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A Systematic Review On Proliferating Coronary Artery Disease In Satara Region

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ABSTRACT

Coronary Artery Disease (CAD) remains a leading cause of morbidity and mortality globally, necessitating a profound understanding of its intricate pathophysiology, diagnostic methodologies, and innovative therapeutic approaches. This comprehensive review aims to synthesize the current knowledge surrounding CAD, providing a holistic perspective on its multifaceted aspects. So I decided to review on proliferating CAD Heart Disease in the Satara region. And I found that the major reasons behind increasing CAD cases are Obesity in adults and changed lifestyles. So for Preventing the Proliferating of Diabetes, some Preventing Measures are used That is Tobacco smoking is also associated with an increased risk of CAD Heart Disease and its complications, so smoking cessation can be an important preventive measure as well. And also maintain the cholesterol in body.

Keyword: Coronary Artery Disease, Angina, myocardial infarction, atherosclerosis, Ischemia, Angioplasty, CABG.

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INTRODUCTION

When I saw the number of cases of CAD in Maharashtra, I found that in the Satara region CAD is at high risk on comparing with other districts in Maharashtra So I decided to review on the proliferation of CAD in the Satara region. Coronary artery disease, also known as coronary artery disease (CAD) or ischemic heart disease is a medical condition that occurs when the blood vessels supplying the heart muscle (coronary arteries) become narrowed or blocked. This narrowing or blockage is usually due to the buildup of fatty deposits, cholesterol, and other substances collectively known as plaque, on the inner walls of the coronary arteries. This process is called atherosclerosis.^[1]

TYPES

The people think that coronary artery disease as plaque buildup in your arteries, or atherosclerosis but plaque buildup occurs in only one type of coronary heart disease. There are other artery disease types There are three types of coronary heart disease

Obstructive Coronary Artery Disease (Type 1 OCAD)

A Obstructive coronary artery disease occurs when your coronary arteries gradually narrow due to plaque buildup, also known as atherosclerosis. It's the type of coronary artery disease that's most common and well-known. As the artery narrowing worsens, it can eventually cut off blood flow to your heart. A sudden blockage is known as a heart attack, which requires immediate medical attention to minimize.^[2]

Non-Obstructive Coronary Artery Disease (Type 2 NCAD)

No obstructive coronary artery disease occurs to the other problems with your coronary arteries. It not caused by plaque buildup. Instead, your coronary arteries may have problems such as Compression or squeezing from the heart muscle (myocardial bridging) Constrictions at improper times (coronary vasospasm) Damage to the artery lining endothelial dysfunction Malfunctions in smaller artery branches microvascular dysfunction the heart damage.

Spontaneous Coronary Artery Disease

SCAD and heart attack symptoms can person to person but may include pain, especially on the left side or center of your chest that doesn't go away with back pain Lightheadedness or weakness. Sensations of fullness, squeezing in your chest Shortness Pain radiating from your chest through your shoulders or arms of breath even at the Rest.

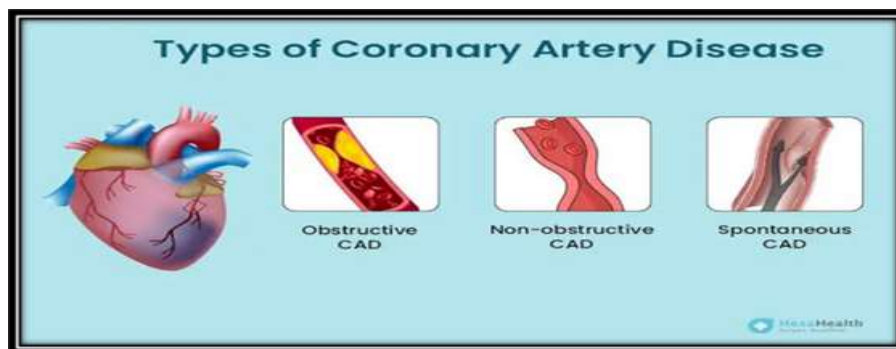


Figure 1: Types of Coronary Artery

SIGN AND SYMPTOMS

The classic symptoms of untreated diabetes are as follows ^[3]

- Angina or chest pain caused by the heart can feel like pressure, squeezing, indigestion, burning, or tightness, and is sometimes related to physical activity.
- Cold sweats
- Dizziness
- Light-headedness
- Nausea or a feeling of indigestion
- Shortness of Breathnism

