

A Brief Review - Heart Attack

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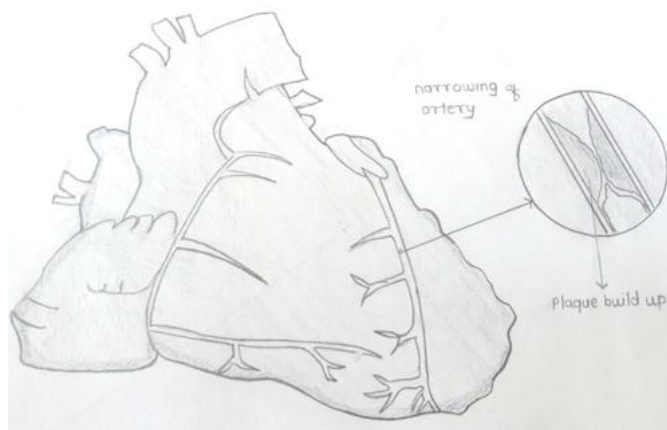
Abstract: A heart attack when supply of blood and oxygen to area of heart muscle is blocked by the blood clot. This is caused by the stop beating and pumping blood and lead to cause death or permanent damage to heart. Sign of the heart attack is chest pain it spread to backside like shoulder arm neck or jaw. Symptoms such as shortness of breath nausea sweating or dizziness. Risk factor of heart attack including age and family history. But lower risk in no smoking, eating low in fat and cholesterol and exercise regularly. Diagnosis and treatment of heart attack can with help of ECG, blood test, chest x-ray, nuclear imaging, coronary angiography and echocardiogram etc. Many of deaths in Poland are caused by cardiovascular diseases. A high percentage causes them to rank first among the causes of death. According to the Polish Cardiac Society, acute coronary syndromes are the reason for hospitalization of 140,000 people. It including myocardial infarction of 90,000 people each year. In addition to sudden cardiac deaths, cardiovascular disease is also a major cause of hospitalization and permanent or temporary disability in both physical and mental. This condition has consequences in the form of the among others, inability to work. Which leads to the gradual development of social disability. The multitude and variety of problems faced by patients determines the need to recognize and eliminate them. The aim of the study is to present the required scope of patient care after myocardial infarction, based on individual case study. A case report. An 82-year-old patient admitted to hospital after losing consciousness while working in the garden. The ECG showed myocardial ischemia without visible ST segment elevation. Coronary angiography in the hemodynamic laboratory revealed stenosis of the left coronary artery, which was cleared by the introduction of a vascular stent. An individual care plan has been developed for the patient in accordance with the problems encountered.

Keywords: blood clot, chest pain, exercise regularly, coronary angiography, echocardiogram, cardiovascular diseases, acute coronary syndromes, myocardial infarction, hospitalization, hemodynamic laboratory

1. Introduction

Definition-it also called as myocardial infarction. Heart attack is medical emergency in which supply of blood to heart become blocked often as result of blood clot.

A heart attack happen when there is supplies blood to area of your heart. A heart is muscle and it need to good blood supply to keep it healthy. The inner smooth wall of the arteries that supply blood to heart can become damage and narrow due to presence or build up fatty material called plaque.

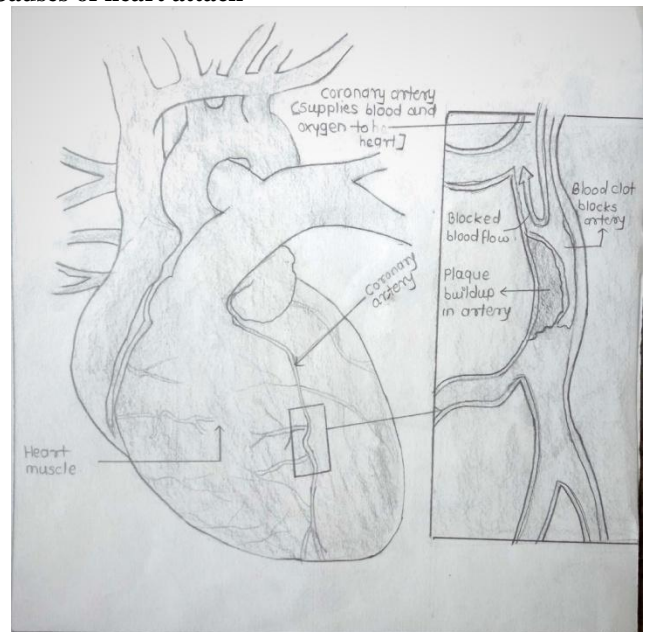


When plaque build up in arteries, it's called as atherosclerosis. It occurs in over many year. A less common cause of heart attack is severe spasm (tightening) of coronary artery. Spasm can occur in coronary arteries that are not affected by atherosclerosis. A heart attack occurs when blood clot completely block the flow of blood and seriously reduced

blood flow to heart muscles. The cause chest pain and as result the heart muscle start to die.

