CORONARY MICROVASCULAR DYSFUNCTION (CMD):

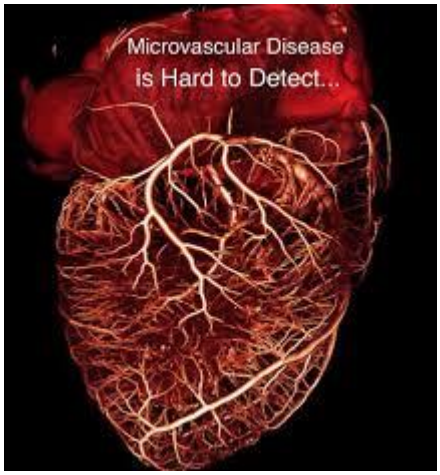
The coronary arteries carry blood from the aorta to the heart muscle. Damage to the small blood vessels that branch off of the main coronary arteries, the coronary microvasculature, can lead to problems with the blood supply to the heart.

CMD can occur even if there is no blockage of the larger coronary arteries.

CMD can cause chest pain, shortness of breath, heart attack, and heart failure, and ultimately cardiac arrest.

Other names for Coronary Microvascular Dysfunction are:

- Cardiac syndrome X
- Nonobstructive coronary heart disease



CAUSES OF CORONARY MICROVASCULAR DYSFUNCTION:

The same risk factors that cause atherosclerosis may cause coronary microvascular dysfunction, such as:

- Unhealthy cholesterol levels
- High BP
- Diabetes
- Overweight & obesity
- Inactivity
- Smoking
- Family history of heart disease

DIAGNOSIS OF CORONARY MICROVASCULAR DYSFUNCTION:

Doctors will diagnose MVD based on the patient's medical history, physical exam and test results. They will also check to see if the patient has any risk factors for

heart disease. I.E.: the doctor will measure the patient's height and weight to check for overweight or obesity. The doctor may also recommend tests for high cholesterol, metabolic syndrome and diabetes.

DIAGNOSTIC TESTS:

The risk factors for coronary MVD and traditional heart disease often are the same. Thus, the doctor may recommend tests for heart disease, such as:

- Coronary angiography (PDF)
- Stress test
- Magnetic Resonance Imaging (MRI)

Unfortunately, standard tests for CHD aren't designed to detect coronary MVD. These tests look for blockages in the large coronary arteries. Coronary MVD affects the tiny coronary arteries. If test results show that you don't have heart disease, the doctor might still diagnose the patient with coronary MVD. This could happen if signs are present that not enough oxygen is reaching the heart's tiny arteries.

Coronary MVD symptoms often first occur during routine daily tasks. Because of this, the doctor may ask the patient to fill out a questionnaire called the **Duke Activity Status Index (DASI)**. They will ask the patient how well he/she is able to do daily activities, such as shopping, cooking, and going to work.

The DASI results will help the doctor decide which kind of stress test the patient should have. The results also give the doctor information about how well blood is flowing through the patient's coronary arteries.

Duke Activity Status Index (DASI)

The Duke Activity Status Index is a self-administered questionnaire that measures a patient's functional capacity. It can be used to get a rough estimate of a patient's peak oxygen uptake.

1. Can you take care of yourself (eating, dressing, bathing or using the toilet)?
2. Can you walk indoors, such as around your house?
3. Can you walk a block or two on level ground?
4. Can you climb a flight of stairs or walk up a hill?
5. Can you run a short distance?
6. Can you do light work around the house, such as dusting or washing dishes?
7. Can you do moderate work around the house, such as vacuuming, sweeping floors or carrying in groceries?
8. Can you do heavy work around the house, such as scrubbing floors or lifting and moving heavy furniture?
9. Can you do yard work, such as raking leaves, weeding or pushing a power mower?
10. Can you have sexual relations?
11. Can you participate in moderate recreational activities, such as golf, bowling, dancing, doubles tennis or throwing a baseball or football?

12. Can you participate in strenuous sports, such as swimming, singles tennis, football, basketball or skiing?

Duke Activity Status Index (DASI) = sum of “Yes” replies _____

VO2peak = (0.43 x DASI) + 9.6

VO2peak = _____ ml/kg/min ÷ 3.5 ml/kg/min = _____ METS

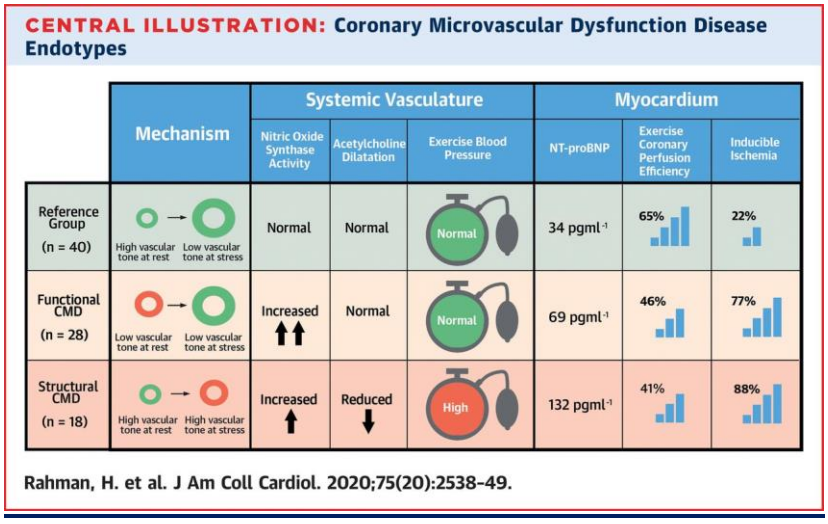
The doctor also may recommend blood tests, including a test for anaemia. Anaemia is thought to slow the growth of cells needed to repair damaged blood vessels.

Research is ongoing for better ways to detect and diagnose coronary MVD. Currently, researchers have not agreed on the best way to diagnose the disease.

CLASSIFICATION CORONARY MICROVASCULAR DYSFUNCTION:

Coronary microvascular dysfunction (CMD)	
Type 1	Primary CMD in the absence of underlying myocardial disease or obstructive epicardial CAD
Type 2	CMD in the presence of myocardial disease (eg, hypertrophic cardiomyopathy, hypertensive heart disease)
Type 3	CMD in the presence of obstructive CAD (either stable CAD or acute coronary syndrome)
Type 4	Iatrogenic CMD secondary to myocardial revascularisation
Type 5	CMD following cardiac transplantation

CAD, coronary artery disease.



TREATMENT FOR CORONARY MICROVASCULAR DYSFUNCTION:

Relieving pain is one of the main goals of treating coronary microvascular disease (MVD). Treatments also are used to control risk factors and other symptoms.

Treatments may include medicines such as:

- Cholesterol medication to improve cholesterol levels
- Antithrombotic medications to lower blood pressure and decrease the heart's workload
- Medication to help prevent blood clots or control inflammation
- Nitro-glycerine to relax blood vessels, improve blood flow to the heart muscle, and treat chest pain

PREVENTION OF CORONARY MICROVASCULAR DYSFUNCTION:

No specific studies have been done on how to prevent coronary microvascular disease (MVD). Researchers don't yet know how or in what way preventing coronary MVD differs from preventing heart disease. Lifestyle changes and ongoing care can help you lower your risk for heart disease.

- Lifestyle Changes - If lifestyle changes aren't enough, the doctor may prescribe medicines to control the risk factors. Take all of the medicines as the doctor advises.
- Know body mass index (BMI)
- Know family history of heart disease