

Semmelweis Egyetem

KARDIOLÓGIAI
KÖZPONT

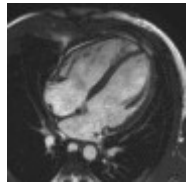
Felnőttkorú Veleszületett Szívbeteggek 10. Fóruma

A koszorúerek rendellenességeiről
Az MRI szerepe a diagnosztikában

Tóth Attila, 2018 VSZÉK



MRCA: 3D navigátoros technika



- Coronaria nyugalmi szakasz:
individuálisan kerül beállításra
- Előnyök
 - Szabad légzésben készül
 - Nem szükséges kontrasztanyagot adni
- Hátrányok
 - Szabályos légzés mellett szép
 - Ingadozó szívritmus mellett nem szép
 - Hosszadalmas, türelem kell hozzá



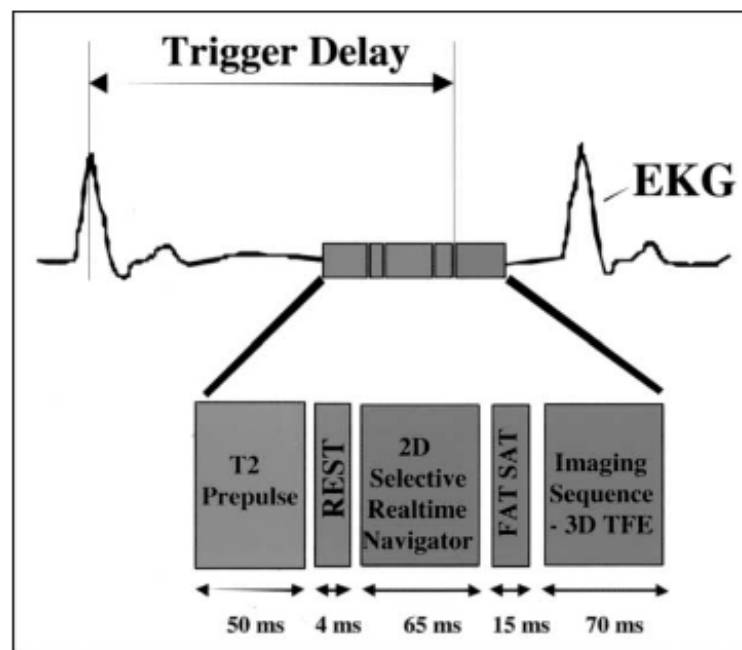
Usefulness of Real-Time Navigator Magnetic Resonance Imaging for Evaluating Coronary Artery Origins in Pediatric Patients

Jason T. Su, DO, Taylor Chung, MD, Raja Muthupillai, PhD, Ricardo H. Pignatelli, MD, Grace C. Kung, MD, Laura K. Diaz, MD, G. Wesley Vick III, MD, PhD, and John P. Kovalchin, MD

Navigator coronary magnetic resonance imaging (MRI) was evaluated in assessing coronary artery origins in a pediatric and adolescent population. Sixty-five consecutive infants, children, or adolescents (age range 11 days to 21 years) were referred for MRI evaluations to assess coronary artery origins. Coronary artery origins were unambiguously delineated in 62 of 65 patients. In 3 patients, irregular arrhythmias precluded cardiac gating of the magnetic resonance acquisition. Two patients had anomalous coronary artery origins detected. Twenty-six patients required sedation for the studies. Free-breathing 3-dimensional MRI with real-time navigator correction is a robust method for delineating the coronary artery origins in pediatric and adolescent patients. ©2005 by Excerpta Medica Inc.

(Am J Cardiol 2005;95:679-682)

