Appropriate Use Criteria for Percutaneous Complex Coronary Interventions

Joint Coronary Revascularization

December 14, 2013 Busan Korea

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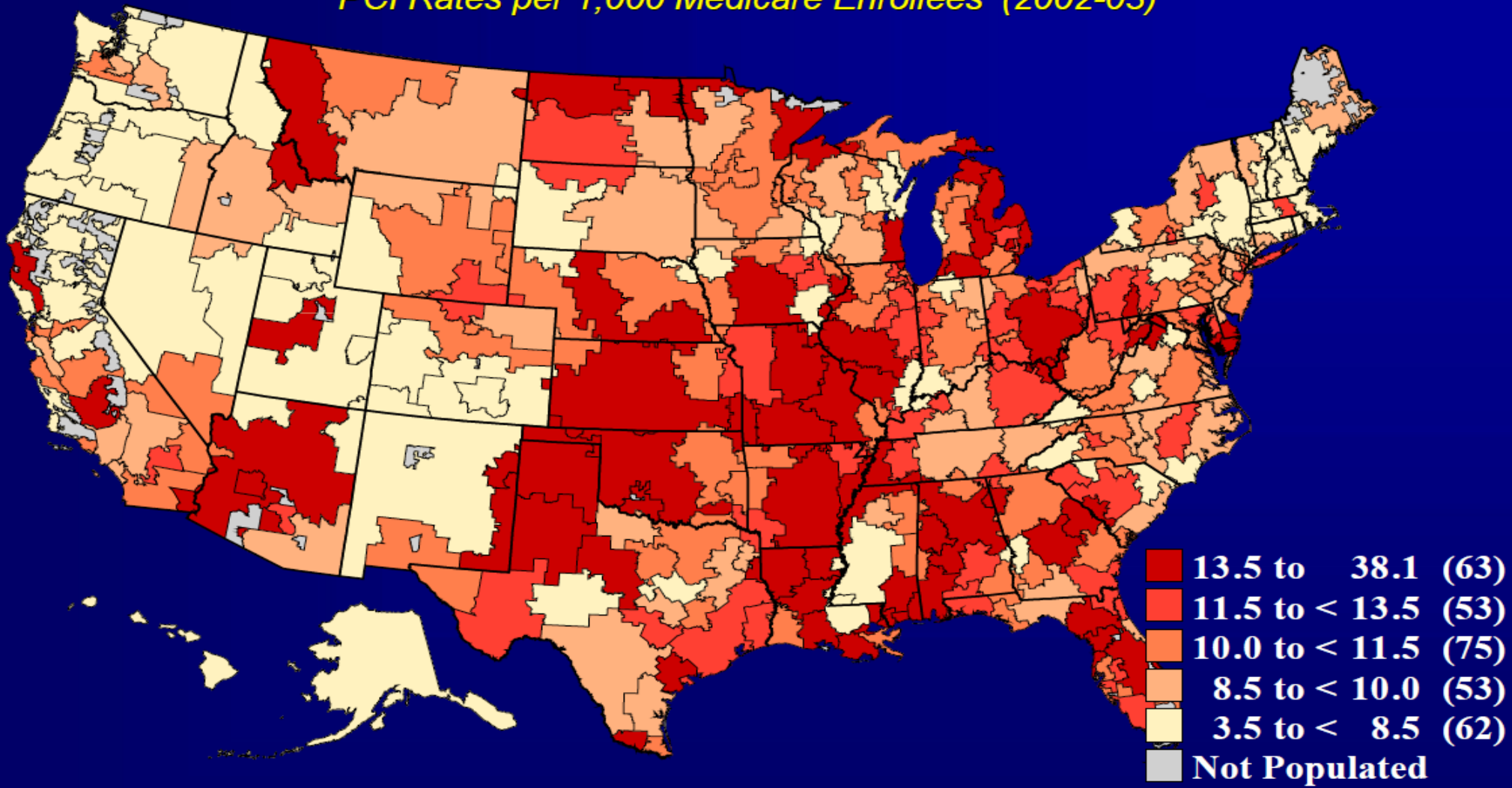
St Mary Medical Center Hobart IN USA

PROBLEMS

Variation in Care

PCI Rates per 1,000 Medicare Enrollees (2002-03)



Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

http://www.dartmouthatlas.org/

TCTJ,mp9-09

ACCF/SCAI/STS/AATS/AHA/ASNC 2009 Appropriateness Criteria for Coronary Revascularization

Coronary Revascularization Writing Group

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The Appropriateness Scores

New Terminology

Appropriate

May be Appropriate

Rarely Appropriate

Do we Provide Appropriate Care to Patients While doing PCI on Complex Lesions?

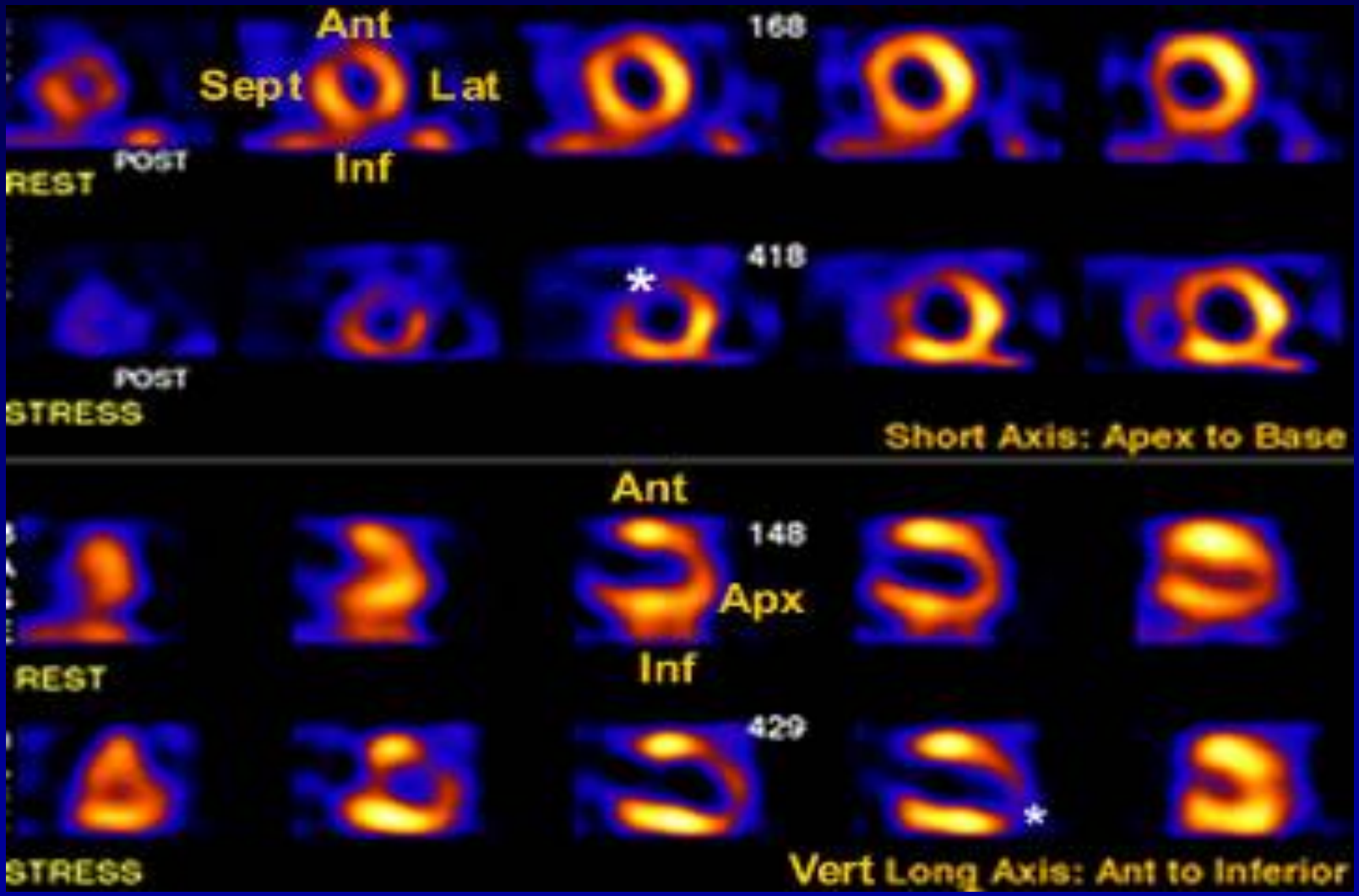
We don’t provide sub-standard care

METHODOLOGY

Classification of Severity of Angina according to the CCS

- **Class 1**: No angina
- **Class 2**: Slight angina
- **Class 3**: Marked limitation
- **Class 4**: Angina with minimal activity or rest angina

Myocardial Ischemia



High Risk Findings in Non-Invasive Study

- 1. LV EF <35%
- 2. High-risk treadmill score (score < or equal to 11)
- 3. Exercise LV EF < 35%
- 4. Stress-induced large perfusion defect (particularly if anterior)
- 5. Stress-induced multiple perfusion defects of moderate size

Table A. CAD Prognostic Index

Extent of CAD	Prognostic Weight (0–100)	5-Year Survival Rate (%)*
1-vessel disease, 75%	23	93
>1-vessel disease, 50% to 74%	23	93
1-vessel disease, ≥95%	32	91
2-vessel disease	37	88
2-vessel disease, both ≥95%	42	86
1-vessel disease, ≥95% proximal LAD	48	83
2-vessel disease, ≥95% LAD	48	83
2-vessel disease, ≥95% proximal LAD	56	79
3-vessel disease	56	79
3-vessel disease, ≥95% in at least 1	63	73
3-vessel disease, 75% proximal LAD	67	67
3-vessel disease, ≥95% proximal LAD	74	59

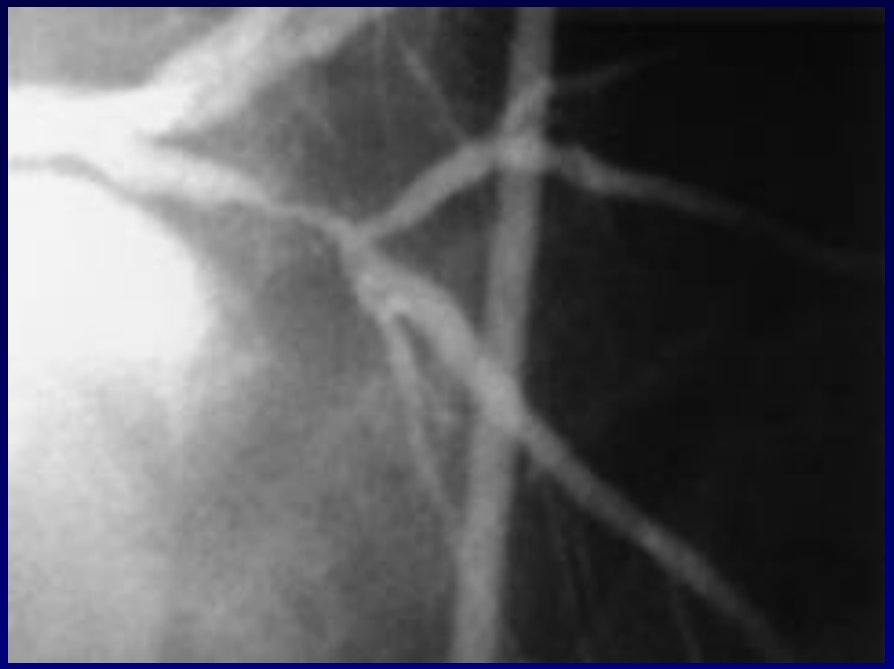
*Assuming medical treatment only. CAD indicates coronary artery disease; LAD, left anterior descending coronary artery. From Califf RM, Armstrong PW, Carver JR, et al. Task Force 5. Stratification of patients into high-, medium-, and low-risk subgroups for purposes of risk factor management. J Am Coll Cardiol. 1996;27:964–1047 (4).