Heart attack can associated with or lead to severe health problem like heart failure and arrhythmias.

Causes of heart attack -



Heart muscle need constant supply to oxygen rich blood. Your coronary arteries give your heart this critical blood supply. If you have coronary arteries disease those arteries become narrow and blood cannot flow as well as it should. When your heart supply to block you have heart attack.

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Fats, calcium, protein and inflammatory cells produce in arteries to form plaques. This plaque deposits hard on outside and soft and mushy on inside.

When plaques is hard the outer shell will be cracks this called rapture. Platelets (disc shaped things in your blood that help to clot.) come to area and blood clots from around plaque. If blood clots blocks to your artery, your heart muscle become starved for oxygen. The muscle cells soon die causing permanent damage.

A spasm in your coronary artery can also cause a heart attack. During this coronary spasm, your arteries restrict or spasm on and off or cutting off the blood supply to your heart muscle (ischemia). It can happen while you are at rest and even if you donot have serious coronary artery disease.

Each coronary artery supply blood to a different part of your heart muscle. How much the muscle is damaged depends on the size of the area that the blocked artery supplies and the amount of time between the attack and treatment.

Your heart muscle starts to heal soon after a heart attack. This takes about 8 weeks. It same as skin wound and scar forms in the damaged area. But the new scar tissue cannot move the way it should. So your heart can't pump as much after a heart attack. How much that ability to pump is affected depends on the size and location of the scar.

Risk factor for heart attack

- Smoking
- Diabetes
- High cholesterol
- High blood pressure
- Stress
- Obesity
- Lack of exercise

Race-African, American, Mexican American, Negative American and Negative American are at high risk

Gender –In the men having more heart attack. Less common cause of heart attack is serve. Spasm or tightening of coronary arteries. This can produces in arteries that does not have plaque produce. Tightening cutting off blood flow spasms are not understand as cause heart attack.

- Taking specific drug like cocaine.
- Cigarette smoking.
- Exposure to extreme cold.
- Serve emotional pain and stress.

Warning signs of heart attack-

As the heart attack can fetal it vital to recognize warning signs that attack is producing. The symptom list are below. These are four warning sign listed by American Heart Association (AHA).

- Discomfort, pressure, fullness in chest that lasts several minute.

- Pain in arms, shoulder, neck, back, stomach or jaw.
- Shortness of breath.
- Other sign can include cold sweat, sick or nauseous feeling.

Symptoms of heart attack-

- The most common symptoms of heart attack in both men and woman of heart attack include:
- Chest discomfort (it's also called angina) which feel like pain pressure, tightness, heaviness or burning like heart burn.
- Pain in neck shoulders, lower jaw, arms upper back or abdomen.
- Shortness of breath that lasts more than few second.

Other symptom could include:

- Feeling lighting,
- Feeling dizzy or faint.
- Nausea,
- Vomiting.
- Unusual sweating.
- Overwhelming,
- Fatigue.

Heart palpitation (feeling like your heart is beating really fast or out of rhythm). Feeling unusually for no reason.

Symptom of heart attack different for female-The common symptom of heart attack is pain. In chest women more likely to have a heart attack without having any chest pain. Therefore women should pay close attention to other symptom of heart attack. These include:

- Shortness of breath,
- Sweating,
- Fatigue,
- Dizziness.

Complication-

These are two type complication:

- 1) Immediate complication.
- 2) Later complication.

1) Immediate complication-

- Arrhythmia- The heart beat is produces irregularly either too fast or too slowly.
- Hypoxemia- The level of oxygen in blood is low.
- Pulmonary edema- In the blood fluid accumulation in and around the lungs.
- DVT or deep vein thrombosis-The deep vein of legs and pelvis develop blood clots that either block the flow of blood in vein.
- Myocardial rapture- it is damage wall of heart meaning increase risk of heart wall rapture.
- Ventricular aneurysm- The heart chamber called as ventricle from bulge.
- Cardiogenic shock- A person suddenly and heart cannot supply sufficient blood for body to work adequately.

