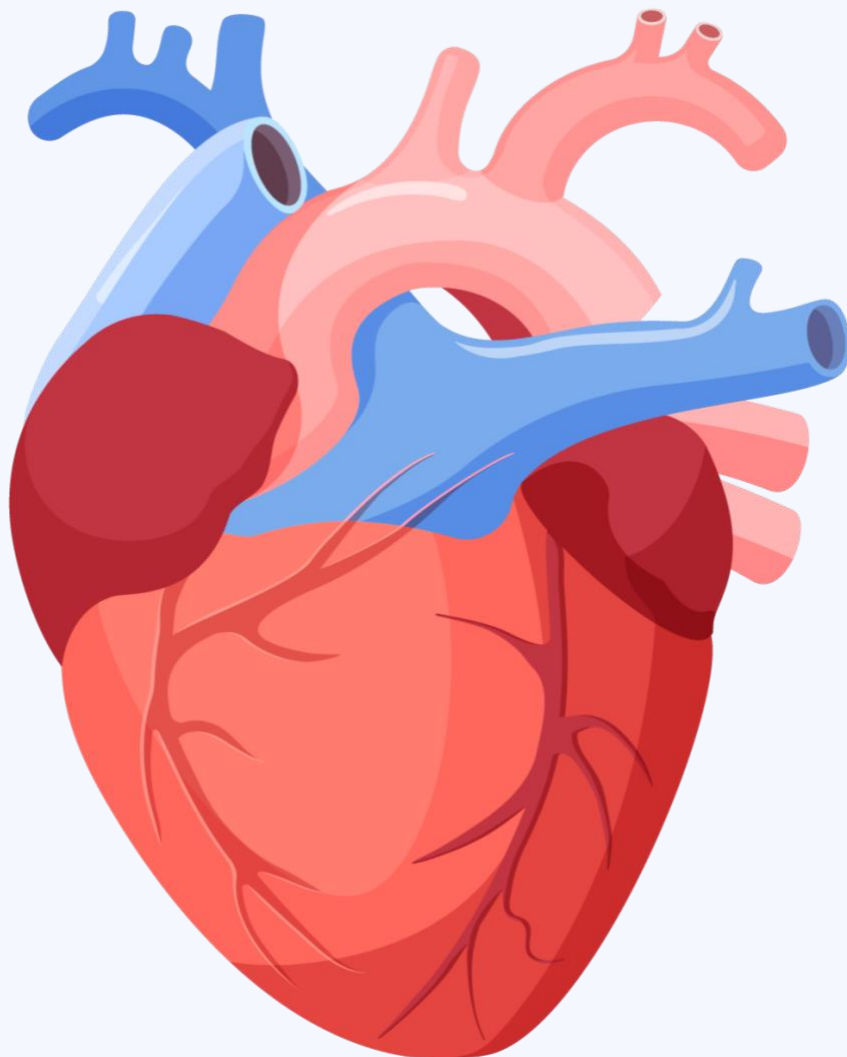




UNIVERSITY OF OTTAWA
HEART INSTITUTE
INSTITUT DE CARDIOLOGIE
DE L'UNIVERSITÉ D'OTTAWA

A Guide to Your MINOCA

(Myocardial Infarction with Non-Obstructive Coronary Arteries)



A GUIDE FOR PATIENTS AND CAREGIVERS

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This document is also available in French under the title: | *Cette publication est aussi disponible en français sous le titre : Comprendre votre MINOCA (infarctus du myocarde sans obstruction des artères coronaires)*

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We are here for you

It may be difficult and stressful to be diagnosed with a heart condition. This stress you feel may be heightened if you are diagnosed with an uncommon condition, such as a myocardial infarction with non-obstructive coronary arteries (MINOCA). As difficult as this may be, the University of Ottawa Heart Institute wants you to know you are not alone. We will offer you the opportunity to participate in educational support groups to learn about MINOCA. We will connect you to people who have had similar experiences and challenges. From your hospitalization throughout your recovery and during your participation in our cardiovascular rehabilitation program, you will have the support of a multidisciplinary team of experts. Patients who have completed our cardiovascular rehabilitation program tell us they have not felt this great in a long time.