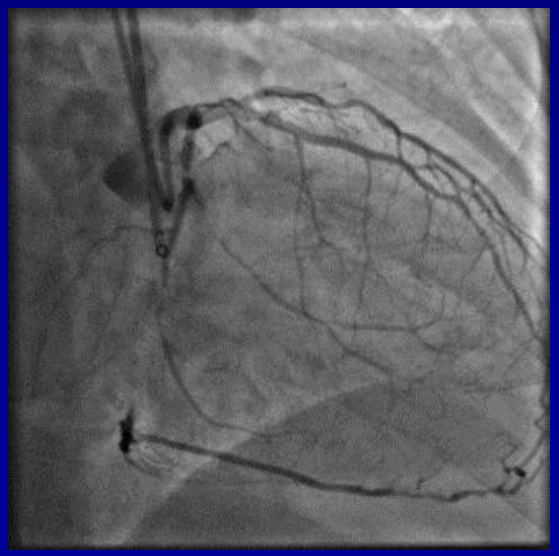
The AUC for PCI

Amount of myocardium at risk =
Probability of mortality in 5 years

and Symptom

We don’t have to memorize the AUC

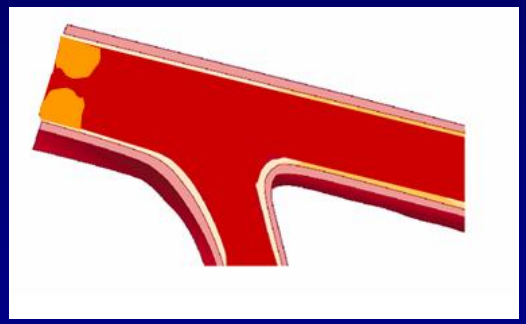


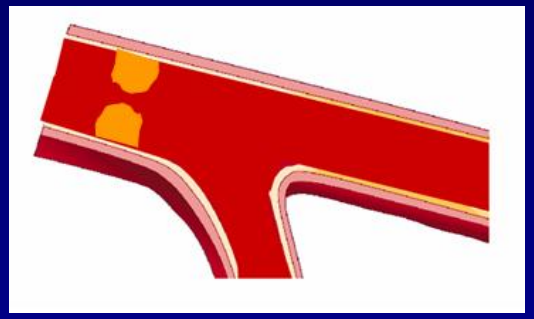


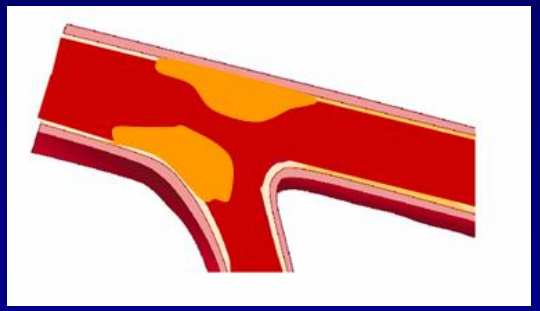
PRINCIPLES

1. Do we prolong life?
2. Do we improve the symptom?
3. Is the area of myocardium at risk large?
4. Does the patient have sign of high risks on non-invasive testings?

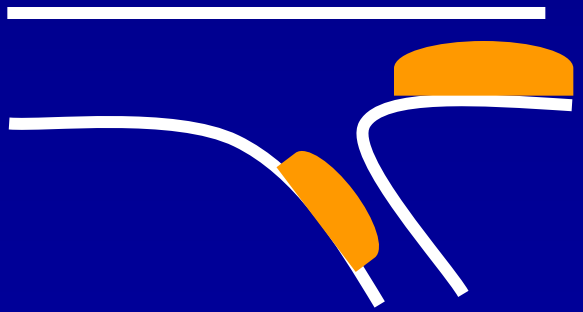
Ostium Shaft Distal Bifurcation



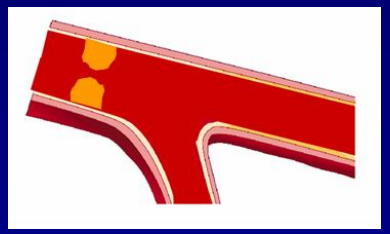


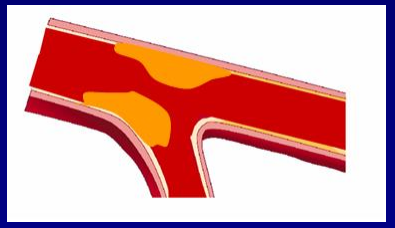


Ostial LAD and LCX 0,1,1



All of these lesions have the same prognostic index value if they are closed abruptly causing acute myocardial infarction





2. Ostial LAD and LCX

High-Risk Findings on Noninvasive Study		CCS Class III or IV Angina	
Symptoms Med. Rx		Stress Test Med. Rx	
Class III or IV Max Rx	A	High Risk Max Rx	A
Class I or II Max Rx	A	High Risk No/min Rx	A
Asymptomatic Max Rx	A	Int. Risk Max Rx	A
Class III or IV No/min Rx	A	Int. Risk No/min Rx	A
Class I or II No/min Rx	A	Low Risk Max Rx	A
Asymptomatic No/min Rx	A	Low Risk No/min Rx	A
Coronary Anatomy	2-vz. disease with prox. LAD	Coronary Anatomy	2-vz. disease with prox. LAD

2. Ostial LAD and LCX

Low Risk Findings on Noninvasive Study	
Symptoms **Med. Rx**	
Class III or IV Max Rx	A
Class I or II Max Rx	A
Asymptomatic Max Rx	U
Class III or IV No/min Rx	A
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Asymptomatic No/min Rx	U
Coronary Anatomy	2 vz. disease with Prox. LAD

Asymptomatic	
Stress Test **Med. Rx**	
High Risk Max Rx	A
High Risk No/min Rx	A
Int. Risk Max Rx	U
Int. Risk No/min Rx	U
Low Risk Max Rx	U
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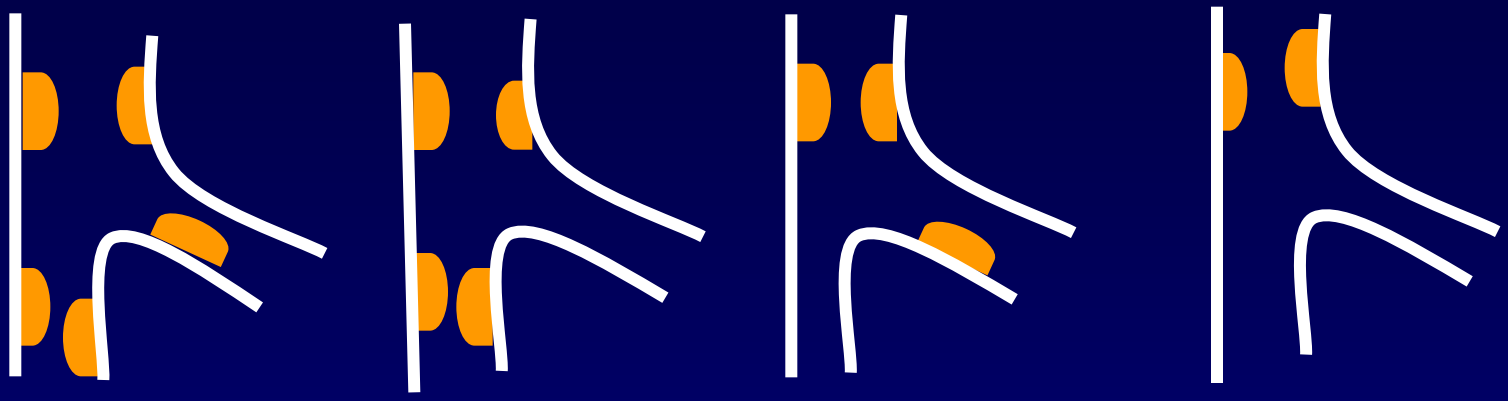
Coronary Anatomy	2 vz. disease with Prox. LAD

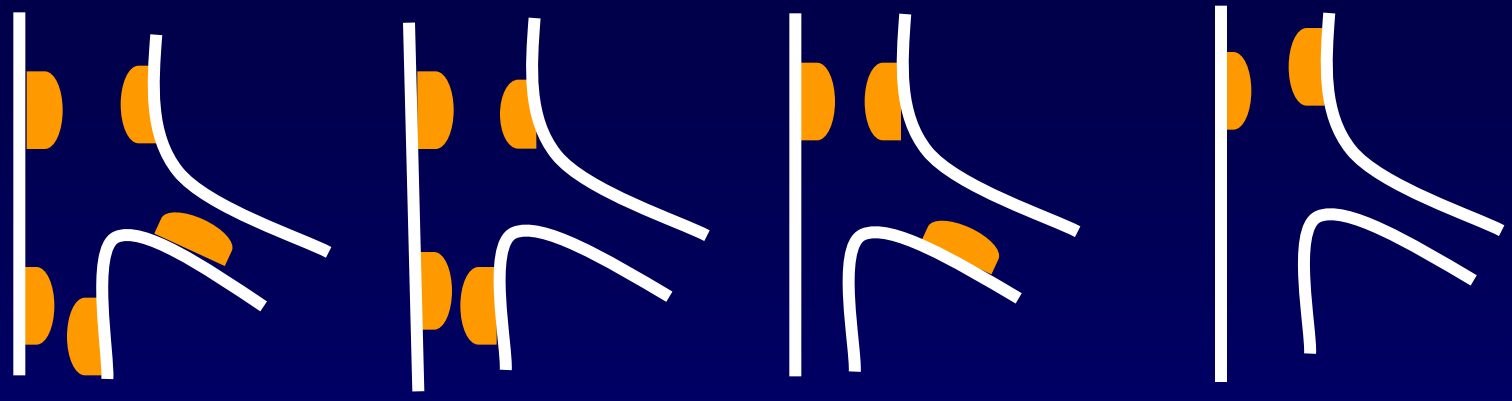
Proximal LAD



3. Proximal LAD -Diagonal Bifurcation

All of these proximal LAD lesions have the same prognostic index value if they are closed abruptly causing acute myocardial infarction

