



What is Coronary Microvascular Disease?

Coronary microvascular disease (MVD) is heart disease that affects the walls and inner lining of tiny coronary artery blood vessels that branch off from the larger coronary arteries. Other names for coronary MVD are small artery disease, small vessel disease, cardiac syndrome X and nonobstructive coronary heart disease.



Coronary heart disease, also called coronary artery disease, involves plaque formation that can block blood flow to the heart muscle. In coronary MVD, the heart's coronary artery blood vessels don't have plaque, but damage to the inner walls of the blood vessels can lead to spasms and decrease blood flow to the heart muscle. In addition, abnormalities in smaller arteries that branch off of the main coronary arteries may also contribute to coronary MVD.

Women develop coronary microvascular disease more frequently and it occurs in younger women.

What causes coronary MVD?

Many researchers think some of the risk factors that cause atherosclerosis may also lead to coronary MVD. Atherosclerosis is a disease in which plaque builds up inside the arteries. Risk factors for atherosclerosis include:

- Family history of heart disease
- Older age
- Unhealthy blood cholesterol levels
- High blood pressure
- Smoking
- Diabetes
- Overweight and obesity
- Lack of physical activity
- Unhealthy diet

What is my risk for coronary MVD?

Women may be at risk for coronary MVD if they have lower than normal estrogen levels at any point in their adult lives. Low estrogen levels before menopause can raise younger women's risk for coronary MVD and can be caused by stress and a functioning problem with the ovaries.

Women who have high blood pressure before menopause, especially high systolic blood pressure, are at increased risk for coronary MVD. Women who experience intense or irregular menopause symptoms also may be more likely to develop heart issues. After menopause, women tend to have more of the traditional risk factors for atherosclerosis, which may also put them at higher risk for coronary MVD.

People who have heart disease are more likely to have a worse outcome, such as a heart attack, if they also have anemia. This is because anemia is thought to slow the growth of cells needed to repair damaged blood vessels.

(continued)



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What are the signs and symptoms?

Women with coronary MVD often have chest pain called angina, also called microvascular angina. They may experience prolonged angina and may also have angina when at rest.

Other signs and symptoms of coronary MVD are:

- shortness of breath
- sleep problems
- fatigue
- lack of energy

People who experience coronary MVD symptoms often first notice them during their routine daily activities and times of mental stress. They occur less often during physical activity or exertion. This differs from disease of the major coronary arteries and main branches, in which symptoms usually first appear during physical activity.

How is coronary MVD diagnosed?

Your doctor or other health care professional will diagnose coronary MVD based on your medical history, a physical exam and test results. You will also be evaluated for any risk factors for heart disease including high cholesterol, metabolic syndrome, diabetes and being overweight or obese.

Research is ongoing to learn more about the role of hormones in heart disease and to find better ways to diagnose coronary MVD.

The risk factors for coronary MVD and traditional heart disease often are the same. Some recommended tests for heart disease include:

- Coronary angiography
- Stress test
- Coronary magnetic resonance imaging (CMR)

Standard tests for coronary heart disease may not be able to detect coronary MVD. These tests look for blockages in the large coronary arteries. Coronary MVD affects the tiny coronary arteries. If you have angina but tests show your coronary arteries are normal, you could still have coronary MVD. Additional testing can confirm the diagnosis.

Diagnosing coronary MVD was previously a challenge. But positron emission tomography (PET) scans and other types of imaging are now available which measure blood flow through the coronary arteries and can detect MVD in very small blood vessels.

Coronary MVD symptoms often first occur during routine daily tasks. Because of this, you may be asked to fill out a questionnaire called the Duke Activity Status Index (DASI). It includes questions about how well you're able to do daily activities, such as shopping, cooking and working.

The DASI is a self-administered questionnaire that measures a person's functional capacity. It can be used to get an estimate of peak oxygen uptake and can help determine if additional tests are needed.

DUKE ACTIVITY STATUS INDEX

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 _____

VO₂ peak = $(0.43 \times \text{DASI}) + 9.6$

VO₂ peak = _____ ml/kg/min ÷ 3.5 ml/kg/min = _____ METS



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You may also be tested for anemia. Anemia is thought to slow the growth of cells needed to repair damaged blood vessels.

Research to identify better ways to detect and diagnose coronary MVD is ongoing.

How is coronary MVD treated?

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

Treatments may include medicines such as:

- Cholesterol medication to improve cholesterol levels.
- Blood pressure medications to lower high blood pressure and decrease the heart's workload.
- Antiplatelet medication to help prevent blood clots.
- Medications to relax blood vessels including beta blockers, calcium channel blockers and nitroglycerin.
- Nitroglycerin to treat chest pain.



Can coronary MVD be prevented?

Researchers don't yet know how or in what way preventing coronary MVD differs from preventing heart disease.

Knowing your family history of heart disease, making healthy lifestyle changes and ongoing care can help you lower your risk for heart disease.

If lifestyle changes aren't enough, your doctor may prescribe medicines to control your risk factors. Take all of your medicines as prescribed.

HOW CAN I LEARN MORE?

- 1 Call 1-800-AHA-USA1 (1-800-242-8721), or visit heart.org to learn more about heart disease and stroke.
- 2 Sign up for our monthly *Heart Insight* e-news for heart patients and their families, at HeartInsight.org.
- 3 Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at heart.org/SupportNetwork.

Do you have questions for your doctor or nurse?

Take a few minutes to write down your questions for the next time you see your health care professional.

For example:

What tests will I need?

What medications will I be prescribed?

MY QUESTIONS:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage your condition or care for a loved one. Visit heart.org/AnswersByHeart to learn more.