We hope you find this guide helpful and informative. A panel of our expert professionals designed this guide with the input of patients just like you – people who were diagnosed with MINOCA and understand the type of support you need.



What is MINOCA?

Myocardial infarction with non-obstructive coronary arteries (MINOCA) is a condition with different causes. It is characterized by clinical evidence of a heart attack and angiographically typical or minimally obstructive coronary arteries. In patients with MINOCA, there is less than 50% blockage in the arteries of the heart. Patients diagnosed in a timely manner usually have a better prognosis than patients who experience a heart attack due to obstructive coronary artery disease. MINOCA accounts for five to ten percent of all heart attacks.

What are the symptoms of MINOCA?

MINOCA symptoms are like those of a heart attack. A common symptom is chest discomfort (a feeling of pain, pressure, burning or tightness). Other symptoms include:

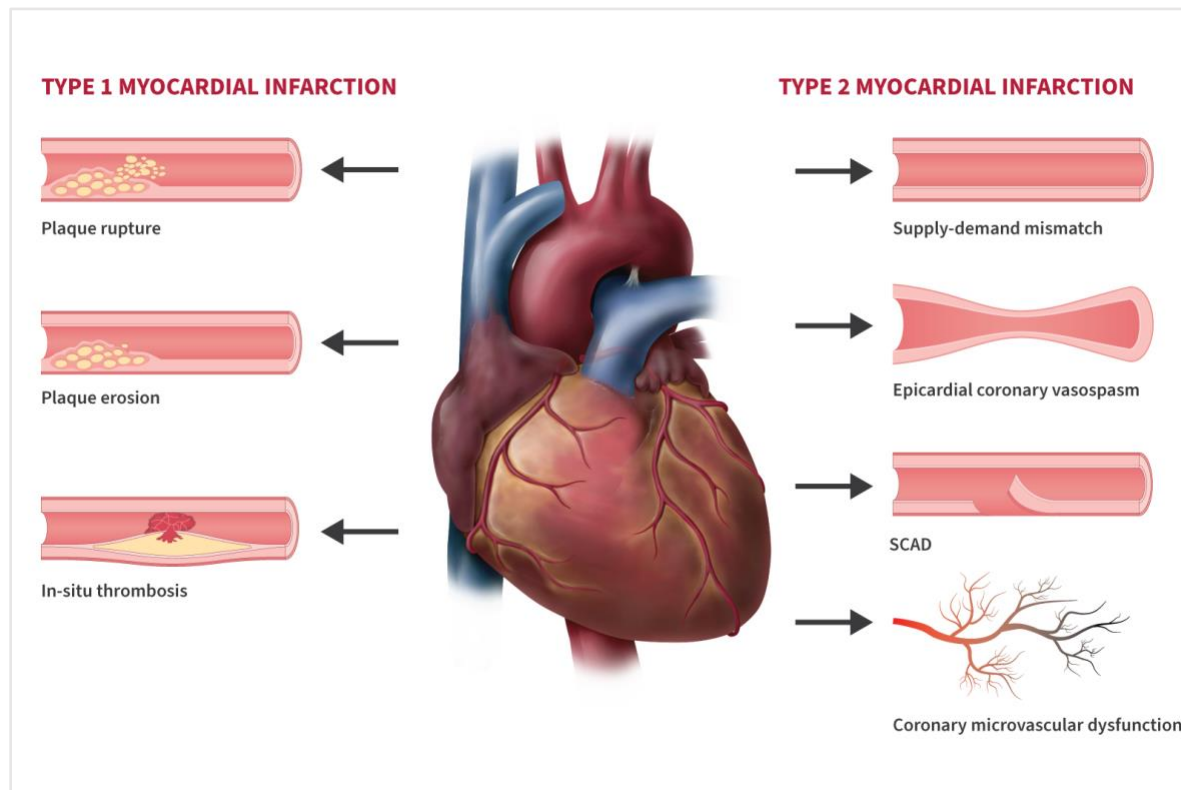
- Jaw pain
- Unexplained shortness of breath
- Unusual fatigue or weakness
- Unexplained nausea, vomiting or gastrointestinal discomfort
- Cold sweats

How is MINOCA diagnosed?

