

# Acute Chest Pain Cardiac & Coronary

Emergency Radiology 2023

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8th Nordic Course in Emergency Radiology, Aarhus,  
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*Disclosures: None*

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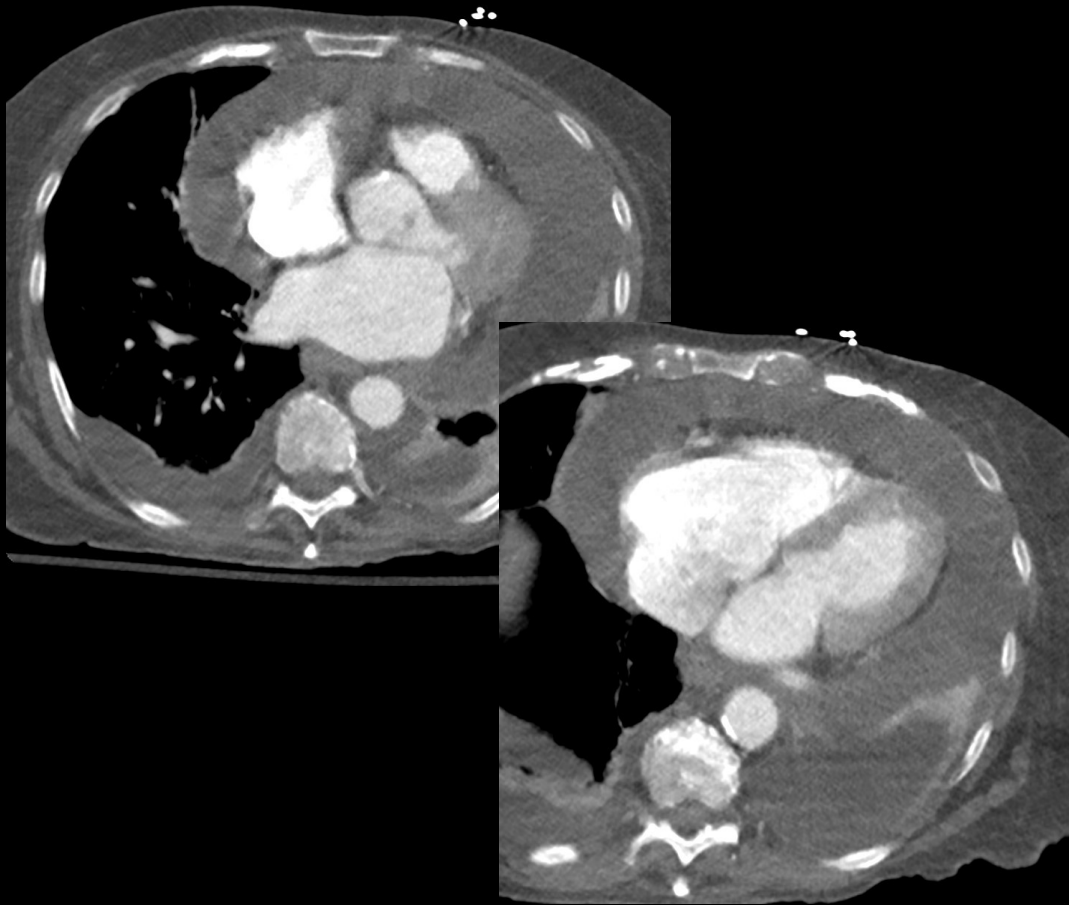
## Cardiac

- Pericardiac Disease
- Cardiac aneurysm
- Myocardium

## Coronary

- Coronary Artery Aneurysms
- Congenital Coronary Artery Anomalies
- Coronary Artery Atherosclerosis