2) Later complication-

- Aneurysm- The scar tissue build up on damaged heart wall and leading to produce blood clots low blood pressure and abnormal heart rhythms.
- Angina- not enough oxygen reach to the heart cause chest pain.
- Congestive heart failure-The heart can beat very weakly leaving person feeling exhausted and breathless.
- Edema- The blood fluid accumulates in ankles and legs causes the swell.
- Loss of erectile function- The erectile dysfunction is caused by vascular problem. However it produces also result depression.
- Loss of libido-The loss of sexual drive can happen especially in case men.
- Pericarditis-The lining of heart become inflamed causing chest pain.

Diagnosed heart attack-

- Electrocardiogram(ECG)
- Blood test
- Echocardiogram
- Chest x-ray
- Nuclear imaging
- Coronary angiography

- 1) Electrocardiogram- This is use for to check electrical activity of your heart. It can help diagnose heart rhythm problem. It can find damage from decrease in blood flow.
- 2) Blood test- when blood flow decrease or slow the special protein leak into blood system. A blood test can detect protein. Your doctor will want to test your blood several time during first 24 to 48 hours after your symptoms start.
- 3) Echocardiogram- This test uses sound waves to make picture of your heart. This picture indicates how well your heart is pumping. It can show that the problem between in heart valves.
- 4) Chest x-ray- To see the size and shape of your heart. It can show if there is any fluid in your lung.
- 5) Nuclear imaging- This test injects tiny radioactive substance travel to your to your heart to create picture. The radioactive substance is safe and leaves your body after test is finished.
- 6) Coronary angiography- This test is sometime called cardiac catheterization. It involve inserting long tube is guided to heart or arteries that carry blood to heart. A substance inject into tube makes. It visible by x-ray. It allows your doctor to see where blockage that decreases blood flow to your heart is location.

Treatment

- A) Common heart attack treatment.
- B) Type of medicine.

A) Common heart attack treatment-

- Angioplasty-It is special tube. This tube with attached to deflated balloon is threaded up to coronary arteries.

- Angioplasty, laser- It is same as the angioplasty except has laser tip that open the blocked arteries.
- Artificial heart valves surgery- In this technology remove or replace the diseased heart valves with healthy heart valves.
- Atherectomy- It is similar to angioplasty except that of catheter has rotating shaver on its tip to cut away plaque from artery.
- Bypass surgery- In this technology treating blocked heart arteries by creating new passage for blood to flow to your heart muscle.
- Cardiomyoplasty-An experimental procedure in which skeletal muscles are taken from patient back or abdomen.
- Heart transplant- this technology can remove diseased heart and replaces it with donated healthy human hear.
- Minimally invasive heart surgery- It is alternative to standard bypass surgery.
- Radiofrequency ablation- A catheter with electrode at its tip guided through vein to heart muscle to destroy carefully selective heart muscle cells in very small area.
- Trans myocardial revascularization (TMR) - A laser is used to drill series of holes from outside of heart into heart. The heart is pumping chamber.
- Stent procedure- A stent is wire mesh tube used use to prop open an artery during angioplasty.

In addition to the above treatments you might hear implantable medical devices being used to treat certain heart attack.

b) Type of Medication:

Heart attack treatment involves variety of drugs. The list below provides quick overview if common type. You can learn about cardiac medication in more detail

- 1) Anticoagulant :It is used to treat certain blood vessel, heart and lung condition
- 2) Antiplatelet agent: Keep blood clots from forming by preventing blood platelet from sticking together
- 3) Angiotensin - converting enzyme – (ACE): It is inhibitor expands blood vessels and decrease resistance by decreasing level of angiotensin - II. Allows blood to flow more easily and makes the heart work on more efficient.
- 4) Angiotensin-II receptor blocker: Rather than lower levels of Angiotensin-II receptor blocker prevents this chemical from having any effect on heart and blood vessels. This keeps blood pressure from rising.
- 5) Beta blocker – Decreasing the heart rate and cardiac output. Which lower blood pressure and makes heart beat more slowly with less force
- 6) Combine alpha and beta blocker: These are used as IV drip for those. Patient has hypertension crisis. They prescribe for outpatient high blood pressure use if patient is at risk for heart failure
- 7) Calcium channel blocker: Interrupts movement of calcium in cell of heart and blood vessel. It may be decreases heart pumping, strength and relax blood vessel.
- 8) Cholesterol: Lower medication, it can lower blood pressure. Level but statins are the best first course of action. When statins prove in effective or if patient experience serious side effect from statin therapy other drug may be recommended

