

**Harvard Medical School Department of  
Continuing Education and the Cardiovascular  
Division of the Department of Medicine,  
Brigham and Women's Hospital**



***Cardiology Rounds***  
**May 2004**

**Intracoronary Vascular Profiling of Shear Stress, Lumen, and Wall Morphology  
to Predict Vascular Behavior and Atherosclerosis Progression:**

**Part 1: Rationale and methods**

By Peter H. Stone, M.D., and Charles L. Feldman, Sc.D.

**Objectives:**

In this two-part presentation of *Cardiology Rounds*, Drs. Peter Stone and Charles Feldman discuss the role of intracoronary endothelial shear stress – ie, the rubbing force exerted by blood flow on the endothelial monolayer that lines the coronary arteries – in the development and progression of coronary artery disease. In Part 1, presented in this issue, Drs. Stone and Feldman review the role of coronary endothelium as the modulator of CAD pathogenesis. The reader will gain a better understanding of how shear stress influences atherogenesis and coronary artery remodeling, as well as improved insight into the molecular biology underlying the adverse effects of low intracoronary shear stress. Drs. Stone and Feldman have developed the first device available to routinely measure *in vivo* intracoronary hemodynamics and intracoronary shear stress in man.

**TEST:**

1. It is well-known that the majority of myocardial infarctions are initiated by intracoronary plaque rupture. The majority of these culprit lesions obstruct the lumen by <75%.  
True       False
2. Plaques that rupture are typically rich in lipids.  
True       False
3. Coronary artery disease and plaque rupture progresses as a “wavefront” through the coronary tree.  
True       False
4. Regions of low and disturbed shear stress correlate well with regions of coronary atheroma.  
True       False

5. Physiologic shear stress is  $< 4$  dynes/cm<sup>2</sup>.

True       False

6. Low shear stress increases adhesion of monocytes to the endothelium and endothelial permeability to lipids.

True       False

7. Plaque rupture is more likely to occur in regions of outward remodeling.

True       False

To receive AMA category 1 credit, you must correctly answer 60% of the test questions.

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