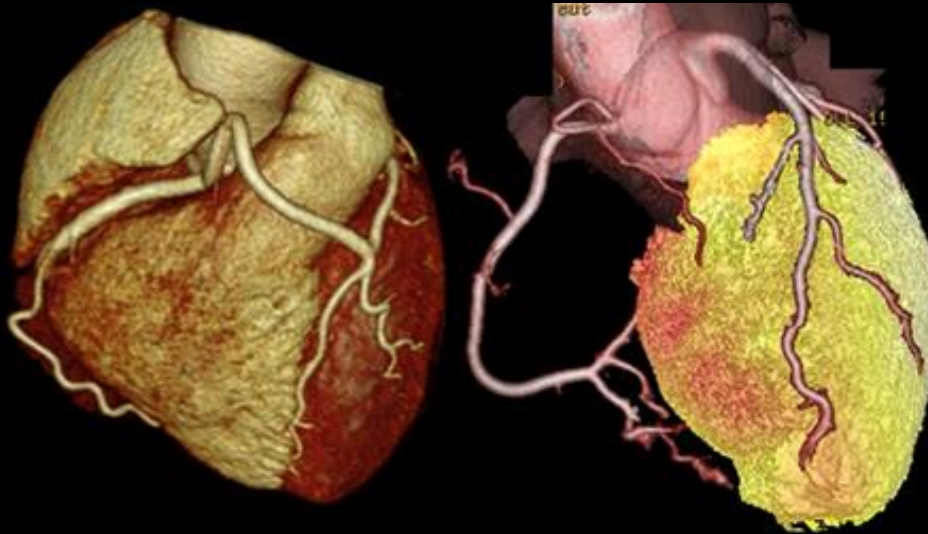
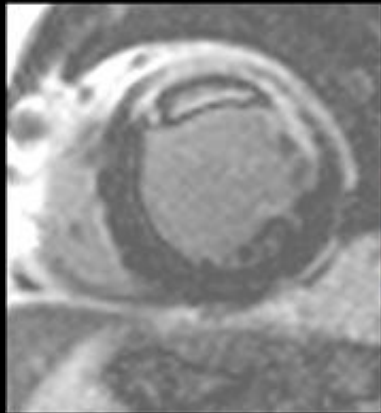


"Utilidad de las Cardioimágenes en la Enfermedad Cardiovascular"



Dra. María Cecilia Ziadi

Clínica La Sagrada Familia

Imágenes Cardiovasculares No Invasivas

SIMI: XXV Semana del Intervencionismo Mínimamente Invasivo

Miércoles 06 de Julio de 2016, Buenos Aires, Argentina

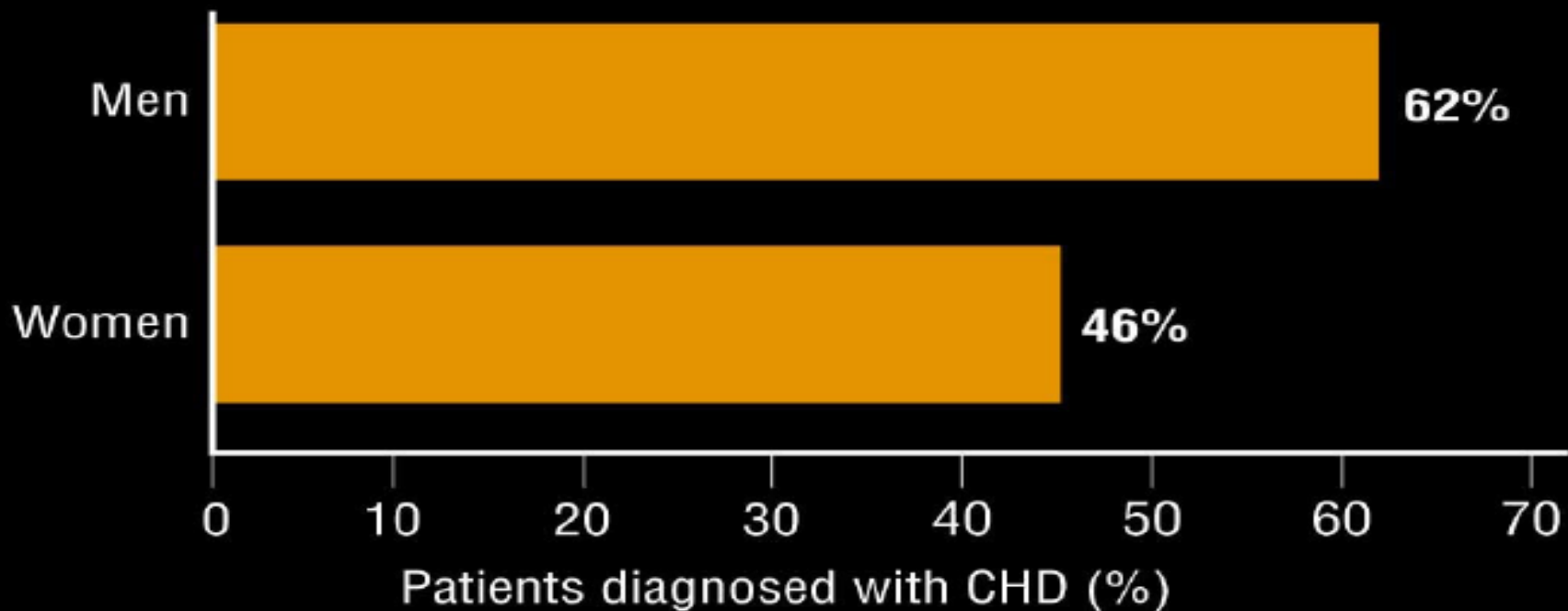


Conflictos de Interés

- Ninguno

Cardiopatía Isquémica: ¿Cuál es el problema?

**Myocardial infarction (MI) or death
as initial presentation of CHD**



Score de Riesgo de Framingham



NATIONAL CHOLESTEROL EDUCATION PROGRAM

Third Report of the Expert Panel on

Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)

Risk Assessment Tool for Estimating Your 10-year Risk of Having a Heart

Existen limitaciones!

- Diabetes
- Antecedentes Familiares

[HDL Cholesterol:](#)

mg/dL

[Smoker:](#)

No Yes

[Systolic Blood Pressure:](#)

mm/Hg

Are you currently on any medication to treat high blood pressure.

No Yes

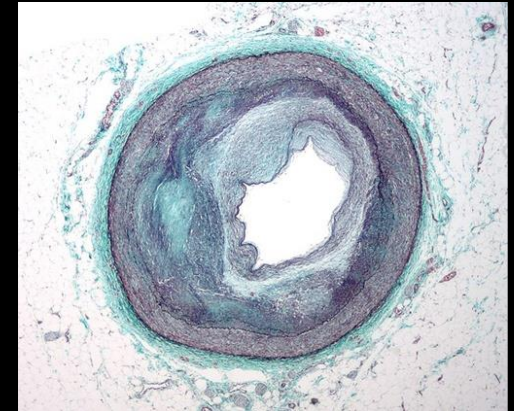
Calculate Your 10-Year Risk

Paradigmas Emergentes en Cardiología

**Aterosclerosis
Temprana
(Preclínica)**



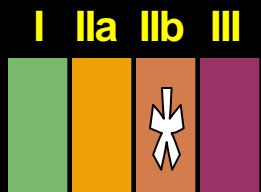
**Enfermedad Obstructiva
(Etapa Sintomática)**



2010 ACC/AHA Guideline for Screening in Asymptomatic Adults



Measurement of CAC is reasonable for cardiovascular risk assessment in asymptomatic adults at intermediate risk (10% to 20% 10-year risk).

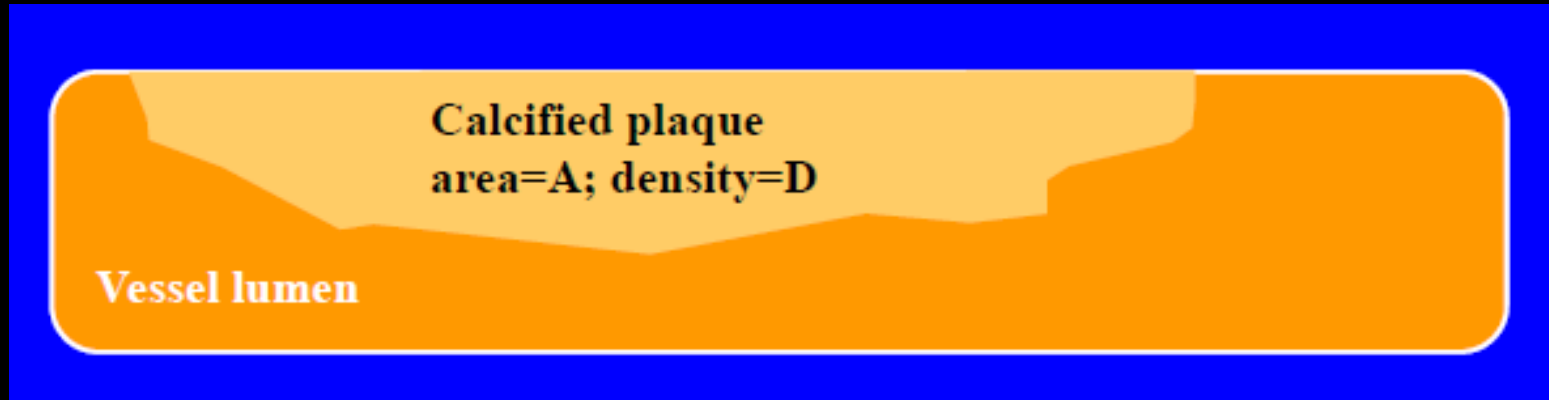


Measurement of CAC may be reasonable for cardiovascular risk assessment persons at low to intermediate risk (6% to 10% 10-year risk).



In asymptomatic adults with diabetes, 40 years of age and older, measurement of CAC is reasonable for cardiovascular risk assessment.

Score de Agatston



Area $\geq 1\text{mm}$; Densidad $\geq 130\text{UH}$

Densidad Placa (D)

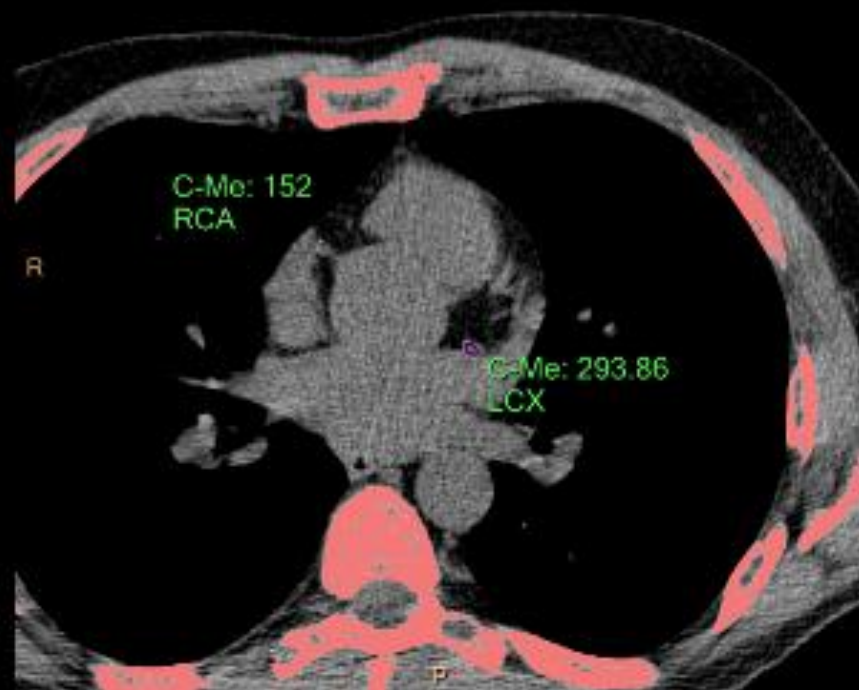
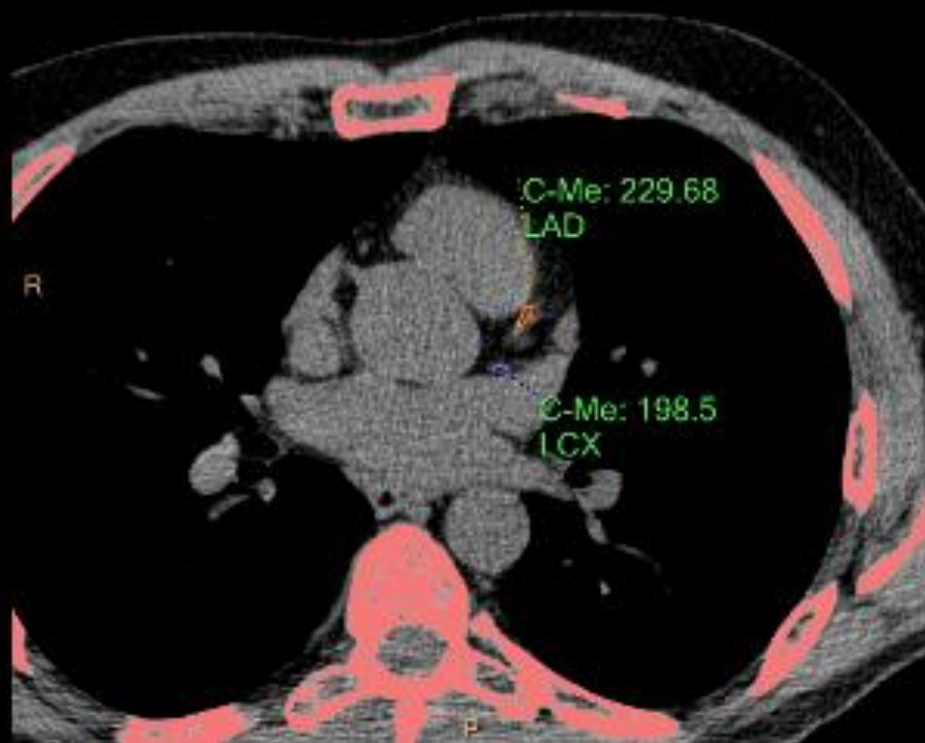
- 130 - 200 UH = coeficiente 1
- 201 - 300 UH = coeficiente 2
- 301 - 400 UH = coeficiente 3
- > 400 UH = coeficiente 4

Score de Agatston = Area x D_{coef}

Categorías del Score de Calcio

Score de Calcio (Unidades Agatston)	Categoría de Calcificación Coronaria
0	Ausente
1-10	Mínima
11-100	Leve
101- 400	Moderada
401-1000	Severa
> 1000	Difusa

Score de Calcio



Resultados de puntuación: Agatston Score, protocolo				
	LAD	LCX	RCA	Coronarias totales
Nº de ROI	3	6	4	13
Área cuad. (mm2)	54.25	32.5	9.72	96.47
Coincidencia base datos: Hombre, 55-59Y; percentil: 83%				