AUC for Proximal LAD -Diagonal Bifurcation



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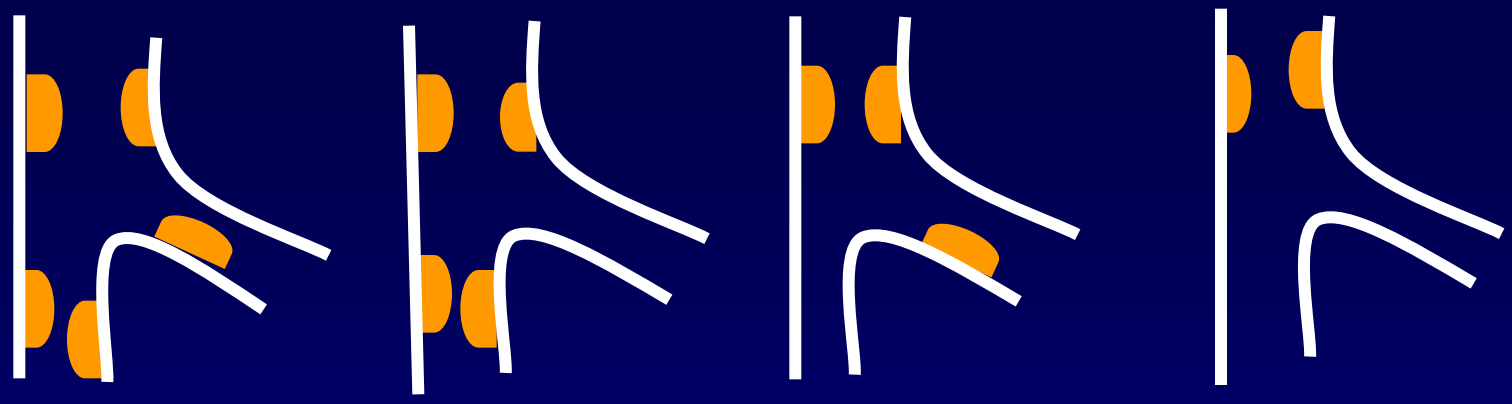
Asymptomatic Max Rx	A	Int. Risk Max Rx	A
Class III or IV No/min Rx	A	Int. Risk No/min Rx	A
Class I or II No/min Rx	A	Low Risk Max Rx	A
Asymptomatic No/min Rx	A	Low Risk No/min Rx	A
Coronary Anatomy	1-vz. disease of prox. LAD	Coronary Anatomy	1-vz. disease of prox. LAD



Discrepancy between severity of lesion and non-invasive study, then FFR or OCT should be done

ALL OTHERS

Mid LAD-Diagonal 011
LCX-OM and RCA-PDA 101, 111, 011
CTO

AUC for all Lesions (except LM and Proximal LAD)

High-Risk Findings on Noninvasive Study			CCS Class III or IV Angina		
Symptoms Med. Rx			**Stress Test Med. Rx**		
Class III or IV Max Rx	A	A	High Risk Max Rx	A	A
Class I or II Max Rx	A	A	High Risk No/min Rx	A	A
Asymptomatic Max Rx	U	A	Int. Risk Max Rx	A	A
Class III or IV No/min Rx	A	A	Int. Risk No/min Rx	U	U
Class I or II No/min Rx	U	A	Low Risk Max Rx	U	A
Asymptomatic No/min Rx	U	U	Low Risk No/min Rx	I	U
Coronary Anatomy	CTO of 1-vz.; no other disease	1-2-vz. disease; no prox. LAD	**Coronary Anatomy**	CTO of 1-vz.; no other disease	1-2-vz. disease; no prox. LAD

AUC for all Lesions (except LM and Proximal LAD)

Low Risk Findings on Noninvasive Study		
Symptoms **Med. Rx**		
Class III or IV Max Rx	U	A
Class I or II Max Rx	U	U
Asymptomatic Max Rx	I	I
Class III or IV No/min Rx	I	U
Class I or II No/min Rx	I	I
Asymptomatic No/min Rx	I	I
Coronary Anatomy	CTO of 1 vz.; no other disease	1-2 vz. disease; no Prox. LAD

Asymptomatic		
Stress Test Med. Rx		
High Risk Max Rx	U	A
High Risk No/min Rx	U	U
Int. Risk Max Rx	U	U
Int. Risk No/min Rx	I	I
Low Risk Max Rx	I	I
Low Risk No/min Rx	I	I
Coronary Anatomy	CTO of 1 vz.; no other disease	1-2 vz. disease; no Prox. LAD

CAVEATS

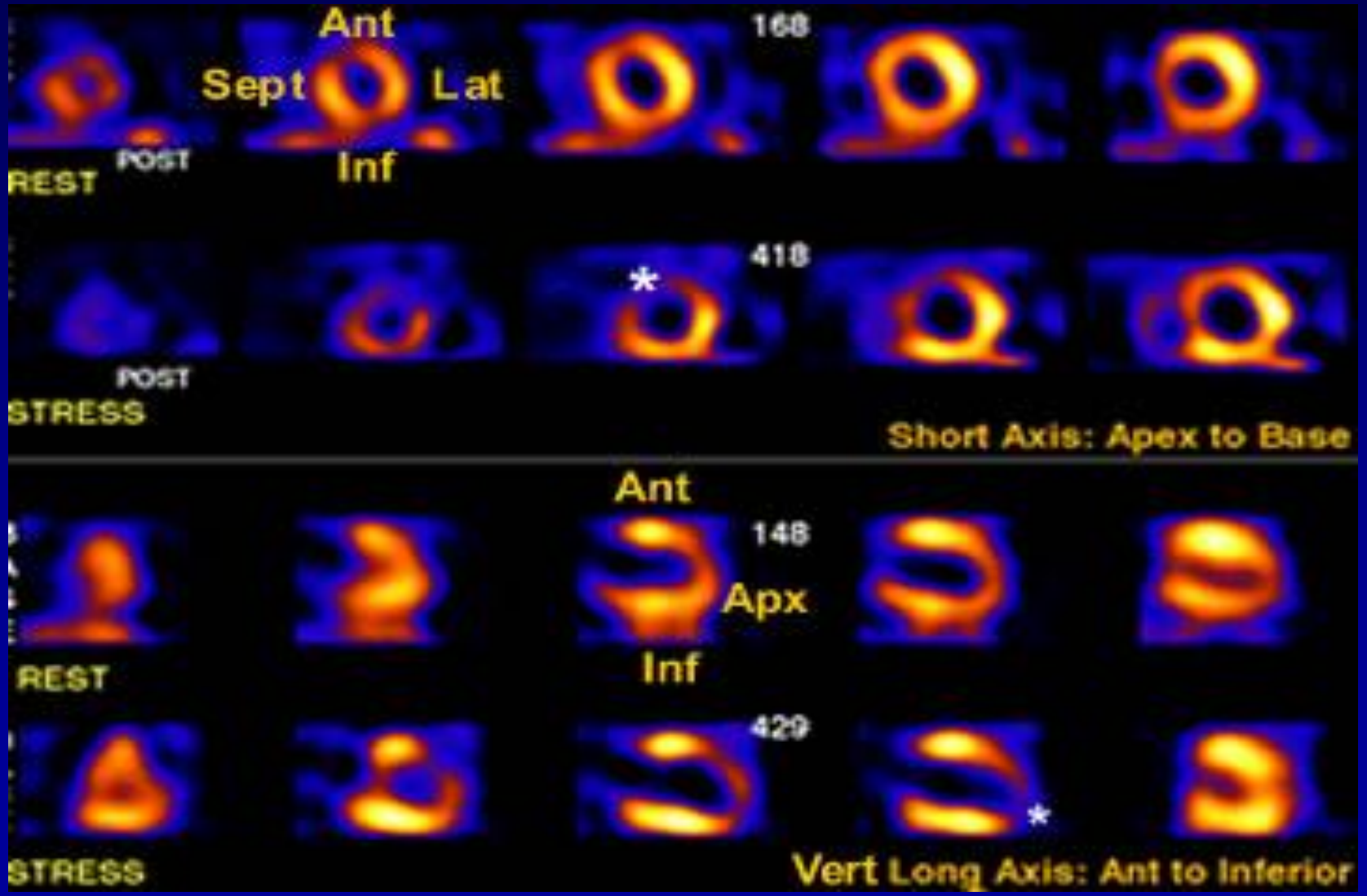
Severity of Angina

(not predictive nor prognostic value)

Numbers of Risk Factors

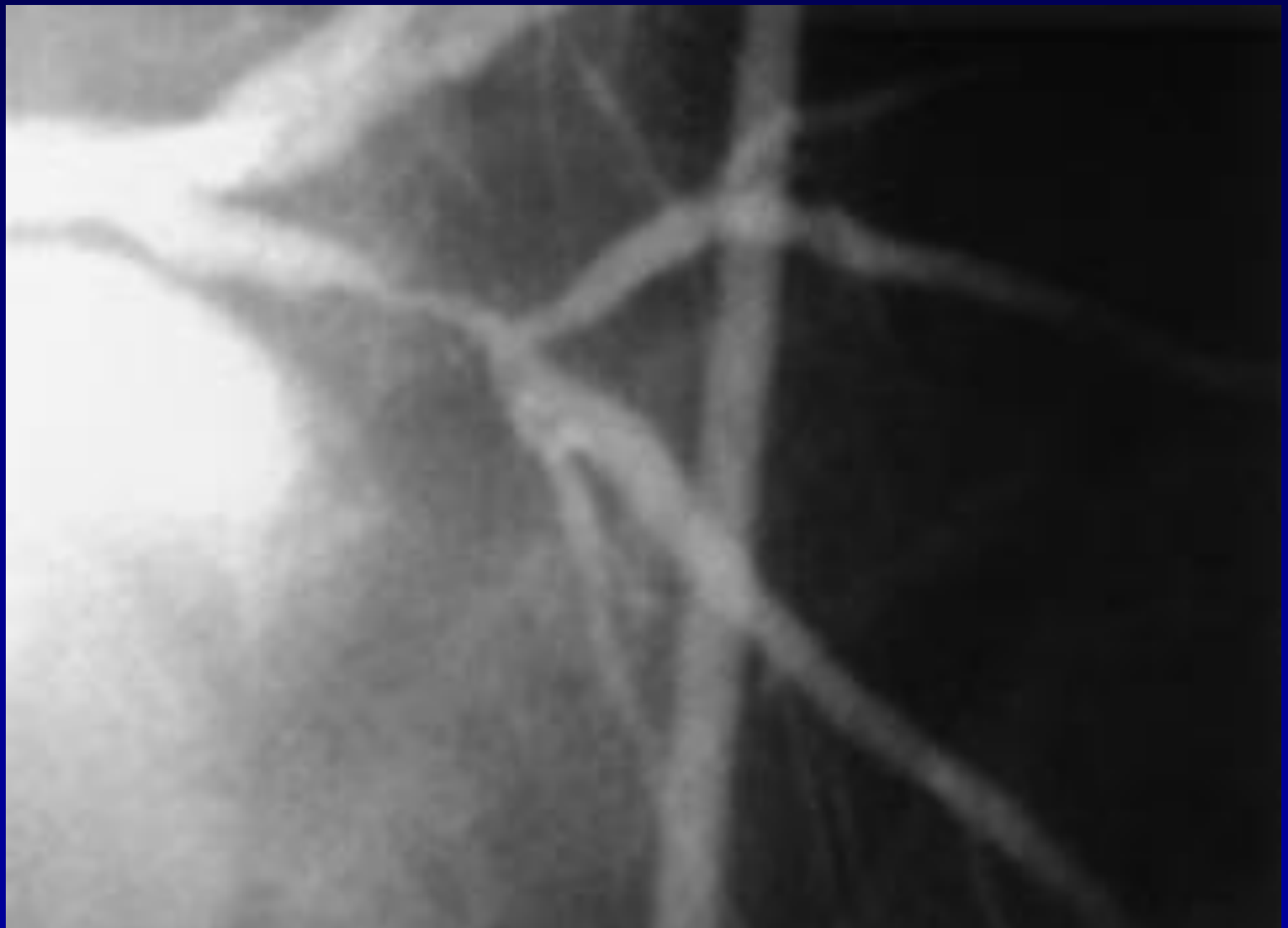
(not predictive nor prognostic value)

Non-Invasive High Risk Features
(Have predictive and prognostic value)

