1.5.5 Management of a heart attack and recovery

Surviving a heart attack can bring a mixture of relief, uncertainty, fear and many questions about what comes next.

The truth is that recovery looks different for everyone. Some people return to many of their usual activities within weeks, while others need considerably longer - this depends on age, as well as other biological factors such as the size and location of the heart attack, how quickly blood flow was restored, how well the heart is pumping afterward, other medical conditions, and the treatment that was required.

The important thing to know is that many people go on to live active and fulfilling lives after a heart attack. Recovery is not simply about healing from the event. It is also an opportunity to understand why the heart attack happened and reduce the risk of another one. Healthcare professionals may use an echocardiogram to evaluate how well the heart is pumping. One measurement you may hear about is the ejection fraction (EF), which estimates the percentage of blood pumped out of the left ventricle with each contraction. A normal EF is usually situated at 50-75%.

What to Expect

Treating a heart attack

As soon as you arrive at the hospital with a heart attack, specific protocols are initiated. The priority is to determine what is happening and, when an artery is blocked, restore blood flow as quickly as possible to save heart muscle.

The initial management is often broad but covers the basis of emergency care which is to stabilize the patient.

The ER team will take your vitals signs and make sure that they are stable by providing some O2 if needed , provide medications for pain relief, and order some basic blood work. If cases where a heart attack is being suspected, the cardiology team is also being consulted for the next steps.

You may hear a lot of unfamiliar terminology during this process. Here is what some of it actually means.

1. *Doing an electrocardiogram to figure out what is happening.*

Your evaluation may begin before you even reach the hospital. Paramedics will assess your symptoms and vital signs and may perform an electrocardiogram (ECG). An ECG involves placing small stickers called electrodes on your chest and limbs to record the heart's electrical activity. It does not hurt, and it does not send electricity into your body. Certain ECG changes can indicate that a coronary artery may be seriously or completely blocked and that you need

treatment urgently. Once you arrive at the hospital, the emergency and cardiology teams may perform additional ECGs and a blood test measuring troponin. Troponin is a protein found inside heart muscle cells. When heart muscle becomes injured, troponin is released into your bloodstream. Together, your symptoms, ECGs, blood tests and other investigations help your healthcare team determine whether you are having a heart attack and what treatment you need.

2. *Opening the blocked artery*

There's 2 types of coronary artery blocked that can be diagnosed as STEMI (ST segment elevation) and NSTEMI (Non ST segment elevation) which are two types of MI that can be seen on ECG. Both present with elevated troponin markers. A STEMI indicates a complete blockage compared to NSTEMI which indicates a partial blockage.

If doctors determine that a coronary artery needs to be reopened urgently, you may be taken to a specialized hospital room called the Cardiac Catheterization Laboratory or the "Cath Lab." It is a specialized procedure room equipped with X-ray imaging and everything the cardiology team needs to treat artery blockages. A cath lab may look somewhat like an operating room, but PCI is generally not open-heart surgery. A STEMI usually requires this type of intervention compared to a NSTEMI that can be treated medically.

Your healthcare team may include:

- an interventional cardiologist (a heart doctor specially trained to perform procedures inside the coronary arteries)
- specialized nurses
- cardiovascular/cath-lab technologists
- other healthcare professionals involved in your monitoring, medications and care

Additionally, you are usually awake, but you will receive local anesthetic to numb the area where the catheter enters, and medications may be given to help you relax and remain comfortable.

3. *Finding the artery blockage, in the Cath lab*

Before doctors can treat a blockage, they need to see exactly where it is. This is done with coronary angiography, sometimes simply called an angiogram (SOURCE).
Instead of making a large incision in the chest, the cardiologist inserts a very thin, flexible tube called a catheter into an artery, most commonly through the wrist, and sometimes through the groin.
The catheter is carefully guided through the blood vessels toward the heart.
Contrast dye is then injected into the coronary arteries while X-ray images are taken.
The dye makes the blood vessels visible on the screen, allowing the cardiologist to see:

- Where is the blockage?
- How severe is it?
- Are other coronary arteries narrowed too?

You may briefly feel warmth when contrast is injected, but you generally cannot feel the catheter moving through your blood vessels.

4. *Reopening the artery*

If the cardiologist identifies a blockage that should be treated immediately, they can often treat it during the same procedure. This treatment is called Percutaneous Coronary Intervention (PCI).
PCI is a minimally invasive procedure used to reopen a narrowed or blocked coronary artery. A very small balloon is guided to the blockage through the catheter and then is briefly inflated, which helps open the narrowed area and restore blood flow. This part is called angioplasty.

