

Morphology and Distribution of Left Main and Non Left Main Bifurcation Atherosclerosis

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest /arrangement or affiliation with the organization(s) listed below

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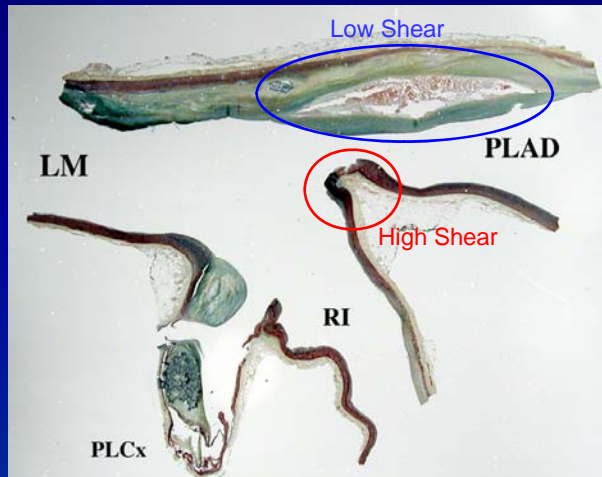
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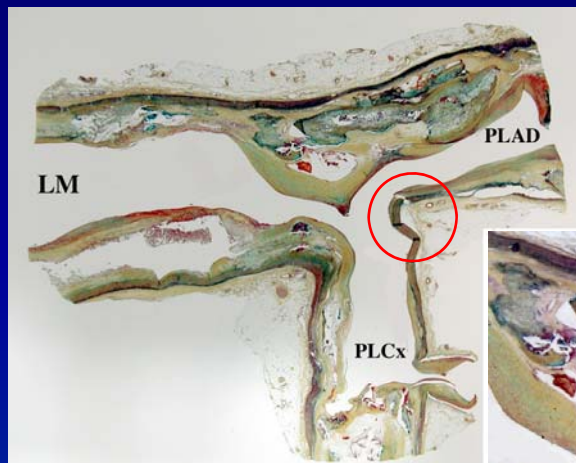


Plaque Formation



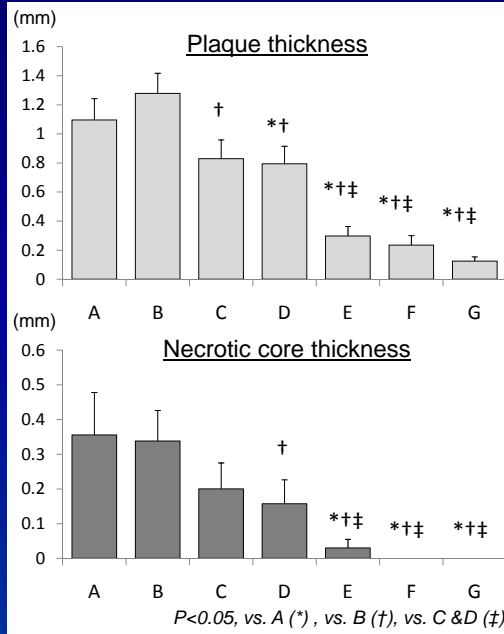
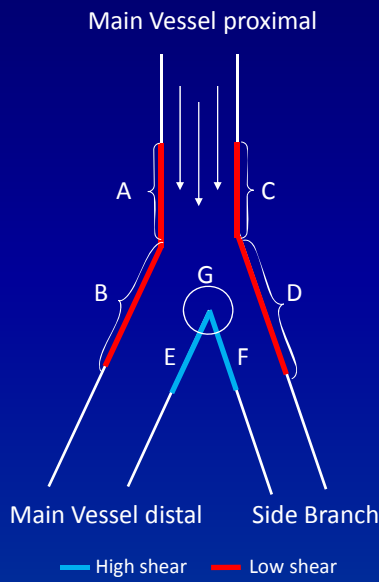
Virmani R, LM/CTO Summit 2011