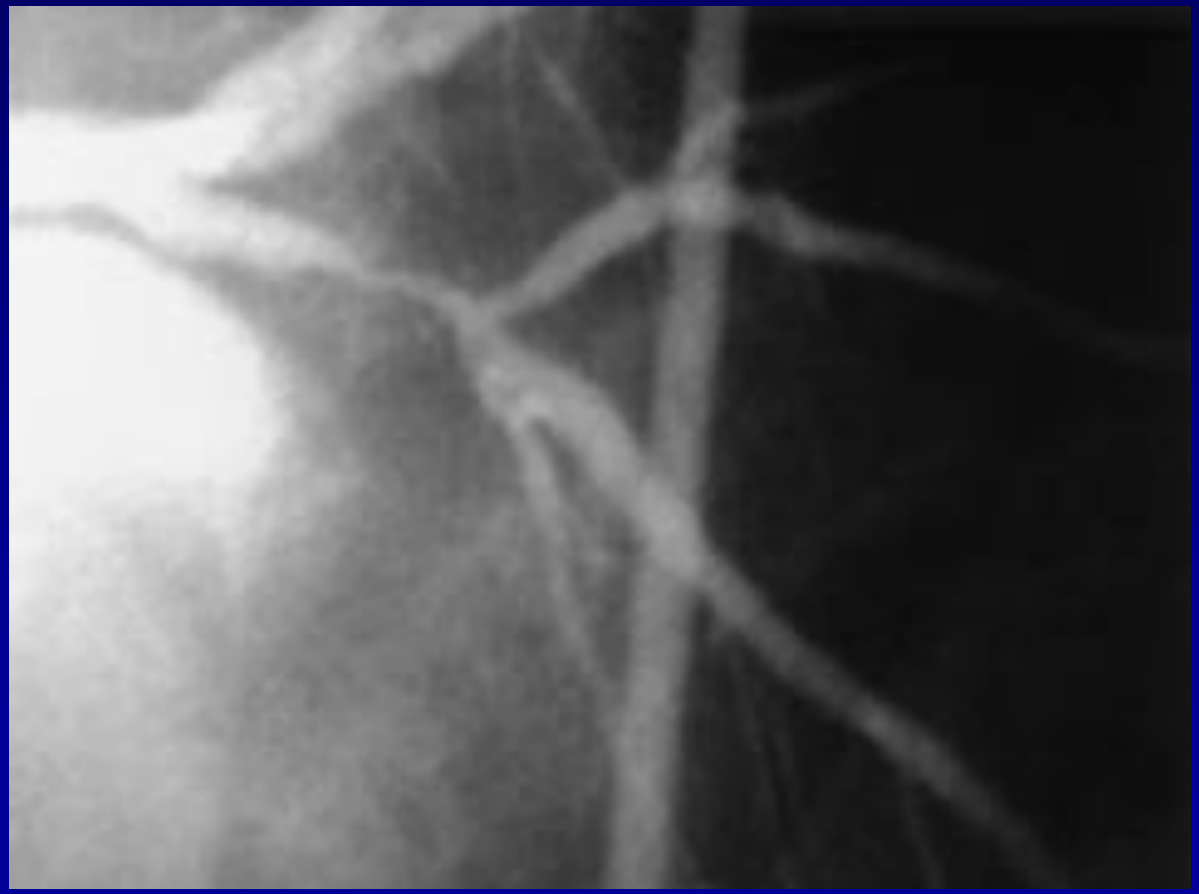


Location of the Lesions

(Have predictive and prognostic value)

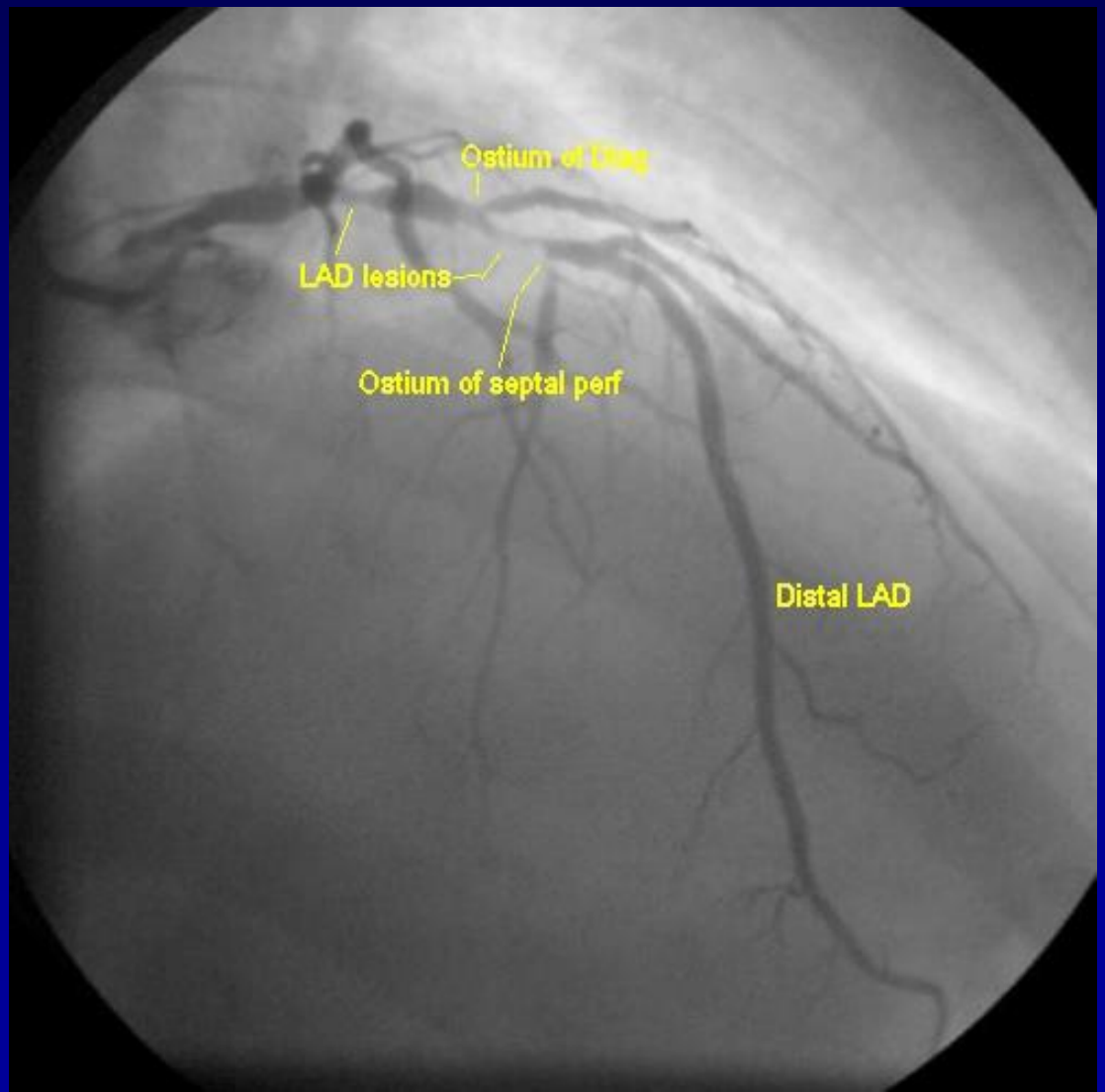


Why is the Lesion at the Proximal LAD Important?

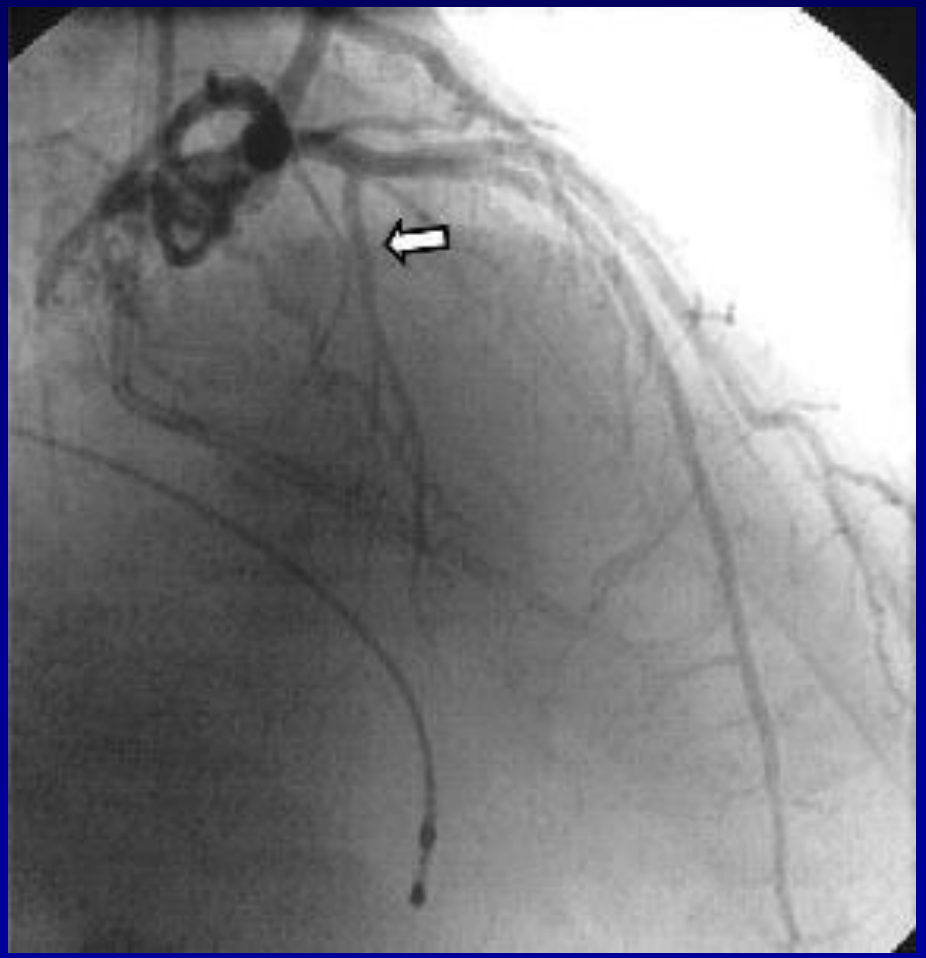


AWMI with occluded septal perforator

AWMI with patent septal

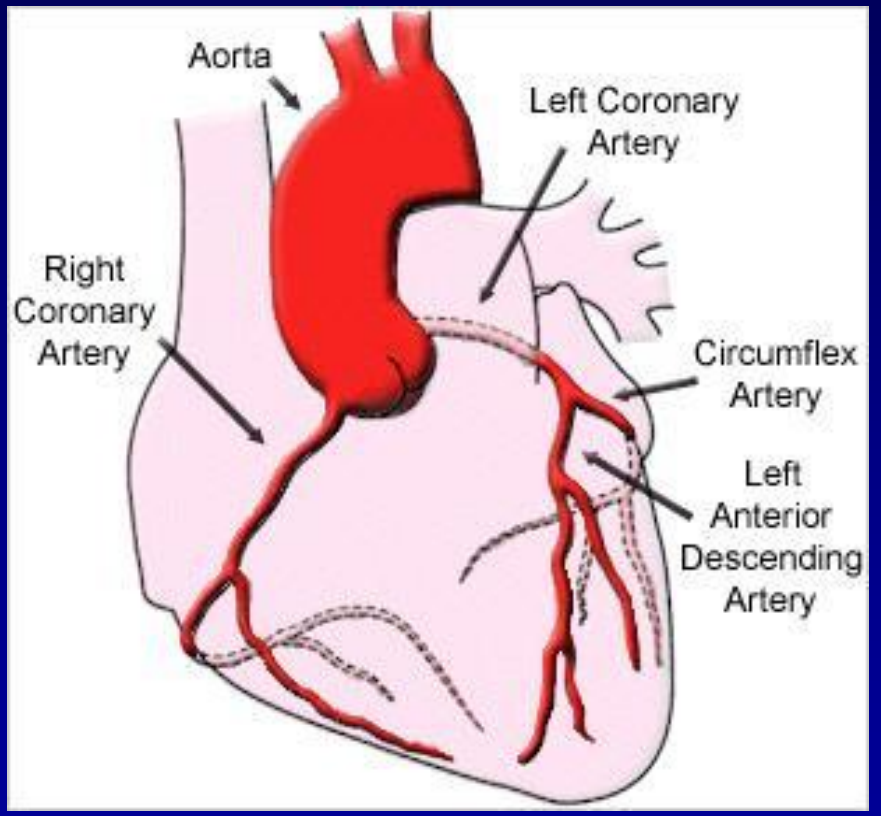


The first septal branch contracts the proximal segment of the septum and generates 20cc of stroke volume