Score de Calcio= 0

Valor Pronóstico

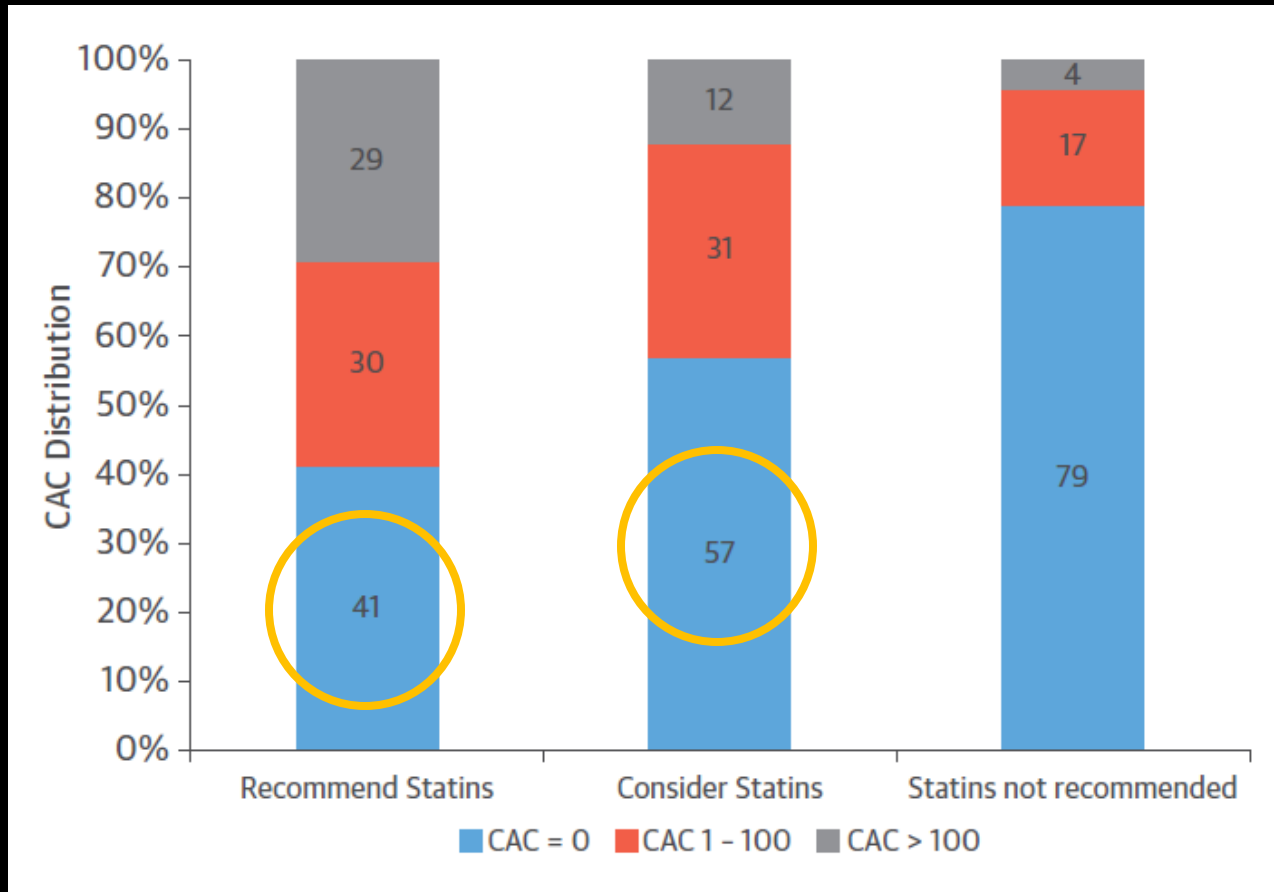
Study Type	Population (n)	CAC=0 (%)	FU (Years)	Number of events (%)
Meta-Analysis *	71,595	29,312 (41%)	4.3	154 (0.47%) CVD events
Retrospective**	44,052	19,898 (45%)	5.6	104 (0.52%) Deaths
Prospective***	6,809	3,414 (50%)	4.1	17 (0.52%) CHD events

*Sarwar A, Shaw LJ, Shapiro MD, Blankstein R, Hoffman U, Brady TJ, Cury R, Budoff MJ, Blumenthal RS, Nasir K. JACC Imaging 2009

** Blaha M, Budoff MJ, Shaw LJ, Khosa F, Rumberger JA, Berman D, Callister T, Raggi P, Blumenthal RS, Nasir K. JACC Imaging 2009

*** Budoff M, McClelland R, Nasir K, Greenland P, Kronmal RA, Kondos G, Shea S, Lima JAC, Blumenthal RS. Am Heart J 2009

CAC Distribution Across Statin Eligibility Groups*



CAC 0 reclassifies ~ 1/2 of candidates as not eligible for statins
10 year event rates in CAC 0.

0.5%/year in recommend statins (high intensity)

0.1%/year in consider statins (moderate intensity)

Visualización no Invasiva de las Arterias Coronarias

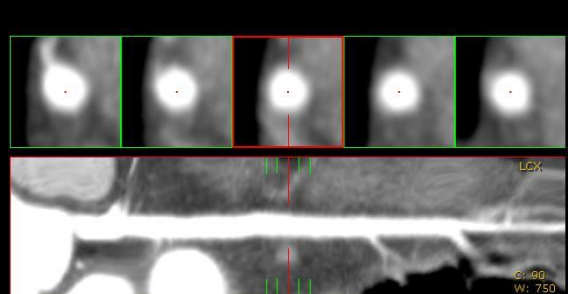
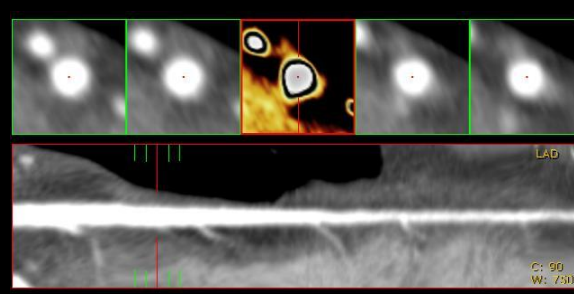
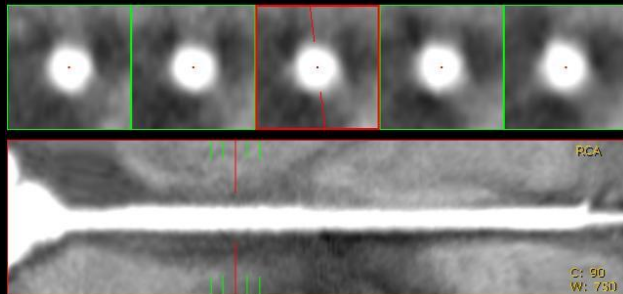


Alto Valor predictivo negativo

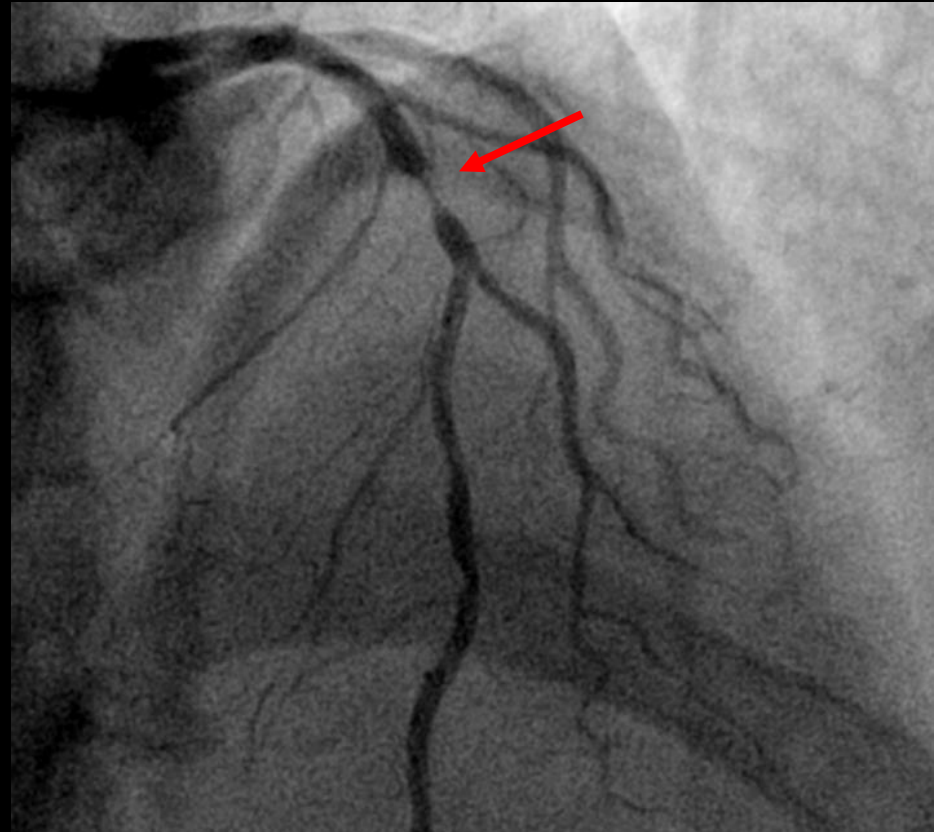
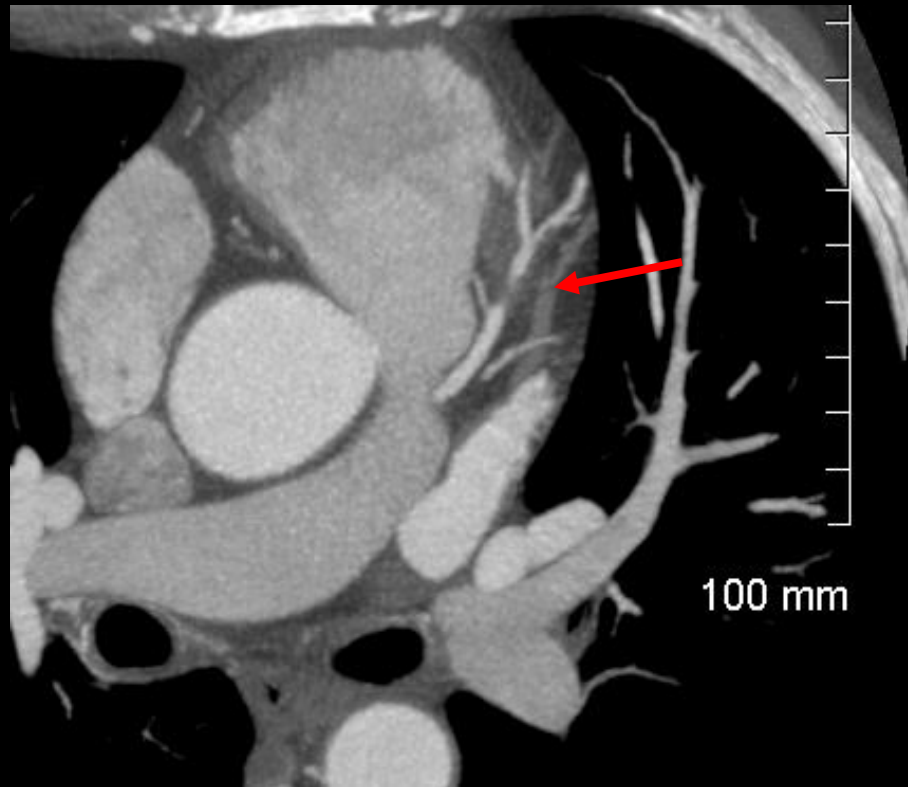
Art. CD

