

Cardiac Syndrome X

Cardiac syndrome X (also known as **microvascular angina**), a condition characterized by angina-like chest discomfort, ST-segment depression during exercise, and normal coronary epicardial arteries at angiography, has the highest prevalence in post-menopausal women.

In a large percentage of patients, there is a finding of systemic microvascular abnormalities, causing reduced blood flow in the microvasculature of the cardiac muscles. When the blood vessels constrict and fail to dilate there is decreased oxygen level to the cardiac muscles resulting in hypoxia (myocardial ischemia) which leads to chest pain.

Signs and Symptoms

- Angina: This usually **does not cause dysfunction on echocardiogram** and can last longer than that of heart disease.
- Abnormal cardiac stress test: **ST changes are typically similar to those of coronary artery disease**, and the opposite of those of Prinzmetal's angina. Myocardial perfusion imaging can be abnormal in 30% of patients.
- Coronary angiogram: **Normal**
- Other causes of chest pain must be ruled out, including:
 - Prinzmetal's angina aka vasospastic or variant angina / Coronary artery spasm
 - Esophageal spasm



Animated sequence from a reconstructed coronal CT pulmonary angiography (CTPA)

Angina pectoris	Cardiac syndrome X
exercise-induced angina	exercise-induced angina
exercise-induced ischemia detected by ECG	exercise-induced ischemia detected by ECG
stenosis proved by coronary angiography	coronary angiography - no abnormalities
positive provocative test (as in Prinzmetal's AP)	negative provocative test
pathological alternation in epicardial coronary arteries	pathological alternation in prearteriolar vessels
chest pain disappears spontaneously, is relieved with nitroglycerin	pain is not relieved with nitroglycerin

Cause

Chest pain caused by microvascular angina is most of the time unpredictable and it can occur when at rest and/or during exercise. The pain associated with microvascular angina is normally more intense and lasts for longer periods compared to the pain caused by other conditions. For example, stable angina causes chest pain that goes away when at rest. Another difference is that while chest pain caused by any type of stable angina is relieved with nitroglycerin, this drug is not effective in most patients with microvascular angina.

The major cause of microvascular angina is the pathological alternation (microvascular dysfunction) in prearteriolar vessels.^[1]

Treatment

- **β-blockers**,
- **L-Arginine** - increases the release of NO at vascular level, thus leading to the vasodilatory effect,
- **calcium channel blockers** - specifically nifedipine and diltiazem can be effective,
- **antidepressants**.

Links

Related Articles

- Angina pectoris
- Myocardial Infarction

Reference

1. KLENER, Pavel, et al. *Vnitřní lékařství*. 3. edition. Praha : Galén, 2006. 120,416,417 pp. ISBN 80-7262-431-8.

Bibliography

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