Importance of Proximal LAD

1. Proximal septal
2. Large diagonal
3. Large amount of myocardium at risk

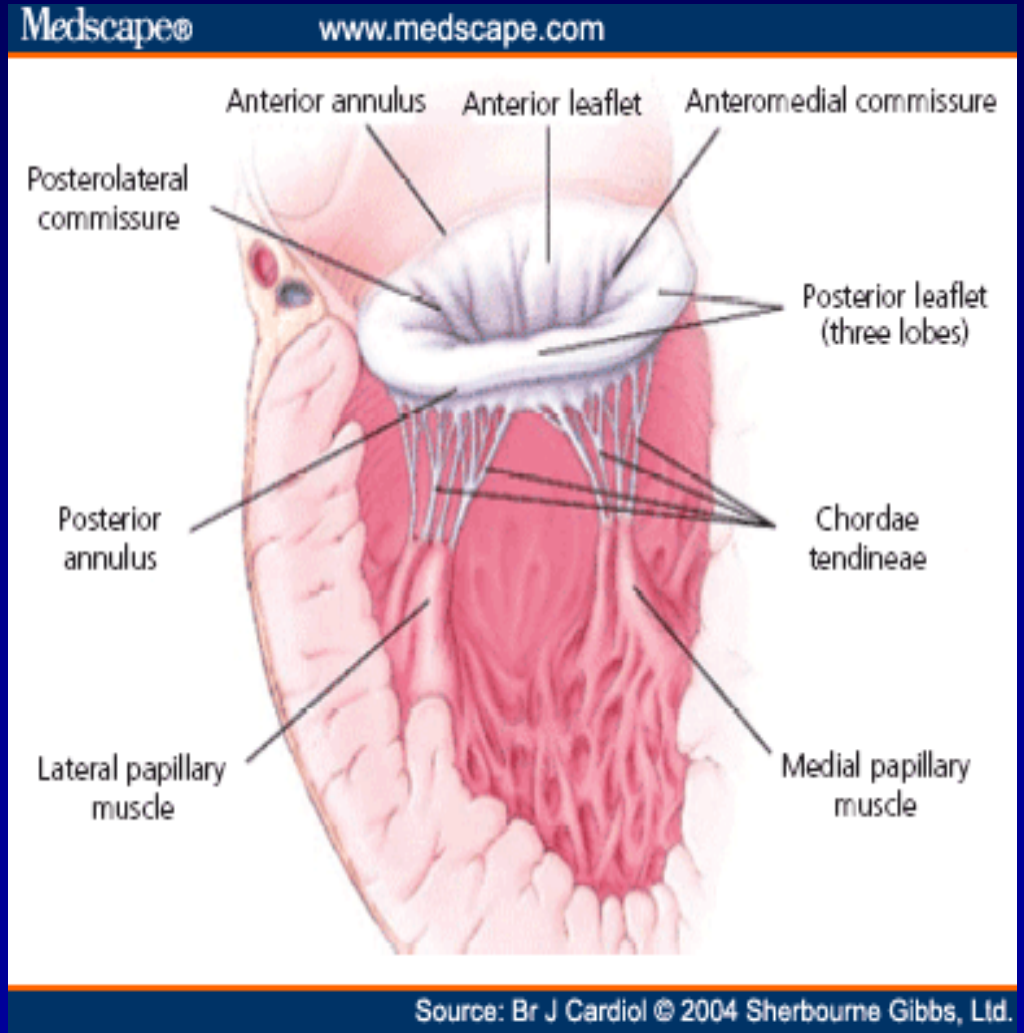


Why does a patient die after occlusion of the diagonal, obtuse marginal or posterior distal artery or right coronary artery?


V.Singh,MD

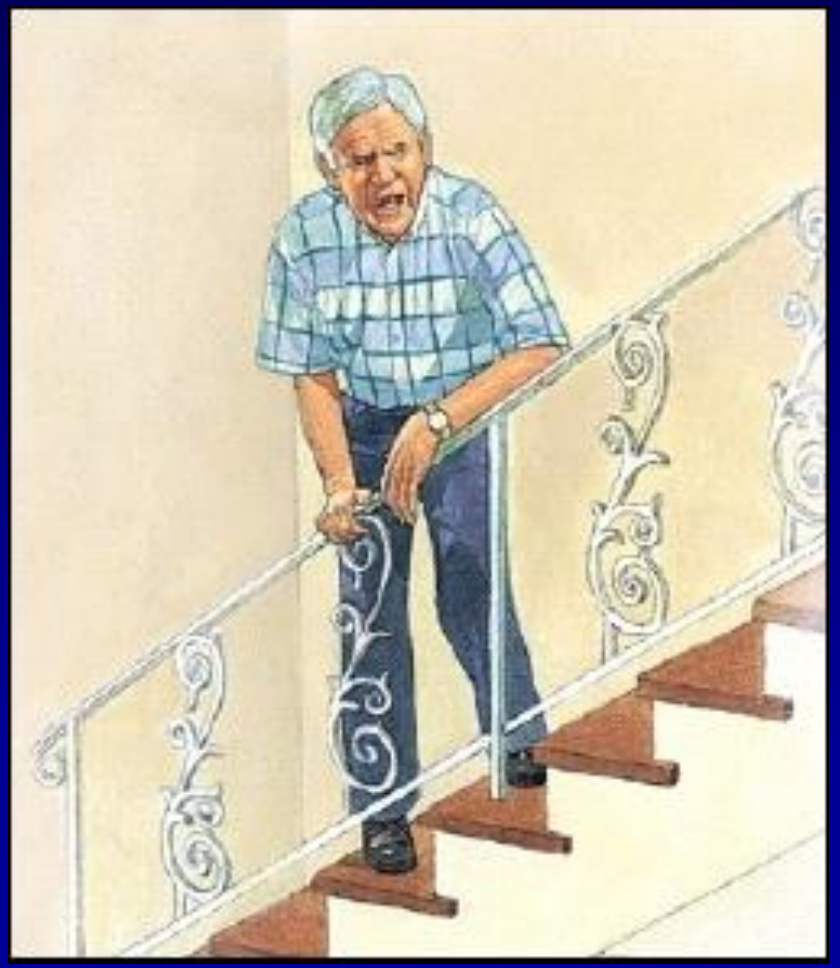
Blood supplied to the 2 papillary muscles

1. Large diagonal
2. Distal PDA in right dominance
3. Large Obtuse Marginal in L dominance



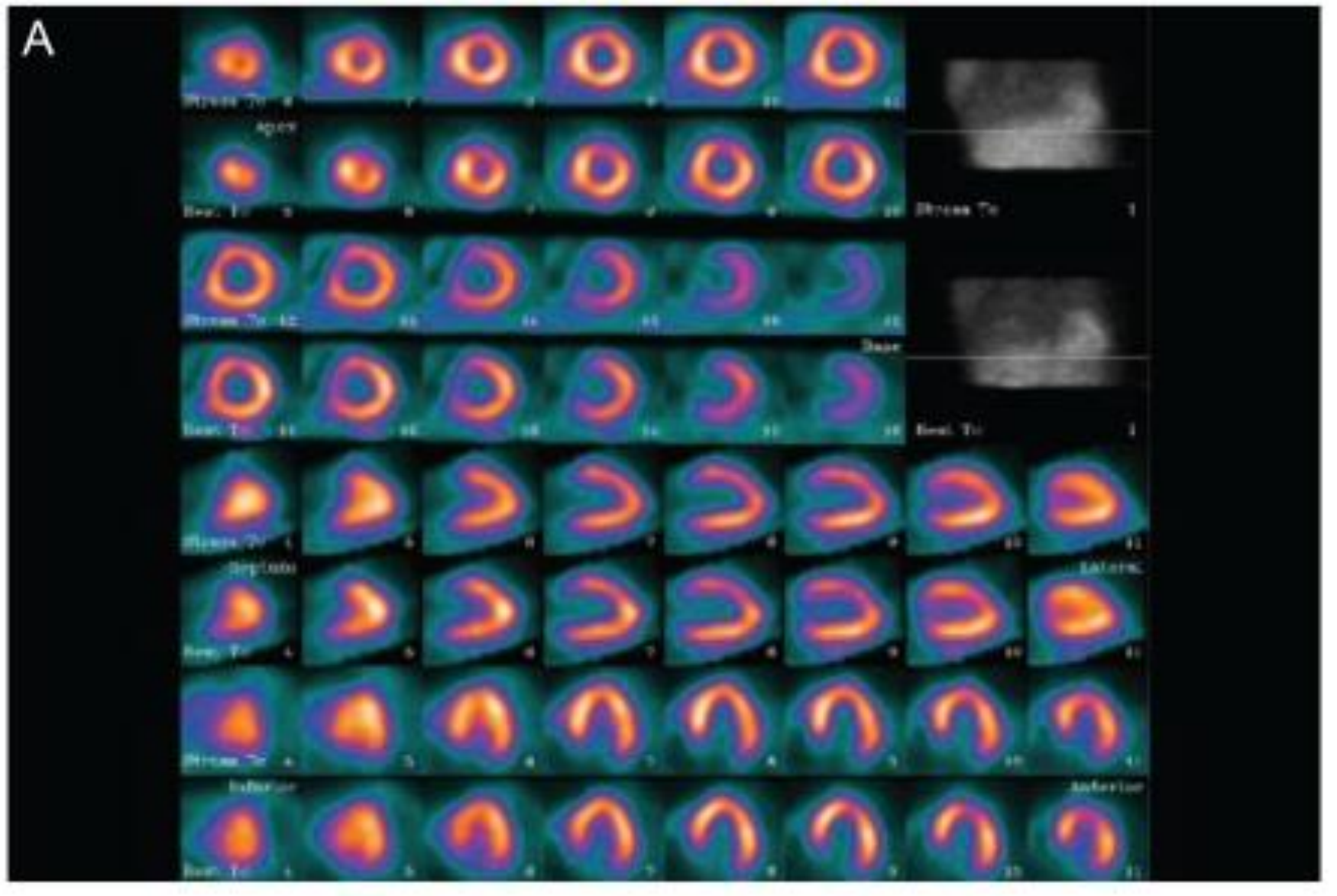
PCI for Shortness of Breath

A patient with increasing SOB. EF=20%. The angiogram showed the large diagonal with a severe lesion in its proximal segment.

