Microembolization During Elective Coronary Stenting in Diabetic Patients Is Associated Not Only With Troponin Elevation But Also With Poor Long-Term Outcomes

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Background:
Elevation of cardiac troponin I (cTnI) after percutaneous coronary interventions is not uncommon, especially in patients with type II diabetes mellitus (T2DM) and extensive coronary artery disease (CAD). The exact pathogenesis of cTnI elevation after uncomplicated PCI is not fully elucidated. The study evaluated the impact of periprocedural microembolization and subclinical elevation of cTnI after PCI on long-term cardiovascular outcome in patients with a cardiovascular high risk profile.

Objectives:
Aim of this study was: (1) to quantify the extent of coronary microembolization during elective PCI, (2) to identify predisposing anatomical and procedural factors and (3) to evaluate its impact on long-term outcome in patients with a high cardiovascular risk.

Methods:
We included 48 consecutive patients (38 males) aged 66.7 ± 6.1 years with T2DM and multi-vessel CAD, who underwent successfully elective PCI with stent placement to treat single-vessel lesions. An intracoronary ultrasound Doppler guide wire (FloWire, Volcano®) was used to detect real-time microembolization during PCI as high-intensity transient signals (HITS) (Figure 1). Peak levels of cTnI were measured within 24 hours after PCI. Patients were followed for 2 years recording major cardiac adverse events (MACE: death, myocardial infarction - MI, target vessel - TVR and non-target vessel revascularization - nTVR).

Results:
In 47 of 48 patients microemboli were detected during PCI. After excluding 5 patients with side branch impairment, a pathologic cTnI > 0.12 ng/ml (0.13 to 28.9, median 0.39 ng/ml) occurred in 19 patients without any clinical manifestations. The total number of HITS correlated with the peak value of cTnI (r=0.43, p=0.003), but not with other clinical, angiographic or procedural data. In ROC analysis, a high number of microemboli (HITS > 25) predicted a major cTnI elevation > 1 ng/ml (100 % sensitivity, 83 % specificity, p = 0.002).

At 2-year follow-up MACE were found in 9 out of 48 patients (18.8 %): MI - 2 pts, nTVR - 7 patients and TVR - 2 patients (Table 1), who had significantly higher baseline microembolization (15.4 ± 11.8 vs. 28.2 ± 16.0 HITS; p = 0.009, OR 1.07; 95 % CI: 1.011-1.13).

Conclusion:
The extent of microembolization during elective PCI appears to be the indicator of atherosclerotic burden, associated with acute biomarker elevation and adverse long-term outcomes. It represents a stronger predictor than cTnI elevation alone for adverse long-term outcome in patient population with a cardiovascular high risk profile.