Intravascular Ultrasound (IVUS)-Based Computational Modeling and Planar Biaxial Artery Material Properties for Human Coronary Plaque Vulnerability Assessment

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Summary

Image-based computational modeling has been introduced for vulnerable atherosclerotic plaques to identify critical mechanical conditions which may be used for better risk assessment and rupture predictions. In vivo patient-specific coronary plaque models are lagging due to limitations on non-invasive image resolution, flow data, and vessel material properties. We propose a procedure where intravascular ultrasound (IVUS) imaging, biaxial mechanical testing and computational modeling are combined together to acquire better and more complete plaque data and make more accurate plaque vulnerability assessment and predictions.

Keywords: Coronary artery; cardiovascular; fluid-structure interaction; atherosclerotic plaque rupture, IVUS.