Review Article

Cardiovascular Disease Death Rate - Current Scenario in The State of Andhra Pradesh

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Received: 13-11-2017; **Revised:** 30-11-2017; **Accepted:** 15-12-2017.

ABSTRACT

Cardiovascular diseases (CVDs) are the number one cause of death globally. Now a day with increased globalization and urbanization the risk for cardiovascular disease increased due to increased exposure to risk factors. 17.7 million People die every from CVDs, an estimated 31 % of all global deaths. More than 75 % of CVD deaths occur in low income middle- income countries and 80 % of all CVD deaths are due to heart attack and strokes. Nearly 36 million deaths are due to cardiovascular disease mainly of due to heart attack as per 2008. If it continues as such by 2030. It is estimated 23.6 million people die due to heart attack and any other cardiovascular disease as per WHO. In case of A.P the most of the death cases are reported on heart attack and the average age of heart attack is about 49 years. And the cases reported 60 years and above are between 21-25 %. The highest number of cases is reported in Nellore, Kadapa, Vizag, Guntur districts. And the lowest number of cases is reported in Krishna, Prakasam, Godavari districts. On analysis the report was declared that 13,840 heart attack patients were hospitalized in the year 2016.

Keywords: Cardiovascular diseases, Globalization and urbanization, WHO.

INTRODUCTION

The heart is a vital organ that pumps blood, oxygen and vitamins to all parts of the body. For this pumping of oxygen and nutrients heart muscle itself requires oxygen and nutrient supply which is supplied by the coronary arteries. The heart attack is a condition which is characterized by a decrease in blood supply to heart because of the blockage in coronary arteries. Heart attack is most prevailing conditions; bringing awareness about this can save many lives. As we know prevention is better than cure, preventing the occurrence of heart attack is better than facing the consequences occurred by it. A single death caused by heart attack can affect several hearts. Hypertension, myocardial infarction, atherosclerosis, arrhythmias and valvular heart disease, and stroke, collectively known as cardiovascular diseases (CVDs)[1-4]. A heart attack usually causes a sudden onset of pain or discomfort in the chest, and it may cause other symptoms. Many causes of death include the confusion of the patient between the gastric disturbance and the heart attack.

Heart attack is experienced by the radiating pain from shoulders, which spreads to the neck and lower jaw, whereas gastric disturbance is not experienced by radiating pain. Responding incorrect time and taking the person to the hospital in right time can save the life. The heart attack is also called as Myocardial infarction (MI) which occurs when there is a sudden decrease blood flow to the heart muscle. The heart continuously pumps to all parts of the body and to its own muscle tissues.

Epidemology[5]

Every year million cases of heart attack are seen worldwide. The death rate[6-9] increased day by day due to various diseases is shown in fig.1a and fig.1b.

