INTRAVASCULAR ULTRASOUND: ASSESSMENT OF ATHEROSCLEROSIS

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ABSTRACT

Intravascular ultrasound (IVUS) is a technology that uses an ultrasound element on the tip of a catheter. This catheter is advanced through the groin into the coronary arteries. In this way a tomographic image of the vascular wall and atherosclerotic plaques can be produced.

Historically it has been used to assess the level of occlusion, the atherosclerotic plaque burden and the native size of the vessel. This information can be used to decide to treat or not and to determine the diameter and length of the stent to be used for treatment. It has also been used extensively to determine if the stent was well deployed.

The composition and morphology of an atherosclerotic lesion are currently considered more important determinants of acute coronary ischemic syndromes that the degree of stenosis[1]. When a lesion is unstable, it can rupture and cause an acute thrombotic reaction. An unstable plaque can be characterized by a lipid core that is covered by a thin fibrous cap, which has been locally weakened by inflammatory cells.

The last decade serious effort has been put in developing IVUS towards identifying these unstable plaques. This lecture will focus on the development of measuring the elastic properties of the plaque as a marker for plaque instability[2] and measuring the vascularization in the plaque[3], which plays an important role in the pathogenesis of unstable plaque. Furthermore the role of combined ultrasound/light catheters will be discussed[4, 5].

Technology development and validation will be presented as well as the role of IVUS to provide imaging biomarkers in natural history studies and trials for the development of new cardiovascular drugs[6, 7].

Index Terms—Ultrasound, intravascular, atherosclerosis, photoacoustics.

REFERENCES