# Pericardial Effusion



Clinical presentation is based on **speed** of accumulation

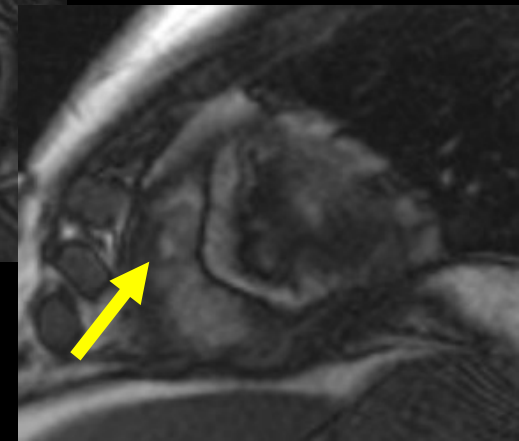
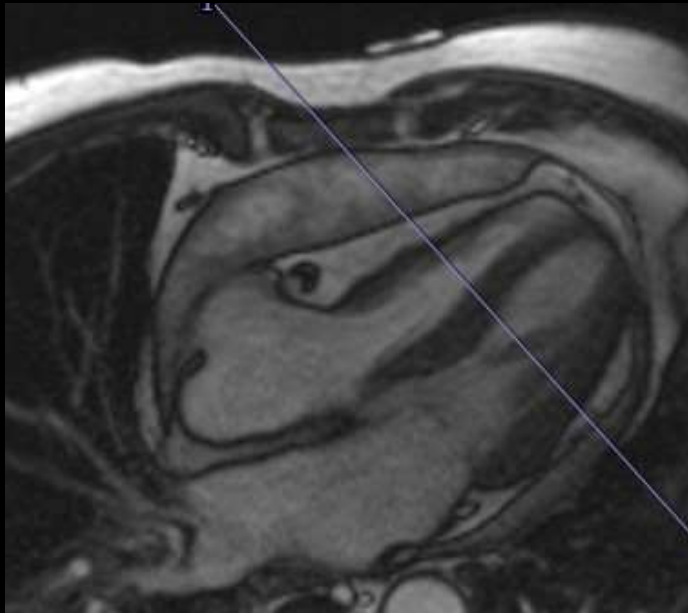
If rapid: impaired filling of low-pressure chambers, particularly the right atrium. Triad : jugular