Not every hospital has a cardiac catheterization laboratory available around the clock.
For certain types of heart attacks caused by an acutely blocked coronary artery, if PCI cannot be performed quickly enough, doctors may sometimes use a medication called a fibrinolytic or thrombolytic. It is often referred to as a "clot-busting" medication. Rather than mechanically opening the artery with a catheter and balloon, this medication helps the body break down the blood clot that is blocking the artery. The medical team decides whether this treatment is appropriate based on factors such as the type of heart attack, how long symptoms have been present, how quickly PCI can be accessed and whether the person has conditions that make clot-dissolving medication unsafe. These treatments are reserved for STEMI only, which indicate a complete heart block.

5. *Putting in a stent to keep the artery open*

Opening up the artery is a great start to protect the heart, but to keep it open long-term, a stent is commonly placed during PCI. A stent is a tiny expandable mesh tube, and it is positioned inside the narrowed portion of the coronary artery and expanded. The balloon and catheter are then removed, while the stent remains permanently inside the artery to help keep blood flowing.
Most modern coronary stents are coated with medication that slowly releases into the surrounding tissue to reduce the chance of the artery narrowing again. It may help and fix one specific artery, but it doesn't mean that other arteries of the heart are free from atherosclerosis and that it eliminates further heart attack risk. In some patients, there's also a risk for the stent to become obstructed again.

Sometimes doctors discover that there are multiple severe blockages, that an important artery is affected in a particular way, or that the anatomy of the coronary arteries makes PCI less suitable.
In these cases, doctors may recommend Coronary Artery Bypass Grafting (CABG). This is heart surgery and takes place in an operating room.

Your healthcare team may include:

- A cardiac surgeon
- Anesthesiologist

- Operating room nurses
- Perfusionists
- Respiratory therapists

Instead of opening the blockage itself, the surgeon uses healthy blood vessels taken from elsewhere in the body to create a new route around the blocked coronary artery.
Think of a blocked road: PCI reopens the road, whereas bypass surgery builds another route around it. Each has its own advantages depending on various factors, such as timing and patient profile.

Medications given to help with recovery
While all of this is happening, you will likely receive medications as well.
Depending on the type of heart attack and your individual circumstances, medications may be used to:

- prevent an existing blood clot from getting larger
- reduce the formation of additional clots
- relieve symptoms
- reduce the workload on the heart
- lower cholesterol and begin protecting the arteries from future events

Here are common medications that may be prescribed to help with recovery, as well as their purpose:

Antiplatelets/Dual antiplatelets therapy (DAPT) (e.g. aspirin , clopidogrel)	Reduce formation of additional clots.
Anticoagulant	Dissolve and prevent clots formation.
Beta blocker (e.g. metoprolol, bisoprolol) / ACE inhibitors (e.g. ramipril, perindorpil) or ARBs (e.g. losartan, valsartan)	Decreased workload on the heart.
Statins (e.g. atorvastatin, rosuvastatin)	Lower blood cholesterol.
Tylenol, opiods (e.g. morphine)	For acute pain management as needed.
PPI (e.g. pantoprazole, omeprazole)	Prevention protection against GI bleeds secondary to previous medications.

After a cardiac event regardless if the patient underwent PCI or not, most patients will continue DAPT for at least 12 months with a few exceptions (i.e high risk of bleeding patients will do monotherapy of antiplatelets treatment). It is important to not discontinue these medications without talking to your doctor as they prevent reformation of clots in the arteries or new stents.

Recovery within the first days

After the immediate treatment, you will usually remain in the hospital for monitoring while your heart begins to recover. Your healthcare team will watch your heart rhythm, blood pressure, oxygen levels and symptoms, and may repeat ECGs and blood tests to make sure you remain stable. An echocardiogram (ultrasound of the heart) is often performed to assess how well your heart is pumping and whether the heart attack affected its function. Among the acute complications, some patients can experience arrhythmias, heart failure or a recurrent ischemia from the heart damage which are also monitored by the team.

During these first days, your medications will also be adjusted, you will gradually begin moving around again, and your healthcare team will start planning for a safe discharge home. Before leaving, your healthcare providers will explain your medications, follow-up appointments and activity recommendations.

Recovery within the first weeks:

Going home can feel surprisingly intimidating. In the hospital, monitors and healthcare professionals are always nearby. At home, it is common to suddenly become very aware of every heartbeat, ache or unusual sensation. It is also normal to feel more tired than usual. However, generally speaking, the goal is not complete bed rest. Gentle walking and light activities may be encouraged, with activity increased progressively according to the recommendations of your healthcare team.

One of the most important parts of recovery after leaving the hospital is cardiac rehabilitation (cardiac rehab). Cardiac rehab is a medically supervised program that helps you safely return to everyday life while reducing your risk of another heart attack. It is much more than an exercise program. These programs are led by a multidisciplinary team to ensure a progressive and safe return to physical activity and healthy lifestyle . These teams are usually composed of occupational therapists, physical therapists, kinesiologists, nutritionists and nurses. They will help you return to a progressive active lifestyle while individualizing the approach to your own condition. It may include:

- Supervised exercise to safely rebuild strength and cardiovascular fitness
- Nutrition guidance to develop sustainable, heart-healthy habits
- Risk-factor management for blood pressure, cholesterol, diabetes and smoking
- Education to understand your treatments and why they matter

Additionally, a heart attack can fundamentally change how someone feels about their body and their future. Some people experience:

- anxiety
- low mood or depression
- fear of another heart attack
- difficulty sleeping
- Irritability
- fear of exercise

- hyperawareness of their heartbeat or physical sensations
- loss of confidence

These feelings can occur even when physical recovery is going very well. Emotional recovery deserves the same attention as physical recovery. If you or someone you know who has suffered a heart attack reports having these feelings persist or interfere with everyday life, speak with your healthcare team.