▲ Although early attempts using magnetic resonance



SURVEY_BFFE FOV 450
2009.11.12, 18:12 Slice 16/20

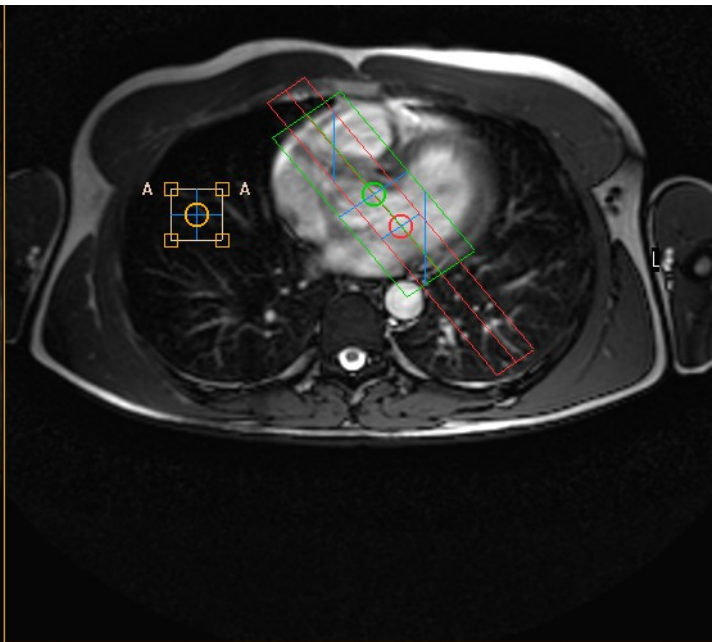
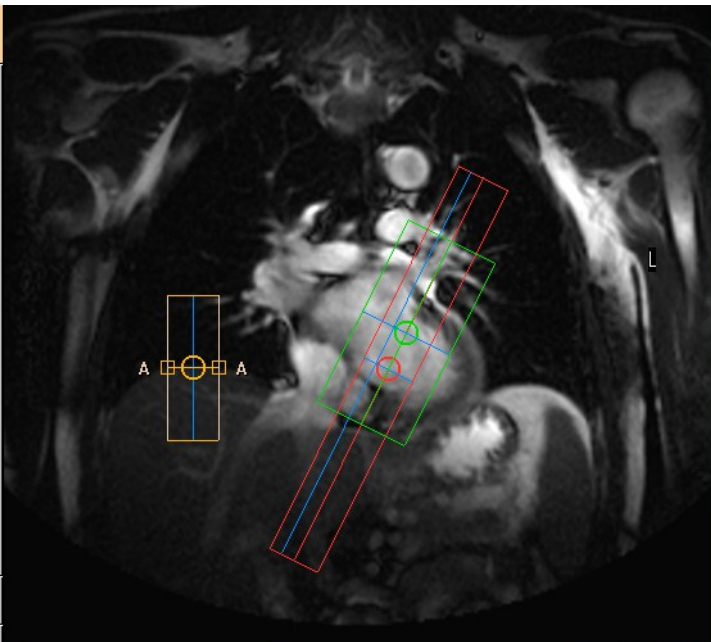
Planscan

Geometry: **Navigator A**

Delete Copy

Volume Stack Slab

All midplanes 3PPS



System Ready 20

HC Screen HC Case

Compose Compose

Scan: 1

More... All

View Window RAL

VCG+Resp 5 s 63

3D_BTFFE_BH

HAJNI VIAB II(2) 00:03:45

Navigator Display

3D_BTFFE_BH

Leading navigator, beam 1

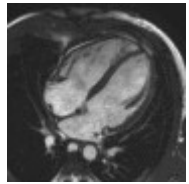
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3D_BTFFE_BH CORON

initial	geometry	contrast	motion	dyn/ang	postproc	offc/ang	conflicts
Coil selection	SENSE-Cardiac		Total scan duration		02:45.7		
element selection	12345		Rel. signal level (%)		100		
connection	d		Act. TR/TE (ms)		4.9 / 2.4		
Dual coil	no		ACQ matrix M x P		228 x 182		
CLEAR	yes		ACQ voxel MPS (mm)		1.10 / 1.11 / 1.10		
FOV FH (mm)	250		REC voxel MPS (mm)		0.49 / 0.49 / 1.10		
AP (mm)	200		Scan percentage (%)		98.9		
RL (mm)	25		TFE shots		172		
Voxel size FH (mm)	1.1		TFE dur. shot / acq (ms)		270.9 / 112.5		
AP (mm)	1.1		TFE shot interval (beats)		1		
RL (mm)	1.1		Entered heartrate		63		
Recon voxel size (mm)	0.5		Trigger delay max. / act...		904.8 / 630.0		
Fold-over suppression	yes		Max. heart phases		1		
Slice oversampling	default		Act. WFS (pix) / BW (Hz)		0.223 / 974.7		
Reconstruction matrix	512		Min. WFS (pix) / Max. B...		0.222 / 980.4		
SENSE	no		SAR / whole body		< 32% / 1.3 W/kg		
k-tBLAST	no		Whole body / level		< 1.3 W/kg / norm		
Overcontiguous slices	no		B1 rms [uT]		2.6		



