The relevance of periprocedural troponin rise: the never ending story!

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High-sensitivity troponin is—per definition—highly sensitive to detect all sorts of myocardial injury. This does not necessarily mean that permanent damage has been done to the myocyte. It is known that the troponin level may well be elevated after exceptional physical exercise, like in marathon runners. Of course, long-term prognosis will not be compromised in these athletes, but also in non-coronary conditions like aortic valve or mitral valve disease, elevated troponin values were detected, with different implications on prognosis (table 1).

A variety of studies addressed the frequent finding of elevated biomarker values following coronary angiography and percutaneous interventions with or without stent deployment in patients with stable coronary artery disease. Potential mechanism of periprocedural infarcts are (1) side branch occlusion, (2) distal embolisation, (3) prolonged or multiple balloon inflation, (4) coronary dissection with slow flow or (5) microthrombi and no reflow.

However, the definition of periprocedural myocardial injury varies among different authors and the interpretation of these data may prove difficult. In particular, as an isolated troponin elevation might have less prognostic impact if compared with true myocardial necrosis with a creatine kinase MB (CK-MB) rise. Tricoci and colleagues compared the prognostic impact of Creatine kinase-MB (CK-MB) and troponin rise. Interestingly enough, the mortality risk of a CK-MB rise >3× upper limit of normal (ULN) was comparable to a cTroponin rise >60× ULN.

In the interventional community, it is widely accepted that an isolated minor troponin rise following percutaneous coronary procedures will not affect prognosis. Therefore, no guidelines recommend routine evaluation of biomarkers in patients with an uneventful postinterventional course. However, the European Society of Cardiology defined the percutaneous coronary intervention (PCI)-associated myocardial ischaemia as a Type 4a infarct. The Type 4a infarct is characterised by an elevation of troponin values >5×99th percentile ULN in patients with normal baseline values and (1) symptoms suggestive of myocardial ischaemia, (2) new ischaemic ECG changes or new left bundle branch block, (3) angiographic loss of patency of a major coronary artery or a side branch or persistent flow or no flow or embolisation or (4) imaging demonstration of new loss of viable myocardium or new regional wall motion abnormality.

In the present issue of ‘Open Heart’, Hamaya and colleagues investigate the impact of high-sensitivity I troponin elevation. Their study included 538 stable patients who underwent a diagnostic coronary angiogram. The authors identified patients with minor procedure-related myocardial necrosis and those with major procedure-related myocardial necrosis with troponin elevation >3–5x ULN. The troponin was measured just before the angiogram and 18–24 hours postprocedure. Importantly, in patients with significant coronary artery disease, any revascularisation procedure was rescheduled for a second session.

The main findings of this study were that patients with troponin elevation were older, female, had previous coronary interventions and a longer procedural time. Patients with major elevations of troponin had higher levels of N-terminal -Brain Natriuretic Protein (NT-proBNP) and a higher left ventricular enddiastolic pressure. Moreover, aortic stenosis or pressure wire measurements were associated with a troponin rise. In addition, the authors conclude that a major troponin rise was associated with a worse long-term outcome.

Indeed, it is not surprising that older and sicker patients will experience a more pronounced troponin rise. If this troponin rise does translate into a worse outcome remains somehow speculative. Unfortunately, the patient number in the present study is too small to elucidate this research question.

In general, the interpretation of the presented data is impeded by several potential unmeasured confounders. In particular, the outcome of the revascularisation procedure


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It is hard to believe that a troponin rise following a diagnostic procedure should impact on survival, while a minor isolated troponin elevation after percutaneous intervention is considered to be negligible.

In conclusion, it is unlikely that this study will change current clinical practice.

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REFERENCES