Procalcitonin in myocarditis patients: role in aetiology identification and risk stratification

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Background: Procalcitonin (PCT) is an established predictor of bacterial infections and sepsis. However, PCT involvement in cardiovascular diseases has been scarcely investigated so far. In particular, no studies at all ever addressed the role of PCT in myocarditis patients.
We aimed at evaluating PCT in myocarditis patients, as a potential biomarker of: a) aetiologic diagnosis; b) prognosis.
Methods: A cohort of 130 consecutive patients with a novel diagnosis of myocarditis confirmed by both endomyocardial biopsy and cardiac magnetic resonance were included in the study. Patients with known bacterial infections or bacterial myocarditis were excluded (n=5). PCT concentration was measured on admission in all patients. Prospective follow-up (FU) was performed every 6 months up to 5 years.
Results: Of 125 patients analyzed (mean age 45±15 years, males 62%, mean LVEF 48±15%), 22 (18%) had fulminant myocarditis (FM). The remaining 103 cases had non-fulminant myocarditis (NFM), including infarct-like presentation and non-malignant arrhythmias. Aetiology was viral or virus-negative in 23 and 102 patients, respectively.
The mean PCT value was 0.44±0.18 mcg/ml, with no significant differences between viral and virus-negative myocarditis (0.43±0.19 vs. 0.44±0.18 mcg/ml, p=0.90).
Baseline PCT concentration was significantly higher in FM patients (0.69±0.21 vs. 0.39±0.16 mcg/ml, p=0.07). Consistently, PCT was higher in patients with LVEF <60% (0.51±0.20 vs. 0.30±0.14 mcg/ml, p=0.03) and in those with elevated (>400 pg/mL) NT-proBNP (0.55±0.19 vs. 0.36±0.17 mcg/ml, p=0.03). As for inflammatory biomarkers, patients with high ESR (>20 mm/h) had also higher PCT values (0.56±0.20 vs. 0.37±0.16 mcg/ml, p=0.03). By converse, no association was found between PCT and CRP abnormal values (p>0.05).
At univariate analysis, high PCT (≥0.20 mcg/ml) was predictive of heart failure recurrence (OR 2.77, 95% CI 1.18–6.48, p=0.02) or arrhythmic cardiac arrest (OR 3.22, 95% CI 1.19–8.71, p=0.02) by discharge, with overall hospitalization prolonged by 10±4 days (p<0.05). Furthermore, patients with high PCT were more prone to myocarditis recurrences (13/80 vs. 4/45, p=0.03) by 5-year FU.
Conclusions: In myocarditis patients, elevated PCT values at presentation are not associated with myocarditis aetiology. Nonetheless, PCT suggests a worse short-term clinical outcome, and also a higher risk of myocarditis recurrences at long-term FU.