MECHANISM

Coronary artery disease is caused by atherosclerosis, a build of plaque in the walls of the heart arteries. This build can narrow or block the arteries. Mechanism Coronary artery disease is caused by atherosclerosis, a build of plaque in the walls of the heart arteries. This build can narrow or block the arteries ^[4]

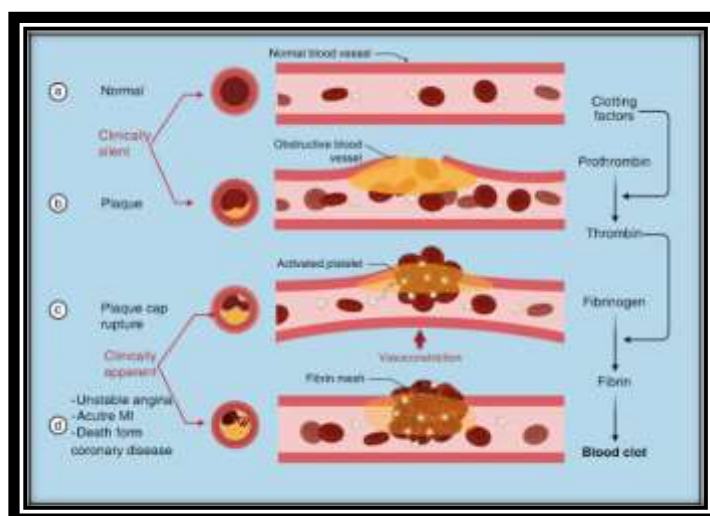


Figure 2: Mechanism

COMPLICATIONS:**Angina Pectoris:**

- **Stable Angina**

Chest pain or discomfort that occurs during physical exertion or stress and typically improves with rest or medication.

- **Unstable Angina**

The Chest pain or discomfort that is unpredictable, occurring even at rest, and is often a sign of an impending heart attack. Myocardial Infarction (Heart Attack)

- **Coronary Microvascular Disease (CMD)**

Affects the tiny blood vessels of the heart (microvasculature) and may not be detected by traditional angiography. It can cause chest pain and other symptoms, especially in women.

Coronary Atherosclerosis^[5]

- **Diabetes and Cardiovascular Diseases-**

The major long-term complications relate to damage to blood vessels. About 75% of deaths in people with diabetes are due to coronary artery disease.

PREVENTION

Healthy lifestyle choices, including a balanced diet, regular physical activity, and avoiding tobacco, can significantly reduce the risk of CAD. Monitoring and managing risk factors, such as blood pressure and cholesterol levels, are crucial for prevention. It's important to note that Coronary Artery Disease is a serious condition that requires medical attention and a comprehensive approach to management. Early detection, lifestyle modifications, and appropriate medical interventions can play a crucial role in improving outcomes for individuals with CAD to high blood pressure and increase the risk of CAD.^[6]

Reduce Cholesterol

High levels of cholesterol in the blood cause plaque to build up in the arteries. This can decrease blood flow to the heart, causing symptoms such as chest pain. Plaque can rupture and cause blood clots to form in the arteries, which can lead to a heart attack or stroke.

Quit Smoking

Smoking can increase the odds of developing coronary artery disease by two to four times. The nicotine in cigarettes raises blood pressure and heart rate reduces the amount of oxygen the heart receives and increases the risk of blood clots. The chemicals in tobacco also contribute to the buildup of plaque in the arteries that lead to the heart.^[7]

Diet

Eat a healthy, Balanced Diet fresh food Intake.

A low fat, higher fiber diet recommended which should include plenty of fresh fruits and vegetables and whole grains.

You should also try to avoid too much sugar in diet as this increasing chance to developing diabetes, which increase the your chance developing coronary heart disease.



Figure 3: Management OF CAD

Medications

Common medications used in the management of coronary artery disease include:

1. Antiplatelet Agents:-Aspirin
2. Statins:- simvastatin, atorvastatin
3. Beta-Blockers:- Metoprolol and Carvedilol.
4. Angiotensin-Converting Enzyme (ACE) Inhibitors:- Lisinopril, Enalapril
5. Calcium Channel Blockers:- Amlodipine, Diltiazem
6. Nitroglycerin^[8]

Dietary Management

Control blood pressure, Manage cholesterol, Check your blood sugar, Eat heart-healthy foods, Avoid alcohol, Get moving, maintain a healthy weight.