Art. DA

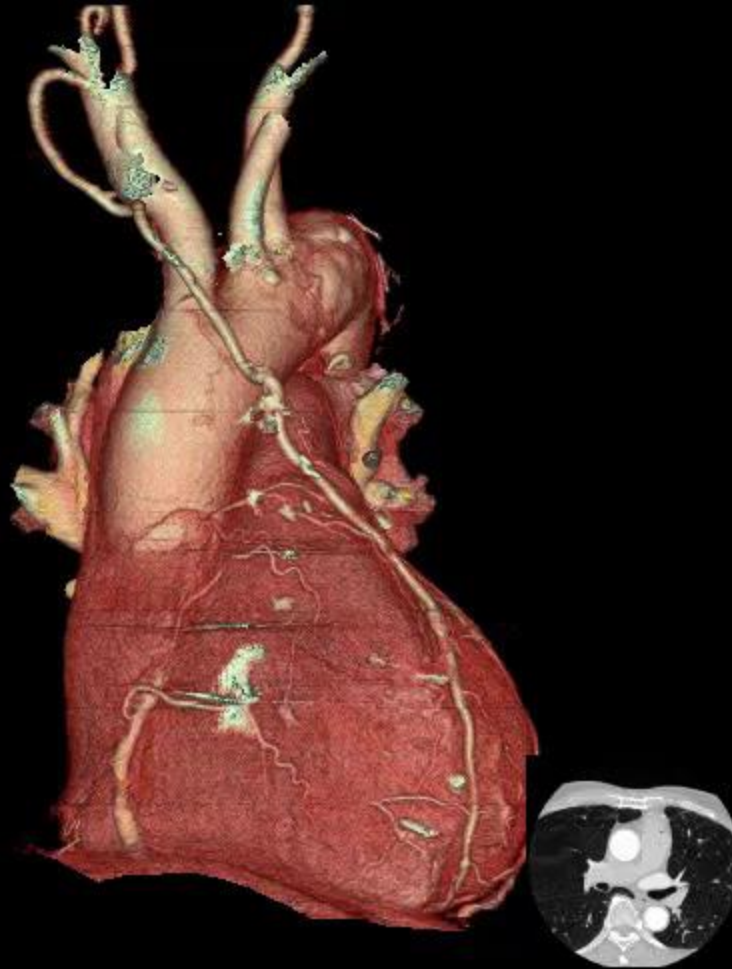
Art. CX



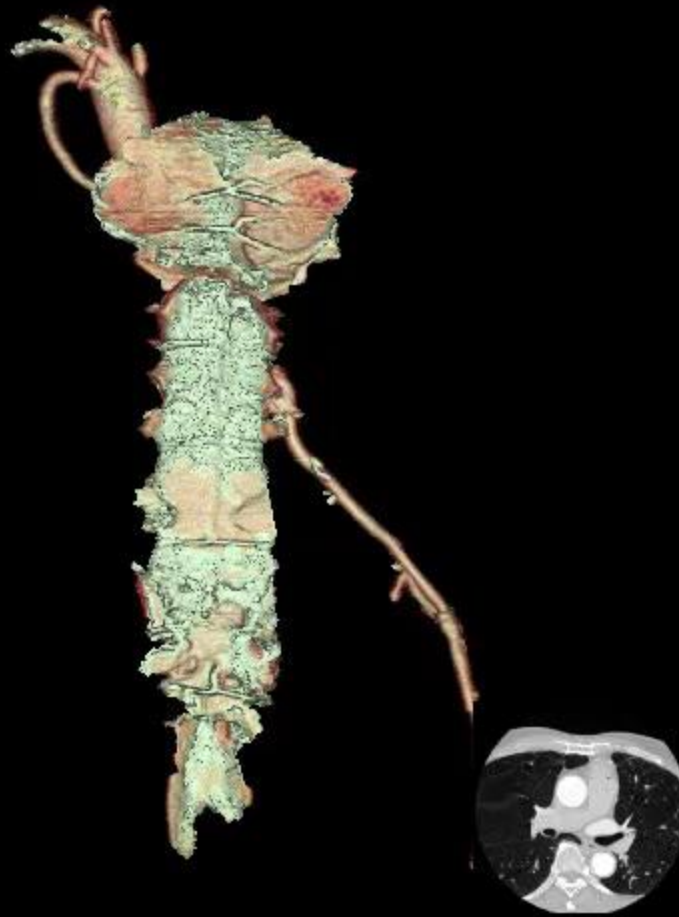
Correlación con Angiografía Invasiva



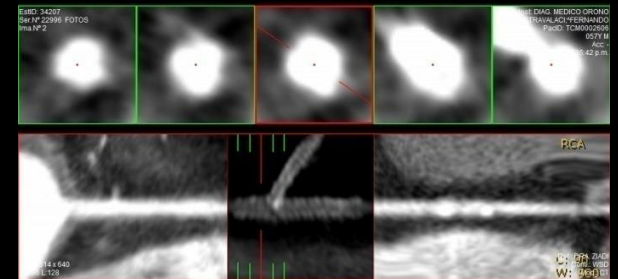
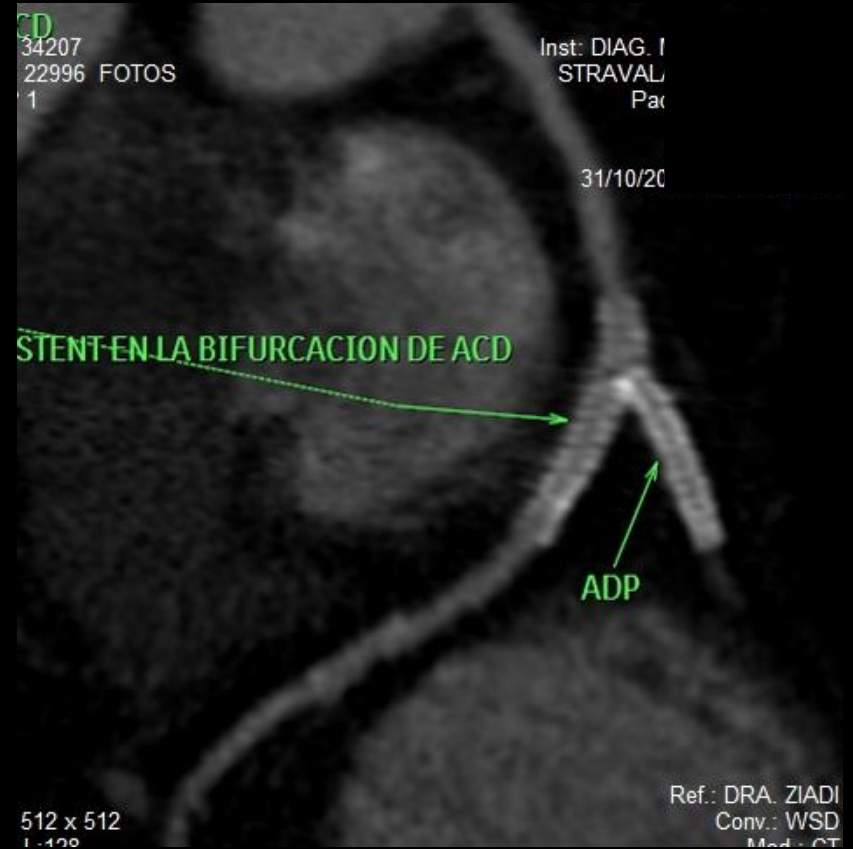
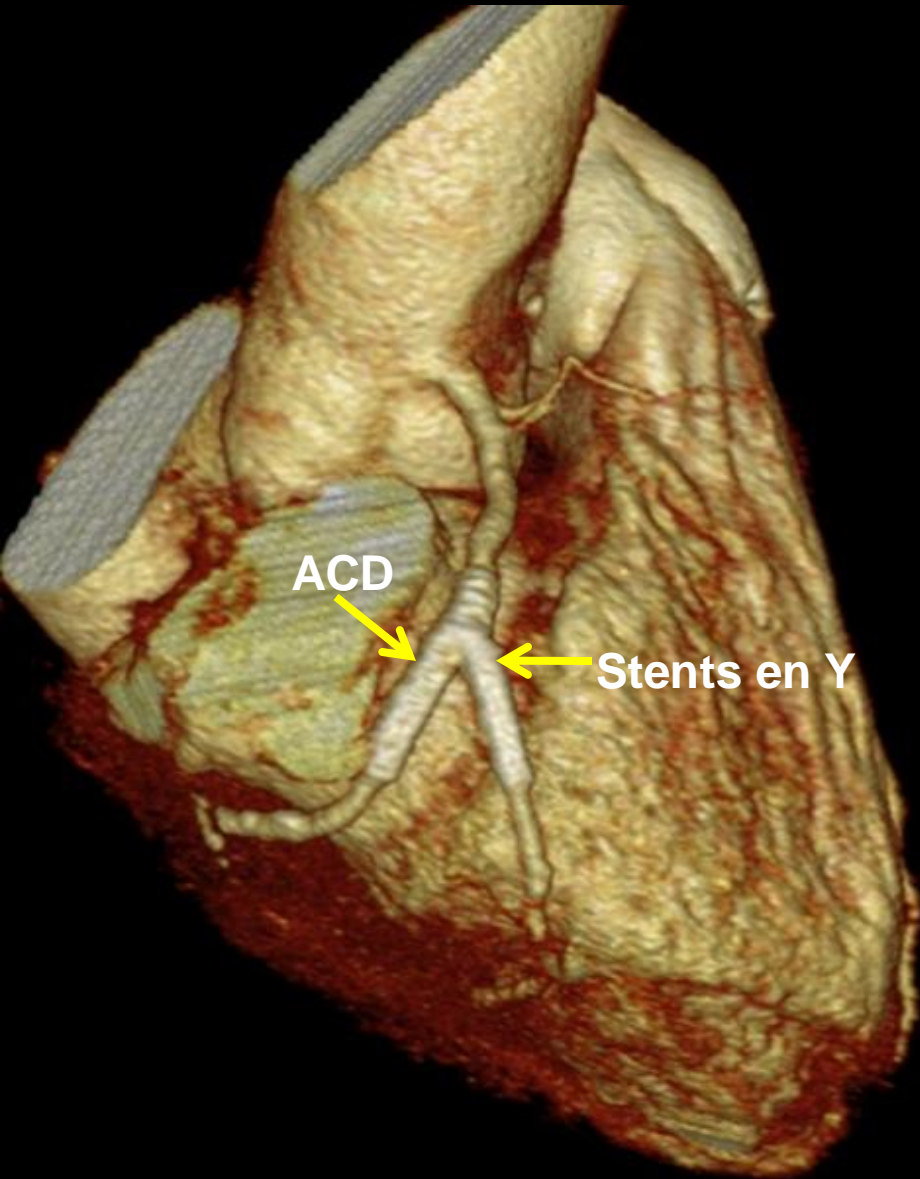
By-Pass Aorto-Coronarios



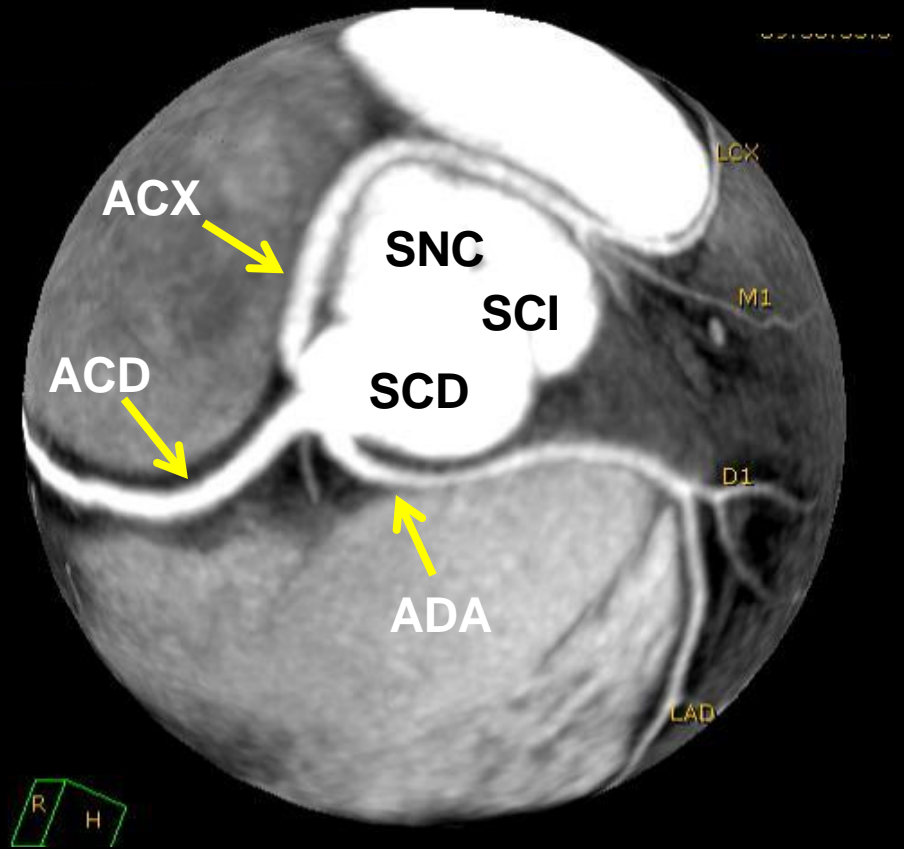
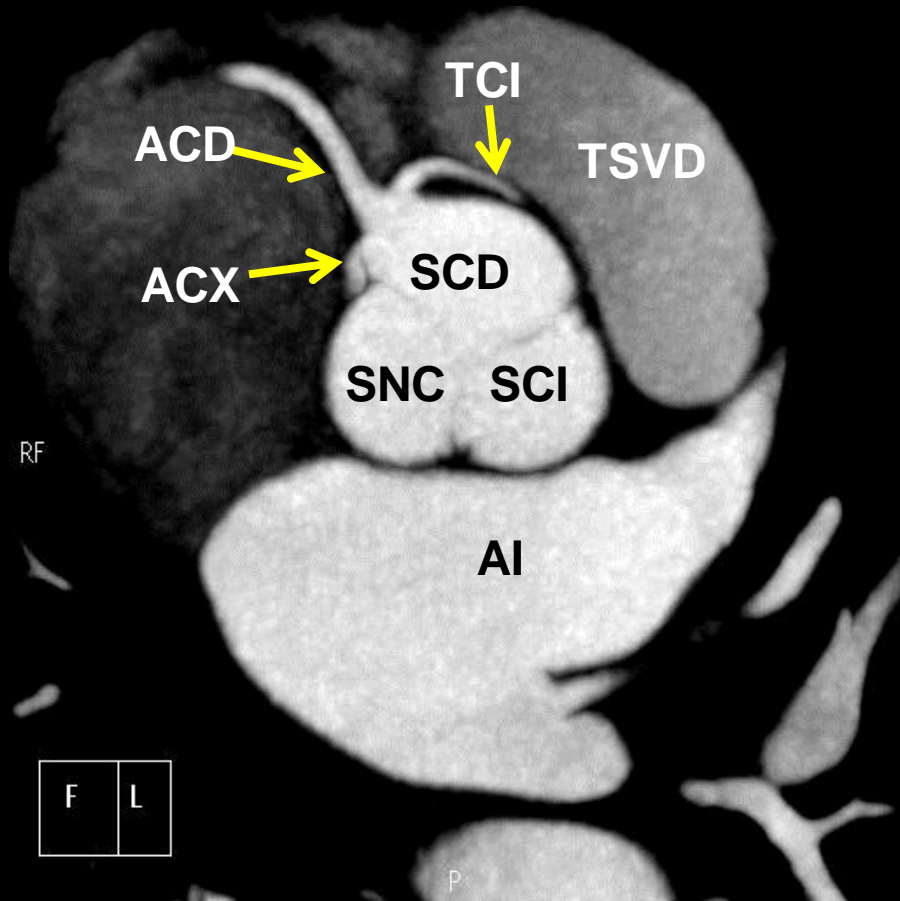
By-Pass Aorto-Coronarios



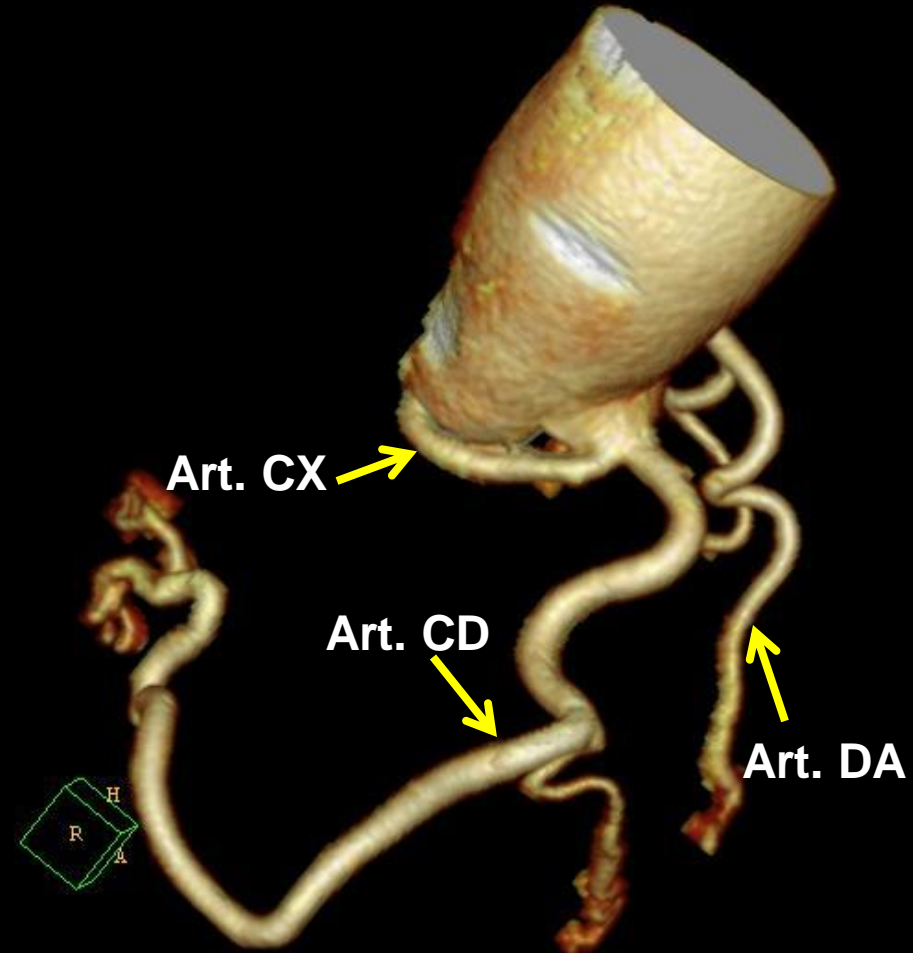
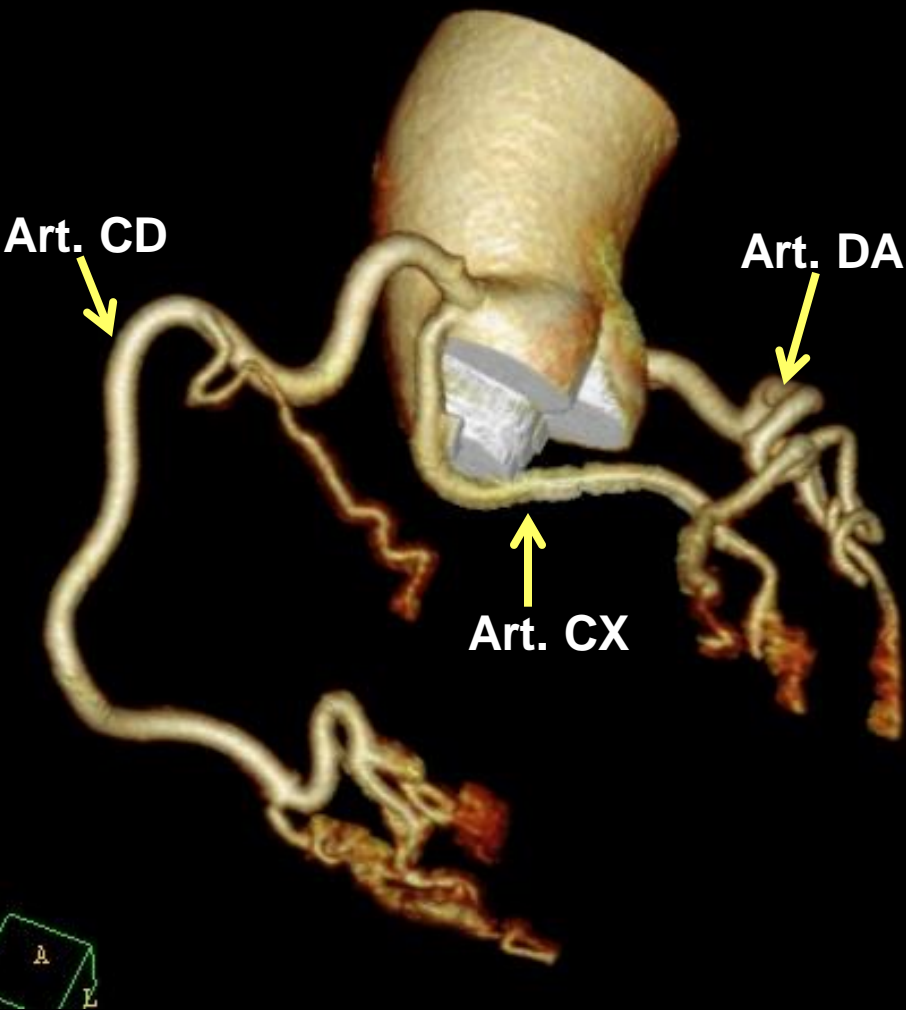
Stents Coronarios