venous distension, hypotension, and muffled heart sounds

- Idiopathic / post viral
- Inflammatory (including, RA, Sjogren)
- Post MI
- Post surgical
- Renal
- Malignancy

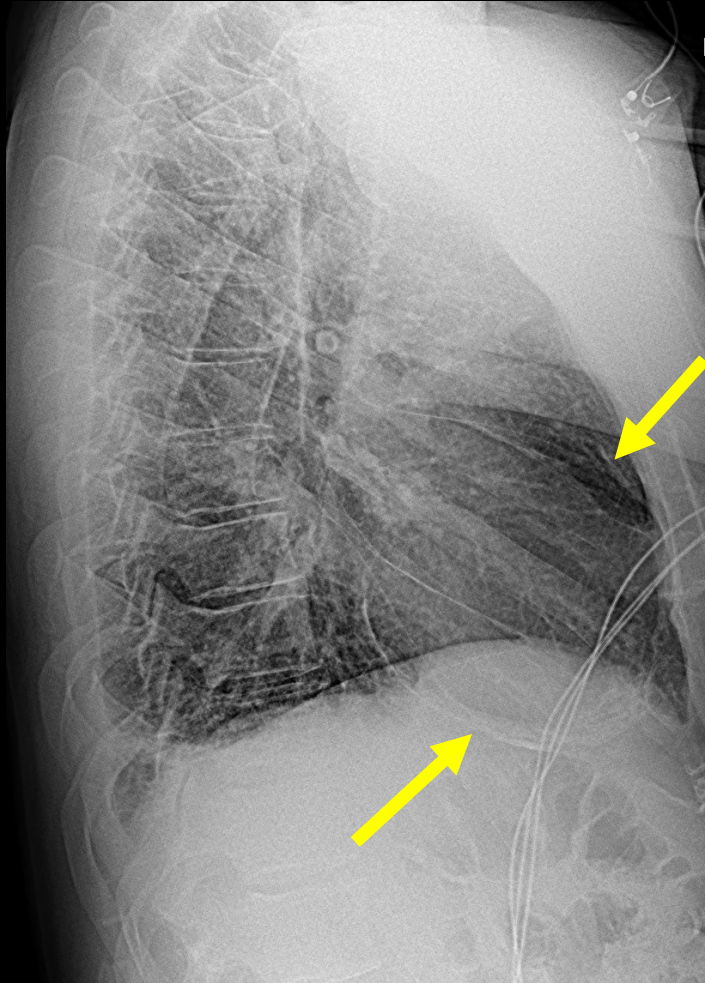
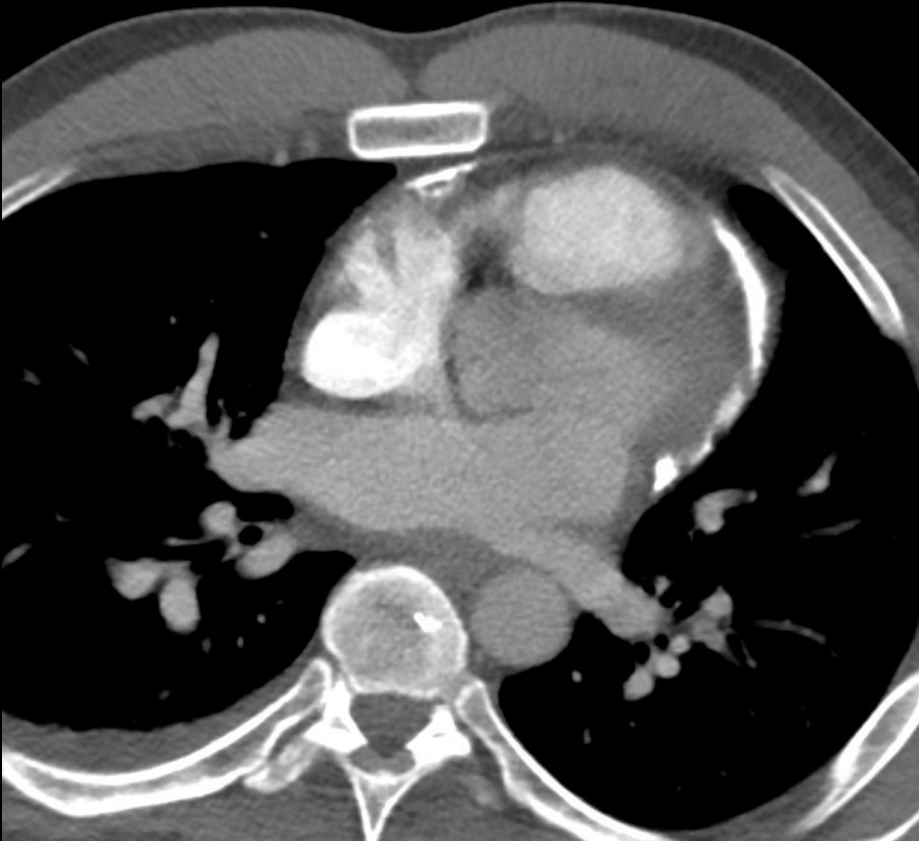
# Pericarditis