SURGICAL TREATMENT

Coronary artery disease (CAD) is a condition where the blood vessels supplying the heart muscle become narrowed or blocked due to the accumulation of plaque. Surgical treatments for coronary artery disease are typically considered when less invasive approaches, such as lifestyle changes or medication, are insufficient. Two common surgical treatments for CAD are Two types.

Coronary Artery Bypass Grafting (CABG):

Also known as heart bypass surgery, CABG is a surgical procedure used to treat CAD by creating new routes for blood to flow to the heart muscle. In this procedure, a surgeon takes a healthy blood

vessel, often from the leg or chest, and attaches it to the coronary arteries beyond the blocked or narrowed area. This bypass graft allows blood to bypass the blocked segment, restoring adequate blood flow to the heart muscle. During coronary artery bypass graft surgery, a blood vessel is removed or redirected from one area of the body and placed around the area or areas of narrowing to “bypass” the blockages and restore blood flow to the heart^[9]

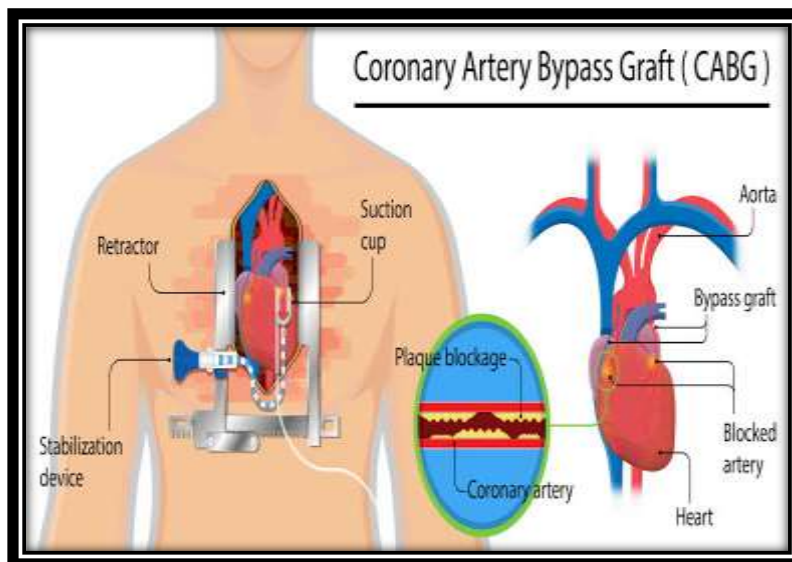


Figure 4: Coronary Artery Bypass Graft

Percutaneous Coronary Intervention (PCI):-

PCI is a less invasive procedure commonly known as angioplasty. It involves using a balloon at its tip to inflate and widen a narrowed or blocked coronary artery. In many cases, a stent a small mesh tube is also placed during the procedure to help keep the artery open. This improves blood flow to the heart muscle. Drug-eluting stents, which release medication over time to prevent re-narrowing, are often used in PCI^[10]

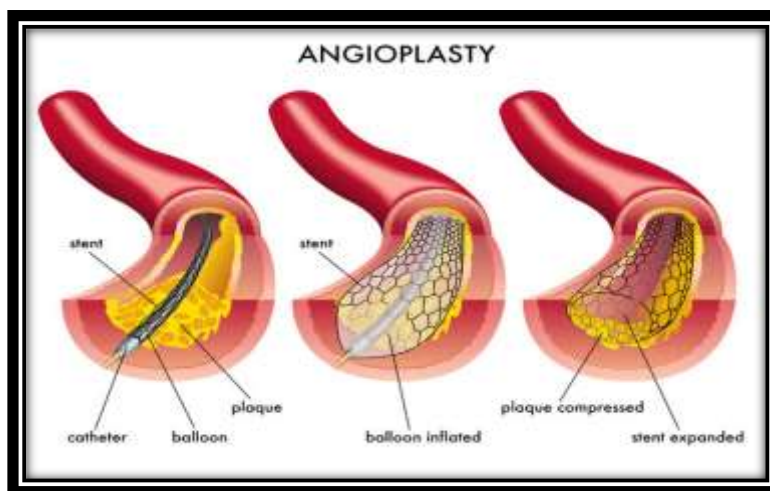


Figure 5: Angioplasty

The choice between CABG and PCI depends on various factors, including the severity and location of the blockages, the patient's overall health, and the presence of other medical conditions. The decision is usually made by a team of healthcare professionals, including cardiologists and cardiothoracic surgeons, after a thorough evaluation of the individual case. It's important for patients to discuss their specific situation and treatment options with their healthcare team to determine the most appropriate course of action. ^[11]