- 9) Digitalis preparation: Increase force of contraction which can be beneficial in heart failure for irregular heartbeat.
- 10) Diuretics: It cause the body to rid itself of excess fluid and sodium through urination. Help to relief heart workload. Diuretics also decreased buildup of fluid in lungs and other part of body such as ankles and legs. Different diuretics remove fluid at varied rates and through different methods.
- 11) Vasodilator: The relaxes blood vessels and increase the supply to blood and oxygen to heart. While reducing its workload available pills to swallow chewable tablets and topical application(cream)
- 12) Dual antiplatelet therapy (DAPT): Some patients have heart attacks that have stents placed in their coronary arteries or undergo coronary arteries bypass graft surgery (CABG). These are treated with two types of antiplatelet agents at some time to prevent blood clotting. This called dual anti platelet therapy.
- 13) Antiplatelet agent is Aspirin. Everyone with coronary artery diseases include those who have had heart attack stent are treated with aspirin for rest of other of their lives. A second type antiplatelet agent called P2Y12 inhibitor is prescribed for months or years in addition to aspirin therapy.
- 14) Angiotensin receptor neprilysin inhibitor- Neprilysin is enzyme that break down neutral substance in body that open narrowed arteries by inhibiting neprilysin, those neutral substance can have their normal effect. The improve artery opening and blood flow reduces sodium retention and decrease strain on heart.

Prevention or avoided heart attack-

- Exercise regularly.
- Managing stress.
- Controlling your blood pressure.
- Managing your blood sugar- You have diabetes be sure to take your medication and check your blood glucose level regularly. You have heart condition work closely with your doctor and take your medication. Talk to your doctor if you have any concerns about risk of heart attack.
- Smoking- Smoking is major risk for heart attack because it cause atherosclerosis and raise blood pressure.
- High blood pressure- Persistent high blood pressure can put extra stain on arteries and heart increasing your of heart attack. If can be reduced by eating healthy diet, moderating your alcohol intake maintaining healthy weight and doing regular exercise.
- Alcohol- The person can drink alcohol do not exceed recommended limit: men and women are advised not regularly drink more than 14 unit of alcohol a week. Spread your drinking over three or more days, if you regularly drink as much as 14 unit week.
- Weight- Weight over forces your heart to work harder to pump blood around your body, which can raise your blood pressure use BMI healthy weight calculate to find out if you are healthy weight for your height.
- Exercise- Being active and doing regularly exercise will lower your blood pressure by keeping your heart and blood

vessel in good condition. Regular exercise can help to lose weight which will help to lower your blood pressure.

Low impact activities such as walking, swimming and cycling are recommended. More strenuous activities such playing football and squash may not suitable for you.

Healthy diet- Eating unhealthy diet that is high in fat will hardening arteries (atherosclerosis) worse and increase your risk of heart attack.

Continuing to eat high fat foods will cause more fatty plaque to buildup in your arteries. This is because fatty foods contain unhealthy type of cholesterol.

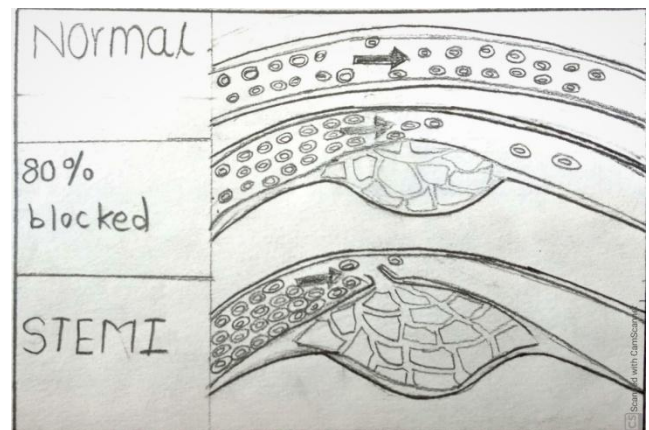
- 1) Low density of lipoprotein (LDL)– The heart made up fat plus a small amount of protein. It also called bad cholesterol.
- 2) High density lipoprotein (HDL) - It is made up to fat plus a small amount of fat. It also called good cholesterol.

Food high in saturated fat include: Pies, fried food, butter, lard, ghee, cream, hard cheese, cake and biscuits, palm oils. Oily fish such as hearing, sardines and salmon can from part of Mediterranean style diet, but there is no need to eat this type fish to try preventing heart attack.

Taking omega 3 fatty acid supplement or eating fortified with omega 3 fatty acid has not been found to help prevent heart attack.