Thickened pericardium, enhancing  
Complexity of fluid

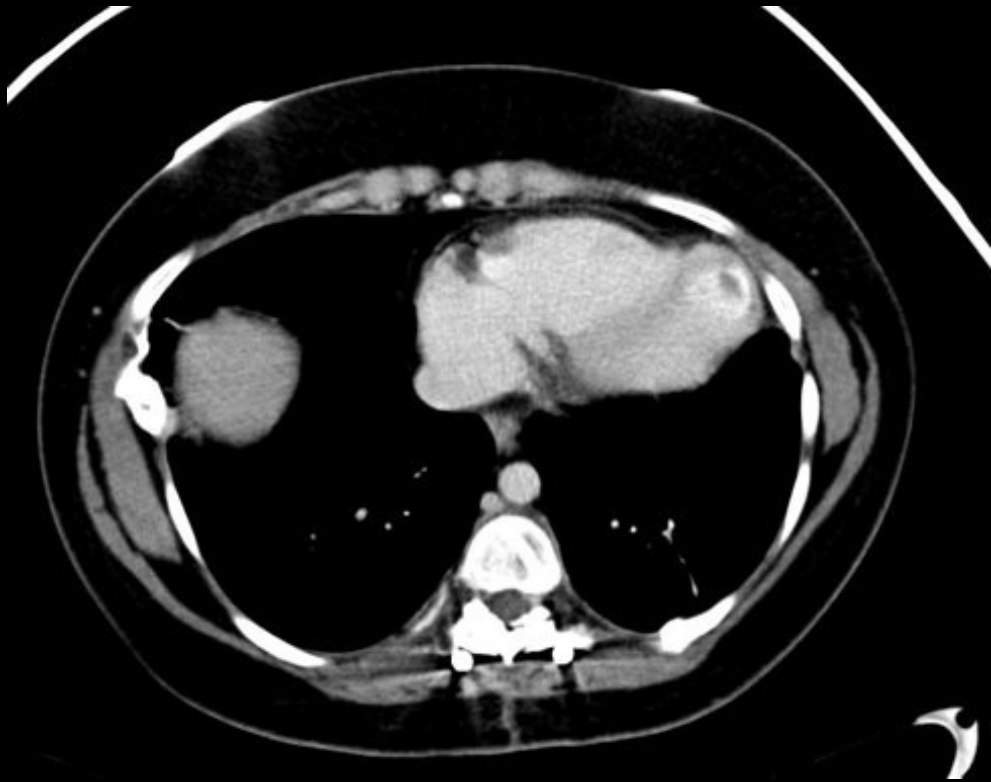
+ Myocardium



# Constrictive Pericarditis



# Cardiac aneurysm



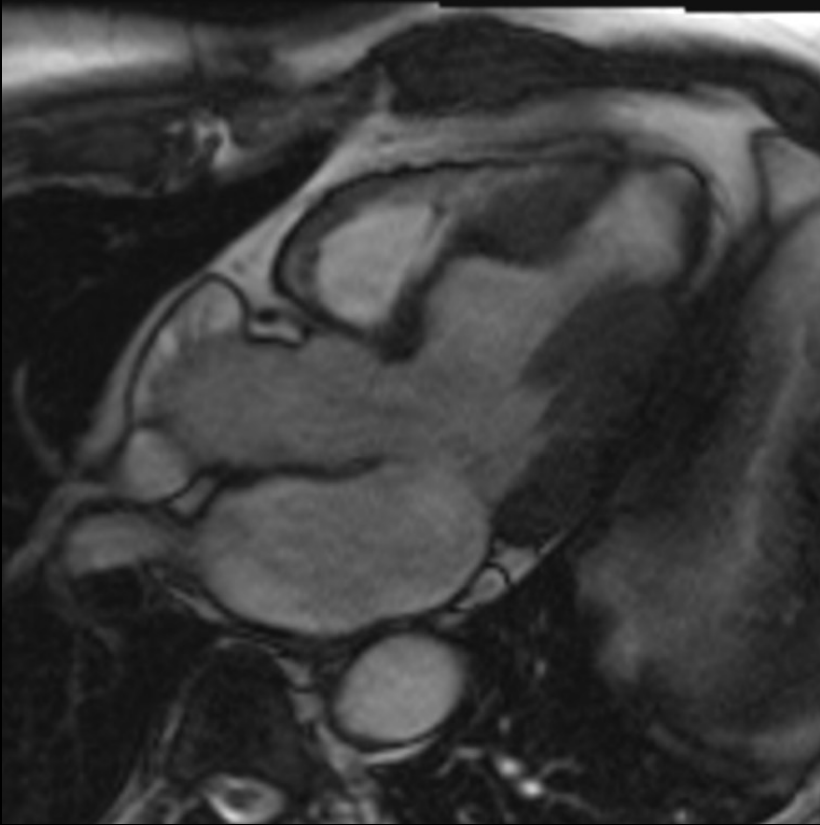
## Common:

- Intramural thrombus, which may calcify
- Impaired cardiac output

## Rare:

- Aneurysm rupture
  - Rupture rate is higher with pseudoaneurysms

# LV aneurysms



# Myocardial Infarct



Case image: Fig #2 from Lee, TL., Hsuan, C., Shih, CH. et al. Early detection of myocardial infarction following blunt chest trauma by computed tomography: a case report. *BMC Cardiovasc Disord* 17, 56 (2017). <https://doi.org/10.1186/s12872-017-0496-3>



