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AN OVERVIEW OF ACUTE MYOCARDIAL INFARCTION IN YOUNG ADULTS

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ABSTRACT

Myocardial infarction (MI) is a major public health concern in industrialized world and steeply increased in developing countries. Acute myocardial infarction (AMI) is a myocardial necrosis resulting from acute obstruction of coronary artery. The prevalence of MI increased in young adults due to smoking, lipid abnormalities, insulin resistance, and obesity. A heart healthy lifestyle like smoking cessation, programs to increase physical activities, incorporate healthy foods to diet can reduces the risk of MI. The review discusses about the causes, risk factors, complications and prevention of MI in young adults.

KEYWORDS: Myocardial infarction, young adults, artherosclerosis, smoking.

INTRODUCTION

Acute myocardial infarction (AMI) seems to be the major cause of mortality and death worldwide.[1] Due to a shortage of oxygen, a MI causes irreparable damage to the heart muscle. An MI can cause a reduction in diastolic and systolic function, leaving the patient at risk for arrhythmias. Furthermore, a MI can result in a variety of significant consequences. The aim is to improve blood flow and reperfuse the heart. The better the prognosis, the earlier the therapy (less than 6 hours after symptom beginning)[2]

AMI in young populations, which can result in mortality early in life and become a huge public health concern. Although the occurrence of AMI in elderly individuals has reduced[1]. In recent years, there has been an increase among the prevalence of cardiovascular risk factors in young adults. As a consequence, the number of young individuals experiencing from acute myocardial infarction (AMI) is increasing. The majority of AMI risk in both the young and old is related to modifiable atherosclerotic cardiovascular disease (ASCVD) risk factors. However, until the time of the first AMI, these risk factors may go undetected or undertreated in young people.[3]

Young patients' myocardial infarction may have several features that are differ from older patients'. Coronary arteriography in young individuals with a myocardial infarction has revealed a rather high incidence of angiographically normal coronary arteries.[4] However, when the disease occurs at a young age, it causes substantial morbidity, psychological impacts, and financial restraints for the individuals. . The causes of MI among patients aged less than 45 can be divided into four groups: (1) atheromatous coronary artery disease; (2) non-atheromatous coronary artery disease; (3) hyper-coagulable states; (4) MI related to substance misuse. All of the categories have a significant amount of overlap.[5]

The majority of "young" MI patients do not have a history of prior angina, MI, or congestive heart failure, and they report less frequently than their older counterparts.[6] Young people with MI fall into two categories: those with angiographically normal coronary arteries and those with coronary artery disease (CAD). The coronary arteries of some young MI patients are normal. Arteritis, thrombosis, embolization, or spasm can all trigger MI in them. Coronary thrombosis can occur in hypercoagulable conditions such as protein C and protein S deficiency, antiphospholipid syndrome, or nephrotic syndrome, just as it occurs in venous thrombosis.[7]

Causes[5]

The aetiology of MI in adult patients of age less than 45 can be categorized into four groups

1. Non-atheromatous coronary artery disease

2. Atheromatous coronary artery disease
3. Hyper-coagulable states
4. MI related to substance misuse.

Non-atheromatous coronary artery disease

Early childhood is when the atheromatous process begins. The conventional risk factors for atheromatous CHD were connected to the aetiology of atheromatous CHD in adulthood. Cigarette smoking was found to be common in up to 92 percent of young patients with an atheromatous process. The prevalence of smoking was found to be higher in patients under 40 years old than in patients over 60 years old in a study of patients who received percutaneous coronary intervention (PCI).

Children born to parents with preterm CHD had a higher frequency of lipid abnormalities, insulin resistance, and obesity, lending credence to the theory of a shared genetic connection. These individuals have greater arterial abnormalities than the rest of the patients who had MI before the age of 45. Lipid abnormalities, particularly hypertriglyceridemia and low HDL, were shown to be more frequent in individuals under the age of 45 years old who had a MI. In addition to clinical signs, poor glucose tolerance was reported in 65 percent of MI survivors under 45 years old.