MR coronaria angiographia

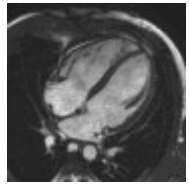


- Kawasaki betegség
- Fallot tetralógia (FIV vagy TOF)
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- Nagyér transzpozíció (TGA)
- Kettős kiáramlású jobb kamra (DORV)
- Truncus arteriosus communis
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- Coarctatio (COA)





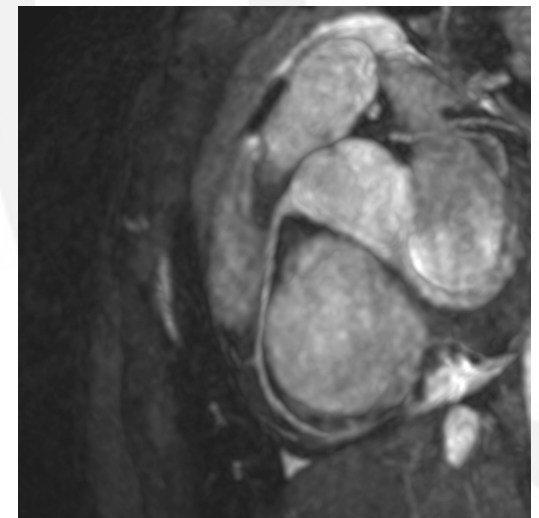
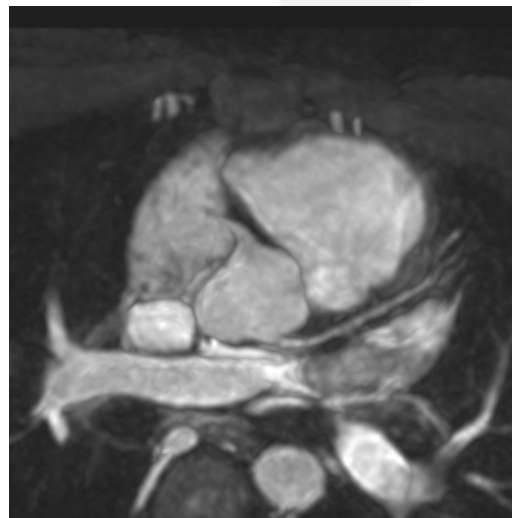
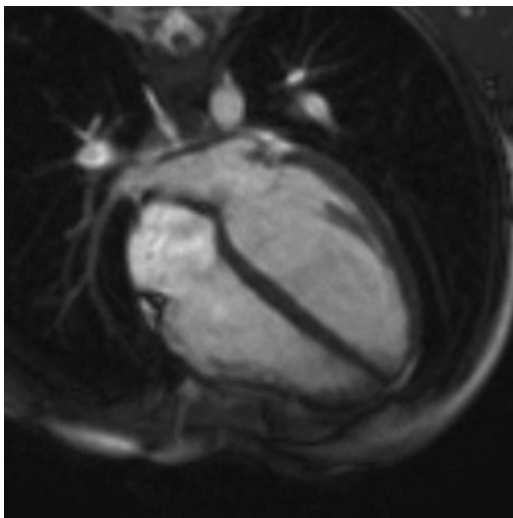
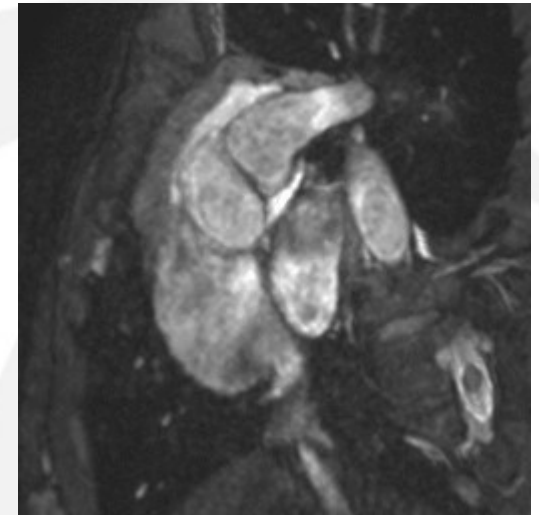
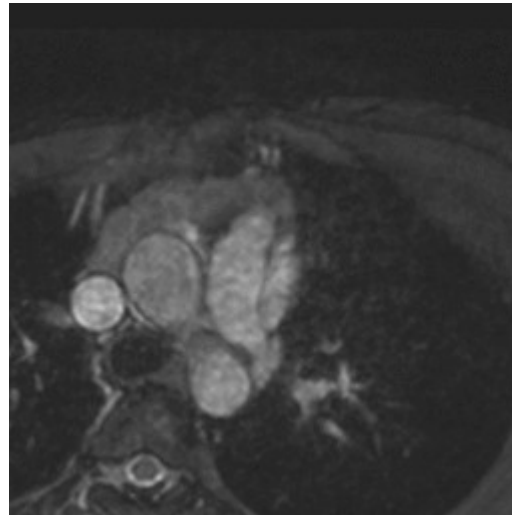
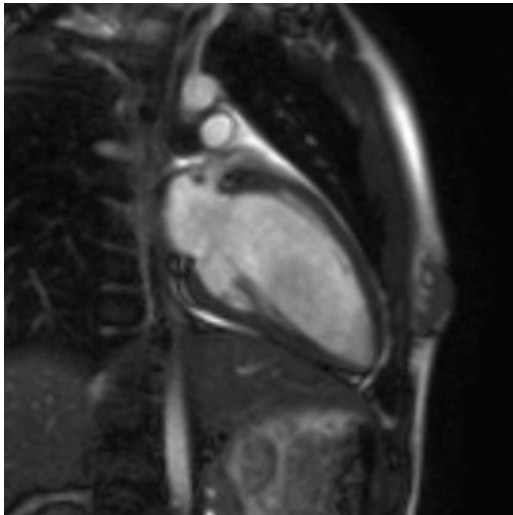
MR coronaria angiographia