Plaque Formation



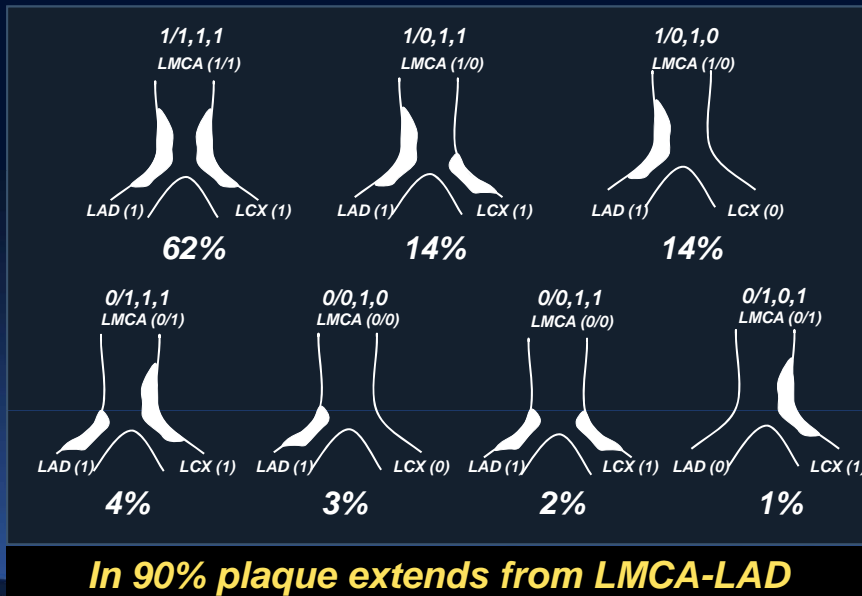
Virmani R, LM/CTO Summit 2011

Distribution of Coronary Plaques at Bifurcation Site



Nakazawa G, et al. *J Am Coll Cardiol*. 2010;55:1679-1687.

Plaque Distribution by IVUS (n=140)



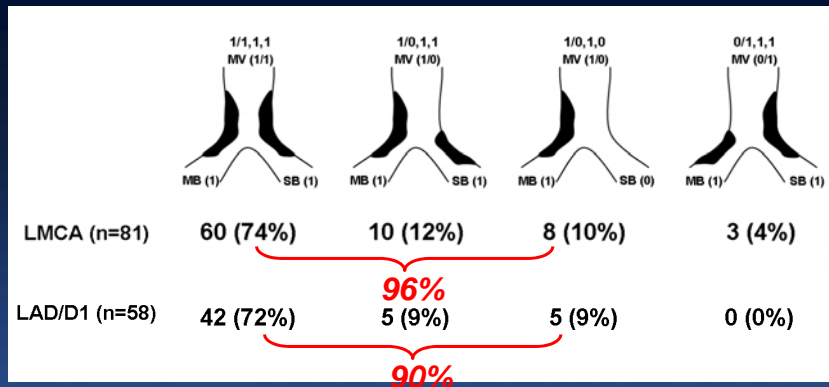
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Oviedo C et al. *Circ Cardiovasc Interv* 2010;3:105-12.

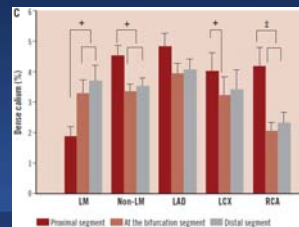
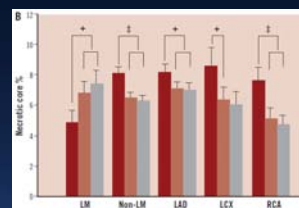
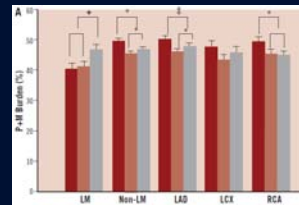
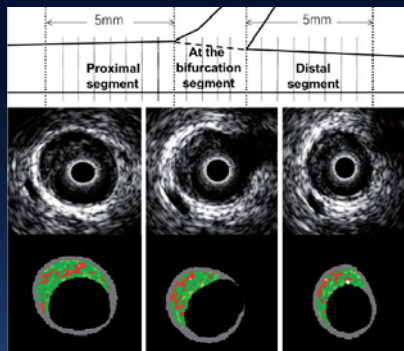
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Plaque Distribution LMCA vs LAD/D1

Inclusion: angiographically significant bifurcation disease



Plaque Composition in 256 Bifurcations



Plaque Composition in Each Vessel

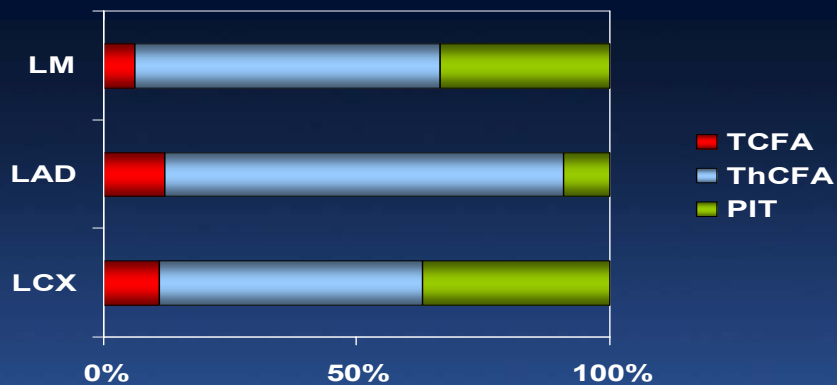
Necrotic Core (NC) & Dense Calcium (DC)

%NC and %DC were greater in the LAD (15.7%, 8.8%) than in the LM (11.8%, 4.5%) or LCX (10.9%, 4.5%) - $p=0.002$ & $p=0.0004$, respectively.