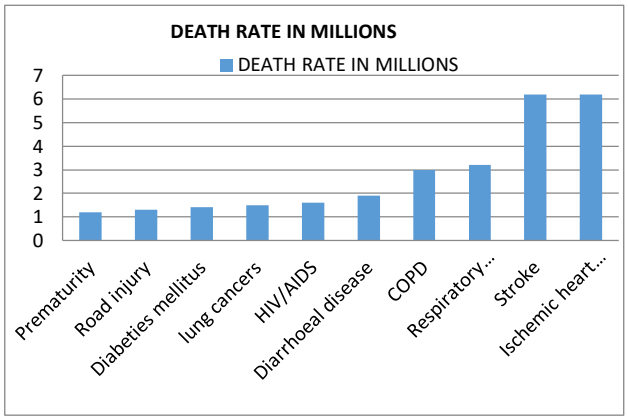


Figure 1a: Death rate due to various diseases world wide

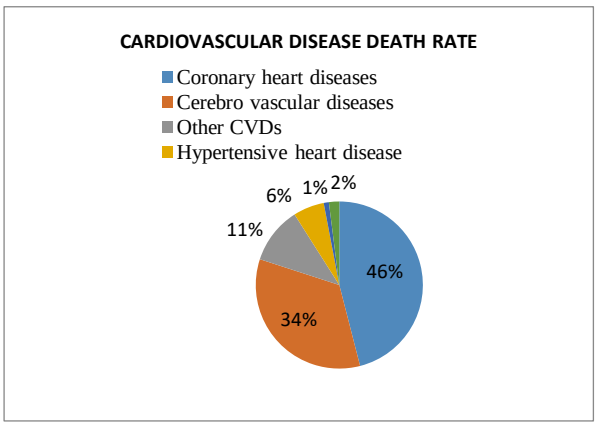


Figure 1b: Cardiovascular disease death rate

Heart attack cases in A.P.

The average age groups in which heart attack cases are mostly seen between 49- 60 years of age. The prevalence of heart attack cases is more in males when compared to females are shown in fig.1d &1e. The percentage of heart attack cases based on the area of their living area are shown in fig.1c.

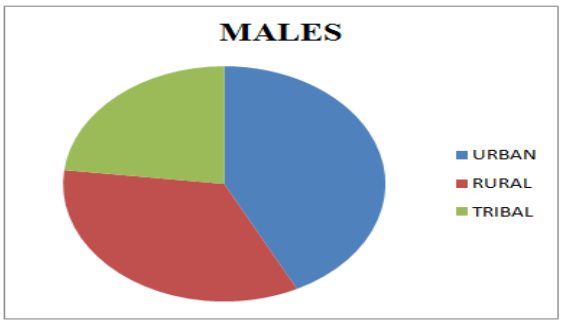
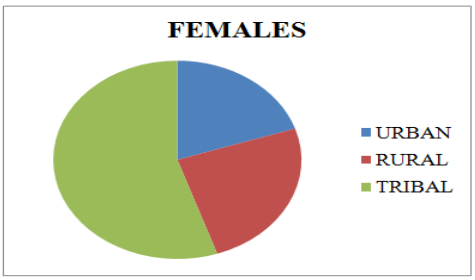


Figure 1c: Proportion of heart attack cases in region of A.P



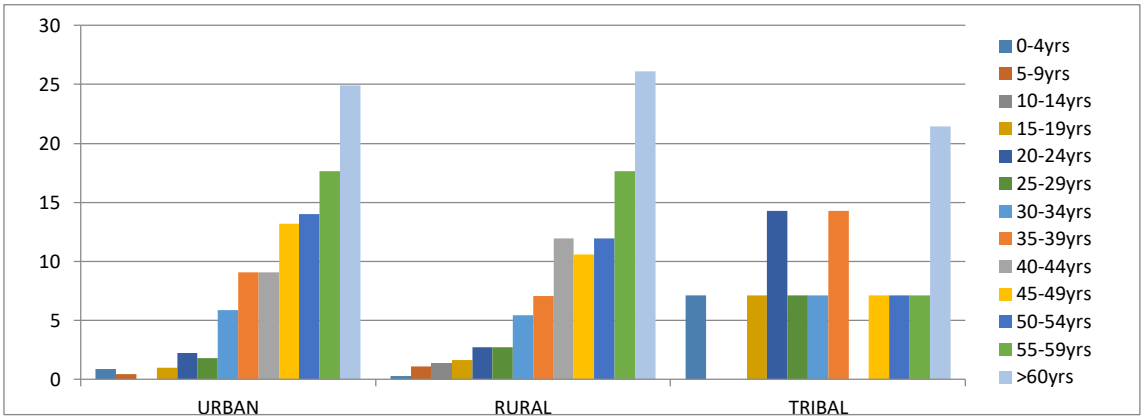


Figure 1d: Based on age heart attack cases reported in A.P (In males)