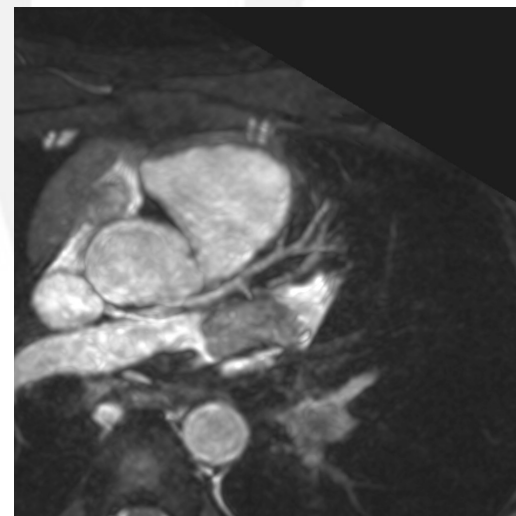
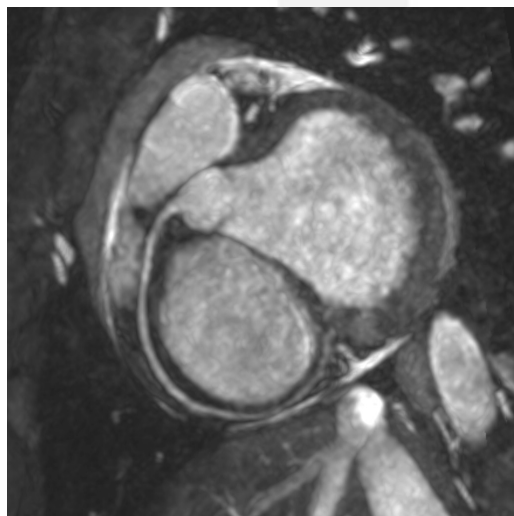
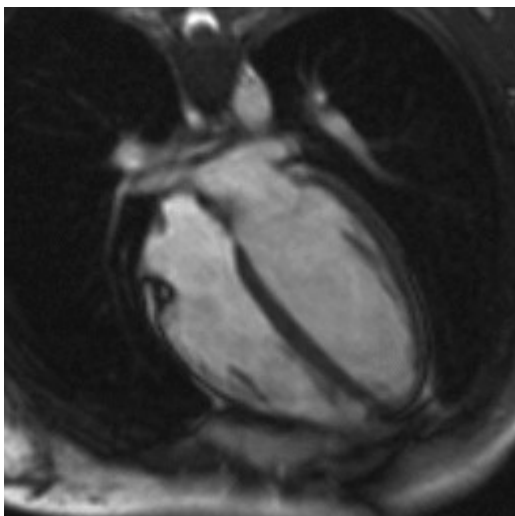
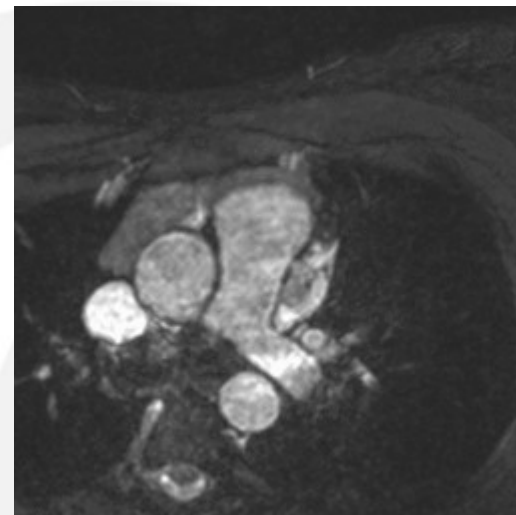
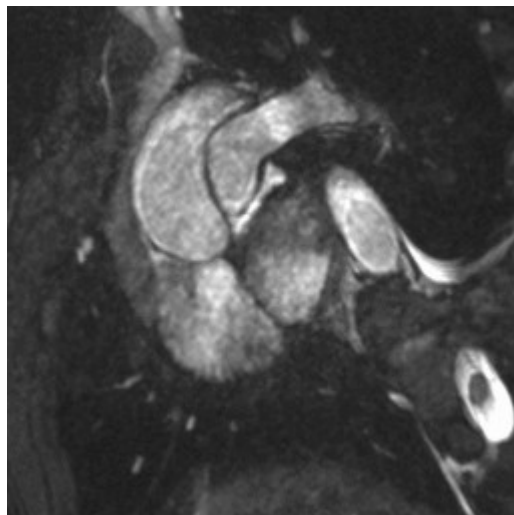
