Acute Myocardial Infarction

Introduction

Acute Myocardial Infarction (AMI) or more specifically ST Elevation Myocardial Infarction (STEMI), commonly known as heart attack is a life-threatening disease. It is usually caused by blockages of major coronary arteries which cause damage to heart muscle. Early medical attention and management are important. Treatment mainly includes medications and revascularization such as Percutaneous Coronary Intervention (PCI, known as coronary angioplasty) and Coronary Artery Bypass Grafting Surgery (CABG, known as bypass surgery).

Causes

AMI is usually caused by atherosclerosis and thrombosis of coronary arteries. Heart is an important organ which pumps blood to various tissues in our body. Coronary arteries are blood vessels which supply blood, oxygen and nutrients for heart muscles to work. With time, particles like cholesterols and lipoproteins deposit on the wall of coronary arteries and form plaques. The process is known as atherosclerosis which continues and causes progressive narrowing of blood vessels. The plaque can sometimes rupture which attracts platelets and fibrin leading to thrombosis and blockages. Without blood supply, heart muscles cannot function and begin to die.

Symptoms and Diagnosis

Typical symptoms of AMI include chest pain and discomfort, sometimes radiating to jaw and left arm. Other symptoms include sweating, diaphoresis and shortness of breath. Atypical symptoms like dyspepsia, indigestion and dizziness can also be due to AMI. Sometimes, cardiac arrest may be the first presentation of AMI.

Healthcare professionals usually diagnose AMI by electrocardiogram and blood test. AMI is a LIFE-THREATENING disease and once a diagnosis of AMI is made or suspected, early treatment is important to reduce the chance of death or major complications.

Complications of AMI

AMI causes heart muscles to die and fail to function which leads to cardiogenic shock and acute heart failure. Besides, the dying heart muscle can develop arrhythmia or heart structures may rupture which cause cardiac tamponade, acute mitral regurgitation or acute ventricular septal defect. All these conditions are immediate life-threatening and increase the chance of stroke or other organ failure.

In long term, due to various degree of heart damage, survivors of AMI are at increased risk of chronic heart failure, arrhythmia and stroke etc.

Treatment

Management of AMI mainly includes medications and other measures to restore the blood supply to the heart muscles. You may be given oxygen, intravenous fluids or medications and various monitoring devices to maintain vital parameters such as blood pressure, blood oxygenation and heart rate.

Specifically for STEMI, the main aim of treatment is to open up the blocked coronary artery as soon as possible. It can be done by performing PRIMARY PERCUTANEOUS CORONARY INTERVENTION (PPCI, known as coronary angioplasty) which opens up the blocked artery or using THROMBOLYTIC therapy which lyse the blood clot. You will also be given drugs such as anti-platelet agents or anti-thrombotics to make your blood thinner. Besides, other medications which help heart function or lower blood lipid may also be used. In some case, Coronary Artery Bypass Grafting Surgery (CABG, known as bypass surgery) may be needed.

(A) Primary Percutaneous Coronary Intervention (Coronary Angioplasty)

Percutaneous coronary intervention (PCI) is a procedure used to dilate and maintain patency for any narrowing of the coronary arteries (arteries supplying blood to heart muscle). This procedure is performed with the use of X-ray through percutaneous method (commonly through femoral or radial arteries). This is an invasive procedure that may follow directly after diagnostic coronary angiogram. Coronary angiogram provides a clear picture of the severity and location of narrowing in the coronary arteries. PCI serves to open up the artery and improve heart function. In emergency situation caused by acute coronary syndrome (heart attack), this procedure is important and can be life-saving. If this procedure is refused, the consequence can be detrimental. Alternative treatment modalities include bypass surgery or medical therapy. Please consider different options carefully and ask your doctor for details.

The Procedure

- This is an invasive procedure performed under local anesthesia in a cardiac catheterization centre.
- Electrodes are adhered to the chest to monitor the heart rate and rhythm. Blood oxygen monitor through your finger tip will be set up. Blood pressure will be measured from your arm at regular intervals during the examination.
- A small wound is made either from the groin or around the wrist for access to arteries or veins.
- Catheters are advanced to the heart under X-ray guidance.
- Contrast is injected into coronary arteries and films are taken using X-ray. Narrowing in the coronary arteries is identified.
- In general, a special catheter is placed at the opening of the coronary artery with

narrowing. A guide wire is advanced across the narrowing. The guide wire serves as a track to allow a balloon to go to the narrowing. The balloon is inflated to open up the artery. A stent is then implanted permanently inside the artery to keep its patency.