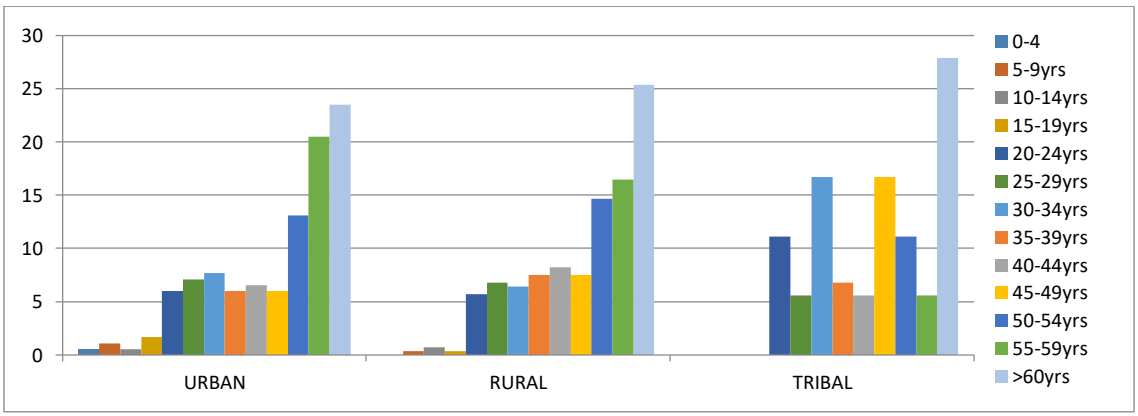


Figure 1e: Based on age heart attack cases reported in A.P (In females)

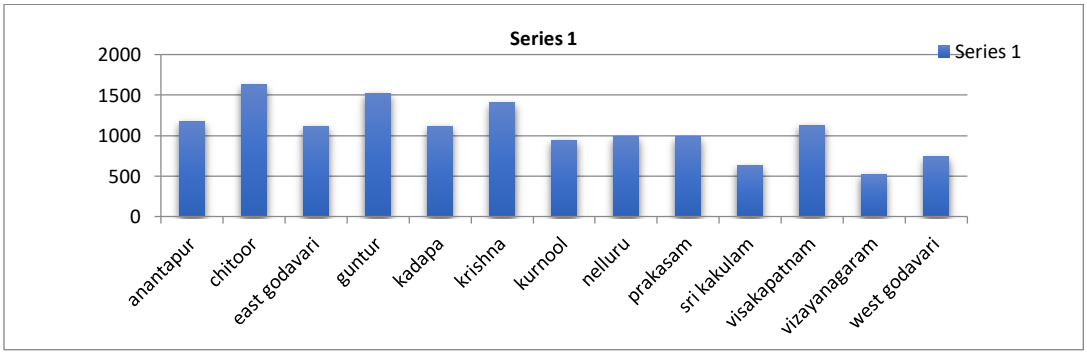


Figure 1f: Prevalence of heart attack cases in different districts of Andhra Pradesh.

Aetiology

A heart attack mainly happens due to decreased flow of oxygen-rich blood to a section of heart muscle suddenly becomes blocked and the heart can't get oxygen. Most heart attacks occur as a result of coronary heart disease (CHD).

Coronary artery disease

CAD is a condition in which a lipid substance called plaque builds up inside the coronary arteries as a result arteries fail to supply oxygen-rich blood to your heart.

Coronary artery spasms

A severe spasm of artery can only cause heart attack of less prevalence. The person who is affected by CAD they aren't affected by atherosclerosis. The causes a coronary artery spasm are 1. Emotional stress 2. Exposure to extreme cold 3. Using certain drugs like cocaine etc.

Arrhythmias

Arrhythmia occurs due to supply of irregular electrical signals to the heart arrhythmia results in palpitations of the heart as a result heart is unable to reach the demands.

Heart failure

Heart failure is the condition in which heart is unable to pump the blood to meet the body needs. It is one of the complications which occurs due to the damage to the heart from a heart attack.

Valvular dysfunction

Valve problems are characterized by presence of heart murmurs.

Risk Factors

Lifestyle

Increase in automation and sedentary lifestyle makes the person more nearer to the heart attack.

Alcohol

Taking too much of alcohol for the relaxation may result in permanent relaxation of the heart. The general advice is that men should not regularly drink more than 3 to 4 units of alcohol a day, and women should not regularly drink more than 2 to 3 units a day.

Food habits

Taking the excess of junk food filled with fats (results in the formation of plaque and further leads to the development of heart attack.