Type of heart attack—

- 1) S T segment elevation myocardial infraction (STEMT)
- 2) Non S T segment elevation myocardial infraction (NSTEMT)
- 3) Coronary spasm or unstable angina



1) S T segment elevation myocardial infraction: It heart attack is severe and requires immediate attention. These attacks occurs when the coronary arteries is fully blocked, preventing blood from reaching large area of heart. This cause progressive damage to heart muscle, which can stop it from functioning also called massive heart attack.

Symptoms:

- Nausea
- Shortness of breath
- Anxiety
- Light headedness
- Breaking out cold sweat

2) Non S T segment elevation myocardial infraction

It heart attack occur when coronary artery is partially blocked & blood flow is severely restricted while they less dangerous STEMI heart attack. They can permanent damage NSTEMI called as mini attack or mild heart attack. It causes less damage to heart than STEMI heart attack

Symptoms:

- Shortness of breath,
- Tightness,
- Pressure dizziness,
- Nausea,
- Sweating,
- Pain in jaw,
- Pain inneck,
- Painin back.

3) Coronary Artery spasm:

Coronary artery spasm also called coronary spasm or silent attack or unstable angina. This is no permanent damage during coronary artery spasm. While silent heart attack are not serious. They do increase your risk of another heart attack or one that may be more serious. It occurs when one heart's arteries tightens so much blood flow stop or become drastically reduced .Only imaging and blood test results can tell your doctor if you have had silent attack.

Symptoms:

- Sweating,
- Dizziness,
- Fatigue,
- Headache,
- cold sweat,
- tightness,
- Anxiety.

Risk factor:

- 1) Migraines,
- 2) Excess thyroid hormones,
- 3) Smoking,
- 4) Excessive alcohol consumption,
- 5) Low magnesium levels,
- 6) Chronic allergic condition.

Drug delivery

If refers to approaches formation technologies and system for transporting pharmaceutical compound in body. Sometime based on nanoparticle needed safety achieve its desired therapeutic effect.

A drug delivery system (DDS) is defined as a formulation or a device that enables the introduction of a therapeutic substance in the body and improves its efficacy and safety by controlling the rate, time, and place of release of drugs in the body. It includes the administration of the therapeutic product, the release of the active ingredients by the product, and the simultaneous transport of the active ingredients across the biological membranes to the site of action.

Drug delivery system is an interface between the patient and the drug. It can be a formulation of the drug to administer it for a therapeutic purpose or a device used to deliver the drug. This distinction between the drug and the device is important. It is the criterion for regulatory control of the delivery system by the drug or medicine control agency. If a device is introduced into the human body for purposes other than drug administration, such as therapeutic effect by a physical modality or a drug may be incorporated into the device for preventing complications resulting from the device. It is regulated strictly as a device. There is a wide spectrum between drugs and devices, and the allocation to one or the other category is decided on a case by case basis. Delivery of the drugs can be achieved using various types of dosage forms including tablets, capsules, creams, ointments, liquids, aerosols, injections, and suppositories

Sequential Drug delivery System:

Advantages

- 1) Drug administration protocol may be simplified.
- 2) Toxicity is reduced by delivering drug to target site their by reducing harmful systemic effects.
- 3) Dose is less as compare to convention drug delivery system.
- 4) Selective targeting infection cells that compare to normal cells.
- 5) Avoidance hepatic first pass metabolism.
- 6) No peak and valley plasma concentration.
- 7) Improve convenience.
- 8) Controlled and defined drug release.
- 9) Better patient compliance.
- 10)Improved drug bioavailability.
- 11)Cost effectiveness is high.

Disadvantage-

- 1) Premature excretion from body.
- 2) Rapid clearance of targeted system.
- 3) Diffusion and redistribution of related drug.
- 4) Requires skill for manufacturing storage.
- 5) Difficult to maintain stability of dosage from.
- 6) Drug deposition at target site may produce toxicity symptom.
- 7) Drug loading is low.
- 8) Immune reaction against IV administration carrier system.
- 9) Insufficient localized targeted system into cells.

2. Conclusion

In conclusion, it should be noted that heart disease can be prevented and the several myths surrounding heart disease especially among women are not always true. In most countries

Such as America, Australia, Canada, and UK among others, heart disease has been singled out as disease without their knowledge simply because, the diseases does not necessarily manifest itself in the aforementioned symptoms. Therefore, there is need to sensitize people on the need to visit their healthcare providers regularly in a bid to check on their heart conditions and prevent more future deaths due to heart disease.

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