- Other techniques may be adopted to improve the success and outcome of the procedures. Please discuss with your doctor about the specific devices/ instruments involved as new advances in PCI cannot be fully discussed in this leaflet.
- During the procedure, you may be asked to hold your breath or cough. Transient chest pain may be experienced during the procedure. If you experience severe or persistent chest pain, dizzy spell or any discomfort, you need to inform the staff.

(B) Thrombolytic Therapy

If PPCI is not available or significant delay is required for arrangement, THROMBOLYTIC therapy is an alternative treatment. THROMBOLYTIC is a drug given by injection and it lyses the blood clot obstructing your artery. After the treatment, you will be closely monitored for whether the drug can open the blocked artery or not. If THROMBOLYTIC does not work or the artery get blocked again, you may be advised to undergo PCI.

During AMI, heart muscles die and invariably there will be damage to heart function. Even with successful treatment by medications or PCI or CABG, chances of clinical deterioration or death or major disability exist. It is important for you to be under close monitoring and follow healthcare professionals' instructions.

Risks and Complications

The PPCI procedure carries certain risks which vary according to patient factors, lesion factors and clinical circumstances. PCI in high risk clinical situation like heart attack as in your case is associated with higher risk but successful PCI can be life-saving.

- The chance of having major complication is generally considered to be higher during heart attack as in your case. Particularly, in case of cardiogenic shock, the risk of dying or major complication can be more than 50%.
- Major complications include death 1.27% (range 0.65-4.81%), periprocedural myocardial infarction (less than 15%), stroke (0.2%) and emergency bypass surgery (0.4%).
- Other major complications include coronary artery perforation, heart failure, arrhythmias, vascular complications, contrast related anaphylaxis, acute renal failure.
- Minor complications include contrast allergy, nausea, or groin complications.

Bruising around the wound site is common.

- Re-narrowing of the dilated or stented coronary lesion might occur in 10% of the cases, but the rate had reduced significantly with latest generation of stent to ~5-10%. The rate varies according to many different factors.
- Other potential risks include air embolism resulting in death or neurological damage, retained foreign body such as guide wires.
- Device deployment complications include device dislodgement, device entrapment and wire fracture.

THROMBOLYTIC therapy makes your blood thinner and increases the risk of bleeding.

- The risk of intracranial bleeding is estimated to be 0.9% and it carries a very high mortality.
- To a lesser extent, anti-platelet agents and anti-thrombotics also increase the risk of bleeding which can sometimes be fatal and cause major disability.
- Other medications may have their potential side effects and you can consult your doctors for details.

Post-Procedure Follow Up

- Generally, you will be discharged or transferred to rehabilitation unit after good recovery (3-5 days in uncomplicated cases).
- Before discharge, healthcare professionals will check your medications and wounds (if any). Strenuous exercise should be avoided before medical consultation. Mild bruises around the wound is not uncommon and will usually subside in 2 to 3 weeks.
- If you suffer from chest pain, chest discomfort, wound bleeding, swelling or other severe discomfort, please return to hospital to seek medical advice.
- **PLEASE FOLLOW DOCTORS' INSTRUCTIONS.** Medication compliance is very important, especially for anti-platelet agents (Aspirin and Ticagrelor or Clopidogrel) in patients received PCI and stenting. Stop medication on your own may cause thrombus formation in stent resulting in AMI and death.
- You are strongly advised to participate in cardiac rehabilitation.

Fees and Charges

- PPCI for acute STEMI is a life-saving procedure. Costs are covered by Hospital Authority and you do not need to pay for the consumables.
- Nevertheless, after the acute phase, subsequent PCI to other coronary stenosis may be required. The procedures may involve use of consumables which are 'Privately Purchased Medical Items'. Financial arrangement is needed before the procedure.

- You need to pay an estimated deposit. The final charge, however, depends on the number of medical devices and consumables used. The principle of actual cost charging applies. After the procedure, you may need to pay the balance to or collect refund from the account office.
- Please note that the procedure may further need to be staged or repeated for various reasons. Separate charging is required for each procedure.
- If you have financial difficulty, you can apply for assistance through our medical social worker.

Remarks

- The list of complications is not exhaustive and other unforeseen complications may occasionally occur.
- The risk quoted is in general terms. In special patient group (e.g. diabetics), the actual risk may be higher.
- Should a complication occur, another life-saving procedure or treatment may be required immediately.
- If there is further query concerning this procedure, please feel free to contact your nurse or your doctor.