There are many criteria that need to occur for a doctor to diagnose you with MINOCA. These criteria include:

- An increase in cardiac enzymes (troponin), and
- A patient experiences the symptoms outlined above and/or:
 - changes in electrical activity of the heart
 - changes in the function of the heart
- No blockages in the coronary arteries after an angiogram
- No specific alternate diagnosis other than MINOCA. Cardiac magnetic resonance imaging (MRI) may help identify the underlying cause of MINOCA.

What can cause MINOCA?



- **Coronary plaque disruption (plaque rupture or erosion):** When a small particle (for example, a blood clot) is disturbed and moves in the coronary artery, it can block a narrower blood vessel, preventing blood flow.

Diagnostic testing includes coronary angiogram and/or intracoronary vascular ultrasound (IVUS), and optical coherence tomography (OCT).

- **Epicardial coronary vasospasm:** These are spasms in the blood vessels that supply blood to the heart. The spasms can prevent blood flow to the heart. To diagnose, doctors may recommend coronary vasoreactivity testing.
- **Coronary microvascular dysfunction:** This occurs when tiny blood vessels of the heart do not function typically and, as a result, slow down the blood flow in the vessels. In severe cases this will compromise blood flow.

Tests to diagnose: Coronary function testing (two tests: CFR = coronary flow reserve, or IMR = index of microvascular resistance), myocardial positron emission tomography (PET) or cardiac MRI.

- **Spontaneous coronary artery dissection (SCAD):** This occurs when blood builds up in the wall of the artery that takes blood to the heart, compromising flow and/or causing a tear inside an artery. When the inner layers of the artery separate from outer layers of the artery, the blood stays in between the layers and clots, preventing further blood flow.

Tests to diagnose: Coronary angiogram, IVUS and OCT.

- **Hypercoagulable disorders:** This is when the blood clots faster than it is supposed to. This slows blood flow in the coronary artery.

Tests to diagnose: Hypercoagulable work-up (blood tests).

- **Coronary and paradoxical emboli:** This is when small particles (for example, clots, air, or fat) travel in the blood vessels of the heart and prevent blood flow to the heart.

Tests to diagnose: Coronary angiogram and transthoracic echocardiogram (TTE), transesophageal echocardiogram, or bubble contrast echocardiography.

Other conditions that mimic MINOCA symptoms

- **Takotsubo or other cardiomyopathy:** Cardiomyopathy is a heart condition in which the cardiac muscle does not function well. A patient experiencing cardiomyopathy will have more difficulty pumping blood to the rest of the body. Takotsubo is a type of cardiomyopathy. Takotsubo cardiomyopathy is a sudden, reversible weakness of the left ventricle (the heart's main pumping chamber). It is most often caused by severe emotional or physical distress. This condition is also sometimes called “stress-induced cardiomyopathy” or “broken heart syndrome.”

Tests to diagnose: Cardiac MRI, TTE and/or coronary angiogram.

- **Myocarditis:** Inflammation of the muscle of the heart, which may cause the heart muscle to become weak or cause irregular heart rhythms.

Tests to diagnose: Cardiac MRI and TTE.

How is MINOCA treated?

Medications

The treatment for your MINOCA depends on the underlying cause of the condition. Medication prescribed is often the same as typical medication for treating heart attacks. These medications may be temporary or permanent depending on your personal situation and the recommendations of your doctors. Please ensure you understand the role of each medication prescribed to you before your discharge. Most medication prescribed for MINOCA does the following:

- Lowers the workload of your heart
- Helps relax the blood vessels
- Lowers cholesterol
- Helps prevent blood clots from forming
- Lowers your overall risk of having another heart attack

You may need to take medication for the rest of your life.

You may be prescribed the following medication.