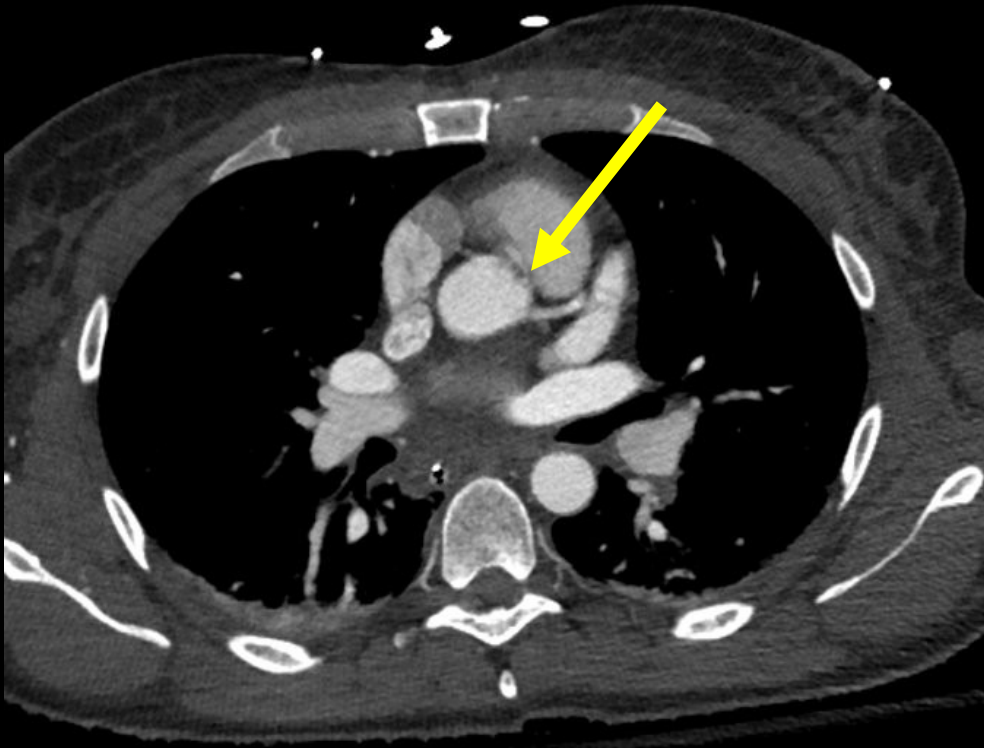


# Coronary artery aneurysms



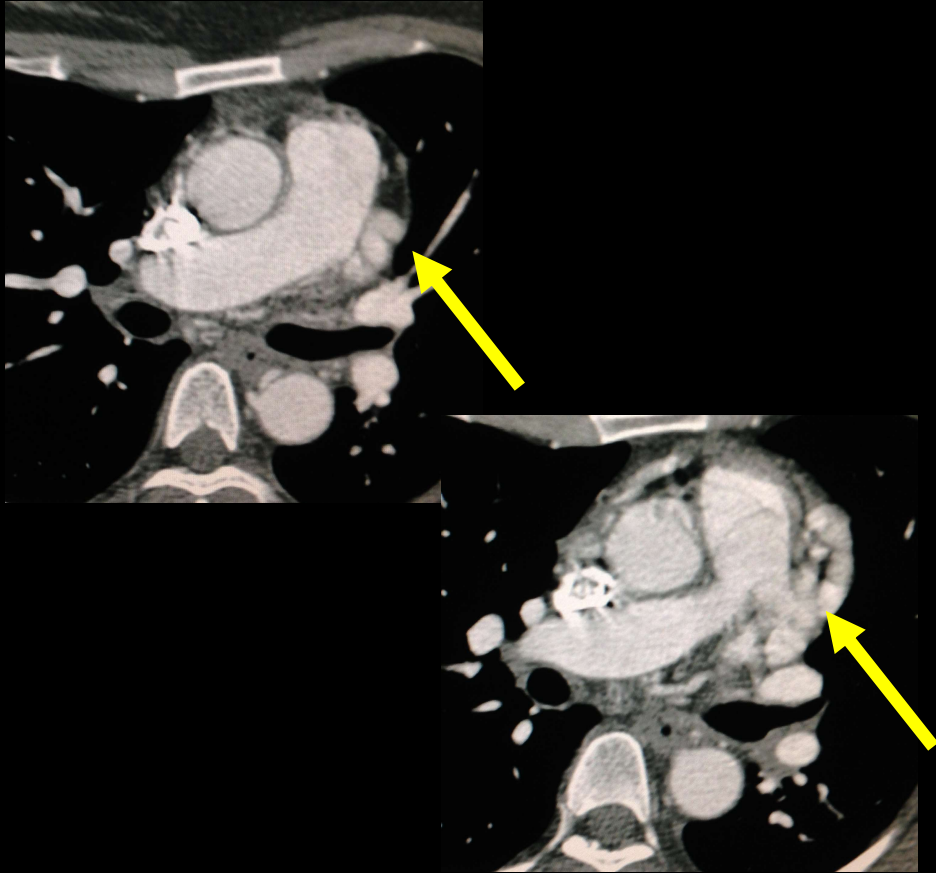
- Localized dilatation exceeding the diameter of adjacent normal segment by 50%
- > 2 cm = “Giant “
- Adults: usually atherosclerosis
- Angina ,MI, sudden death
- thrombus formation, fistula formation, rupture, congestive heart failure