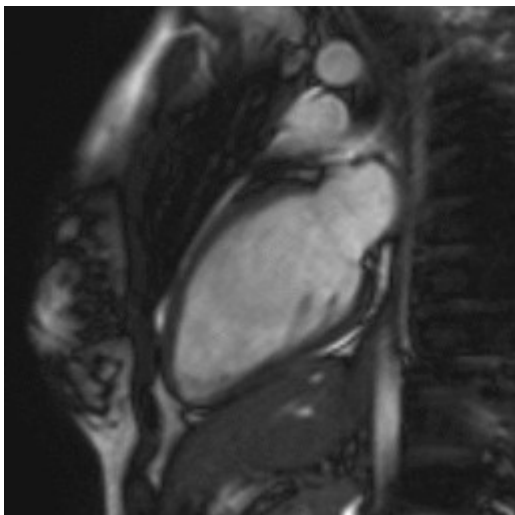
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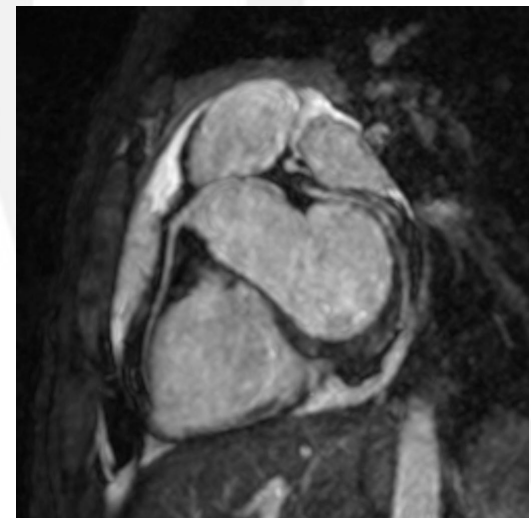
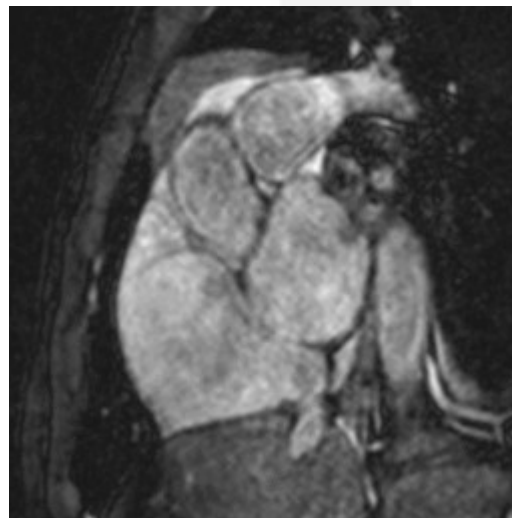
