J Aust 2006; 184 (Suppl.):S1–S32.
- 7. Chew DP, Aroney CN, Aylward PE, et al. 2011 Addendum to the National Heart Foundation of Australia/Cardiac Society of Australia and New Zealand Guidelines for the management of acute coronary syndromes (ACS) 2006. Heart Lung Circ 2011; 20(8):487–502.
- 8. National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand (Chronic Heart Failure Guidelines Expert Writing Panel). Guidelines for the prevention, detection and management of chronic heart failure in Australia. Updated July 2011. Melbourne: National Heart Foundation of Australia, 2011.