Anomalías Coronarias

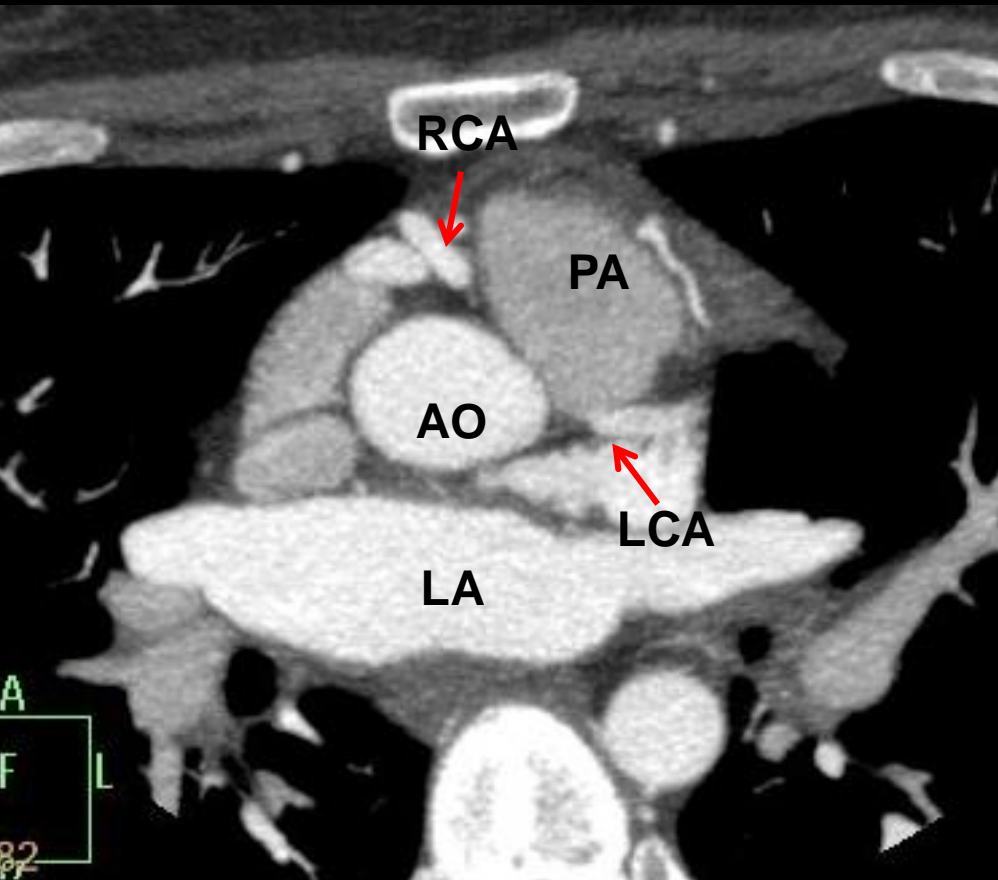


Anomalías Coronarias

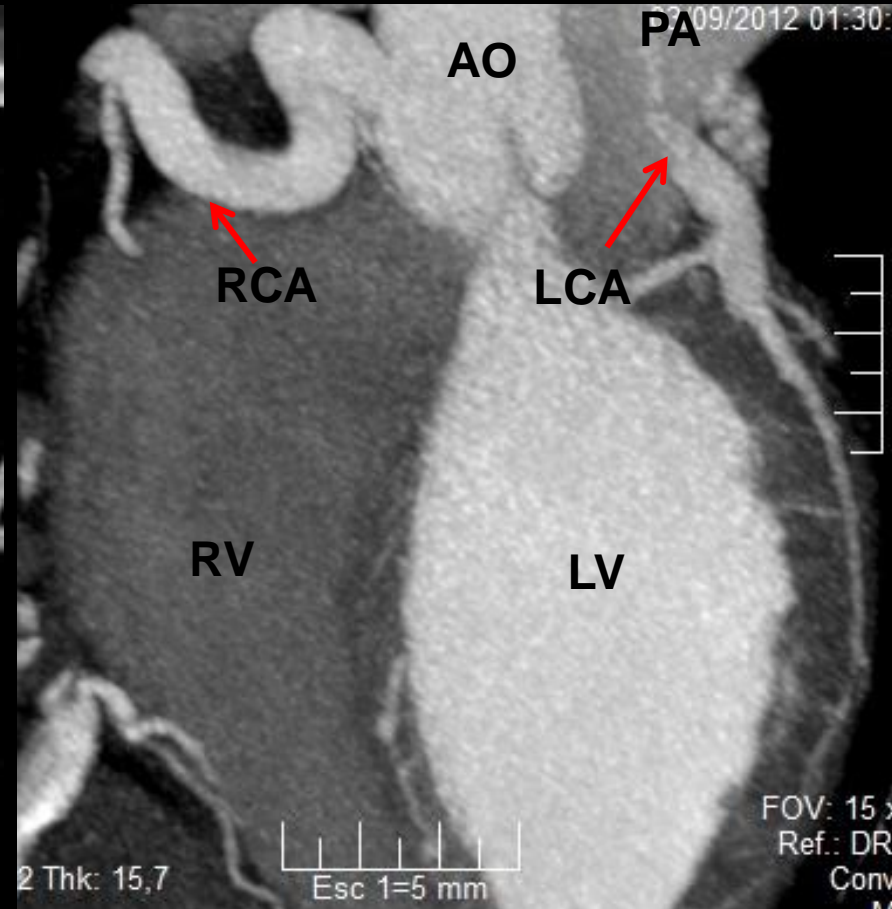


Síndrome de ALCAPA

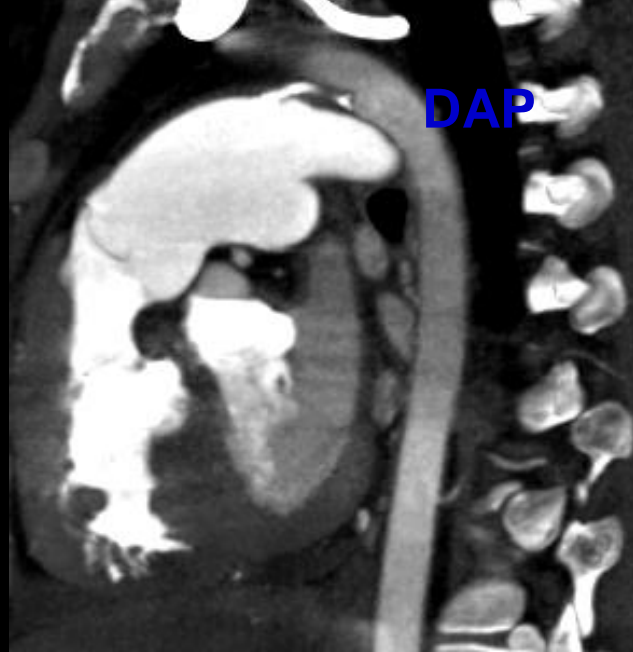
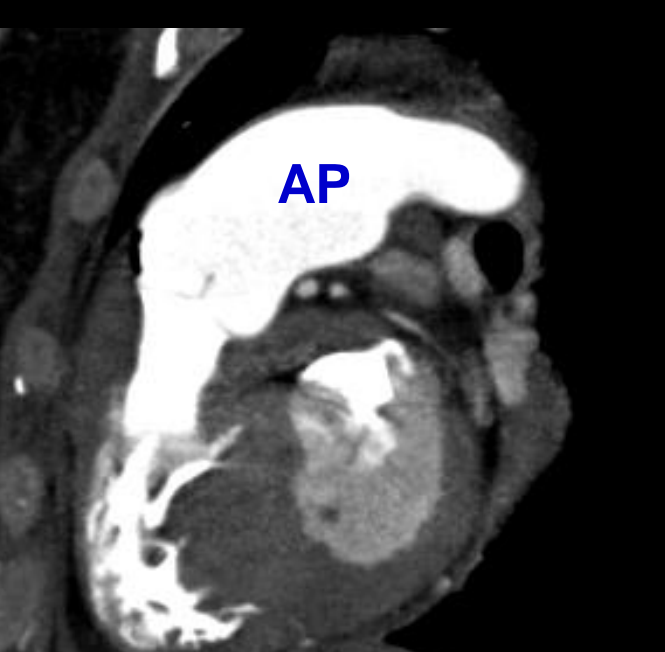
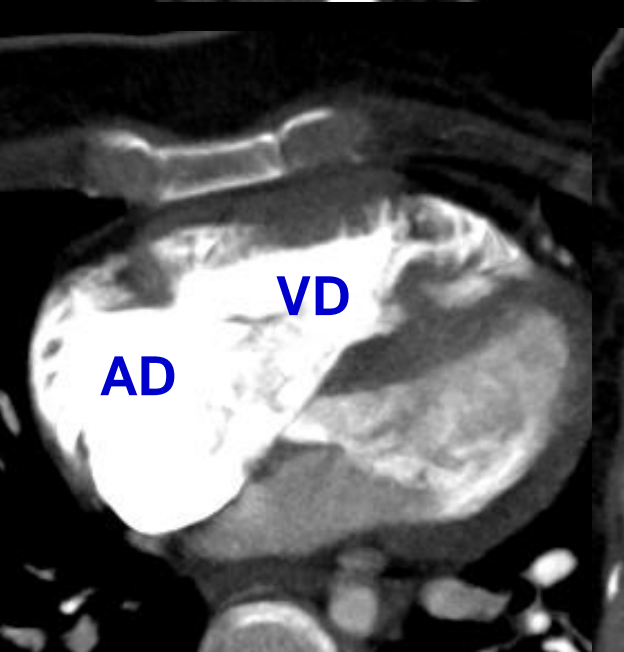
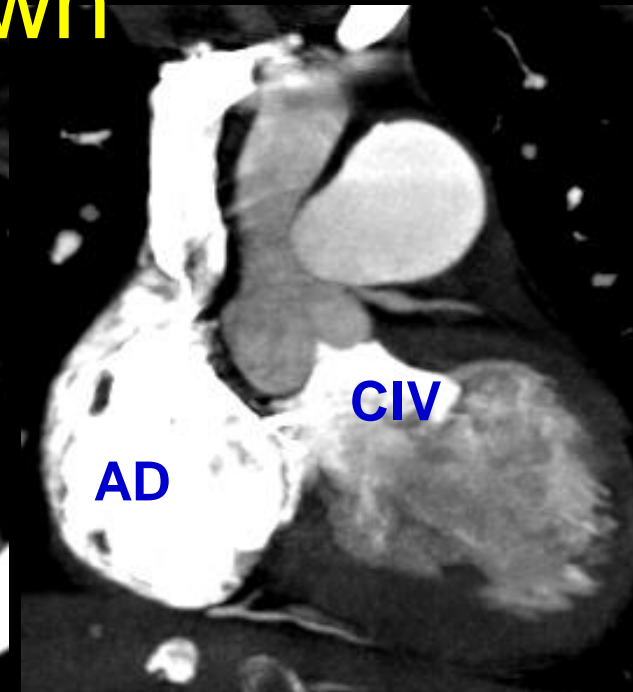
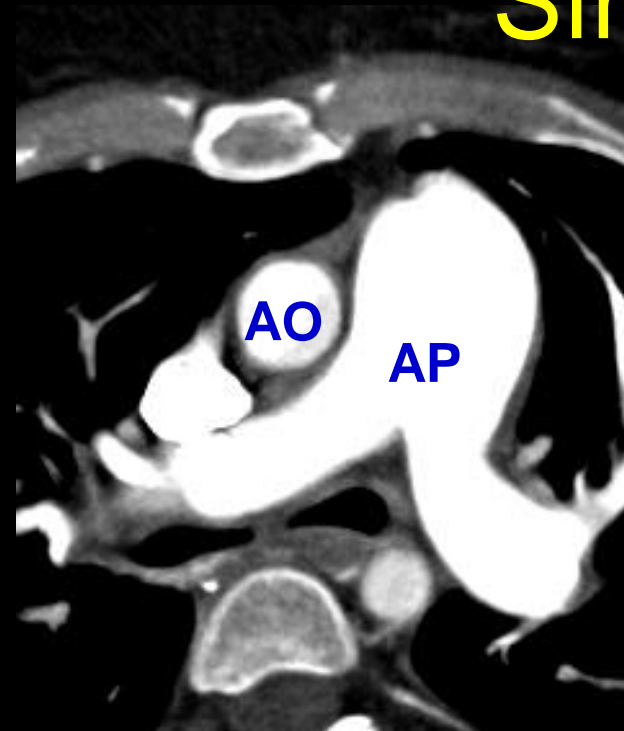
Axial View