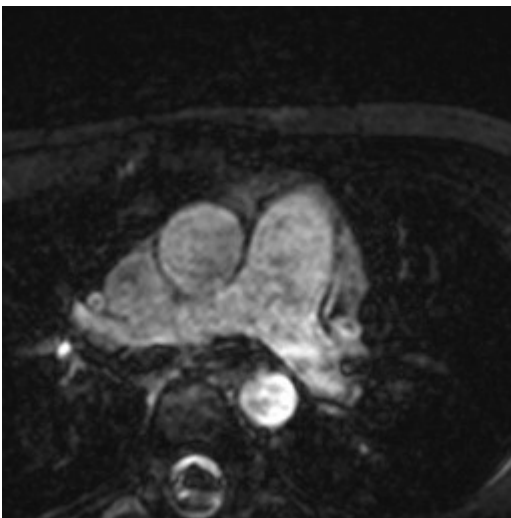
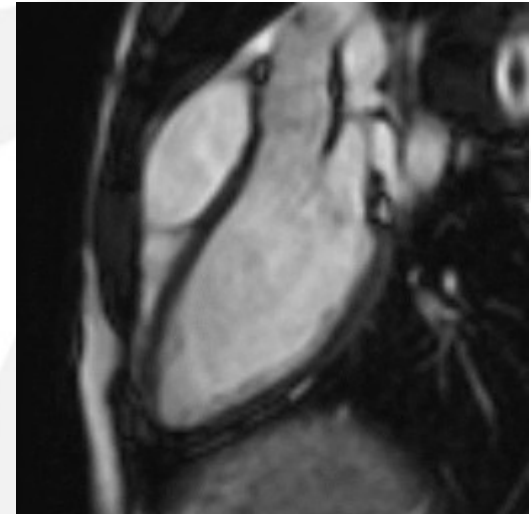
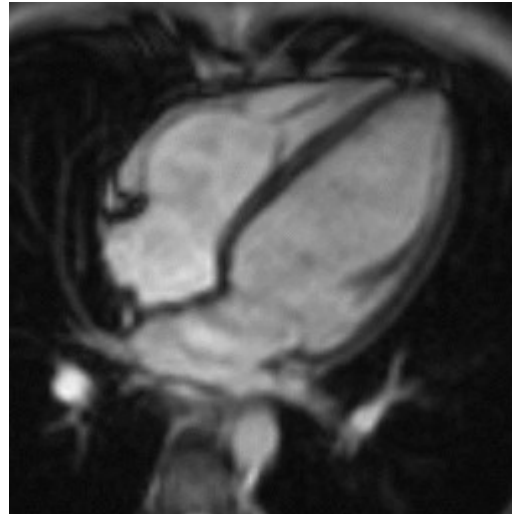
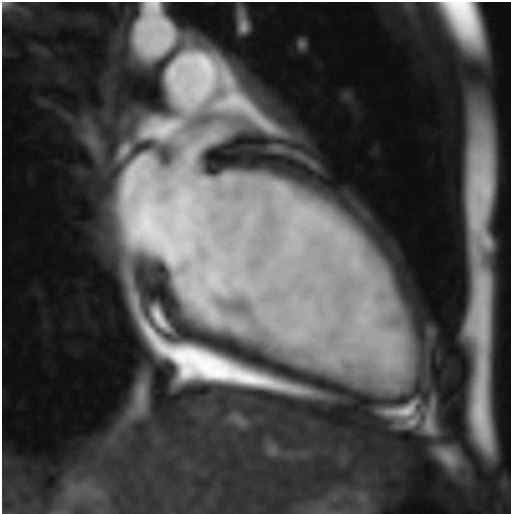
Kawasaki után MRCA: nincs ectasia



