Invasive coronary function testing in patients with INOCA - a single center experience

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Funding Acknowledgements: None.

Background: Coronary vasomotion disorders (CVDs) represent a frequent cause of angina in patients with ischemia with non-obstructed coronary arteries (INOCA). Invasive coronary angiography (ICA) often fails to identify patients with vasospastic angina and/or microvascular dysfunction.

Purpose: Our aim was to describe and characterize CVDs in INOCA patients, using a multi-parametric, invasive, coronary function testing protocol.

Methods: Patients with INOCA that underwent our protocol for coronary function testing (CFT), between July 2021 and October 2022 were included in this single-center prospective study. The protocol consisted of an invasive assessment of coronary circulation vasorelaxation at rest and during hyperemia, as well as the propensity for coronary vasospasm using increasing doses of intra-coronary acetylcholine. Fractional flow reserve, coronary flow reserve (CFR), and index of microvascular resistance (IMR) were recorded. CVDs were diagnosed based on the criteria proposed by the Coronary Vasomotor Disorders International Study Group.

Results: A total of 56 patients were included, mean age was 64±12 years and 57.1% were female. At baseline, all patients had either typical angina (82.1%, n=46) or a positive ischemia test (67.9%, n=38). Twenty patients (35.7%) had a history of a previous ICA or computed tomography due to anginal symptoms, while only 8.9% of patients had known structural ischemic heart disease and were subjected to percutaneous coronary intervention. Our CFT protocol was completed in all patients without any serious complications. Isolated epicardial vasospasm was found in 16 (28.6%) patients, isolated coronary microvascular dysfunction (CMD) in 9 (16.1%), and a combination of CMD and coronary vasospasm in 9 (16.1%). Only 1 patient (1.8%) had isolated microvascular spasm.

We were able to further identify two distinct endotypes of CMD, using a combined assessment of CFR and IMR, termed structural and functional CMD: Functional CMD - 7 patients (12.5%) had CFR < 2.0 and IMR < 25; Structural CMD - 6 patients (10.7%) had CFR < 2.0 and IMR > 25.

Conclusion: Coronary vasomotion disorders are a common cause of INOCA. A CFT protocol is safe, can be used in clinical practice, and can provide a definite diagnosis for the underlying cause of angina.

The population of INOCA patients (n=56)

- 28.6% (n=16): Epicardial spasm
- 8.9% (n=5): Microvascular spasm
- 16.1% (n=9): Microvascular dysfunction
- 8.9% (n=5): Structural CMD
- 1.8% (n=1): Functional CMD

Figure 1 – Venn diagram showing coronary vasomotion disorders distribution