Coronal View

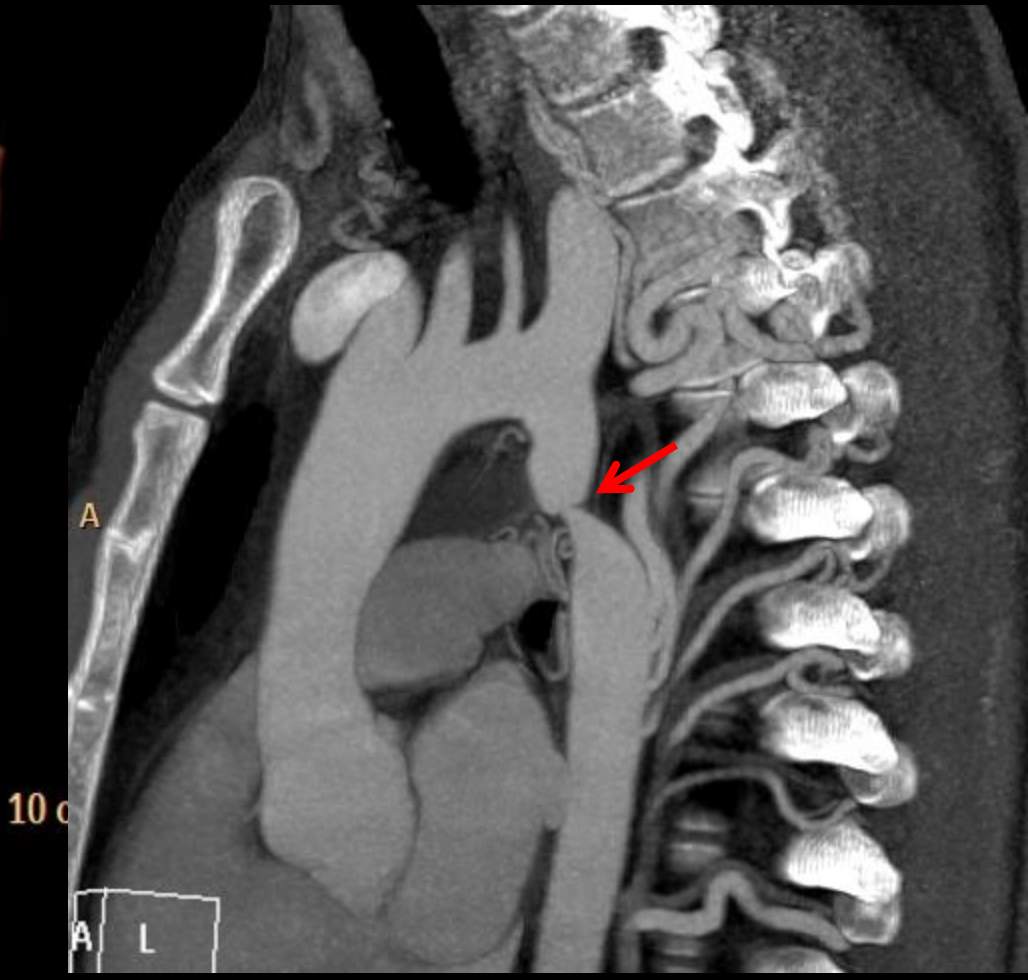


Síndrome de Down



Coartación de Aorta

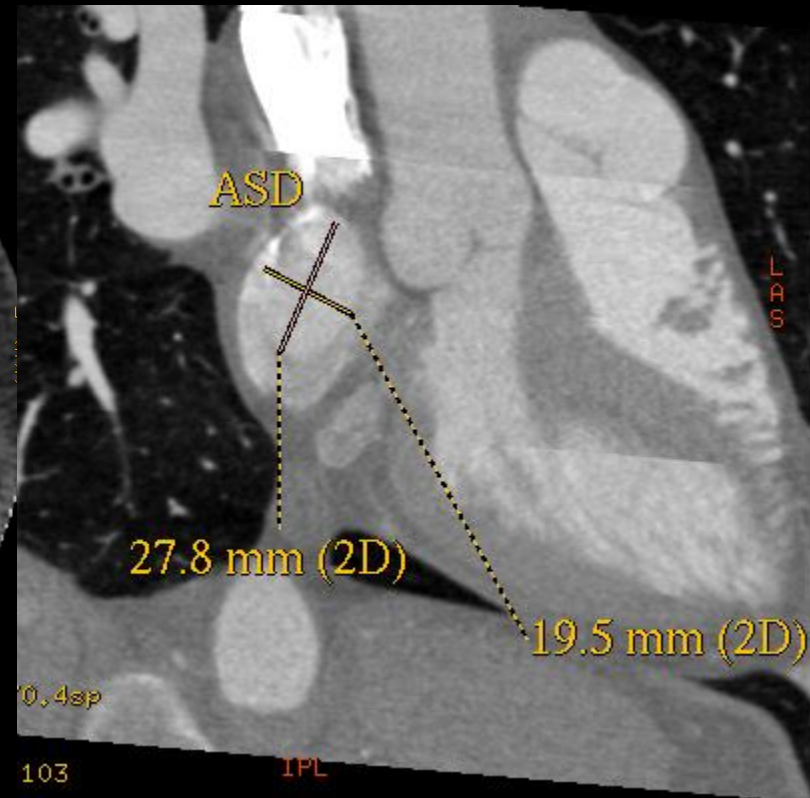
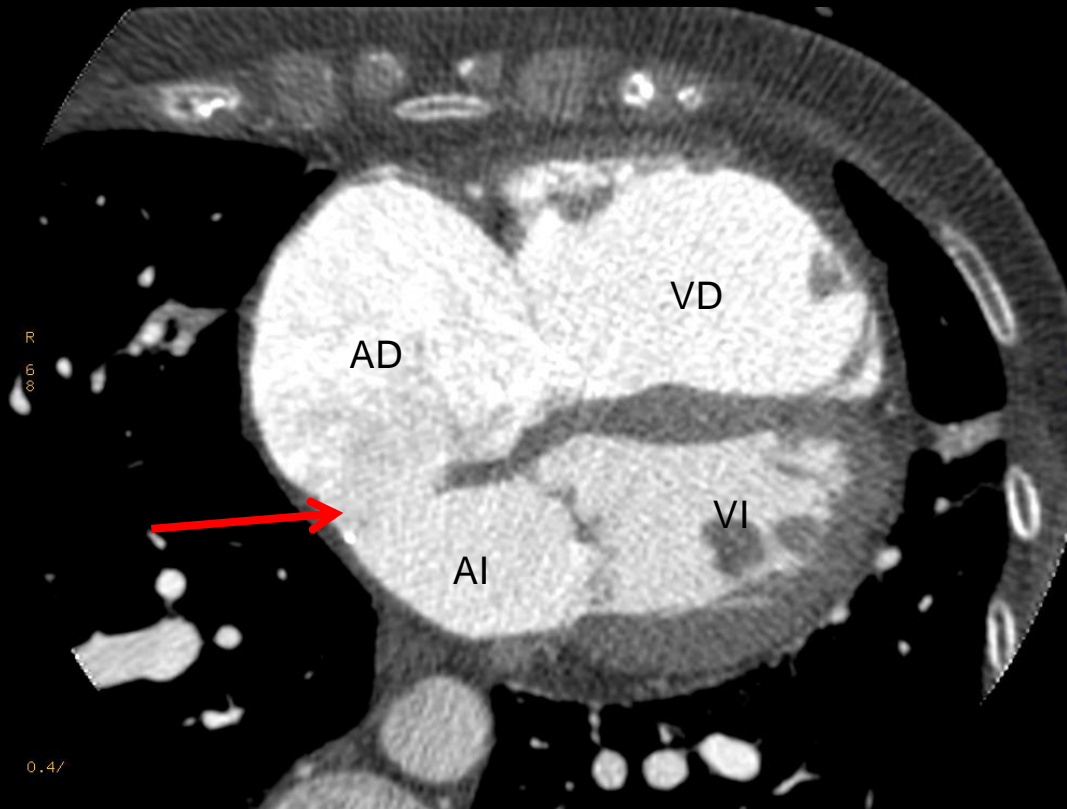
5-8% de todos los defectos congénitos



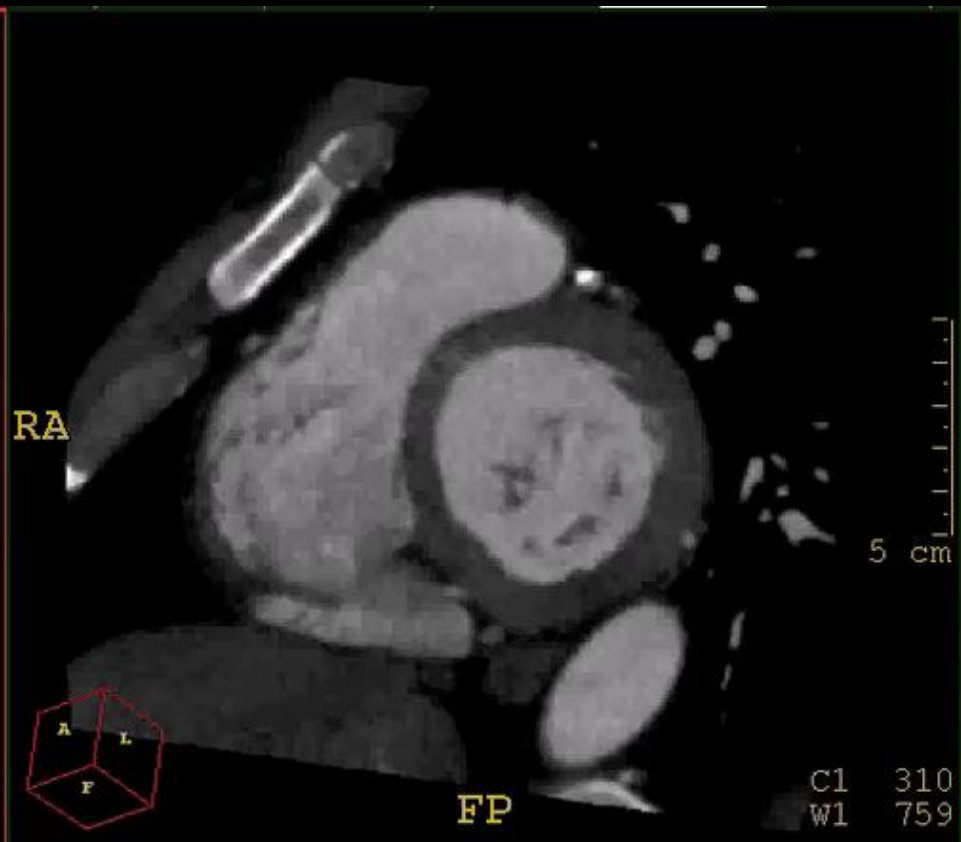
Comunicación Interauricular

10% de las cardiopatías congénitas

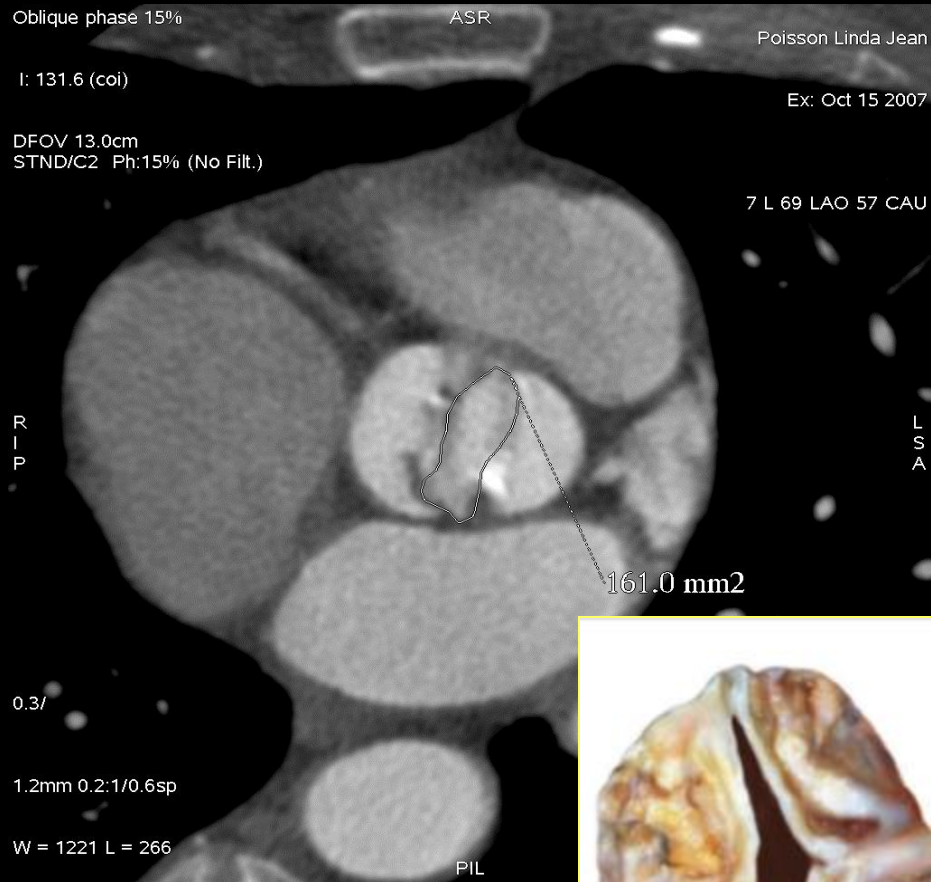
CIA tipo ostium secundum 70%



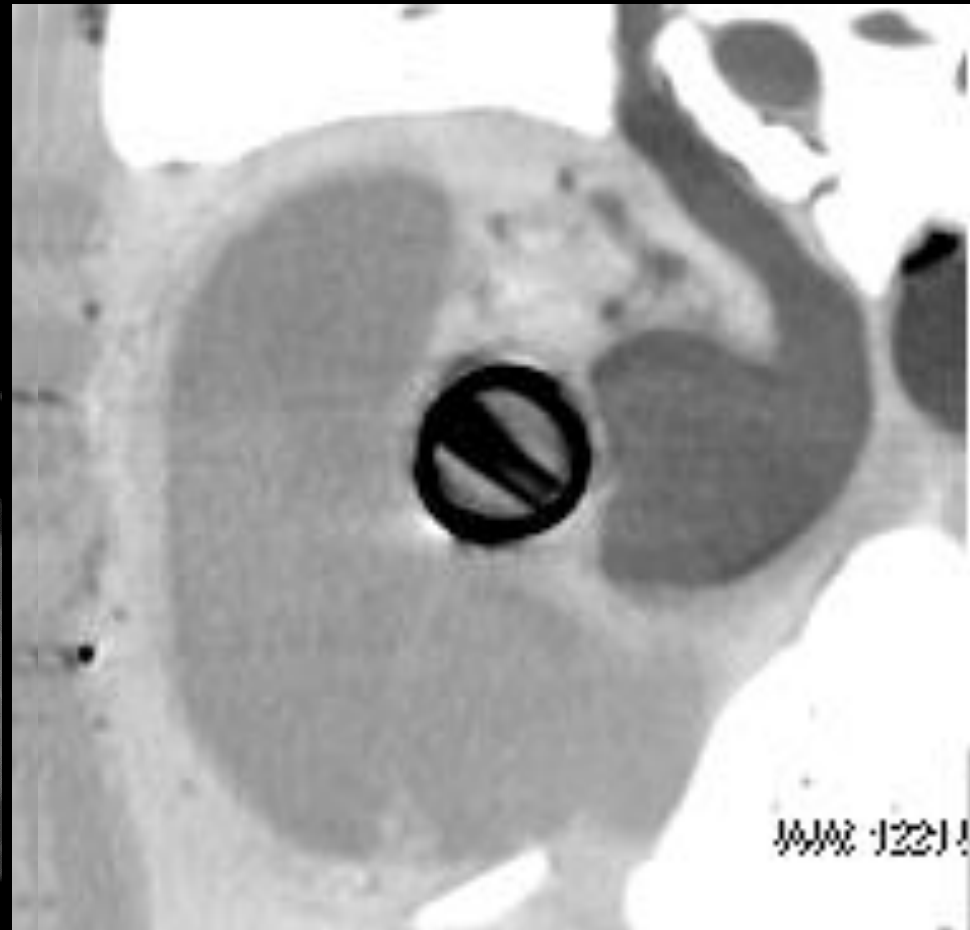
Función Ventricular



Válvulas Cardíacas



Prótesis Valvulares



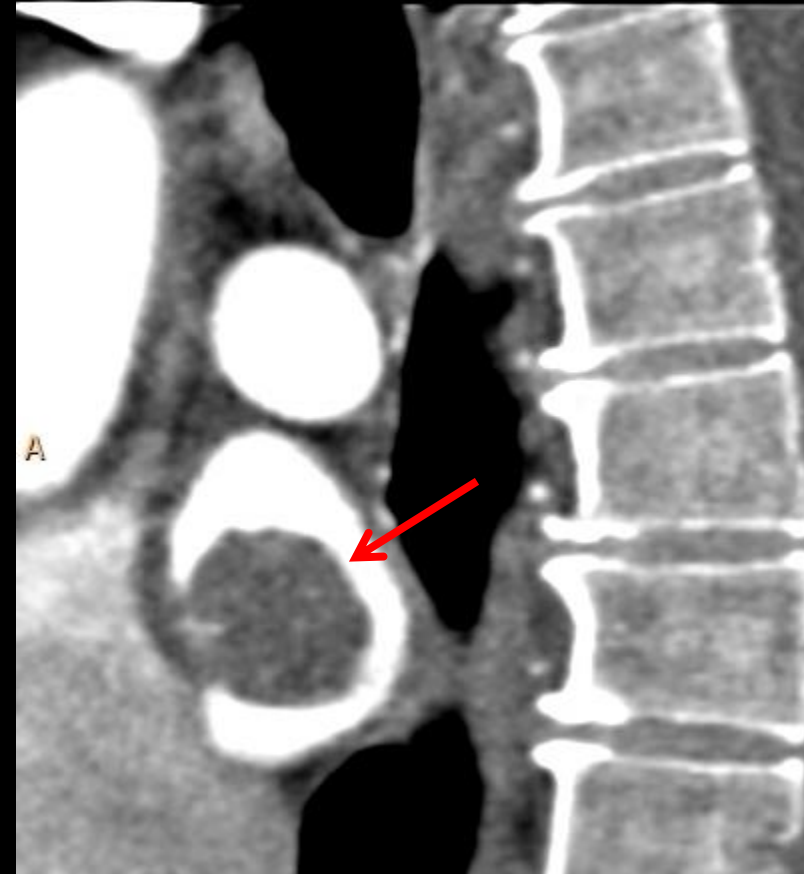
Endocarditis Infecciosa: Vegetaciones

- Alta morbi-mortalidad
- Factores predisponentes:
 - Válvulas protésicas
 - Enfermedad valvular subyacente
 - Drogas EV