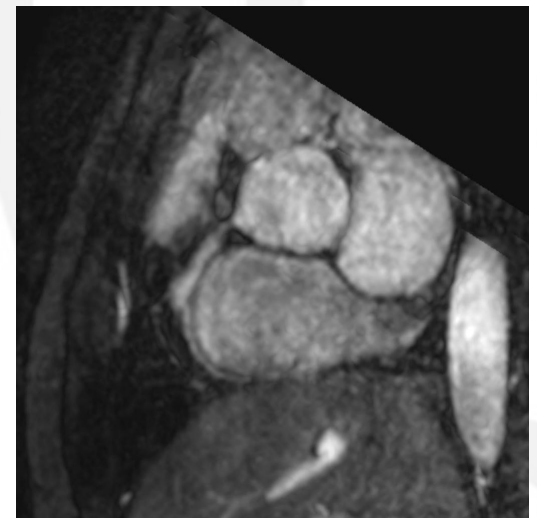
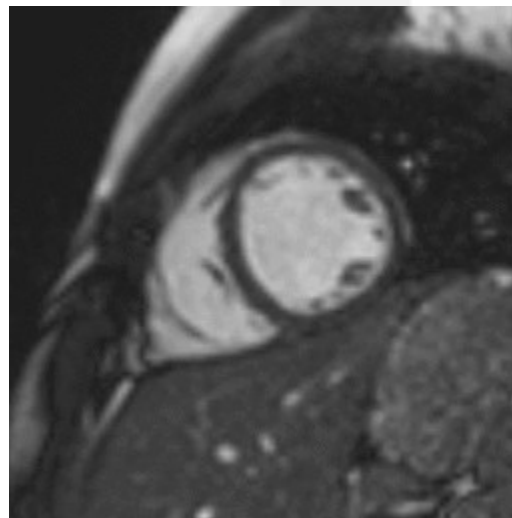
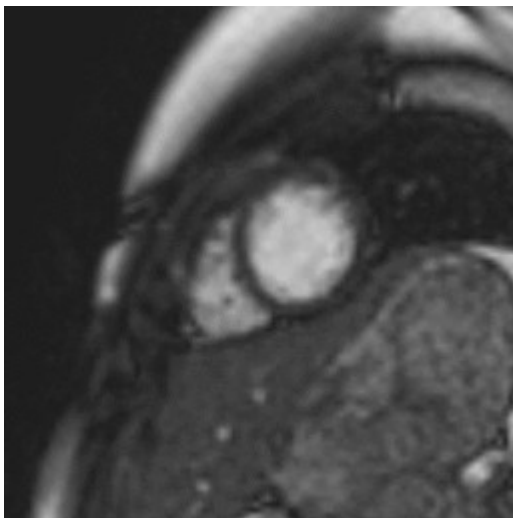
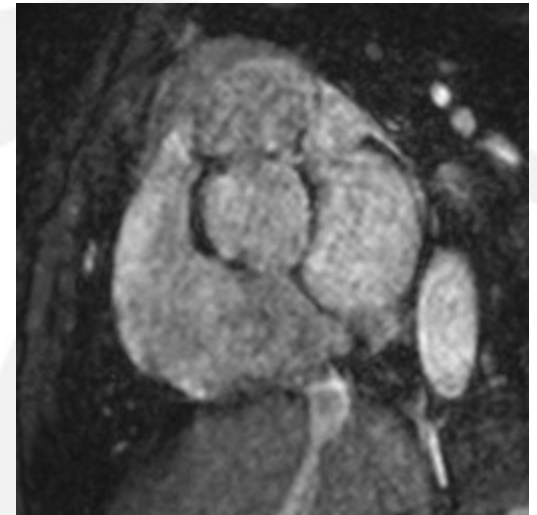
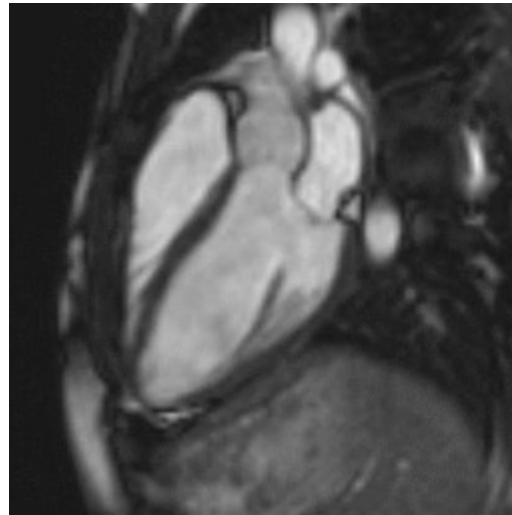
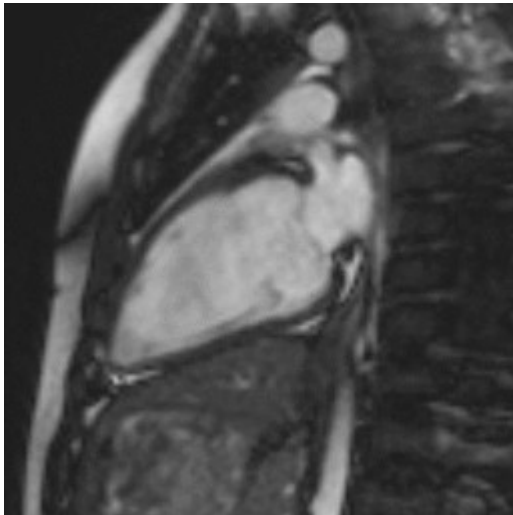
Kawasaki: negatív MRCA