High cholesterol

Cholesterol is a fatty substances present in blood. If you have too much amount of bad cholesterol like low density lipoproteins and high density lipoproteins (LDL & VLDL) which can increase the risk of developing cardiovascular disease by forming atheroma in walls of artery.

Family history

Family history is one of the predisposing factors for the development of the heart attack.

Smoking

The more you smoke more the risk will. Smoking damage the lining of arteries leading to a build up a fatty material (atheroma) which narrow the artery. This can cause angina, heart attack and stroke. The nicotine present in cigarettes stimulates your body to produce adrenaline which makes heart to beat faster which increases blood pressure and further causes heart attack and stroke.

Diabetes

People with diabetes have a greater risk of developing coronary artery disease when compared to people without diabetes. Increased glucose level in blood can damage the wall of arteries, which more likely develop fatty deposits (Atheroma). If the Atheroma builds up in coronary arteries it may leads to coronary artery disease which further cause angina and heart attack. The risk of developing cardiovascular disease can be reduced by controlling your blood glucose levels.

Hypertension

High blood pressure is a risk factor in developing heart attack. Increased blood pressure along with heart and circulatory disease worsen the condition in developing coronary artery disease, angina, and heart attack. The risk can be reduced by like style modification like reduce in salt content, increase in physical activity, eating balanced and healthy diet and control in blood pressure.

Pathophysiology of Heart Attack

Normal artery: The blood flow is normal and the artery remains normal.

⇩

Fatty streak: It is an accumulation of lipid-laden foam cells in the intimal layer of the artery. The **fatty streak** evolves into a fibrous plaque.

⇩

Mature plaque: It is also called atheroma in which degenerative material like lipid cells and macrophages accumulate and form into mature plaques which restrict blood flow.

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Ruptured plaque with thrombus formation: Rupture of atherosclerotic plaque associated with complete or partial occlusion leads to decreased blood supply and finally leads to ischemia.

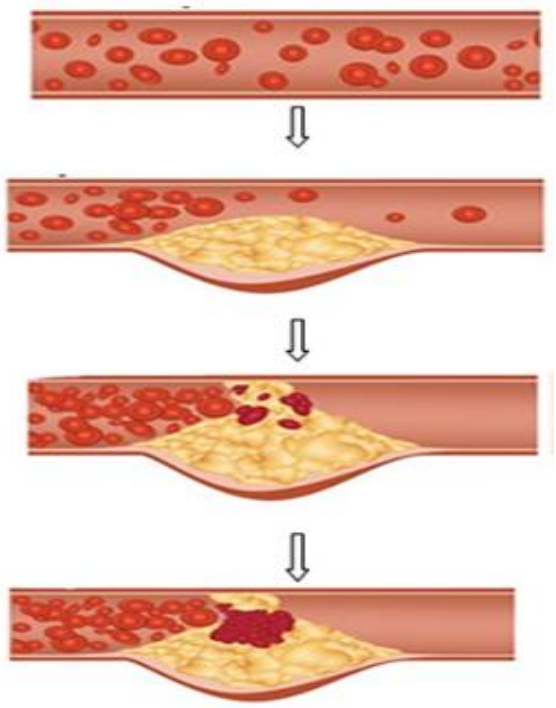


Figure 2: Pathophysiology of heart attack.

Diagnosis

Exercise test

An exercise ECG can help to decide whether you need to have a coronary angiogram this is an ECG that is recorded continually, usually while you are walking on a treadmill.

Chest X-ray

A chest X-ray will show the accumulation of fluid around the heart and enlargement of the heart. It also shows the lungs.

Echocardiogram

This is an ultrasound picture of the heart, which gives information about the heart.

Stress Echocardiogram

This is when an echocardiogram is done while the heart is put under stress by increasing its heart rate either with exercise or with a certain type of medicine. In some cases, if the doctors need more detailed information, a stress echocardiogram may be needed.