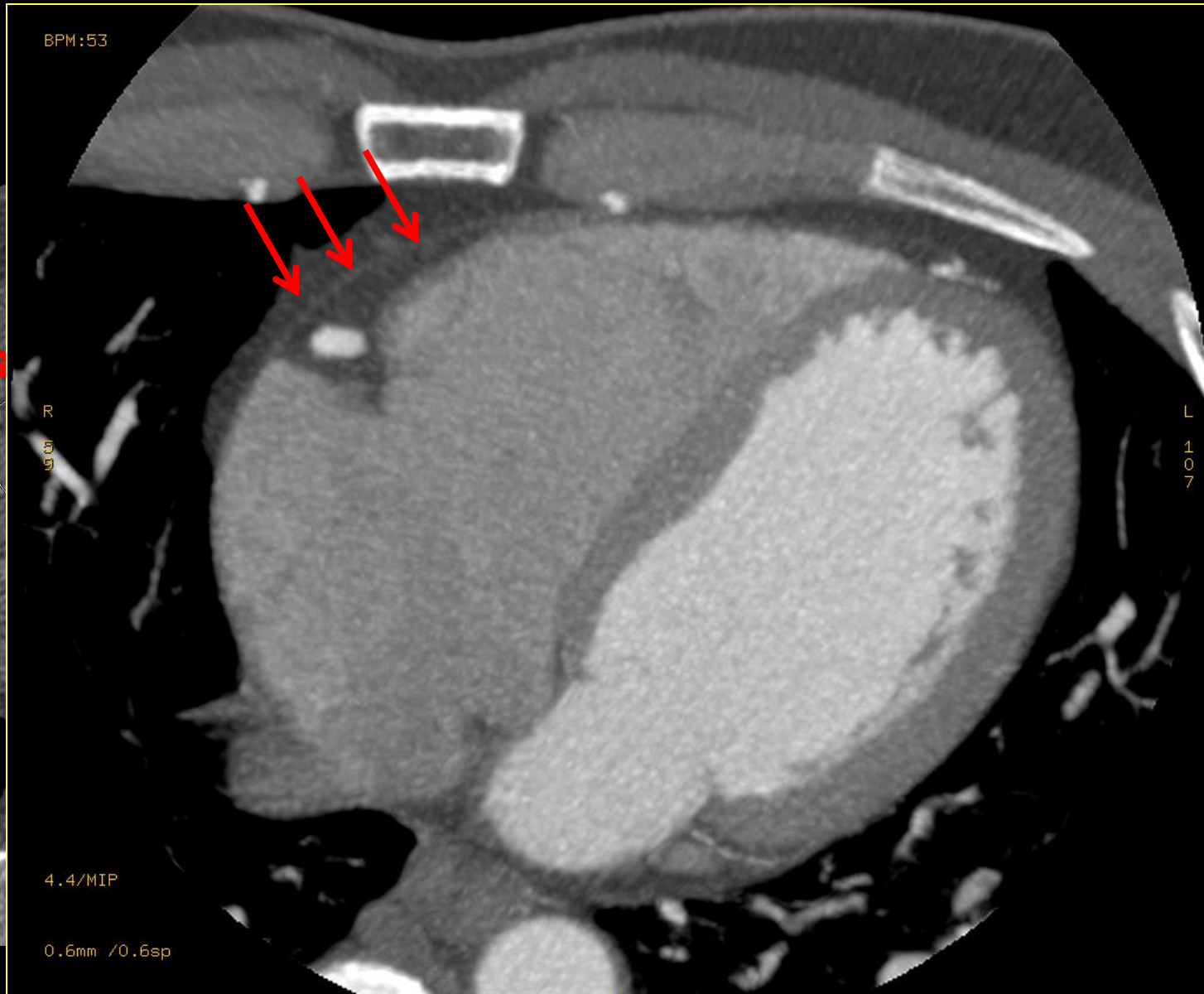


Tumores Intra-cardíacos: Mixoma Auricular

40-50% Tm Cardíacos primarios/ 75% en AI



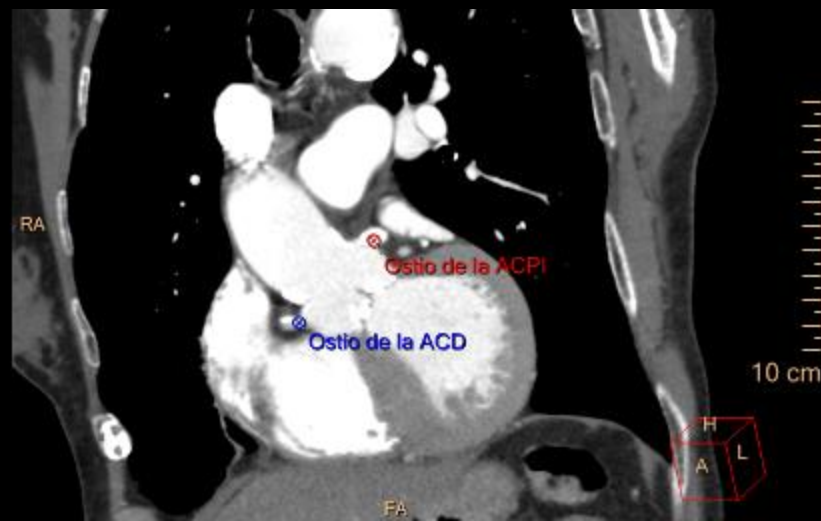
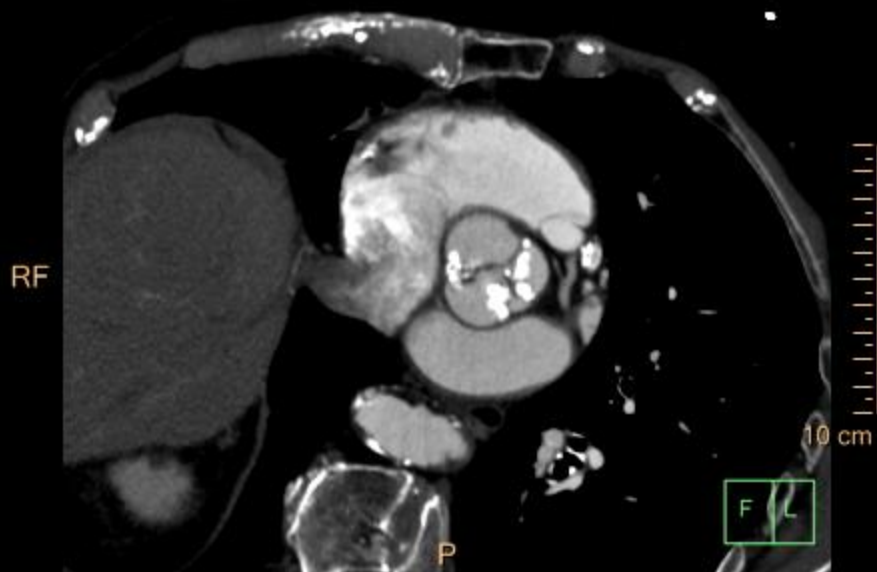
Pericardio



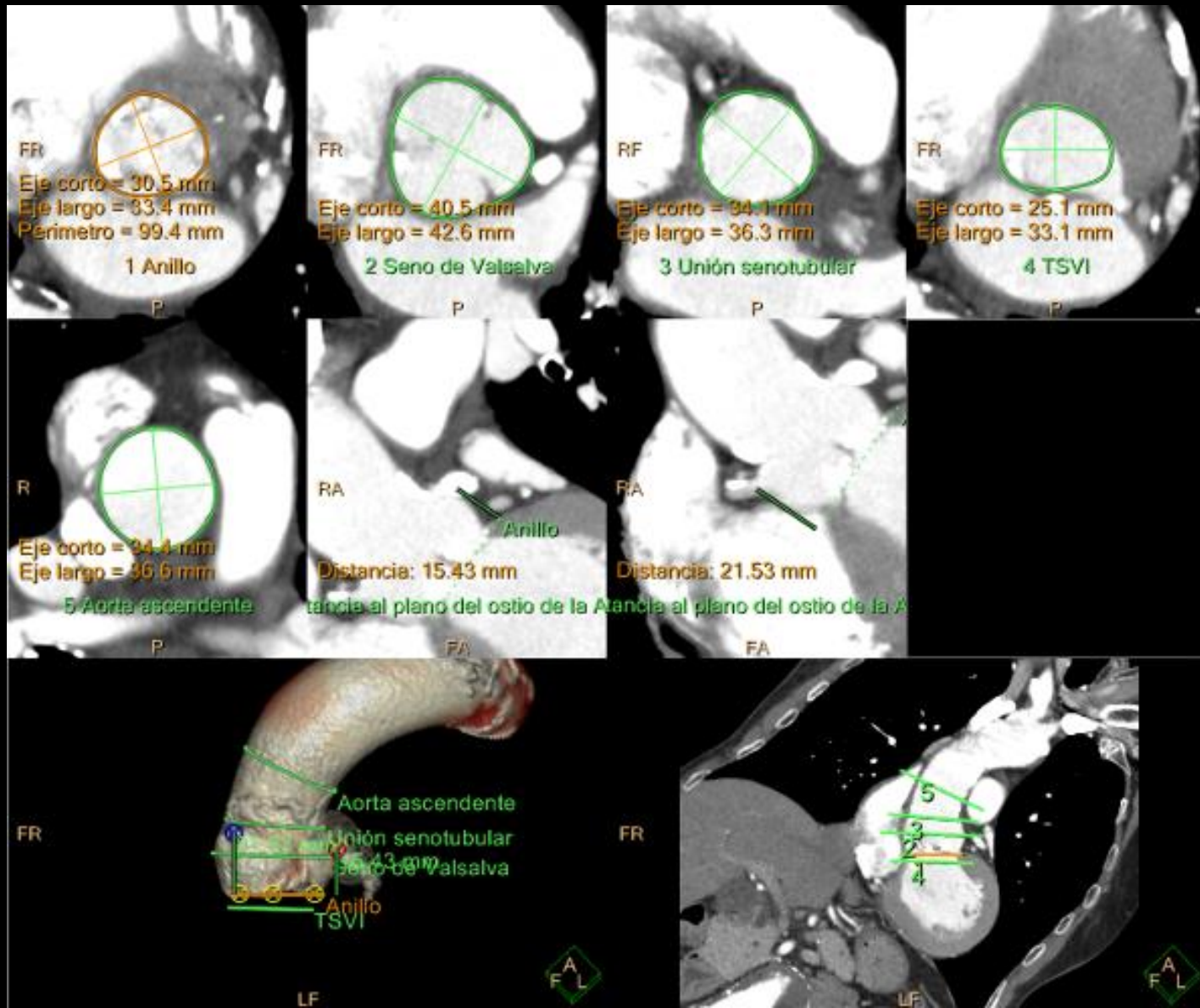
Patologías de la Aorta



Evaluación de Aorta previo a TAVI



Evaluación de Aorta previo a TAVI



Evaluación de la Circulación Arterial Pulmonar



Evaluación de las venas pulmonares previo a ablación de FA



Resonancia Magnética (RMI)

¿Ventajas?

- Alta definición de estructuras cardíacas
 - Caracterización de miocardiopatías
 - Viabilidad miocárdica
 - Patologías del Pericardio
 - Masas
- Evaluación Multiplanar-Imágenes en 3D
- Ausencia de radiación
- Pacientes con mala ventana para Ecocardiograma

Distribución Tisular del Gadolinio

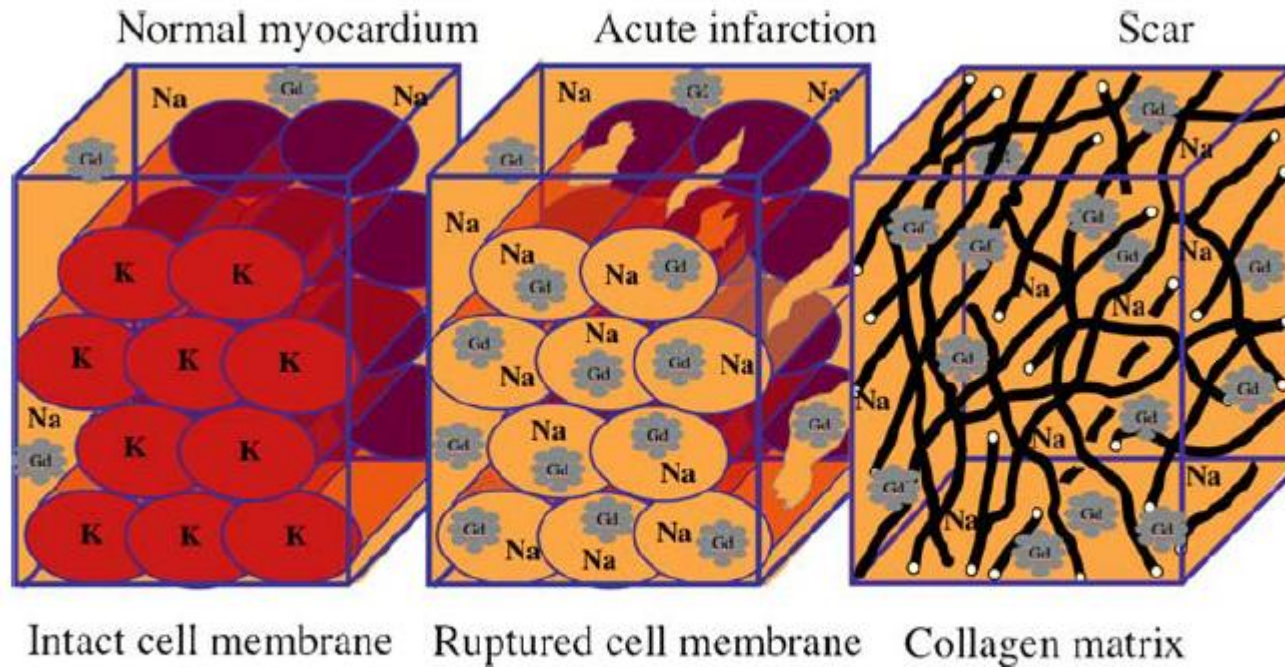
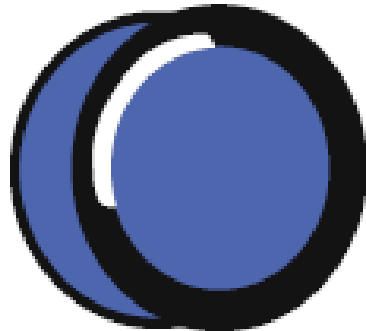


FIGURE 1.5. The volume of distribution for gadolinium is increased in both acute and chronic infarcts. (From Shah et al, Myocardial Viability. In: Edelman et al, eds. *Clinical Magnetic Resonance Imaging (3rd ed.)*. New York, NY: Elsevier; 2006)

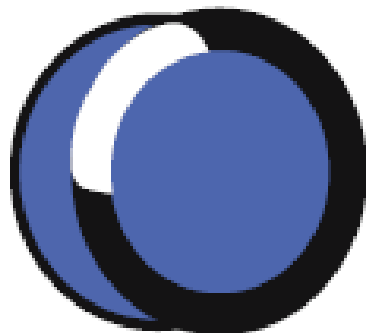
Patrones de Realce Tardío

Ischemic

A. Subendocardial Infarct

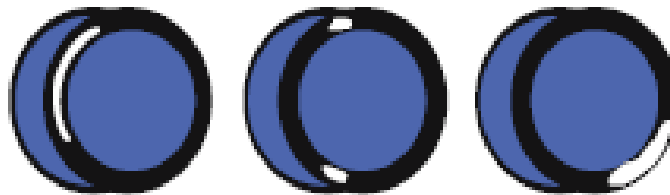


B. Transmural Infarct



Nonischemic

A. Mid-wall HE

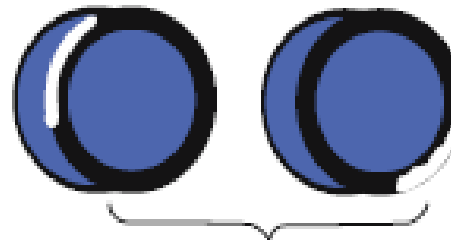


- Idiopathic Dilated Cardiomyopathy
- Myocarditis

- Hypertrophic Cardiomyopathy
- Right ventricular pressure overload (e.g. congenital heart disease, pulmonary HTN)

- Sarcoidosis
- Myocarditis
- Anderson-Fabry
- Chagas Disease

B. Epicardial HE



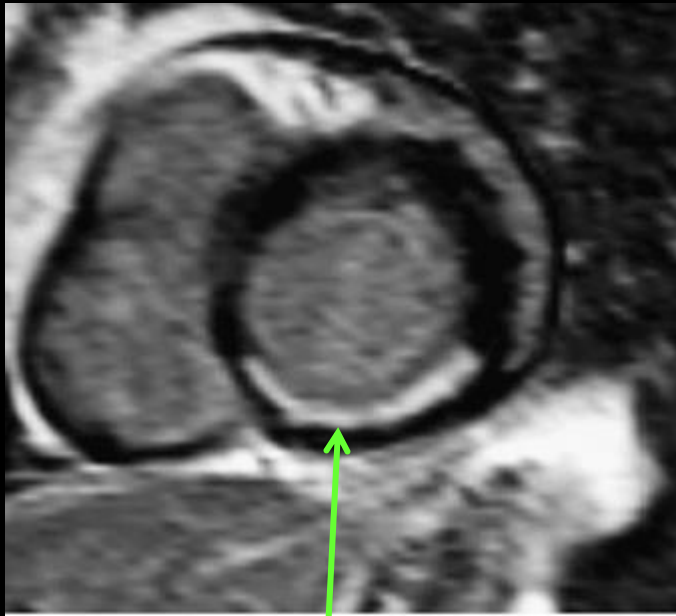
- Sarcoidosis, Myocarditis, Anderson-Fabry, Chagas Disease