Cardiac rehab can help you regain strength, confidence and independence, while improving quality of life and reducing the risk of future cardiovascular events and hospitalizations. It can also include psychological support. Don't forget to ask your doctor about a referral to these programs if they are not mentioned to you at your discharge. Cardiac rehab has been shown to reduce readmission and cardiovascular death in the following years after a cardiovascular event.

Recovery within the first months:
As time goes on, you will transition from recovery toward a sustainable new normal. As strength and confidence return, many people gradually resume work, exercise, hobbies, travel and other everyday activities. There is no universal date when someone is "fully recovered." Your timeline depends on:

- the extent of heart damage
- whether you received a stent or underwent surgery
- your heart's pumping function
- whether complications occurred
- your other medical conditions
- the physical demands of your work and activities

<u>Returning to exercise and physical activity</u>
Regular physical activity is an important part of long-term cardiovascular health.
With appropriate guidance, exercise can improve fitness, blood pressure, cholesterol, blood sugar, weight, mood and confidence. The goal is to find movement that is both safe and sustainable. As mentioned earlier, cardiac rehab will equip you with the adequate tools to pursue a safe and autonomous active lifestyle. The objective is you keep moving progressively and by listening to his body.

Activities that elevate your heart rate are not necessarily dangerous: Walking, cycling, swimming, dancing, hiking and many other activities can support cardiovascular health. Not overdoing it is also part of the recovery formula. Sexual activity can also be safely resumed once their cardiovascular condition is stable and they can tolerate moderate physical activity without significant symptoms. Of note, certain medications used for erectile dysfunction can interact dangerously with nitrates such as nitroglycerin, so make sure your healthcare professional knows which medications you take.

1. Returning to work and driving

When you can return to work depends partly on the type of work you do. Someone with a desk job may have a very different timeline from someone whose job involves heavy physical labour. Driving restrictions can also vary depending on the severity of the heart attack, treatments received, heart rhythm problems and whether you drive privately or commercially. This process varies from one province to another. In Quebec, the patient is advised by the doctor to refrain from driving, but it's the patient's responsibility to contact and notify the SAAQ (Society assurance automobile du Quebec) of any chances in their health conditions restricting them from driving.

The rest of your life:

Recovery does not end when you feel normal again. The goal is to prevent another heart attack and optimize your health , since having experienced a heart attack means you have a higher risk of having another cardiovascular event compared to the general population.

The long-term goal therefore becomes preventing cardiovascular disease from causing another event. This is where many of the strategies discussed in our "Preventing a Heart Attack" section become especially important. Your long-term plan may include:

- taking prescribed medications consistently
- controlling LDL cholesterol
- managing blood pressure
- managing diabetes
- avoiding tobacco and nicotine
- maintaining regular physical activity
- following a heart-healthy dietary pattern
- maintaining a healthy weight
- sleeping adequately
- Avoiding recreational drugs
- attending medical follow-up appointments
- continuing the habits learned through cardiac rehabilitation

Some people will need cardiovascular medications for many years or for the rest of their lives.

In sum, the primary goal of post-MI management and intervention is what we called " secondary prevention". Meaning: preventing another cardiac event or the progression of current cardiovascular disease. To do so, your medical team will work with you on optimizing all your risk factors either by improving your lifestyle towards a healthier one or by prescribing new medications to better control other conditions contributing to your CAD (i.e diabetes, hypertension, dyslipidemia, etc.). You will also have closed and repeated follow-up with your cardiologist to monitor for further complications and evaluate your

cardiac function (i.e blood work, TTE, ECG) at 1month post-MI, 3 months, 6 month, yearly etc. These follow-ups appointments are also used to reassess some medication prescribed (i.e Antiplatelets) and determine the duration required to take them and reevaluate the risk/benefits. For example, one of the major risks of post-MI medications such as antiplatelets is the risk of bleeding.

Lastly, it is important to remember that despite everything, some people can have a new MI. Keep in mind that future MI doesn't always mimic previous ones. Therefore keep in mind the cardinal signs of a heart attack such as retrosternal chest pain, pressure often radiating to the jaw or the arm, with shortness of breath, increased sweating, triggered by effort, increased demands or strong emotions. Some patients may experience it as abdominal pain or discomfort, increased fatigue, or just feeling unwell.