Bio markers

Troponin test

Troponin is the one of the important biomarker that is detected in the blood of a person with a heart attack. Troponins are proteins present in the heart cells. When the heart attack occurs from the damaged heart troponins are released into the blood, but the troponins remain in the blood for several hours even after the occurrence of heart attack, so the test is not considered primarily for the treatment.

Signs and Symptoms:

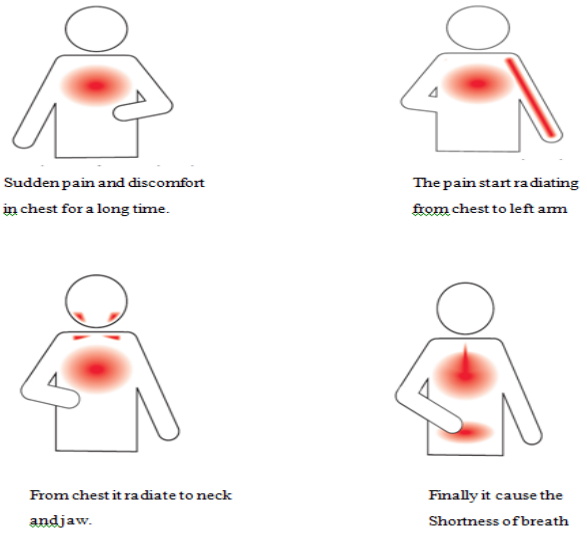


Figure 3: Signs and symptoms of heart attack

First aid-Fight for Saving the Heart Beat

DRS-ABC Treatment

D-DANGER: At first check the status of the person whether he is in danger.

R-RESPONSE: Check the person for response, to check the response gently shakes the person.

S - SHOUT: If there is no response, then shout loudly "ARE YOU ALLRIGHT".

A - AIRWAY: Place the person in such a way to open airway by tilting the head back and uplifting the chin.

B - BREATHING: If breath is not normal, then provide breath to rescue for about 10 seconds.

C - CPR: This should be done only if the person is unconscious and with an abnormal breath rate.

CPR: CPR should be done to rescue heart beat. It's mainly done in 2 steps.

Chest compressions

Place right hand above the left hand in interlocked position above the chest and press down smoothly about 30 times, so that the compression should be up to the depth of 5-6 cms. Continue the same at the rate of 100-120 times a minute is shown in Fig: 4(a)

Figure 4.a : Chest compressions

Rescue breaths

After every 30 compressions, give two breaths by tilting head back and slightly lifting the chin. This is called rescue breathing. This should be done by taking a normal breath by sealing the mouth with your mouth and breathe out. The two rescue breaths should be done in not more than 5 seconds is shown in fig: 4(b).

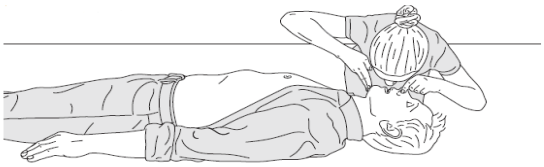


Figure 4.b: Rescue breaths

Continue the CPR by doing 30 compressions followed by 2 rescue breaths until the ambulance service arrives.

Drug Treatment

The initial treatment for a patient who is suffering with cardiac arrest is chest pain management is by aspirin (Anti-thrombotic agent), clopidogrel and nitroglycerine by the sublingual route. Aspirin is used for the primary prevention of cardiovascular events[10].

The next is to treat the plague by using lipid lowering agents like statins namely atorvastatin etc.. Other drugs include beta-blockers, ACE-inhibitors, angiotensin receptor blockers[11-13]. Cardio protective drugs are tabulated in table 1.

Table 1: Cardio Protective drugs.