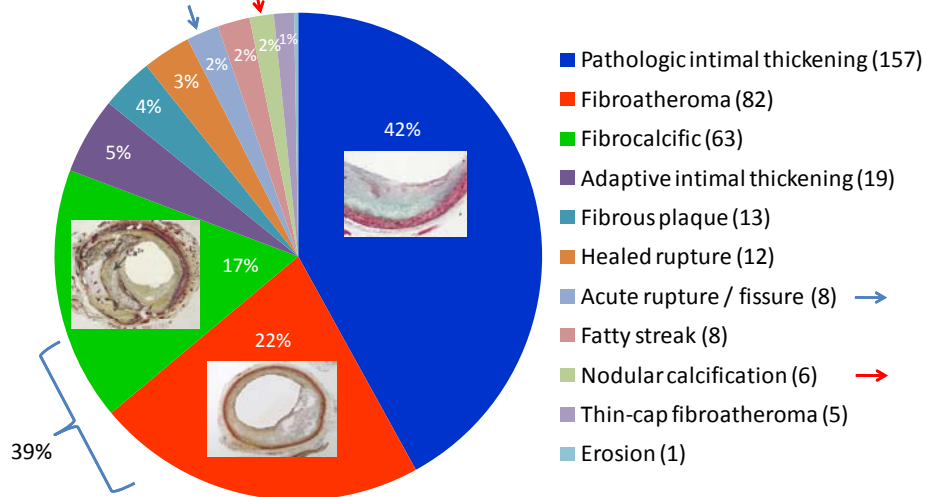
Plaque Phenotype in Each Vessel

The distribution by vessel of the 168 eccentric plaques differed according to plaque type ($p=0.035$)



Types of plaque in LMCA in sudden coronary death cases

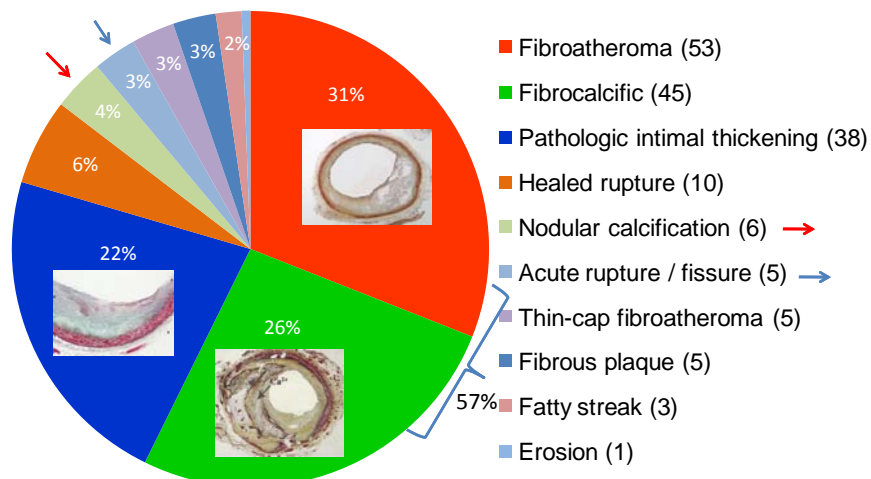
All sudden coronary death cases (n=374)