C. Global Endocardial HE

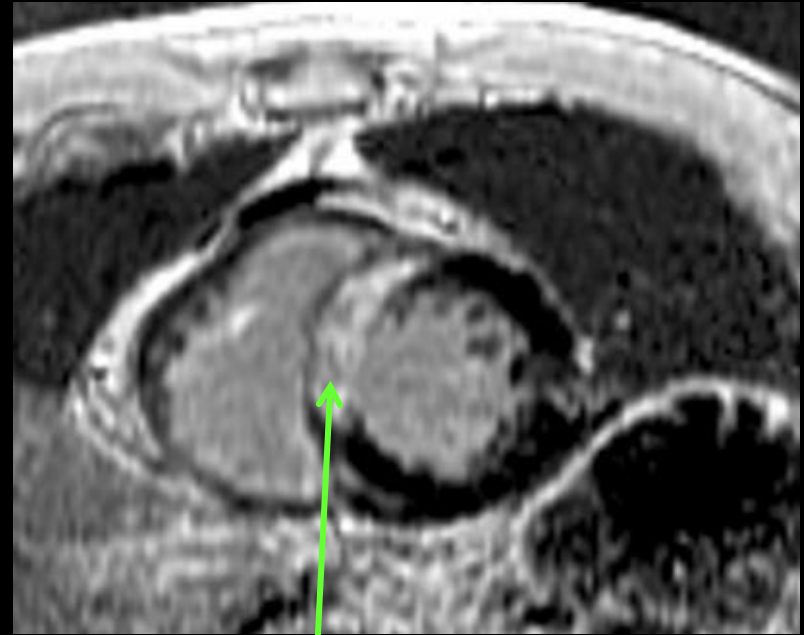


- Amyloidosis, Systemic Sclerosis, Post cardiac transplantation

Patrones de Fibrosis Miocárdica



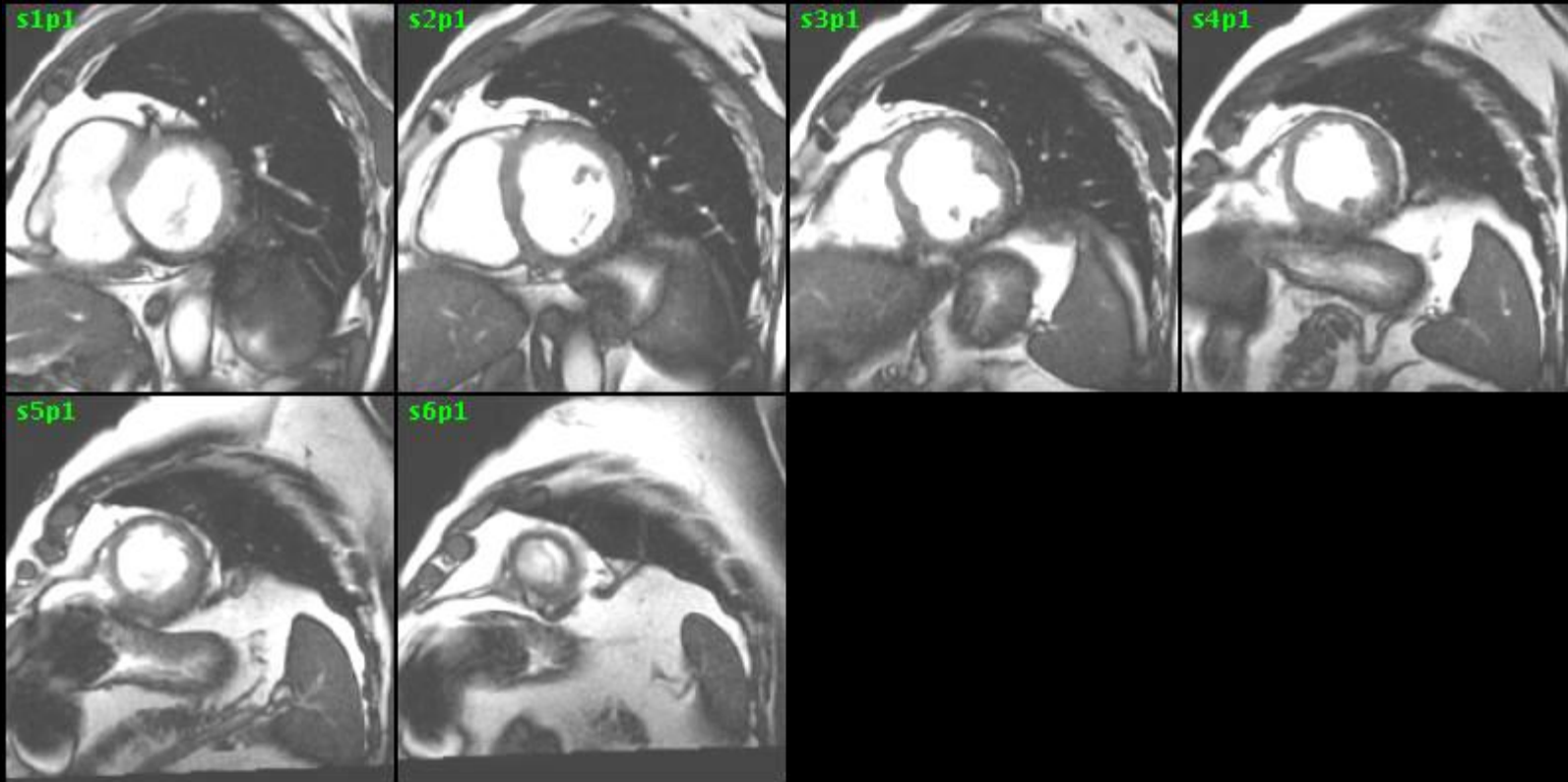
**Fibrosis
Subendocardica**



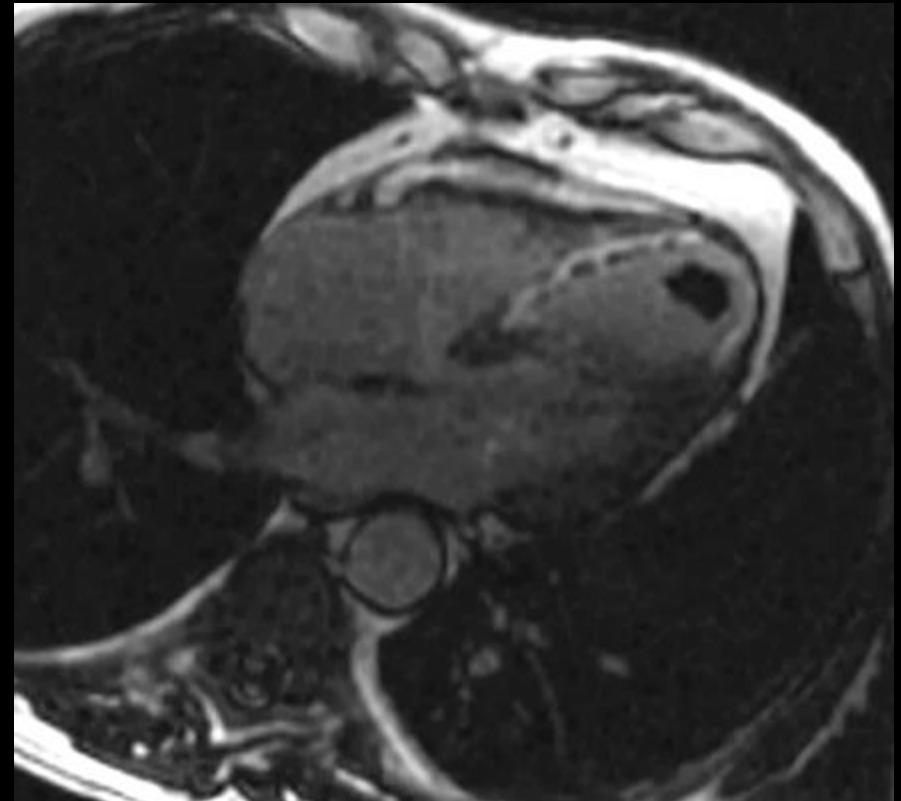
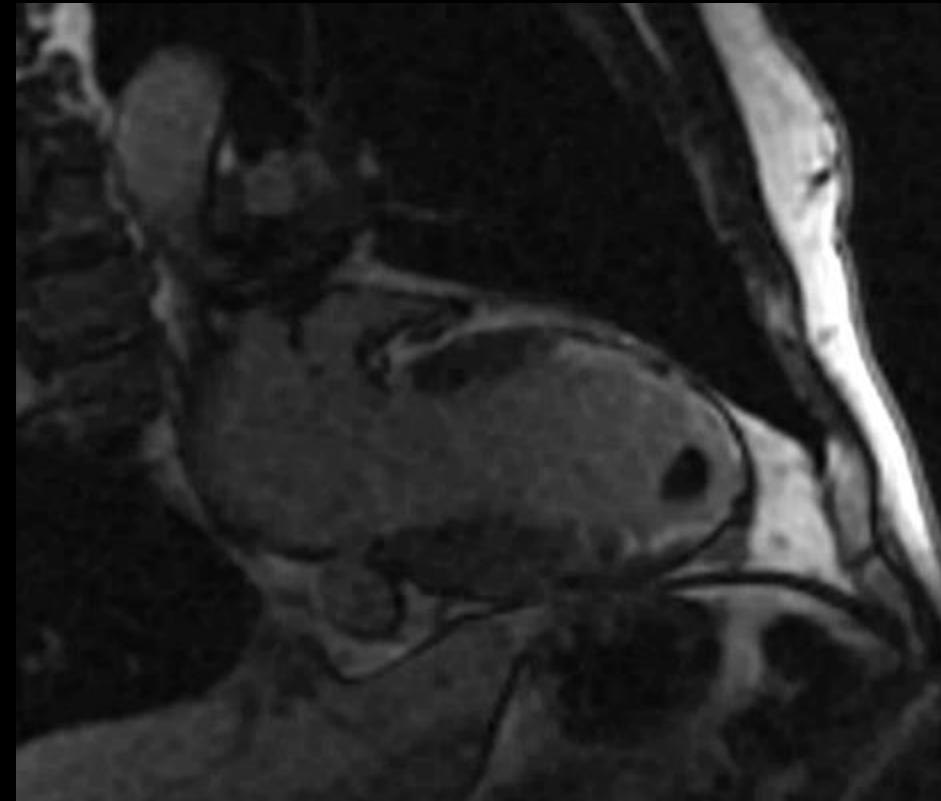
Fibrosis Transmural