Aside from this, the introduction of new CHD risk factors such as hyper-homocysteinemia and lipoprotein among adults of various ages may have similar clinical consequences in younger individuals. Premature CHD is an atheromatous condition that progresses quickly. Anger and psychosocial stress are completely untapped areas that have been linked to MI and coronary artery calcification in young adults.

Atheromatous coronary artery abnormalities

Coronary artery dissection can arise on its own in young people. Chest discomfort is frequently unusual among young population, and women are more prone during the peripartum period. In the majority of instances, the problematic artery was shown to be the left anterior descending artery. Unfortunately, the diagnosis is frequently established during necropsy. There have been reports of successful therapy with stenting or surgery.

Young persons with MI have also been observed to have myocardial bridging, in which the coronary arteries are immersed within a tunnel in the myocardium under a layer of muscles. During systolic contraction, myocardial bridging can cause severe ischemia, which can lead to a heart attack. In this group of patients, both PCI and surgical splitting proved to be more effective than medicinal treatment.Coronary artery aneurysms are an uncommon cause of MI in young people, with the mechanism of MI assumed to be either embolisation from the aneurysmal sac or extraluminal compression.

Recreational drug use

Cocaine usage has been linked to a variety of heart problems, including myocardial infarction (MI). The majority of patients who abuse cocaine are also smokers, increased susceptibility to MI.

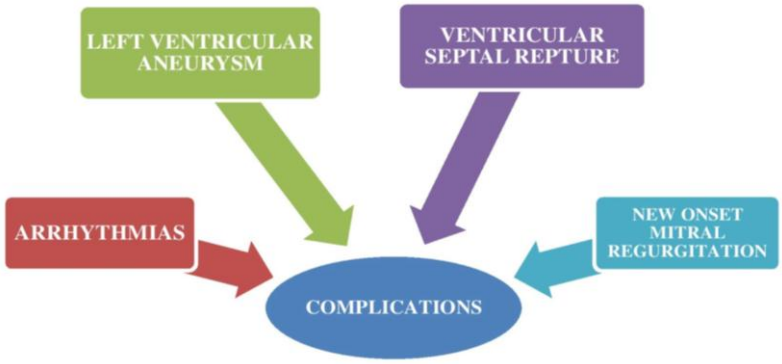
Cocaine use causes acute MI through a various mechanisms, including coronaryvasospasm and hypercoagulability, all of which occur with increased sympathetic activity. Long-term cocaine usage expedites the onset of atherosclerosis. The use of amphetamines and marijuana can cause MI, however the evidence is limited. Binge consumption of alcohol has also been linked to the development of MI in young people.

Hyper-coagulable states

Hypercoagulability is linked to nephrotic syndrome due to a combination of causes including fibrinolytic system abnormalities, dyslipidaemia, and a reduction in anticoagulant factors. The thrombophilic disposition in majority of the individuals was caused by a decrease in the concentration of antithrombin III, a coagulation inhibitor.

Recurrent arterial and venous thrombosis is linked to antiphospholipid syndrome. It is a condition that affects a lot of young people in their 30s. It can be either primary or secondary to other autoimmune disorders such as systemic lupus erythematosus. Acute MI can be caused by thrombotic obstruction of a coronary artery. Premature atherosclerosis and enhanced platelet adhesiveness are prevalent in these individuals. Because of its procoagulant effect, the use of contraceptive pill raises the risk of MI in young women.

