IVUS Guidance of CTO Recanalization Procedures

Gary S Mintz, MD

Cardiovascular Research Foundation
New York City, NY
Key observations by IVUS during CTO procedure
Wire Crossing

CTO Segment: Subintima? Presumed true lumen? Outside of Adventitia?

Distal to CTO: True or false?

Lumen Recanalization

Intraplaque neovascular channels connect to vaso vasorum in adventitia

Columbia University Medical Center
Post-Balloon
Post-Balloon IVUS
Why is being in the "subintimal space or not" important?
DES Stenting the Subintimal Space
It is even more important to end the stent within the true lumen. Otherwise, flow to the distal vessel will be severely compromised.
Inside or Outside of Vessel (Adventitia)?
Where are we?

Start

End

Image is courtesy of Dr. M Ochiai
Outside of Vessel (Adventitia)

Image is courtesy of Dr. M Ochiai
Perivascular damage (Perforation)
Extramural (Peri-adventitial) Hematoma?

Proximal
Extramural hematoma

Edge dissection

Distal
Intramural hematoma
Penetrating the proximal fibrous cap
IVUS-Guided CTO Recanalization
Proper Entry Point Marking by Transducer During Pullback from Small Proximal D-1 into Stump of LAD
Confirmation of Optimal Penetration
Final Result
Optimal Stent Expansion
(although this has not been addressed specifically in CTO lesions. . .)
Predictors of angiographic restenosis in 550 pts with 670 native lesions treated with Cypher stents

(Hong et al. Eur Heart J 2006;27:1305-10)
Forward Looking IVUS for CTO

- Sheath
- 48 Sheath
- 45 MHz Transducer
- 4.8F

Crossing Profile
- 4.8F
- 10 mm

VOLCANO
Forward-looking IVUS with RF Tunneling:

- **CTO Visualization:** IVUS imaging will show proximal CTO cap and vessel borders
- **Steering:** Rotating the tip of the catheter will steer the RF electrode to desired target while the angled RF beam will allow the operator to steer away from vessel walls
- **Tissue Tunneling:** RF waves will tunnel through CTO tissue

*Investigational device, research use only*