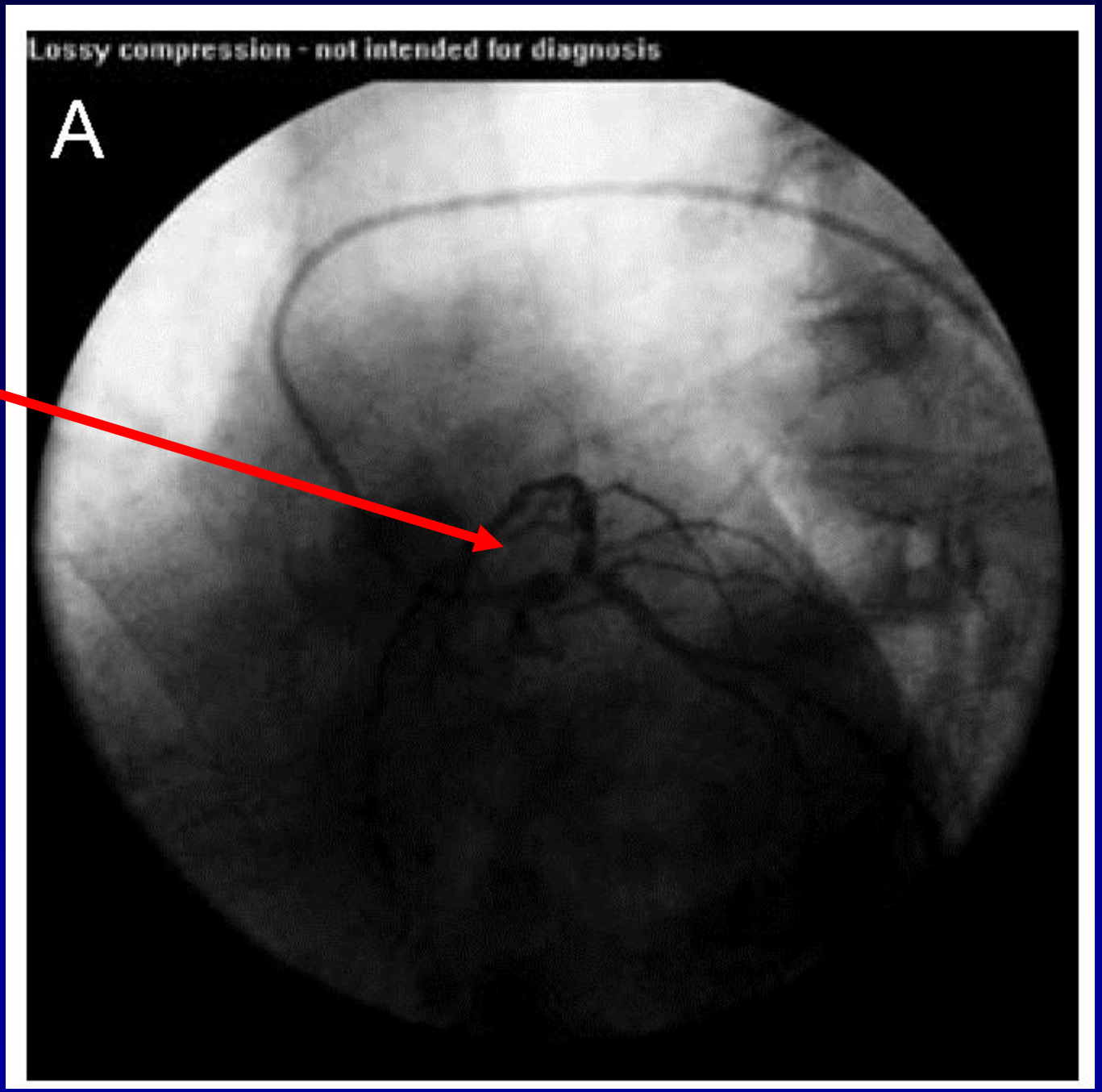


A severe lesion in the diagonal or obtuse marginal or PDA may not cause enough severe angina and large abnormality on nuclear scan. Need high clinical suspicion

A patient with severe typical angina with normal nuclear scan



Heart Int. 2011 September 29; 6(2): e22.
Published online 2011 November 18.
Triple vessel coronary artery disease presenting as a markedly positive stress electrocardiographic test and a negative SPECT-TL scintigram: a case of balanced ischemia **Emad F. Aziz, Fahad Javed, Carlos L. Alviar, and Eyal Herzog**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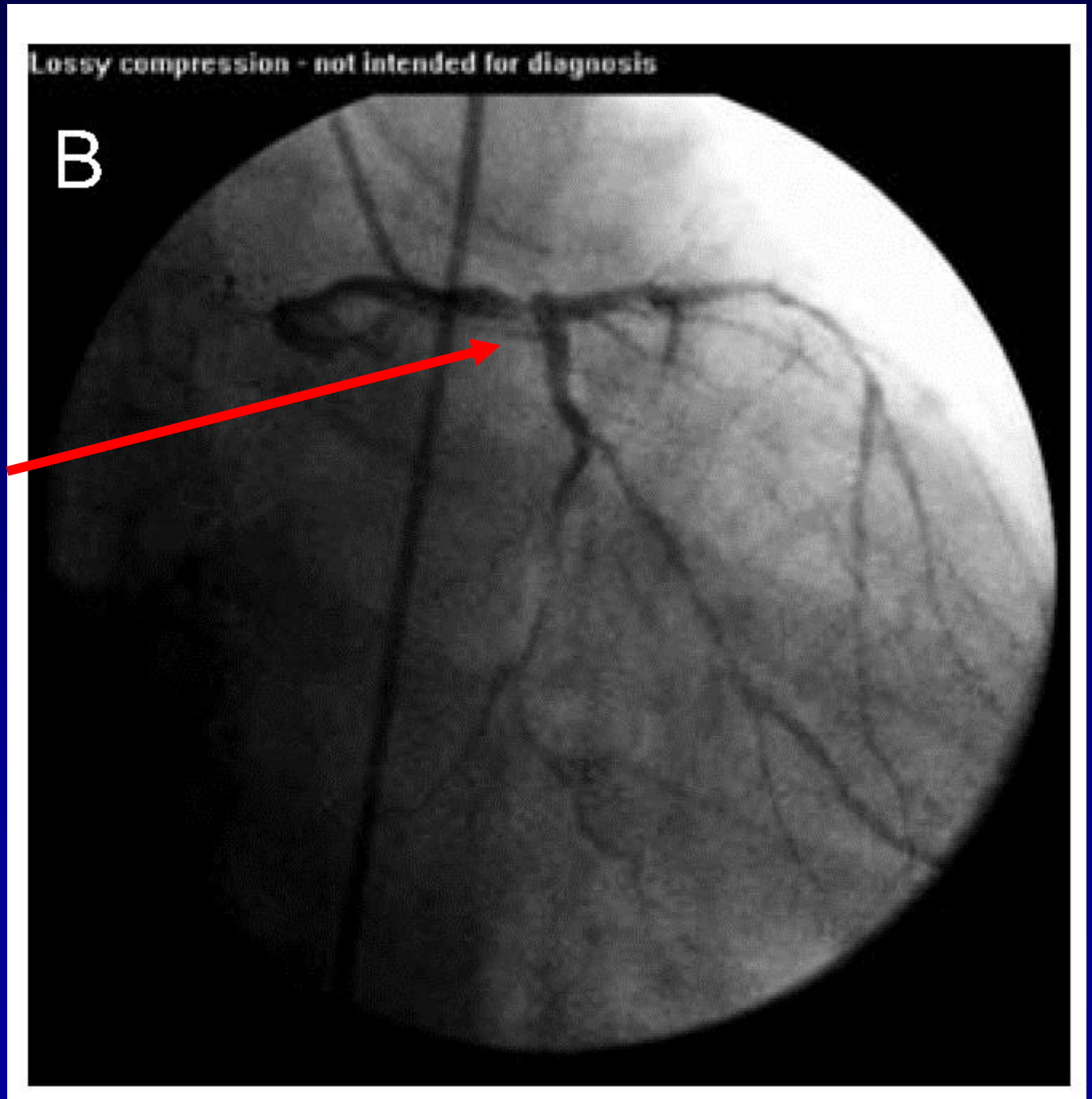
A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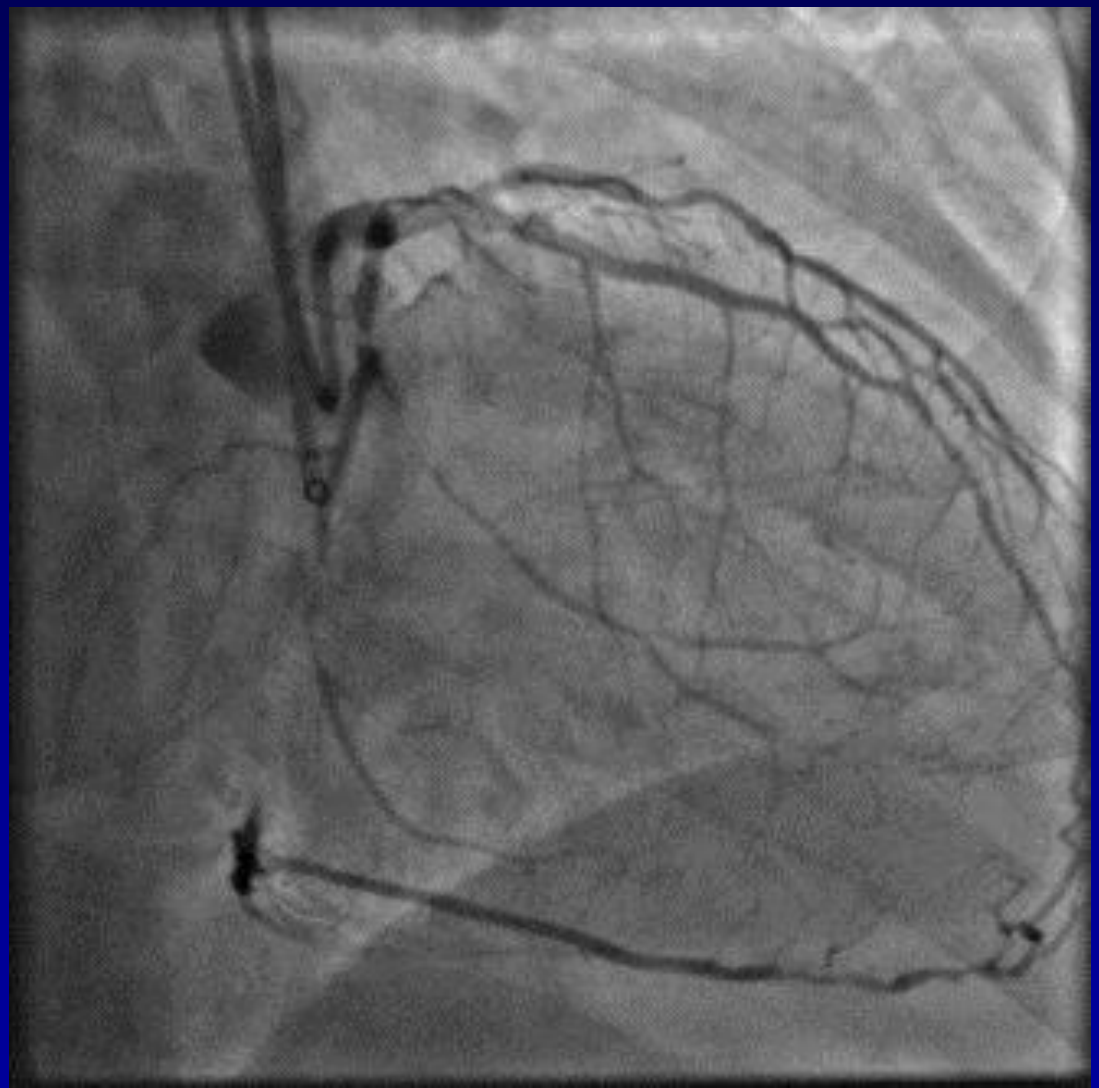
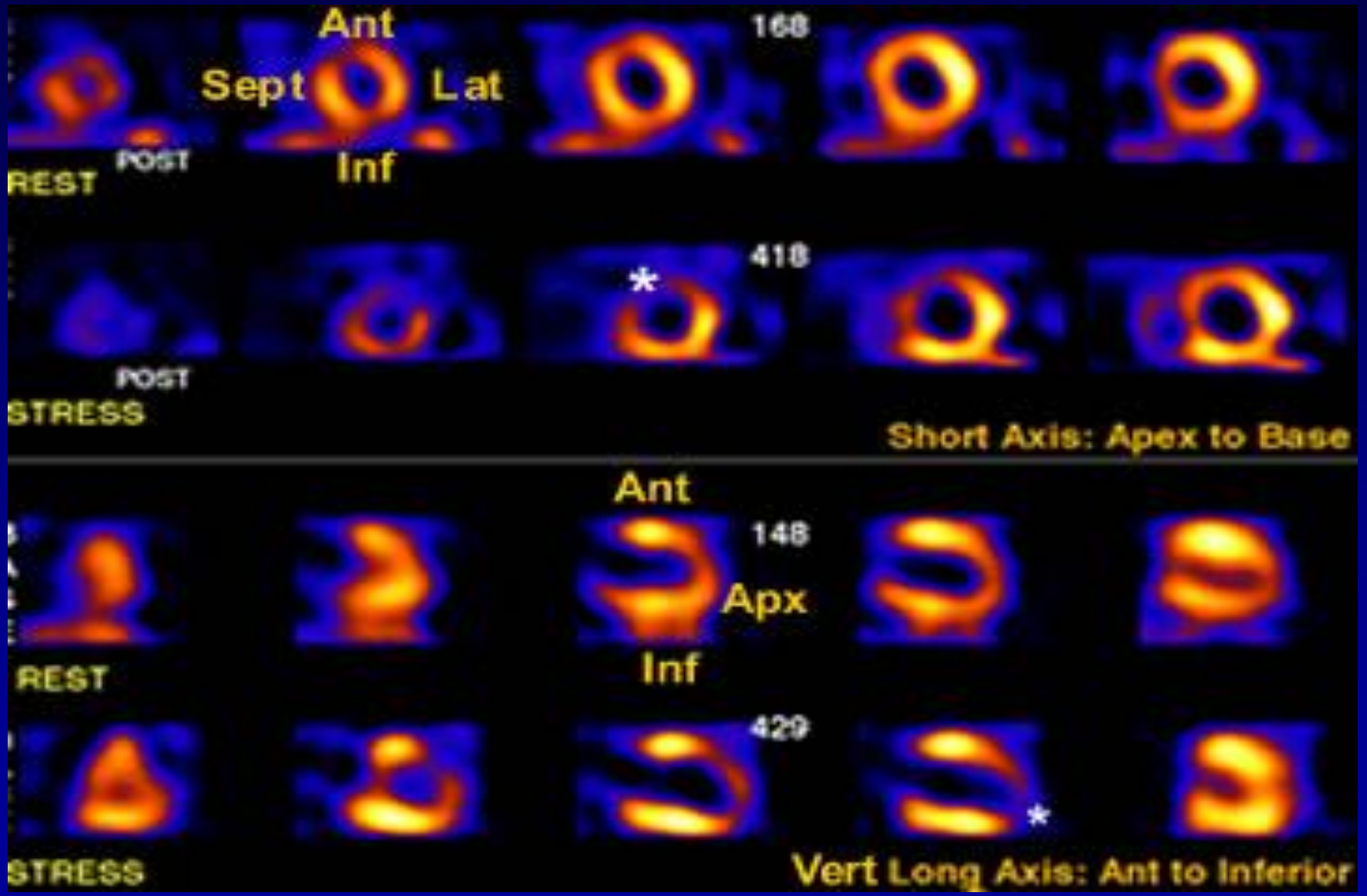
A nuclear scan can be false negative due to generalized decrease of isotope uptake (balanced ischemia) due to severe LM. Need to heighten clinical suspicion

