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Permalink

<https://escholarship.org/uc/item/6w65039n>

Journal

CIRCULATION, 82(4)

ISSN

0009-7322

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Publication Date

1990-10-01

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Peer reviewed

Clinical Cardiology:
Intravascular and
Intracardiac Ultrasound

Wednesday Morning

The Sensitivity of Ultrasound Imaging Compared with Angiography for Diagnosing Coronary Atherosclerosis
Jonathan M. Tobis, Donald Mahon, Kenneth Lehmann, Michael McRae, Walter L. Henry, University of California, Irvine and Long Beach VA Hospital, Irvine and Long Beach, CA

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Contrast angiography identifies the arterial lumen by projection imaging but does not demonstrate the extent of atheroma in the wall of the artery. Cross-sectional images of coronary arteries were obtained by a 20MHz intravascular ultrasound (IVUS) catheter in 20 patients. The arteries were interrogated from the ostium to a length of 6cm. Cross-sectional images permitted quantitative analysis of lumen area and atheroma area bounded by an echo-lucent media. At the normal segments determined angiographically, the lumen cross-sectional area was $11.0 \pm 8.5 \text{mm}^2$ by angiography and $11.1 \pm 8.5 \text{mm}^2$ by IVUS. However, IVUS revealed a substantial amount of atheroma within the wall in either a concentric or smooth eccentric distribution covering a mean area of $5.0 \pm 3.0 \text{mm}^2$ which was $36.6 \pm 20.8\%$ of the available area bounded by the media. These *in vivo* images correspond to prior *in vitro* studies which showed a close correlation between areas of atheroma determined by IVUS and histology ($r=0.88$). Angiography underestimates the extent of disease in coronary arteries compared to intravascular ultrasound.