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Reconsidering aetiologies of type 2 myocardial infarction: when a classification is a simplistic approach for a complex reality

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This commentary refers to 'Type 2 myocardial infarction' by T. Nestelberger *et al.*, on page 3825.

We thank Nestelberger *et al.* for their comments on our article about the role of invasive coronary provocative tests in patients with acute myocardial infarction and non-obstructive coronary arteries (MINOCA).[1] The authors questioned the incorrect classification as type 2 myocardial infarction (T2MI) in patients with Takotsubo syndrome, myocarditis or myocardial infarction (MI), and secondary to cardiotoxic drug administration. Indeed, these conditions are not considered T2MI by the third Universal Definition of MI,[2] while they are classified as causes of MINOCA by current European Society of Cardiology Guidelines on ST-segment elevation MI.[3] It is worth noting that the pathogenesis of these conditions is multifactorial and a T2MI mechanism may be involved. In particular, in Takotsubo syndrome the catecholamine surge secondary to acute stress leads to myocardial damage, through multiple mechanisms, such as direct catecholamine toxicity, epicardial and/or microvascular coronary spasm, and increased cardiac workload.[4] Cardiotoxic drugs (i.e. cocaine abuse in three patients in our study) may also cause myocardial injury with similar mechanisms. Moreover, coronary vasospasm may induce myocardial injury in patients with myocarditis, in particular if caused by parvovirus.[5]

Finally, in our study optical coherence tomography showed the presence of plaque rupture or erosion in five patients and we fully agree with Nestelberger *et al.* that they should be classified as T1MI.

In conclusion, MINOCA is a moving field not even mentioned in the third Universal Definition of MI. It is likely that it will be considered in the upcoming Fourth Definition of MI thus shedding further light on this complex topic. Regardless of definition, we agree that the optimal medical therapy should be based on the cause of MI, which has to be carefully identified in patients presenting with MINOCA.

Conflict of interest: none declared.

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