- **Anti-platelet agents** inhibit the function of blood-clotting platelets to lessen the risk of a clot forming in your artery. The most used anti-platelet agent is aspirin. Your doctor may also prescribe an additional anti-platelet agent, such as clopidogrel or ticagrelor, which are typically given for one year after the heart attack (if the medication is well tolerated).
- **Beta-blockers** decrease the heart rate and contractile force of your heart to help your heart heal.
- **Calcium channel blockers** lower blood pressure and heart rate, help prevent angina (chest pain) and slow irregular heart rhythms.
- **ACE inhibitors** open the blood vessels leading out of the heart, which decreases the workload of the heart muscle. Your doctor may prescribe this class of medication if your blood pressure is too high. ACE inhibitors are also used if the heart muscle is damaged or if the heart muscle is weak.



- **Nitroglycerin spray** opens the blood vessels. Your doctor may prescribe this medication on an as-needed basis in case you have a recurrence of chest pain. Medication may relieve symptoms and promote healing without further treatment. If chest pain or other symptoms continue, your doctor will discuss treatment options with you.
- **Cholesterol-lowering medication** may help you reduce your cholesterol as a preventative measure.

It is important you understand how your medication works and the reason it was prescribed. Take your medication as directed. Talk about any side effects or other concerns with your cardiologist. Do not stop taking your medication without talking to your cardiologist first.

Cardiovascular rehabilitation

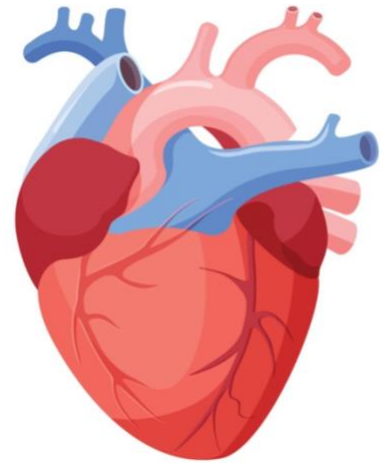
A doctor may refer you to a cardiovascular rehabilitation program. Our rehabilitation program will provide you with the help and the support you need to recover. You will also receive information about the prevention of future heart problems. Participating in cardiovascular rehabilitation can help you on your road to recovery. It can optimize your physical and emotional health. You may choose from a variety of personalized programs designed to meet your needs. Most of our programs are now offered virtually as well as in-person. You can receive help and support from the comfort of your own home. To ensure we have received your referral, please call 613-696-7068.

Research tells us that learning about your risk factors and taking charge of your heart health and health care will help you to continue to do the things you wish to do.

Are there risk factors for MINOCA?

Risk factors for MINOCA depend on the underlying cause associated with your condition. Traditional cardiovascular risk factors are ubiquitous in MINOCA. Roughly three out of every four patients of MINOCA have at least one cardiovascular risk factor. The risk factors may include, but are not limited to:

- Traditional cardiovascular risk factors, such as hypertension, diabetes, high cholesterol, and smoking
- An increased risk of blood clotting problems
- Anxiety and depression
- Cancer
- Autoimmune conditions
- Infectious diseases, such as pneumonia, sepsis, and respiratory infections
- Hormones related to pregnancy, contraception, and hormone replacement therapy



Who is at risk of MINOCA?

- Patients who experience MINOCA are more likely to be women and are often younger in age.
- The average age of a MINOCA patient is 58 years compared to patients with acute myocardial infarction with blockage in their coronary artery, which is 61 years on average.
- MINOCA patients have a lower prevalence of traditional cardiovascular risk factors compared to myocardial infarctions with obstructive coronary disease.

If you are having **angina or heart symptoms**

At the first sign of angina or heart symptom	➔	Stop immediately and rest (sit down)
If no relief immediately with rest	➔	Take a nitroglycerin spray/tablet
If no relief within five minutes	➔	Take a second nitroglycerin spray/tablet
If no relief within five minutes	➔	CALL 911 and take a third nitroglycerin spray/tablet

Additional resources

Heart-healthy living guide

The heart-healthy living guide was developed for people who have been diagnosed with heart disease, but the tools and information are useful for anyone. Topics in this revised edition include managing your risk factors, nutrition, physical activity, cardiac rehabilitation, and managing your medications safely. Please visit:

ottawaheart.ca/heart-healthy-living-guide

Cardiac rehabilitation – Top 10 tips series

To learn more about the top 10 tips for emotional health, exercise, healthy eating, healthy sleep, and managing stress, please refer to: ottawaheart.ca/rehab-top-10-tips