CARDIO INHIBITORY DRUGS:					
Proponolol [INDERAL]	80 mg orally once a day	Binds to the β_1 adrenergic receptors and inhibits them results in a reduction in resting heart rate, cardiac output,	Tremors Angina	Cough with mucus	Proponolol × Verapamil
Metoprolol [LOPRESSOR]	100 - 450 mg/day	Systolic and diastolic blood pressure.	Heart attack	Blurred vision	Metoprolol× Atazanavir
POTASSIUM CHANNEL OPENERS:					
Nicorandil [NICODUCE]	10 - 20 mg twice daily	Dilates arterioles and large coronary arteries by opening the potassium channels and stimulates guanylate cyclase causing venous vasodilatation.	Chronic angina.	Rectal bleeding	Sildenafil
VASODILATORS: **1.Calcium channel blockers**					
Verapamil [CALAN]	120 - 180 mg/day.	Verapamil inhibits voltage dependent calcium channels in the heart causes the reduction in entropy and chronotropy thus reducing heart rate and blood pressure.	Uses to treat Hypertension, Angina and certain heart rhythm disorders.	Difficulty having a bowel movement Headache	Verapamil× Suvorexant
Amlodipine [NORVASC]	5 to 10 mg orally once a day.	Amlodipine relaxes blood vessels and improves blood flow.	Used to treat hypertension or chest Pain and other conditions caused by coronary artery disease.	Shortness of breath. Tightness in chest. Swelling of ankles.	Amlodipine× Simvastatin.

2.Nitrates: Short acting: Glyceryl trinitrate [ANGICARD] Long acting: Isosorbide dinitrate [ISORDIL]	8 to 10mg/day 40 - 80 mg/day	It converts into nitric oxide and activates guanylate cyclase and stimulates the synthesis of CGMP which results in the release of calcium ions results in relaxation of smooth muscles and vasodilation.	Prevent and relieve angina. Prevent and relieve angina.	Faster heart rate Low blood pressure Worsening angina pain Fluttering	Nitroglycerine × Ergonovine Isosorbide dinitrate×Tad alafil
ANTIPLATELET:					
Aspirin [COLSPIRIN]	75 - 150 mg OD oral	Aspirin irreversibly acetylates platelet COX 1 and reduce the production of TXA2 thus anti platelet effect lasts for life time of platelets.	Acute myocardial infraction Unstable angina.	Gastric irritation	Acetazolamide
Clopidogrel [PLAVIX]	75 mg OD	These drugs irreversibly inhibit the binding of ADP to its receptors on platelets there by inhibit the activation of the Gp2b/3a receptors required to bind fibrinogen to platelets.	Stroke Unstable angina Myocardial infarction.	Chest pain Redness Swelling.	Omeprazole
Dipyridamole [PERSANTINE]	150 - 300 mg/day	It is a vasodilator it inhibits phosphodiesterase and increases the concentration of CAMP levels which inhibit platelet aggregation.	Angina pectoris.	Diarrhea	Dalteparin
Abciximab [REOPRO]	0.25 mg/kg intra Venous bolus.	Abciximab is a monoclonal antibody that binds to Glycoprotein 2a/3b thus prevents the final step in the process of the platelet aggregation.	Percutaneous coronary intervention, Unstable angina.	Bleeding Blurred vision.	Anogrelide

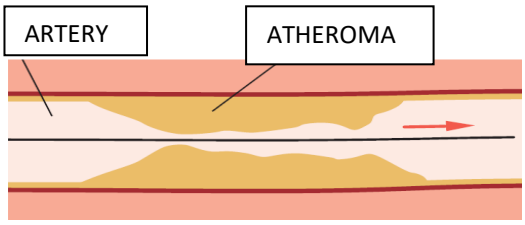
ANTI COAGULANTS					
Heparin	IV in bolus doses of 5000 to10000U.	Heparin binds and activates the anti thrombin3 then inhibits the activated clotting factors and there by inhibits thrombus formation.	Heparin is used to treat and prevent blood clots in veins, arteries or lungs.	Thrombocyt openia Bleeding.	Argatraban Along with heparin increase risk of bleeding.
Lepirudin [REFLUDAN]	0.4 mg/kg IV	It act by directly inhibiting thrombin	Anticoagulant to treat patients with heparin induced thrombocytopenia	Dark urine constipation	Enoxaparin
Dabigatron [PRADAXA]	150 mg orally B.I.D	It is a direct thrombin inhibitor and prevents the formation of clot	Reduce the risk of stroke	Black tarry stools	Flurbiprofen
Warfarin [COUMADIN]	10-15mg followed by 2 to 10 mg/ day.	These are vitamin antagonist.	Unstable angina Thromboembolism.	Teratogenic Blood in urine.	Clopidogrel
FIBRINOLYTICS					
Streptokinase [STREPTASE] Alteplase [ACTIVASE]	For MI 7.5 - 15 lakhs IU infused IV over 1 hr. 15 mg IV	Fibrinolytics promote the conversion of plasminogen to plasmin. This degrades fibrin to fibrin degradation products and thus rapidly dissolves blood clot.	Acute MI Stroke. Deep vein thrombosis.	Bleeding gums Coughing up blood. Bleeding of nose.	Argatraban Enoxaparin