Complications[2]



Causes of acute myocardial infarction without coronary atherosclerosis.[2,8]

Clinical manifestations[9]

The most frequent indications and symptoms of a heart attack are

1. Pain or discomfort in the chest: Most heart attacks are characterised by pain in the centre or left side of the chest that lasts longer than a few minutes or that disappears and reappears. Uncomfortable pressure, squeezing, fullness, and discomfort are among symptoms that might occur.
2. Weakness, light-headedness, or faintness.
3. Discomfort or pain in the jaw, neck, or back.
4. One or both arms or shoulders are painful or uncomfortable.
5. Breathing problems: Shortness of breath commonly occurs in conjunction with chest discomfort, however it can also occur independently of chest discomfort.
6. Bloating, indigestion, or a choking sensation (it may feel like heartburn)
7. Sweating, nausea, vomiting, or dizziness are all symptoms of an upset stomach
8. Heartbeat that is too fast or too irregular.
9. Unusual fatigue.
10. Some people might not experience any symptoms when they have a heart attack (a "silent" myocardial infarction). Diabetes patients are more likely to experience this.

Pathophysiology[2]

Atherosclerotic rupture triggers an inflammatory cascade including monocytes and macrophages, thrombus formation, and platelet aggregation. As a result, oxygen transport through the coronary artery is reduced, resulting in impaired myocardial oxygenation.

The inability of the mitochondria to make ATP triggers the ischemia cascade, which results in endocardial apoptosis (cell death) or myocardial infarction.

Risk factors

In young patients, risk factor reduction is a tough venture.[10]

Young AMI patients had a higher risk factor profile than older patients with a higher incidence of current smoking, hyperlipidemia, and a family history of early coronary artery disease, as well as a lower chance of hypertension and hypercholesterolemia.[10]

Smoking has previously been reported as the most frequent risk factor for heart disease, and it has been correlated to MI and it is more common in patients under the age of 45 with PCI-proven CHD than in those over the age of 60.[10]

In young women, oral contraceptives in concert with smoking have been attributed to MI.[10]

Patients with a family history of early CHD are more susceptible to have lipid abnormalities, insulin resistance, and obesity.[10]

Management[12]

S.NO	CLASSIFICATION	DRUGS
1.	ANTIPLATELET AGENTS	ASPIRIN CLOPIDOGREL TICAGRELOR PRASUGREL
2.	ANTICOAGULANTS	HEPARIN LMWH FONDAPARINUX BIVALIRUDINE
3.	BETA BLOCKERS	ATENOLOL CARVEDILOL
4.	GLYCOPROTEIN IIb/IIIa RECEPTOR ANTAGONIST	ABCIXIMAB EPTIFIBATIDE TIROFIBAN
5.	ACE INHIBITORS	ENALAPRIL RAMIPRIL
6.	ARBs	LOSARTAN TELMISARTAN
7.	VASODILATORS	NITROGLYCERINE
8.	THROMBOLYTICS	ATLEPLASE RETEPLASE
9.	HMG CoA – REDUCTASE	ATORVASTATIN ROSUVASTATIN
10.	ANALGESICS	MORPHINE

Supportive Care

- Defibrilation
- Oxygen Therapy

Prevention[13]

Life style changes

- Stop smoking: Smoking increases your risk of heart attacks and strokes significantly.
- Keep a healthy body weight: By reducing 5 to 10% of weight may helps to reduce the blood pressure and lowers blood sugar levels and will improve cholesterol levels.
- Stick to a workout routine: Avoid a heart attack and maintain the healthy body weight.
- Consume a heart-healthy diet: Consume lot of fruits, vegetables, legumes, and lean meats, such as skinless fowl. Increase your diet of whole grains like oats, quinoa, and brown rice, as well as fish, particularly omega-3-rich fish like salmon, trout, and herring.
- Cut back on unhealthy foods: Avoid processed or prepared meals, which are generally heavy in salt and added sugar. Fatty steak, butter, fried meals, and palm oil all should be avoided. Saturated fats are abundant in all of them.
- Reduce alcohol consumption: Drinking elevates your blood pressure and heart rate. It can also induce weight gain by increasing the amount of fat in your blood.
- Check cholesterol, blood pressure, and blood sugar levels on a regular basis.
- Stress management
- Pay serious attention to your signs and symptoms: Consult doctor if feels anything unusual such as shortness of breath, changes in your heart rate, or excessive exhaustion. Also, keep an eye out for jaw or back discomfort, nausea or vomiting, sweating, or flu-like symptoms.

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