# Anomalous origin



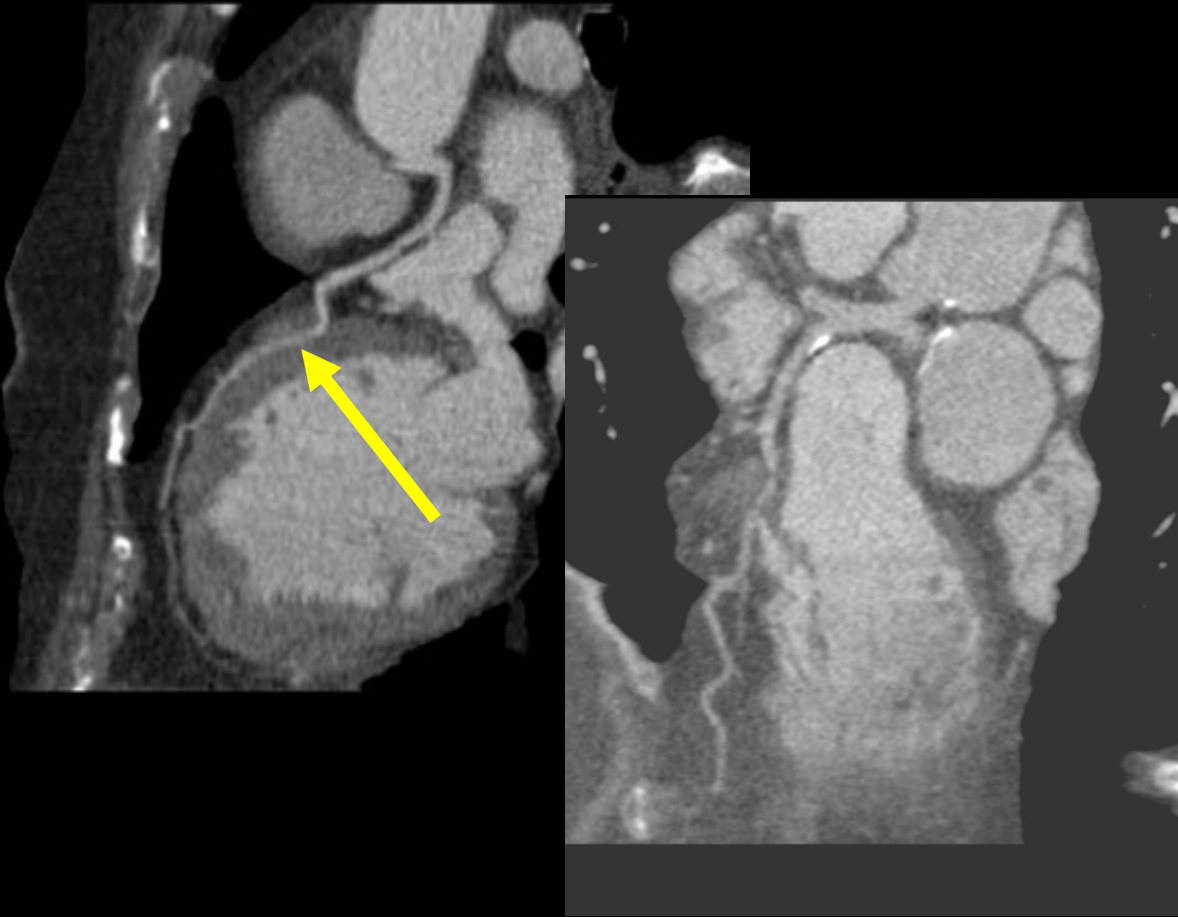
- RCA from the **left** sinus of Valsalva
- Incidence 0.03-0.17%.
- Inter-arterial, retro-aortic, prepulmonic or septal course.
- Sudden death (25-40%)
  
- Slit like ostium, acute angulation at the origin, compression of the vessel between the aorta and pulmonary artery
- Surgical reimplantation of RCA into right coronary sinus (vs. bypass, - stenting)

# Abnormal origin: LCA from the PA(ALCAPA)



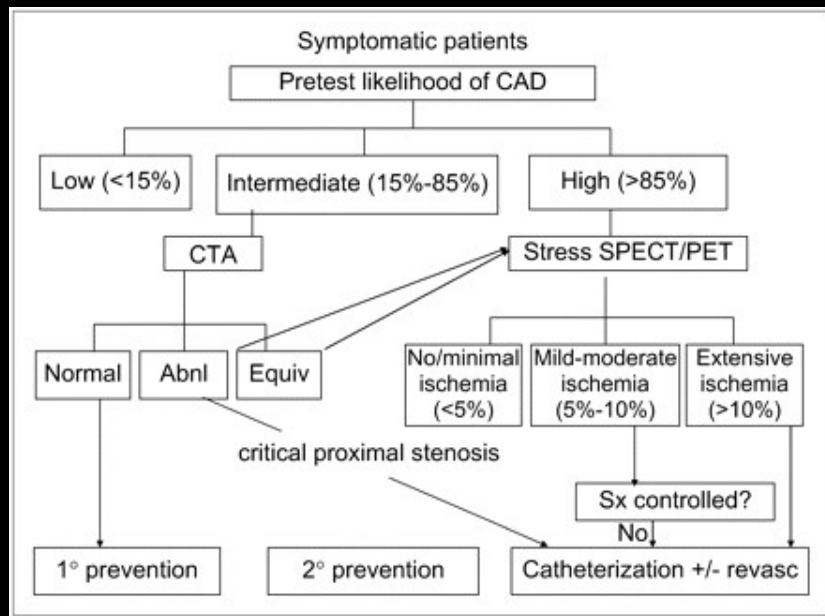
- 0.25%-0.5% of congenital cardiac disease.
- Early infant mortality, adult sudden death.
- Antegrade flow and decreased oxygen content in the LCA: myocardial ischemia + infarction
- Coronary Steal : collateral circulation between the right and left coronary systems develops and left coronary artery flow reverses and enters the pulmonary trunk