SURGERY

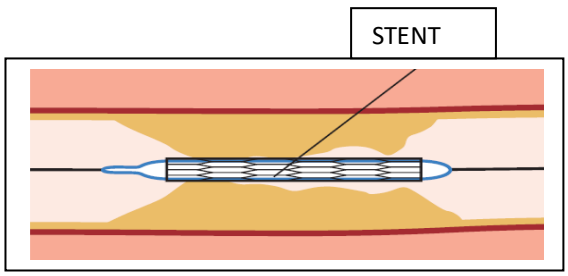
Coronary Angioplasty

In heart attack patients we see the narrowing of one or more coronary arteries they are suitable for coronary angioplasty.In this surgery the stent is placed in the narrowed artery in order rescue blood supply to heart and prevent stoke.

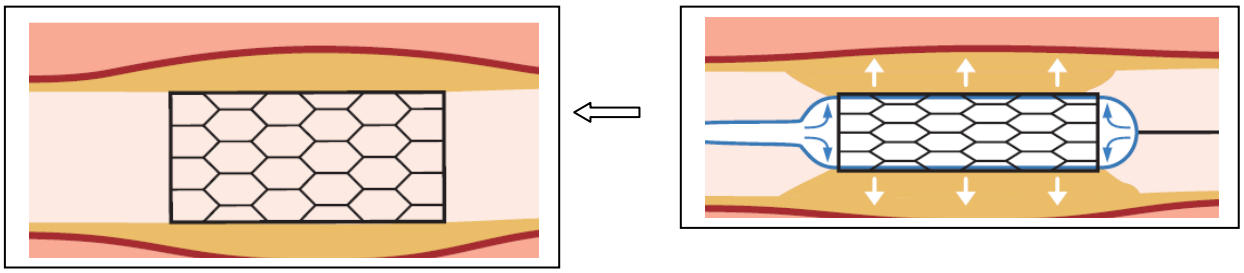
PROCEDURE



Identifying the narrowed artery and guideing wire of catheter towards narrow artery.



The wire is guided in sucha a way that the balloon portion of stent reaches the narrowed area.



The balloon is removed and the stent is placed in such a way that inflates the artery in open position.

After reaching the balloon portion is gently inflated in such a way that it flattens the atheroma towards the arterial wall.

Figure 4.c: Coronary angioplasty

Bypass Surgery

CORONARY ARTERY BYPASS GRAFT (**CABG)**:

CABG is a surgical procedure in which the surgeon collects the blood vessel from the arms, legs, chest in order to bypass the narrowed artery (coronary artery). This procedure is done when coronary angioplasty is not possible.