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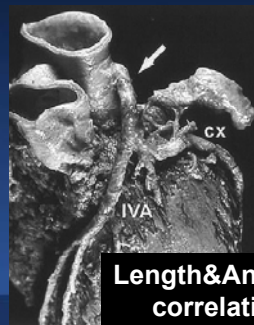
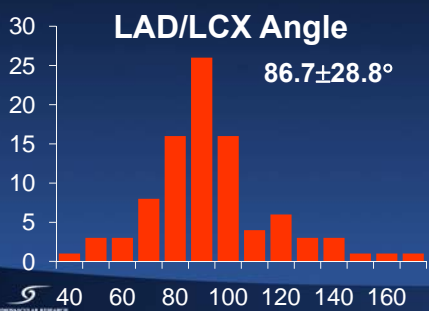
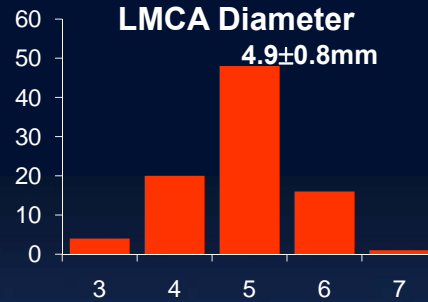
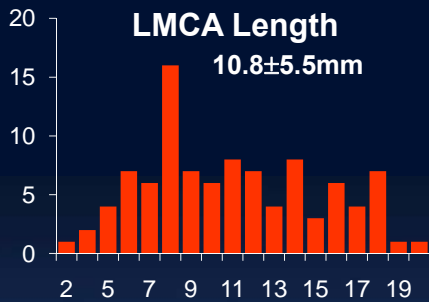
Types of plaque in LMCA in sudden coronary death cases with stenosis $\geq 50\%$

Cases with stenosis $\geq 50\%$ in sudden coronary death (n=171)



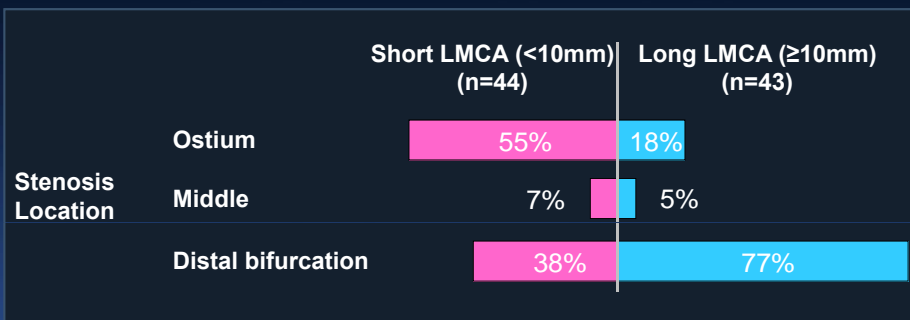
Virmani R, LM/CTO Summit 2011

Anatomical Parameters in LMCA



ReiqJ et al. ClinAnat2004

Anatomic features and the development of atherosclerotic plaque in left main coronary artery: IVUS data

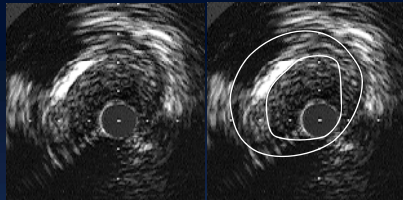


Maehara A, et al. *Am J Cardiol.* 2001;88:1-4.

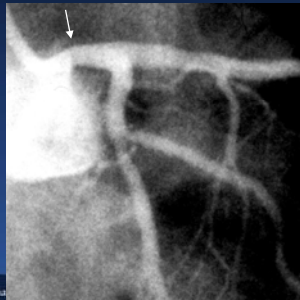
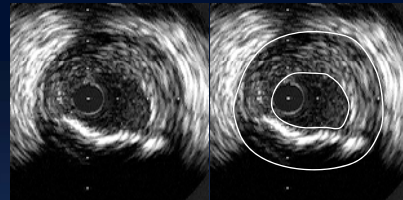
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Ostium vs Bifurcation LM Lesions

Ostium



Bifurcation



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Ostium vs Bifurcation LM Lesions

	Ostium n = 32	Bifurcation n = 55	p value
Plaque burden (%)	62±15	80±9	<0.0001
Max Calcium Arc (°)	78±65	195±101	<0.0001
Eccentric plaque (%)	97	76	0.01
Lesion length (mm)	2.3±2.4	4.5±2.7	0.001
Remodeling Index	0.87±0.19	1.01±0.21	0.005

Bifurcation vs Ostium: more calcium and plaque, longer, and more positive remodeling

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Maehara A. et al, *Am J Cardiol* 2001; 88: 1-4.

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Take Home Message

1. 90% of plaque distribution is LAD (main branch) dominant in the LMCA, LAD/D1 bifurcation, no matter the angiographic appearance.
2. In LMCA bifurcations, advanced atherosclerosis (fibroatheroma, calcification) is more in the proximal LAD than LMCA or LCX. However, in non-LM bifurcation lesions, the proximal segment had more plaque than the distal segment.
3. The left main length may relate to the bifurcation angle and plaque distribution.
4. The morphology between left main bifurcation and ostium is quite different and more complex in the bifurcation.