Large reversible change for years

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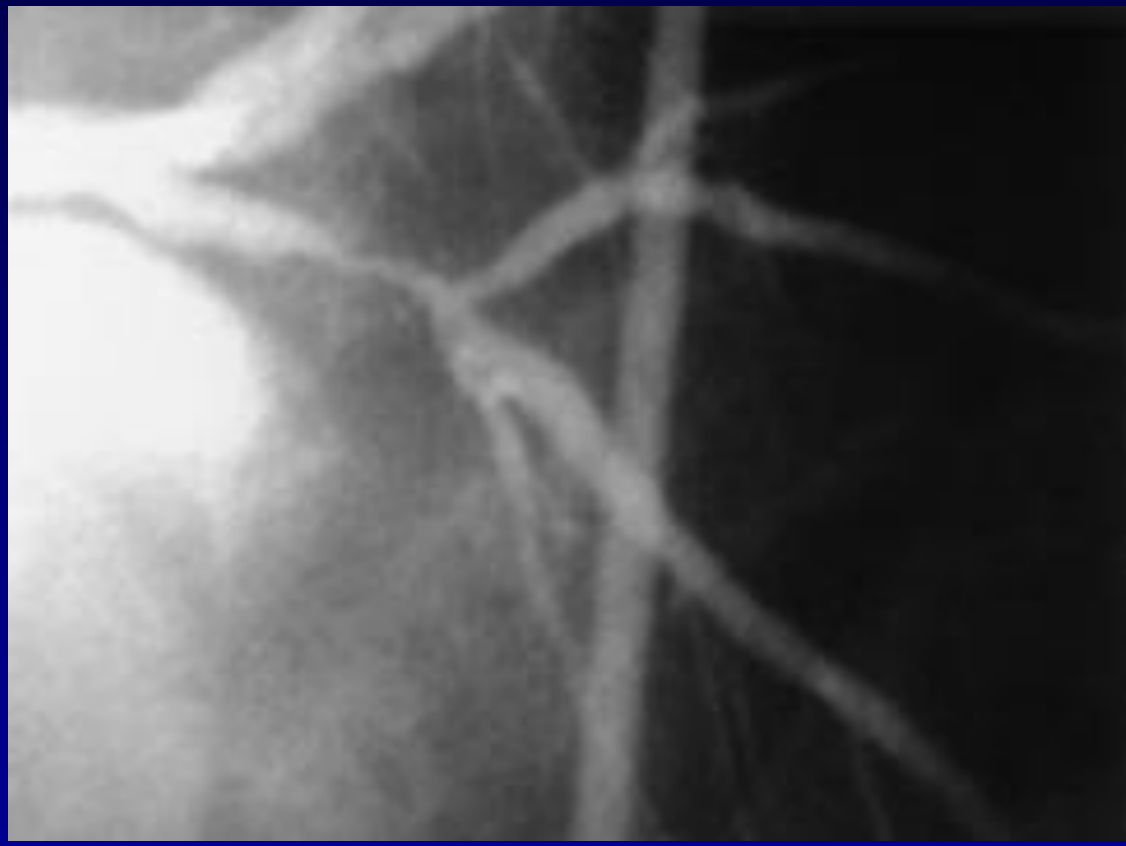
STRESS
Vert Long Axis: Ant to Inferior



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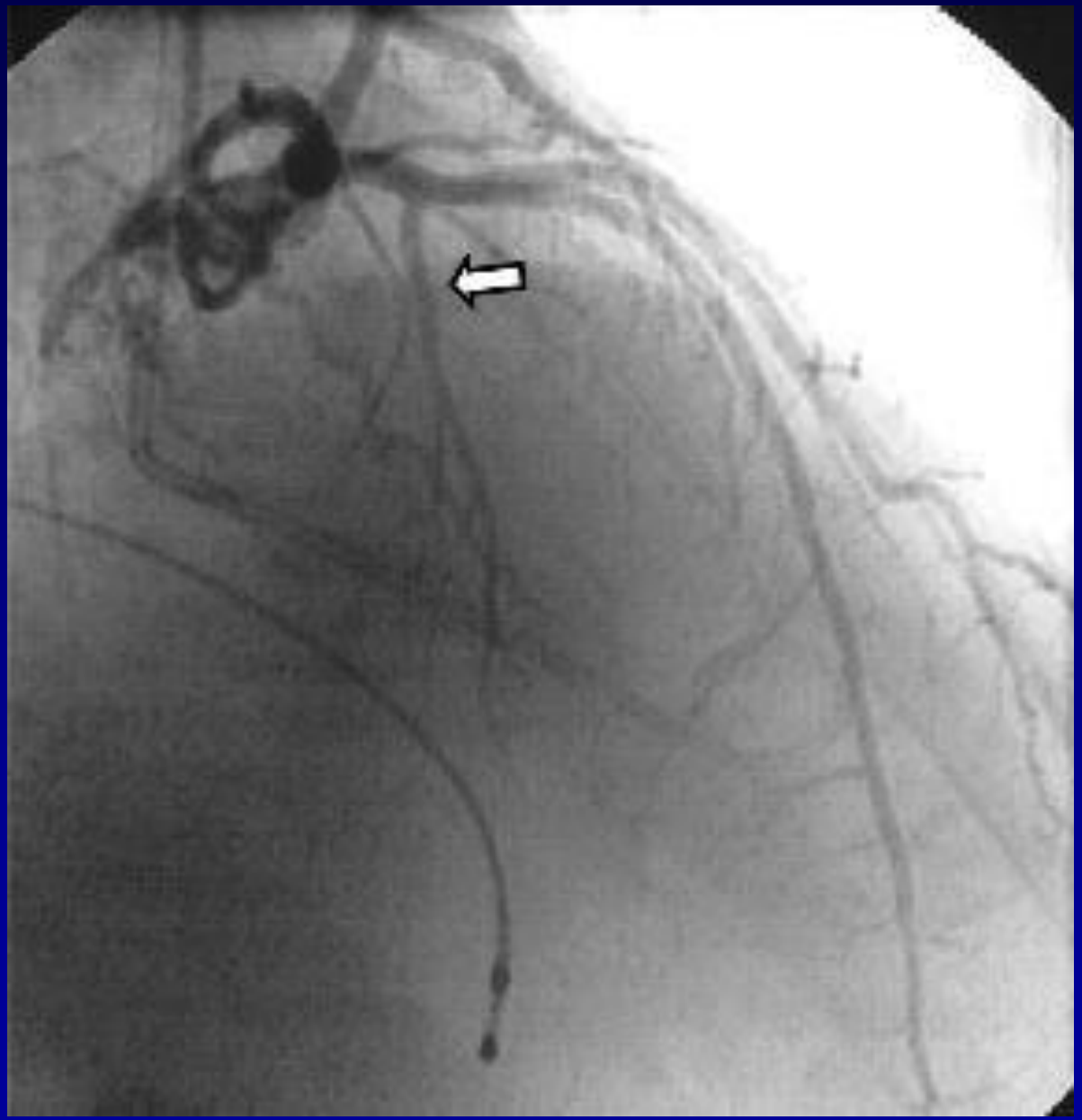


