Thrombin generation in human coronary arteries after percutaneous transluminal balloon angioplasty.


Marmur JD, Merlini PA, Sharma SK, Khaghan N, Torre SR, Israel DH, Ardissino D, Ambrose JA.

Department of Medicine, Mount Sinai School of Medicine New York, New York 10029.

ABSTRACT:

OBJECTIVES. The aim of this study was to investigate the relation between coronary atherosclerotic plaque injury and activation of the coagulation cascade.

BACKGROUND. Thrombus formation after atherosclerotic plaque disruption has been implicated in the pathogenesis of atherosclerosis, unstable angina and myocardial infarction.

METHODS. Biochemical markers of thrombin generation (prothrombin fragment F1+2) and thrombin activity (fibrinopeptide A) were measured in coronary blood before, during and immediately after percutaneous transluminal coronary angioplasty. After demonstrating that blood withdrawal through an angioplasty catheter does not artifactually elevate the plasma levels of these markers in patients after heparinization, coronary artery samples were collected proximal and distal to the lesion before and distal to the lesion after balloon inflation in 26 patients.

RESULTS. Plasma levels of F1+2 measured proximal to the lesion before angioplasty (median 0.47 nmol/liter, 95% confidence interval [CI] 0.40 to 0.50) were significantly elevated after angioplasty (median 0.55 nmol/liter, 95% CI 0.46 to 0.72, p = 0.001). In contrast, plasma fibrinopeptide A levels measured proximal to the lesion before angioplasty (median 2.0 ng/ml, 95% CI 1.3 to 2.2) were similar to those measured after angioplasty (median 1.8 ng/ml, 95% CI 1.3 to 3.0, p = NS). After we defined a normal range of interassay variability on the basis of values obtained from samples drawn proximal and distal to the lesion before angioplasty, seven patients (27%) had a significant increase in F1+2 plasma levels. A significant increase in plasma fibrinopeptide A occurred in five of these seven patients. Lesions with dissection, filling defects or haziness on postangioplasty angiography were associated with more thrombin generation than lesions without these features.

CONCLUSIONS. Markers of thrombin generation and activity can be collected safely and assayed accurately in heparinized blood withdrawn through an angioplasty catheter. Balloon dilation of coronary stenoses increases thrombin generation and activity within the coronary artery in a substantial subgroup of patients undergoing angioplasty.

PMID: 7930280 [PubMed - indexed for MEDLINE]