# Abnormal course: Myocardial Bridging



- Common!
- CCTA shows a portion or all of the artery in an intramyocardial location - the length and depth of the tunneled segment along with the location (proximal/mid or distal segment) can be reported
- Most patients are Asx
- Myocardial Bridging + HOCM -> Symptoms

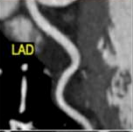

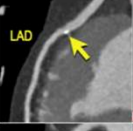

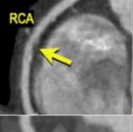
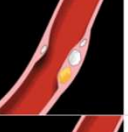

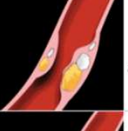
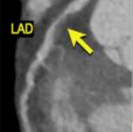

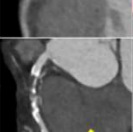
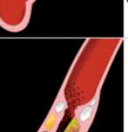
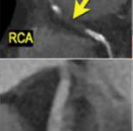
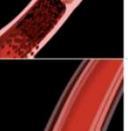
# Role Of Imaging Cardiac Ischemia



Flowchart

Berman, Daniel S., et al. "Roles of nuclear cardiology, cardiac computed tomography, and cardiac magnetic resonance: noninvasive risk stratification and a conceptual framework for the selection of noninvasive imaging tests in patients with known or suspected coronary artery disease." *Journal of Nuclear Medicine* 47.7 (2006): 1107-1118.

- High negative predictive value ~99%
- “Rule out” coronary artery disease in low to intermediate risk patients (NOT having ACS! And not with known obstructive CAD).
- >35 YO
- Would otherwise be admitted
- In selected patients: combo with whole chest CT may also evaluate for pulmonary embolism and acute aortic syndrome “Triple Rule Out”

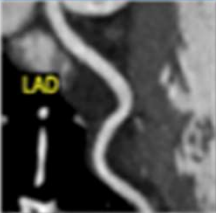

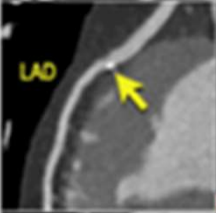
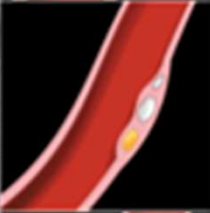

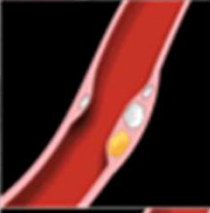
Cad-Rads	Stenosis	CT imaging	Illustration	Additional Tests
Cad-Rads <b>0</b>	0% No stenosis			None
Cad-Rads <b>1</b>	1-24% Minimal stenosis			None
Cad-Rads <b>2</b>	25-49% Mild stenosis			None
Cad-Rads <b>3</b>	50-70% Moderate stenosis			Consider functional assessment
Cad-Rads <b>4</b>	A: 70-99% stenosis in 1 or 2 vessels B: >50% stenosis in the left main or >70% stenosis in 3-vessels			A: Consider functional assessment or ICA B: ICA is recommended
Cad-Rads <b>5</b>	100% total occlusion			ICA and/or viability assessment
Cad-Rads <b>N</b>	Non-diagnostic study			Additional evaluation

[www.radiologyassistant.nl](http://www.radiologyassistant.nl)

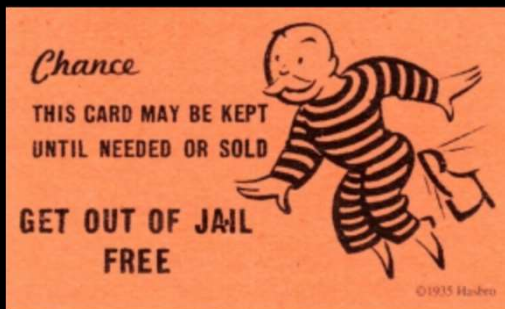
-> Cardiovascular

-> CADRADS \* updated and readily available table

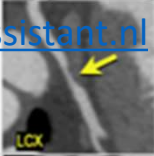
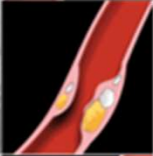

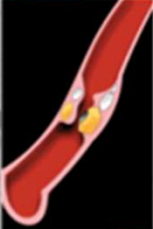

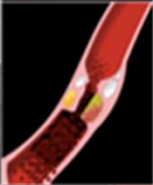
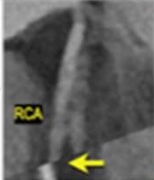

- Overall plaque burden has been added on version 2 : P1 (mild) to P4 (extensive).
- Calcium score or segment involvement score (SIS) ...or based on visual assessment.
- For example: now scored as “CAD RAD 1/P2”

