Tissue Characterization by VH-IVUS Pitfalls and Artifacts

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1. Necrotic core behind Calcium







Plaque behind Calcium





		Correct	Incorrect	ROIs	Accuracy
Mild microcalcium	IVG	2	0	2	100%
	S5	1	1	2	50%
Heavy microcalcium	IVG	3	6	9	33.3%
	S5	18	9	27	66.7%
Dense calcium	IVG	27	10	37	73%
	S5	27	16	43	62.8%
Overall	IVG	32	16	48	66.7%
	S5	46	26	72	63.9%

Overall Accuracy: 65.0 %

When inaccurate, tissue is classified as NC (65% of the time), as FT (18% of the time), as FF (14% of the time) unbia University Medical Center



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Courtesy G Vince, Volcano Corp

→ NewYork-Presbyterian The University Hospital of Columbia and Cornell

Fibrocalcific Plaque



Thick Cap Fibroatheroma



2. One Pixel White Border on the Surface



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3.Thrombus









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4. Confluent Necrotic Core





Non-Confluent Pathological Intimal Thickening

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Thick Cap Fibroatheroma

Confluent

Columbia University Medical Center

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Qualitative Assessment of Lesion Phenotype (Resolution ≈200µ)

Thin Cap

Thick Cap





- Pathologic thin fibrous cap typical of TCFA is <65µ
- However, all fibrous caps <200µ will abut the lumen on VH-IVUS analysis





Thin cap fibroatheroma (TCFA)



- 1. <u>Confluent</u> NC>10%
- 2. 30 degree abutting
- 3. <u>3 consecutive</u> frames

Thin cap < 65 μ m < IVUS resolution=100 μ m





5. Wrong Lumen/Vessel Border



6.Echolucent Plaque=Vulnerable Plaque?



Fibrous Cap Necrotic Core?



Echolucent Plaque and VH



Echolucent Plaque and VH



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7. Aorto-Ostial Segment





9. Lost Data



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10. Variation of Sensitivity of Catheter

Weak Power

Strong Power









Comparison of serial VH images







11.Electronical Noise



12. Stent Struts













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Serial VH of DES

Baseline

Follow-up

Stented segment







Serial VH of BMS

Baseline

Follow-up

Stented segment



Reference segment



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Summary

Tissue characterization behind calcium needs caution. However, calcium and necrotic always together, could be true. To review the overall segments and diagnose.