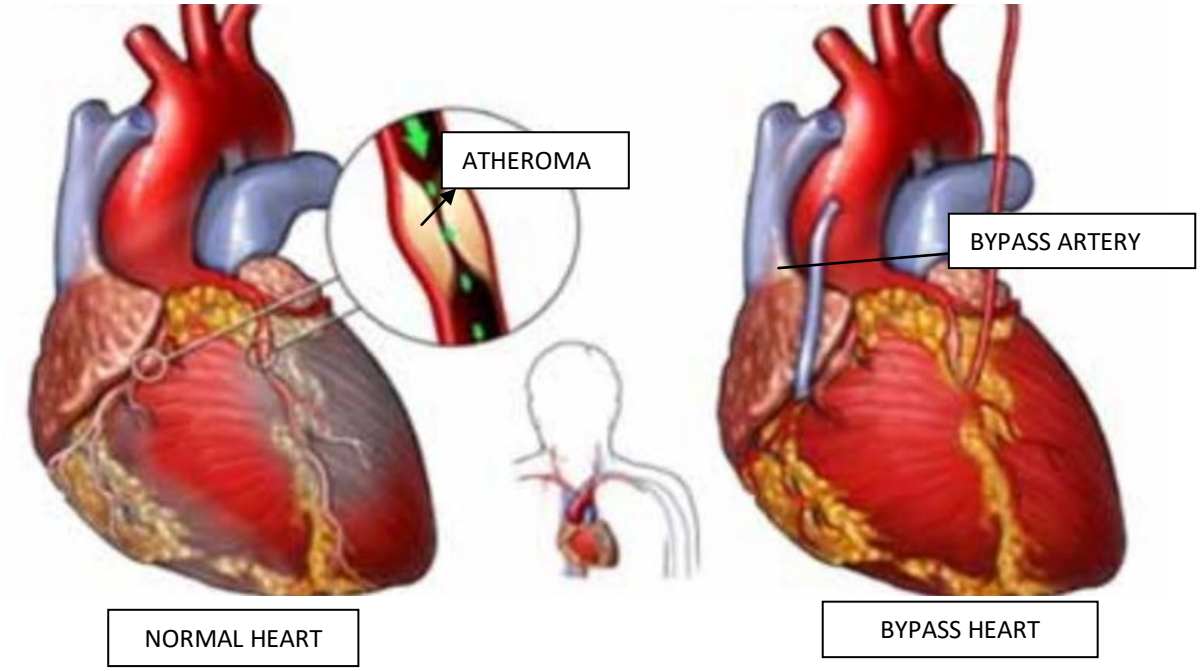


Figure 4.d: Coronary artery bypass graft (CABG)

CONCLUSION

The use of tobacco, physical inactivity, unhealthy diet, obesity, hypertension, dyslipidaemia etc., along with ageing and genetic factors with causes atherosclerosis by narrowing blood vessel and further leads to heart attack in later years. The cardiovascular disease can be prevented by reducing risk factors like tobacco smoking, alcohol consumption, sedentary lifestyle, etc. By cessation of smoking, regular physical activity which prevents formation of embolisms and to decrease the bad cholesterol and control body weight. This prevents the risk for heart attack. By life style modification[14] (eat healthy, balanced diet, including at least five portions of fruit and vegetables a day and 2 to 3 portions of oily fish a week- for example herring, pilchards, sardines, mackerel, salmon or trout) we reduce the prevalence of heart attack by decreasing alcohol consumption, dietary salt, Trans fat, cholesterol (total cholesterol level should be below 4 mmol/l) etc and regularly monitor the blood pressure (blood pressure should be below 130/90 mm Hg), and blood sugar levels. Control diet, taking fresh fruits, vegetables, controlled body weight by physical activities and reduced alcohol consumption reduce risk of CVDs. Individuals at risk of Cardio vascular diseases[15] may demonstrate raised B.P, glucose and lipids as well as overweight and obesity. These can all be easily measured in primary care facilities. First identifying those at highest

risk of CVDs and ensuring they receive apt treatment can stop premature deaths. Access to essential NCD medicines and basic health technologies in all primary health care facilities is essential to ensure that those in need receive treatment and counseling. The main key messages to protect the heart are 1. Tobacco use, an unhealthy diet, and physical inactivity increase the risk of heart attacks and strokes. 2. Engaging in physical activity for at least 30 minutes every day of the week will help to prevent heart attacks and strokes. 3. Eating at least five servings of fruit and vegetables a day, and limiting your salt intake to less than one teaspoon a day, also aids to prevent heart attacks and strokes. Targeting protein quality control to maintain cardiac proteostasis offers a novel therapeutic strategy to promote cardiac health and combat cardiac disease[16]

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Source of Support: Nil, **Conflict of Interest:** None.