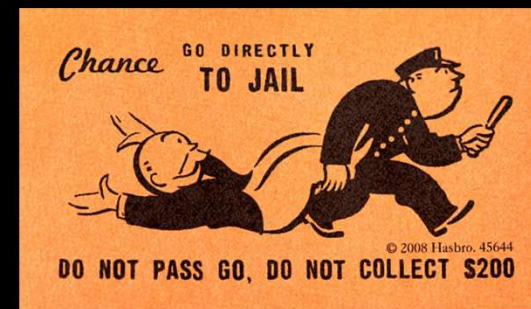
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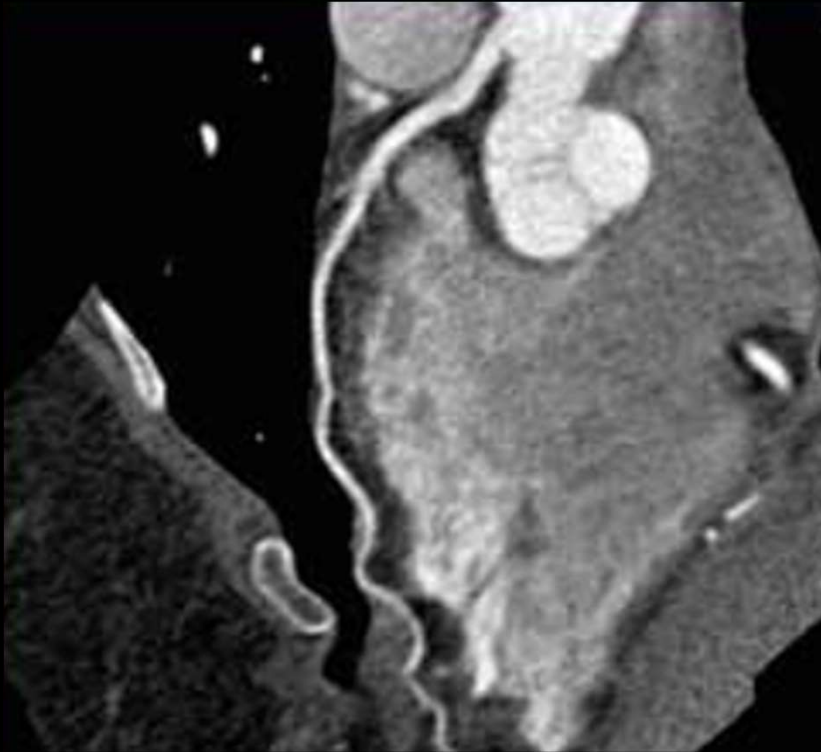
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Cad-Rads 3	50-70% Moderate stenosis			Consider functional assessment
Cad-Rads 4	A: 70-99% stenosis in 1 or 2 vessels B: >50% stenosis in the left main or >70% stenosis in 3-vessels			A: Consider functional assessment or ICA B: ICA is recommended
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Cad-Rads N	Non-diagnostic study			Additional evaluation



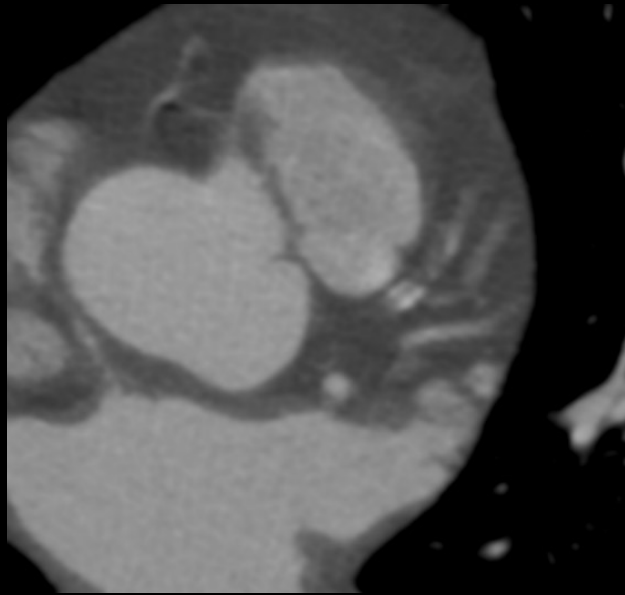


60 Yo F Atypical  
Angina



Cad-Rads 2 -> go home





64 Yo F Atypical  
Angina – ICA



# Summary

- Pericarditis and pericardial effusions are common
- CT could help detect MI ...but has too many false positives, mainstay of diagnosis remains clinical
- Look on your PE/ Chest/ non gated exams for coronary origins!
- CCTA is a validated risk stratification tool