RMI Cardíaca

Función Ventricular

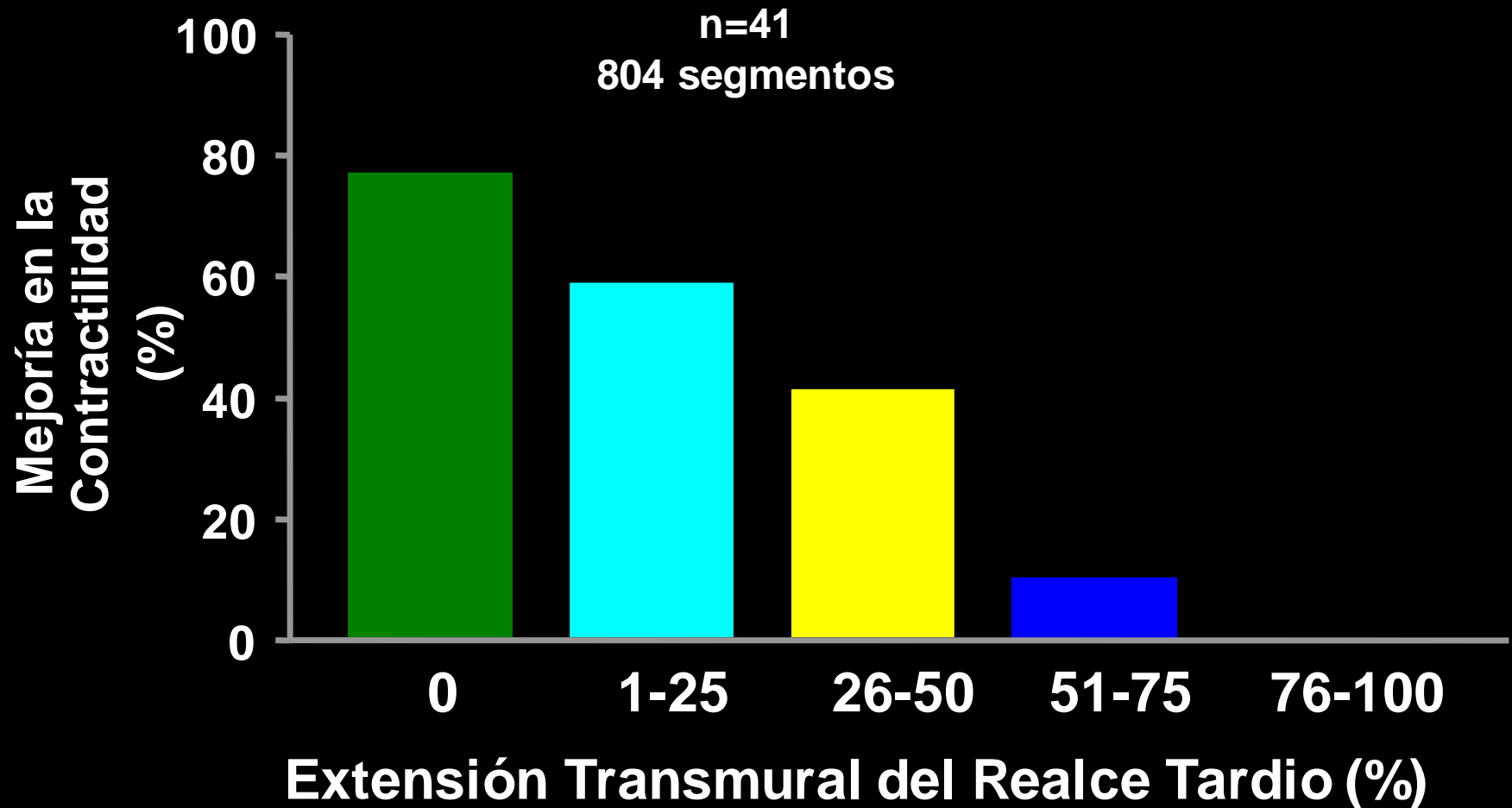


Fibrosis Anteroseptoapical Trombo apical

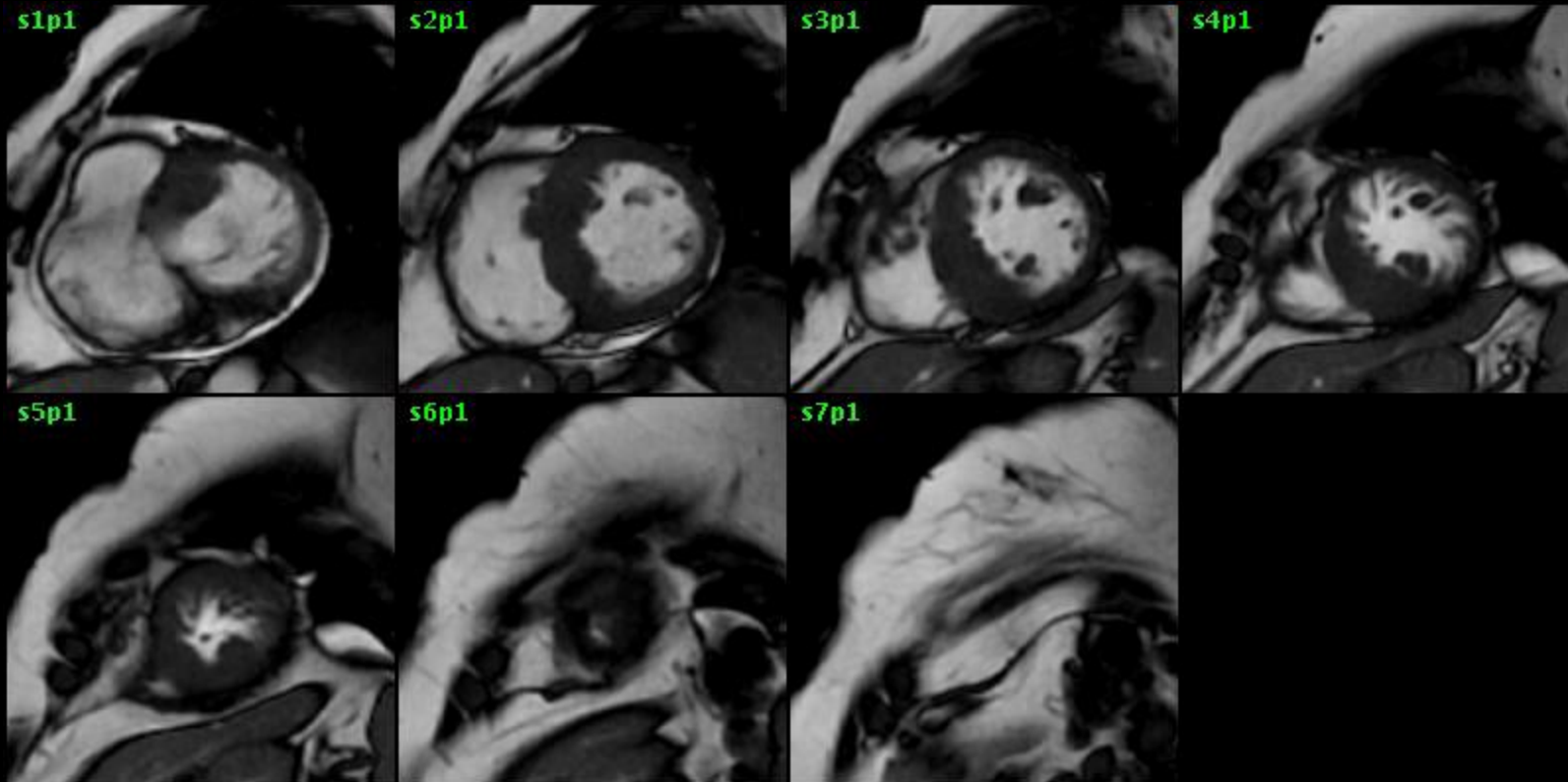


RMI Cardíaca

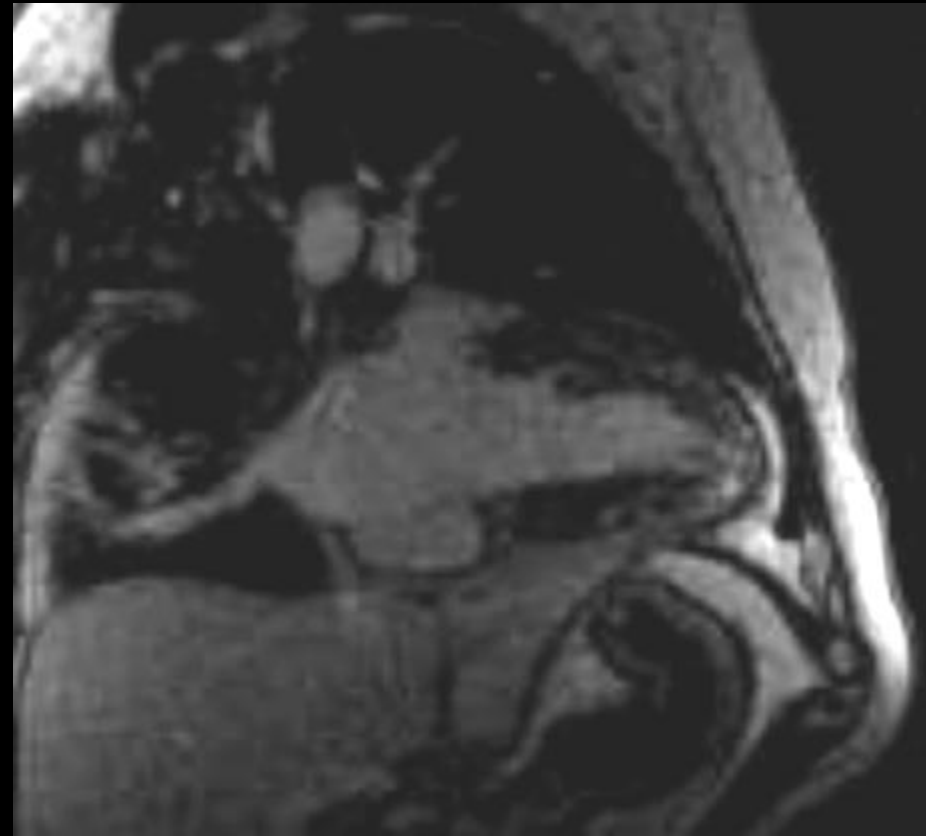
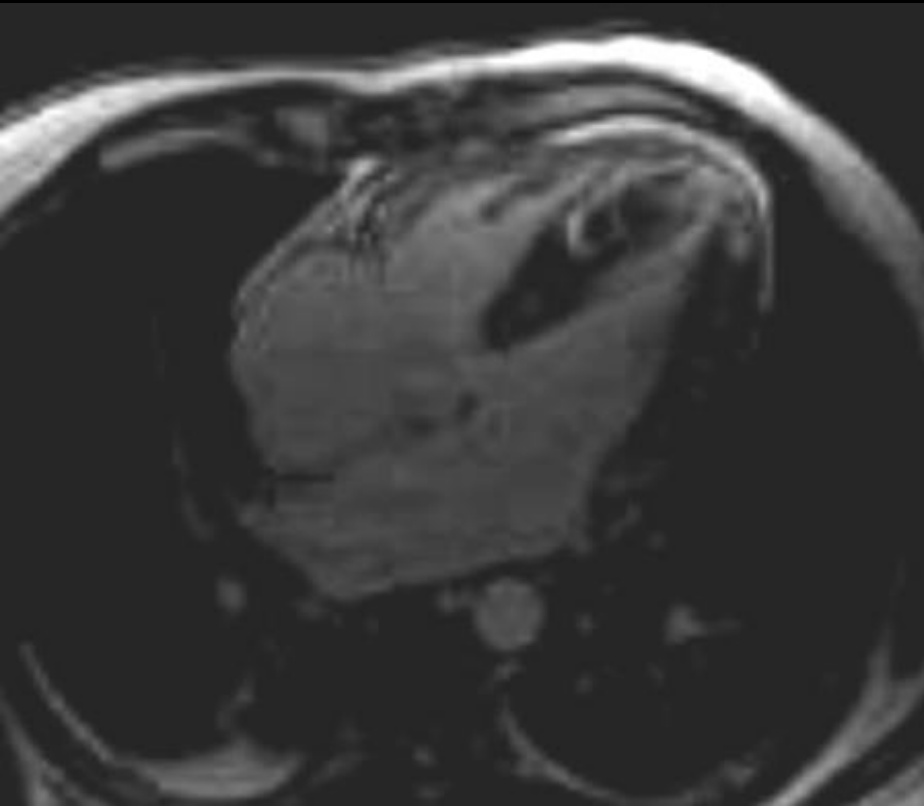
Recuperación Contráctil



Miocardiopatía Hipertrófica

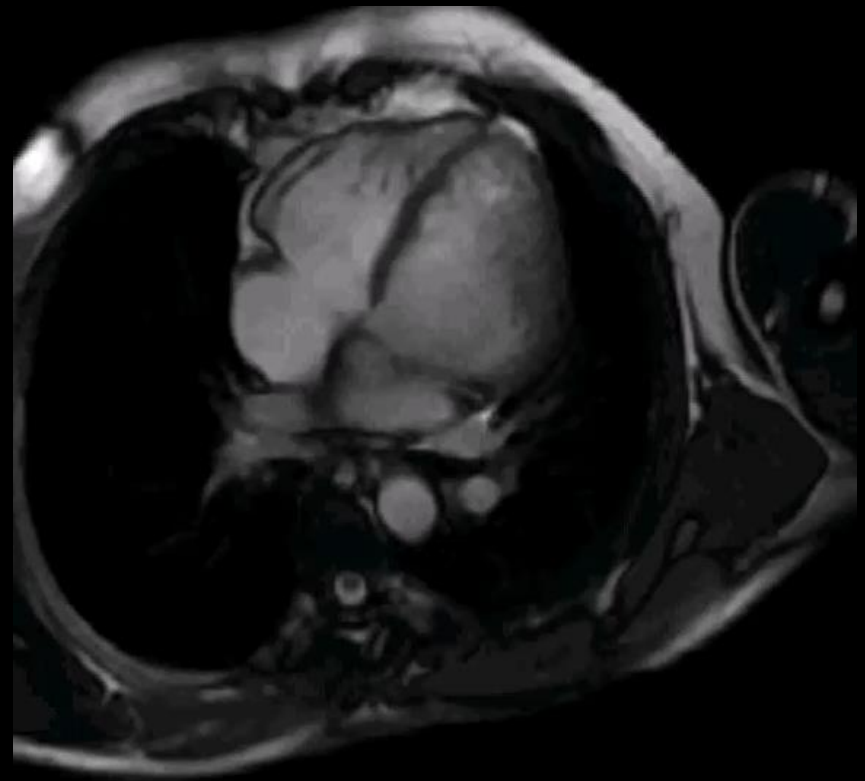


Enfermedad de Chagas



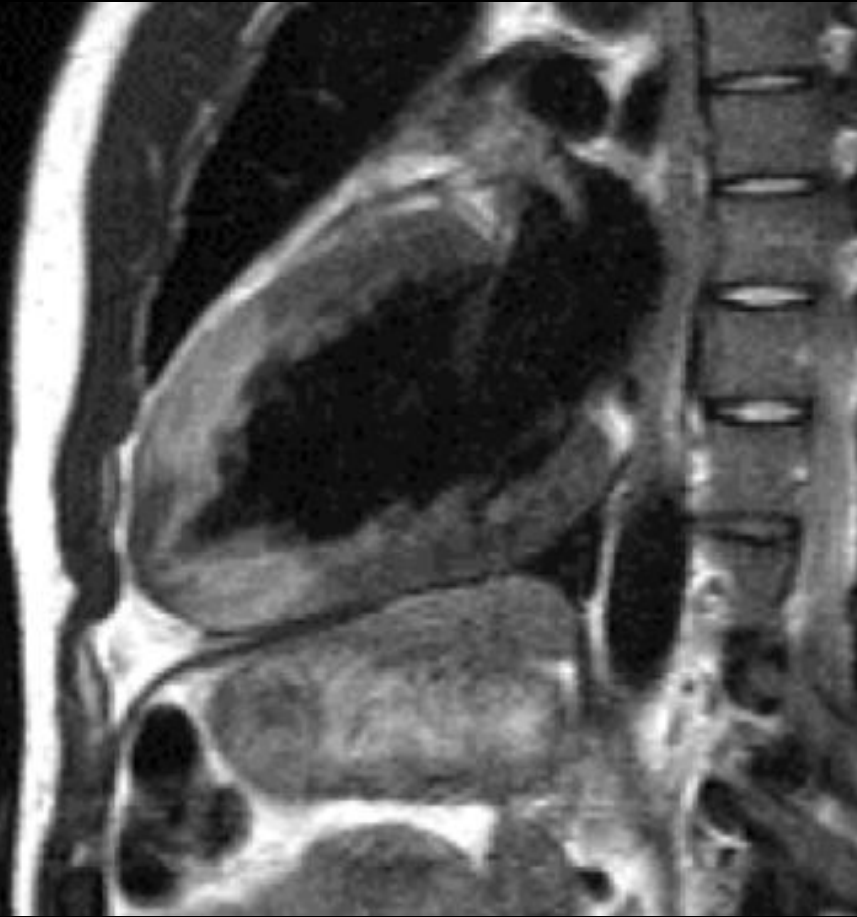
Ventrículo No compactado

- Detención del proceso normal de compactación de la pared ventricular en la vida fetal
- Presentación clínica:
 - Insuficiencia Cardíaca
 - Embolia Sistémica
 - Arritmias
 - Muerte Súbita

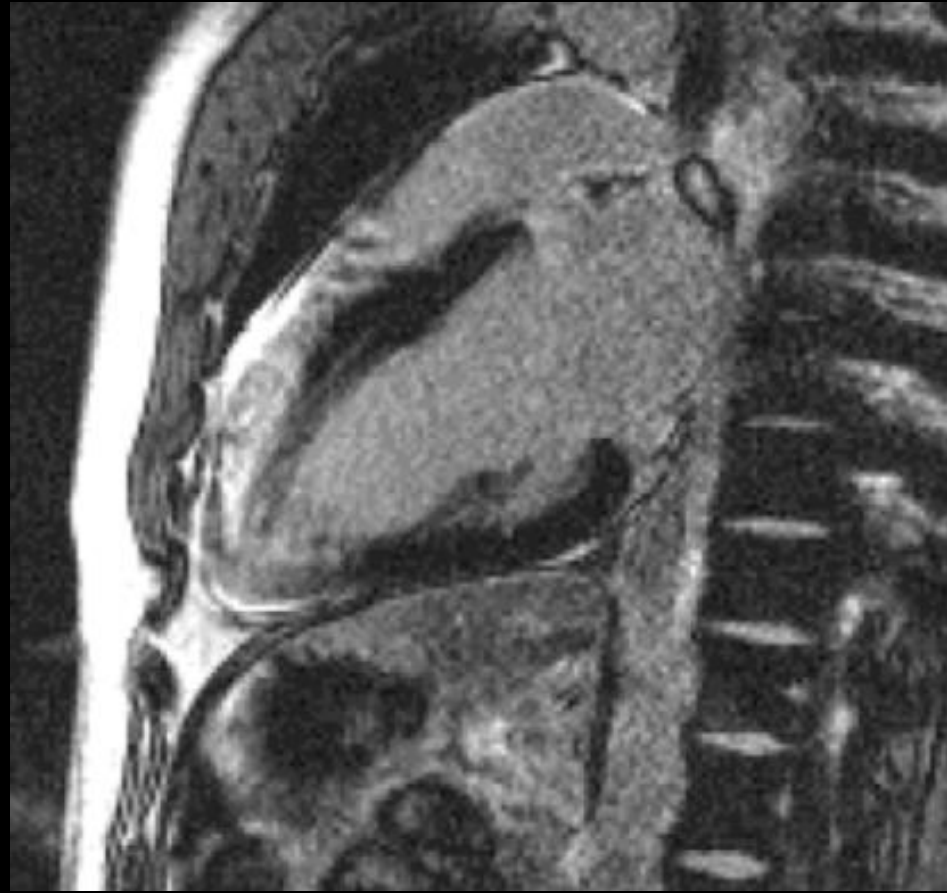


Miocarditis

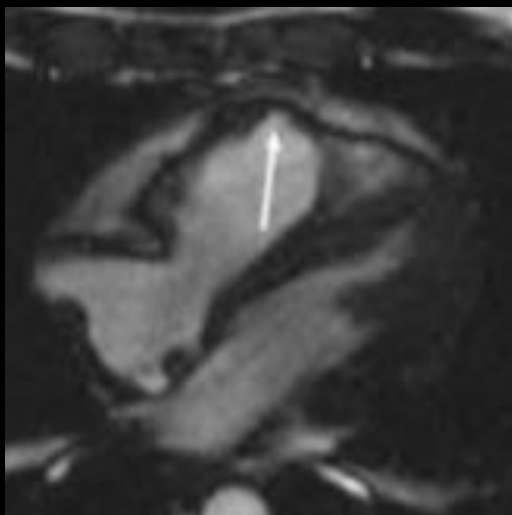
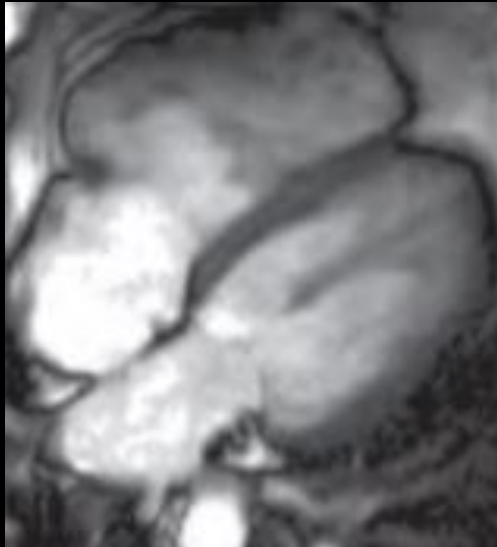
Secuencia Doble IR



Post Gadolinio



Displasia Arritmogénica del VD



Criterios Mayores (RNM)

- Aquinesia o disquinesia regional de VD ó disincronía en la contracción del VD y uno de los siguientes:
 1. VFDVD
 $\geq 110\text{ml/m}^2$ (M)
 $\geq 100\text{ml/m}^2$ (F)
 2. Fracción de eyección del VD
 $\leq 40\%$

Criterios Menores (RNM)

- Aquinesia o disquinesia regional de VD o disincronía en la contracción del VD y uno de los siguientes:
 1. VFDVD
 ≥ 100 y $\leq 110\text{ml/m}^2$ (M)
 ≥ 90 y $\leq 100\text{ml/m}^2$ (F)
 2. Fracción de eyección del VD
 ≥ 40 y $\leq 45\%$

Conclusiones

- El Score de Calcio posee valor agregado dx. y pronóstico, simple de realizar en pacientes asintomáticos sin EAC
- La TCMS brinda alto valor predictivo negativo para exclusión rápida y eficaz de EAC en pacientes de bajo a intermedio riesgo
- La TCMS posee aplicaciones de uso creciente: TAVI/ Vs Pulmonares, Cardiopatías Congénitas, entre otros
- La RMI brinda alta resolución espacial para caracterización de fibrosis miocárdica, con aplicaciones específicas para patologías del miocardio

Muchas Gracias