ETIOLOGY OF CORONARY ARTERY DISEASE -

The doctor gave us Brief Information about the main causes of CAD and which

Includes CAD occurs due to

- Age, gender, genetics
- High cholesterol
- Obesity
- Physical inactivity
- Unhealthy diet ^[12]

CORONARY ARTERY DISEASE CASES BY AGE GROUPS -

Doctors of Spandan Hospital gave me numbers of patients with CAD having different age groups.

According to Their analysis most patients are found in age group 45-65. CAD leading cause mortality in country increase prevalence across age group, cardiovascular disease including CAD account for 27% of among adults aged 40-69 on middle population

1. Young adults (20-39)
2. Middle -Aged Adults (40-59)
3. Older Adults (60 years and Above)

HOW TO DIAGNOSE CAD?

It is diagnosed by demonstrating any one of the following,

1. Electrocardiogram (ECG or EKG). This quick and painless test measures the electrical activity of the heart. ...
2. Echocardiogram. This test uses sound waves to create pictures of the beating heart.
3. Exercise stress test.
4. Nuclear stress test.
5. Heart (cardiac) CT scan.
6. Cardiac catheterization and angiogram ^[13]

WHICH EQUIPMENTIS USED TO DIAGNOSE IT ?

Imaging modalities for evaluating patients at increased risk for CAD include radiography, fluoroscopy, multi detector computed tomography (CT), ultrasound, magnetic resonance imaging (MRI), cardiac perfusion scintigraphy, encephalography, and positron emission results for the diagnosis of Coronary Artery Disease.^[14]



Figure 6: CT & PET

HOW TO MANAGE CORONARY ARTERY DISEASE?

Drug Treatment-Common medications used in the management of coronary artery disease include:^[15]

Antiplatelet Agents: These medications help prevent blood clots. Aspirin is a commonly prescribed antiplatelet agent for individuals with coronary artery disease.

Statins: These drugs lower cholesterol levels and help reduce the buildup of plaque in the arteries. Examples include atorvastatin and simvastatin.^[16]

Beta-Blockers: These medications reduce the workload on the heart by slowing the heart rate and lowering blood pressure. They can also be used to manage angina (chest pain).

Examples include



Figure 7: Aginotensin

Angiotensin-Converting Enzyme Inhibitors: ACE inhibitors help relax blood vessels, reduce blood pressure, and decrease the workload on the heart. Examples include Lisinopril and Enalapril^[17]



Figure 7: Nitroglycerin

Side Effects of Nitroglycerin

Gastrointestinal irritation- It, includes Bloating or swelling of the face, arms, hands, lower leg, or feet.

1. Burning, crawling, itching, numbness, prickling, "pins and needles"
2. Difficult or labored breathing.
3. Feeling faint, dizzy or lightheadedness.
4. Feeling of warmth or heat.

5. Diarrhea
6. Nausea
7. Vomiting^[18]

CONCLUSION

The day came to an end with a discussion with the Dr. Mahesh Menbudle. This visit to the Hospital made me know about the procedures under taken in the hospital, the facilities available in the hospital and about the equipment's used to diagnose the diseases and the special treatments For Coronary artery disease given in the hospital^[19] This visit is a memorable and useful one. At the end of Hospital visit the photo was taken with respected Dr Mahesh Menbudle. They provided us most Information about Coronary artery disease which is very helpful for Project. By this review it is conclude that the Satara region having not so much but have problem with Coronary artery disease and the main reason of proliferating Coronary artery disease cases in Satara region is the obesity (It is often linked to a higher intake of certain foods, like high-fat and high-sugar diets, which can contribute to the development of CAD heart disease) and the change in life style (Includes Hydration, Weight Management , Physical Activity , Excess Fat, Bad cholesterol level , Moderate Protein Intake^[20]

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