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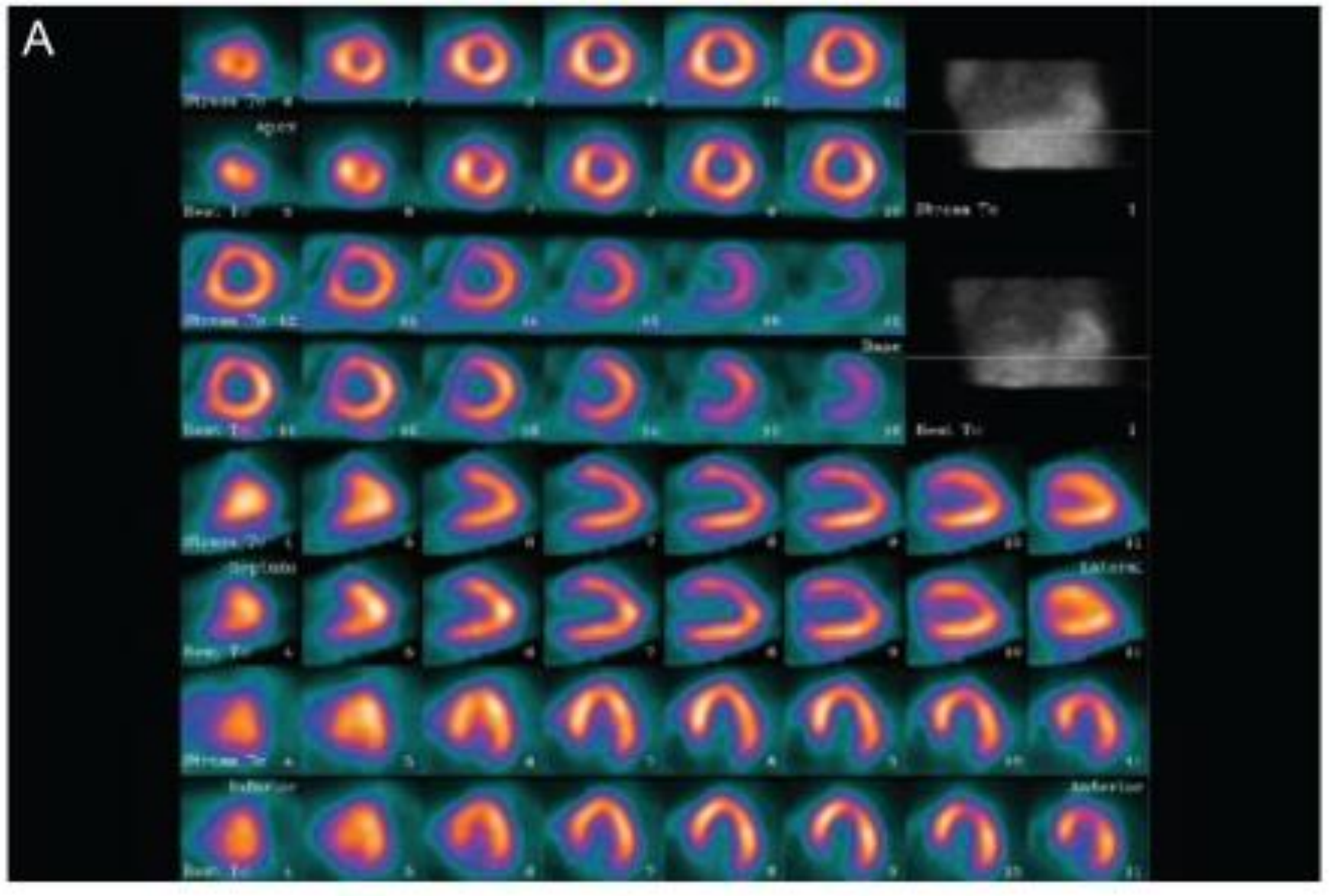

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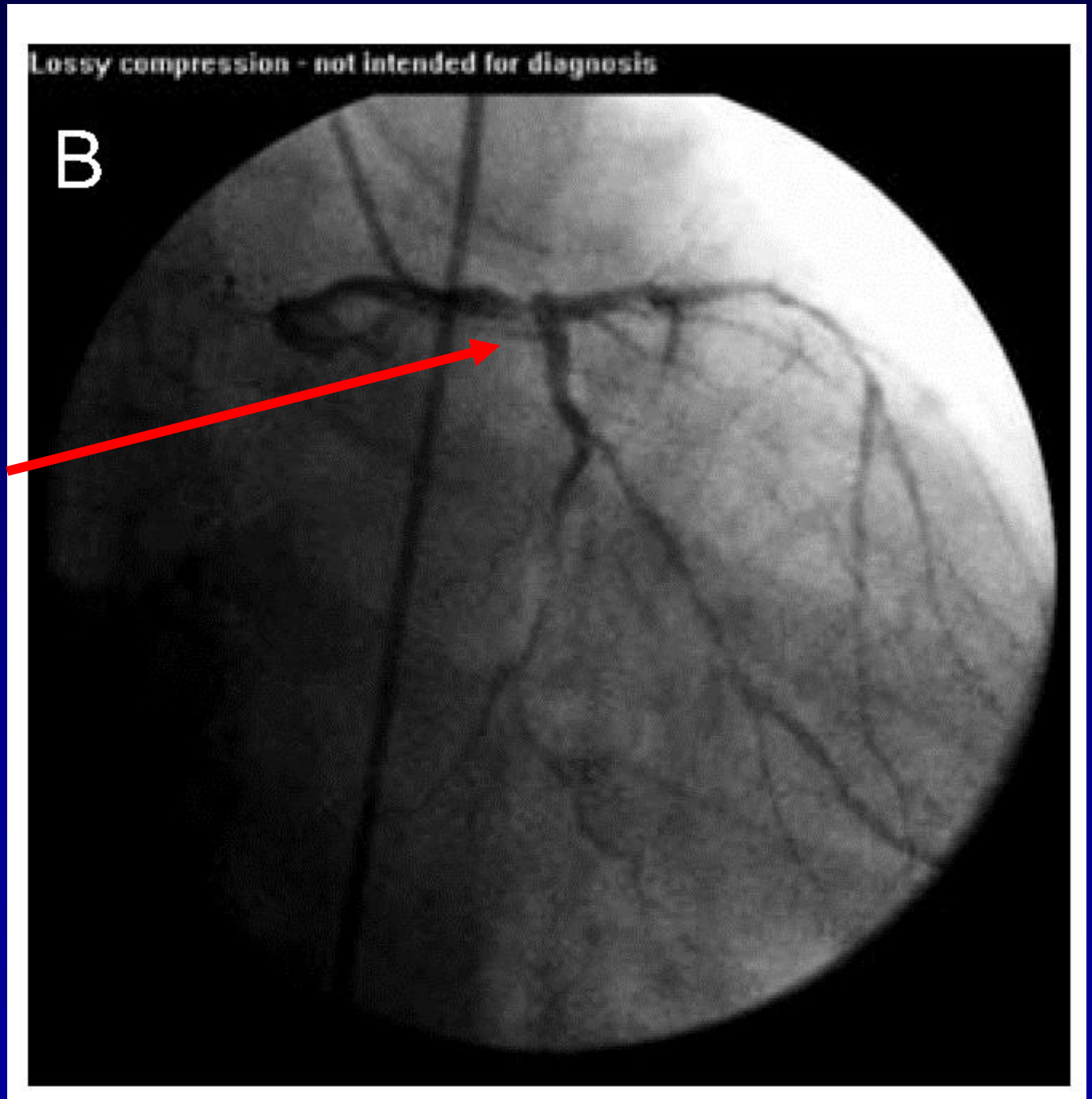
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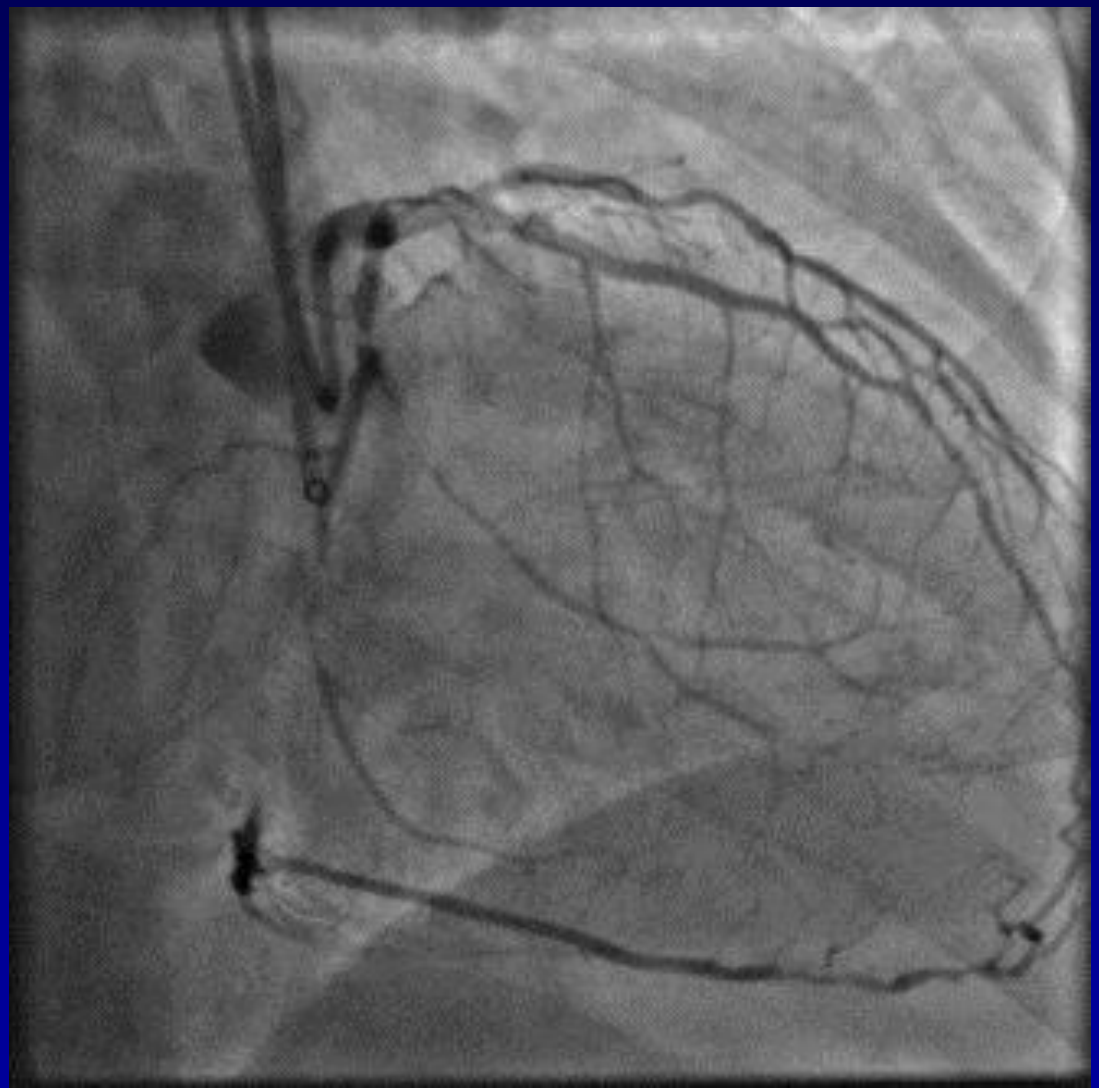

Thank You