Consensus Document on MINOCA – A Turning Point in the Diagnosis and Treatment of an Intriguing Condition

Documento de consenso de MINOCA: Un punto de inflexión en el diagnóstico y tratamiento de una afección intrigante

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Acute myocardial infarction (AMI) usually results from thrombotic events developing at the site of atherosclerotic plaque erosion or rupture. Despite the high prevalence of obstructive coronary artery disease (CAD) in AMI (around 90% in STEMI and 60% in NSTEMI), a sizeable proportion of AMI patients have no obstructive CAD (MINOCA) amounting to up to 13% of all patients with a clinical diagnosis of AMI. (1,2) MINOCA is a heterogeneous syndrome caused by a number of pathogenic mechanisms and aetiologies. (1,3) Among these, the following feature prominently: coronary artery dissection, coronary embolism, takotsubo syndrome, myocarditis, mild plaque disruption, hypercoagulable status, and coronary artery spasm. Uncertainties currently exist regarding the characterisation, diagnostic strategies, treatment and clinical outcomes in these patients. (1,3,4)

Interestingly, clinical presentation, ECG changes and CAD conventional risk factors are similar in MINOCA and CAD-related AMI patients. (1,3) Clinical outcomes however differ among MINOCA patient subgroups given the different causes of the syndrome and all-cause mortality seems to be lower in MINOCA patients compared with patients whose MIs are triggered by obstructive CAD and coronary plaque disruption. (5,6) Indeed, all-cause in-hospital mortality was reported to be 0.9% (95% CI, 0.5%– 1.3%) and 12-month mortality 4.7% (95% CI, 2.6%–6.9%), respectively. (3) Comparison of mortality data in 6 studies that included MINOCA and CAD-AMI patients showed that the latter had higher both all cause in-hospital mortality (3.2% versus 1.1%) and 12-month all-cause mortality (6.7% versus 3.5%). Prognosis, however, is not necessarily "benign" in patients with MINOCA, despite the absence of obstructive CAD. (2,3,5,6)

Establishing the cause and pathophysiological mechanisms in MINOCA patients is of vital importance to implement rational management strategies. As proposed by the European Society of Cardiology Working Group on Cardiovascular Pharmacotherapy in their position paper in 2017, (1) the diagnosis of MINOCA should be considered "work in progress", meaning that thorough diagnostic investigations should be carried out in every MINOCA patient to identify the causal mechanisms. Diagnostic algorithms exist (1,7) that propose the systematic use of clinical and biochemical variables, cardiac MRI and echocardiography, as well as coronary arteriography, intravascular imaging techniques (8,9) and coronary physiology studies, including provocative tests for coronary artery spasm. Coronary artery spasm, whether epicardial and/or microvascular, an established cause of MINOCA, needs to be investigated thoroughly, as effective treatments exist that can prevent the recurrence of coronary spasm and subsequent MINOCA events or life-threatening arrhythmias. (10)

In this issue of the Revista Argentina de Cardiologia, Dr Charask and distinguished colleagues from the "Consenso para el diagnóstico y tratamiento de MINOCA, Grupo de Trabajo Argentino Multidisciplinario de la Sociedad Argentina de Cardiología" present a Consensus document on the diagnosis and management of MINOCA.(11) The objective of their scholarly manuscript is to encourage and assist cardiologists in Argentina dealing with ischaemic heart disease patients, to identify the causes and mechanisms leading to MINOCA and carefully plan their treatment. The consensus document represents an exhaustive guideline for both the diagnosis and rational management of MINOCA. The authors have painstakingly listed possible aetiologies and pathophysiological mechanisms associated with MINOCA and diagnostic tests required for an accurate clinical diagnosis that should, in turn, allow rational treatment strategies to be devised for the individual patient. The document includes diagnostic and management algorithms which will be extremely helpful for the clinician and also busy interventional units. Research groups will most likely also benefit from this guideline document. (11)

Of importance, the Consensus document high-

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lights the fact that despite the established role that coronary artery spasm plays in the pathogenesis of MINOCA and other coronary syndromes, tests for coronary spasm are not routinely performed in patients with obstructive CAD. This is true not only in Argentina but worldwide, with the exception, perhaps of Japan and Korea where these tests are performed more frequently. Unfortunately, in most countries, conventional coronary angiography continues to be used as the gold standard diagnostic test for angina, despite its limitations to evaluate vasomotor changes that may occur in the epicardial arteries or in the coronary microvasculature and can, per se, cause myocardial ischaemia in patients with or without obstructive CAD. The implementation of coronary physiological tests to establish the flow-limiting effects of epicardial coronary stenoses and coronary microvascular function, as suggested by Charask et al (11) should help physicians to make progress regarding the diagnosis and management of MINOCA patients.

Regarding coronary artery spasm in MINOCA, a recent paper by Montone et al (10) showed that provocative tests for spasm 1) identified a large proportion of patients who would otherwise would have been discharged from hospital without a firm diagnosis , 2) have prognostic significance and 3) can be performed safely in the catheter laboratory even when performed in the acute or sub-acute phases (i.e. within 48 hours) of MINOCA.

Regarding the safety of these tests, a recent systematic review (12) and several other studies (13-15) showed that pharmacologic testing with acetylcholine or ergonovine in patients presenting with stable angina or ACS is associated with only a small number of undesirable effects. In the Takagi meta-analysis (12) the overall occurrence of major (0.8%) and minor (5%) complications was low. The most common major complications were sustained ventricular tachycardia or ventricular fibrillation, in 0.69% of cases, cardiogenic shock (0.03%), AMI (0.01%), cardiac tamponade (0.01%), prolonged spasm (0.01%) and coronary artery dissection (0.01%).

In addition to tests for spasm, other techniques also suggested by the Consensus document. i.e. coronary physiology studies, intravascular imaging, cardiac magnetic resonance and others, will help cardiologists to characterise their MINOCA patients appropriately.

Hopefully, the Charask et al paper (11), in conjunction with other International guidelines will encourage clinical and interventional teams to work together to assess MINOCA patients exhaustively and also create multidisciplinary clinical discussion groups in their institutions and nationally to improve their routine clinical practice and serve their patients better. Moreover, the Consensus document -which now shares the stage with other prestigious guideline documents –(1,7,16) will hopefully be the right stimulus for clinical research groups in Argentina to join forces to design and carry out definitive trials that can help

establishing the most effective ways to deal with the complex issue of MINOCA.

Conflicts of interest
None declared.

(See authors' conflicts of interest forms on the website/ Supplementary material)

Ethical considerations
Not applicable.

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