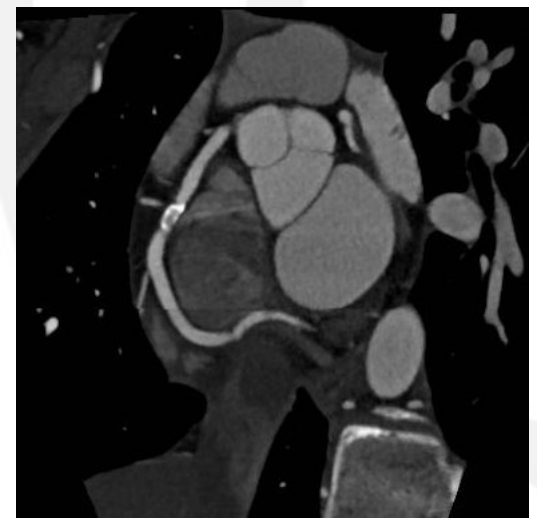
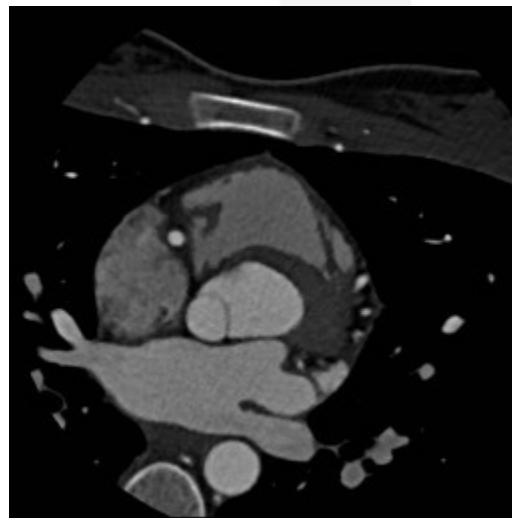
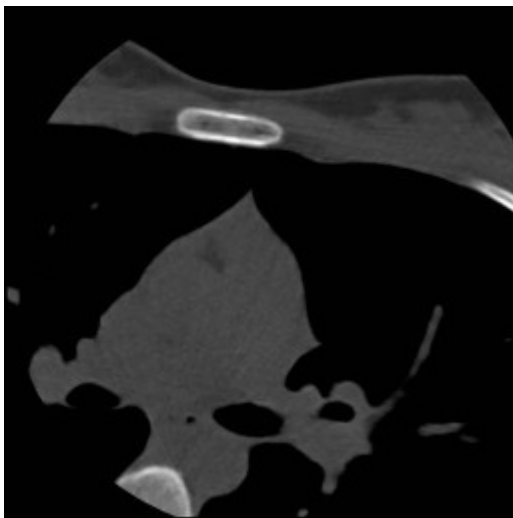
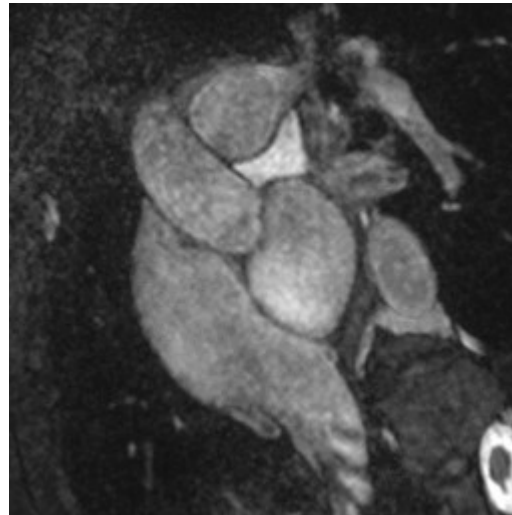
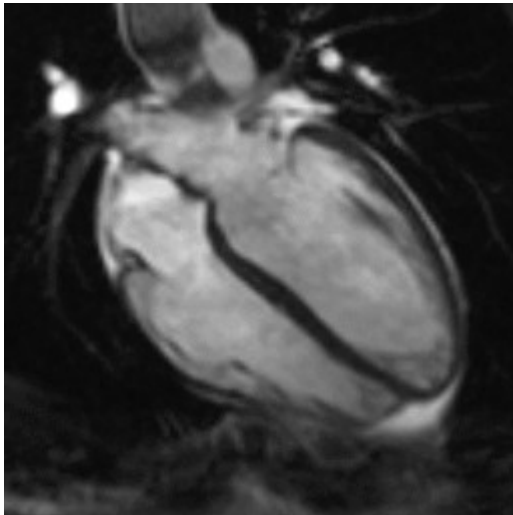
Kawasaki, MRCA systolera triggerelve



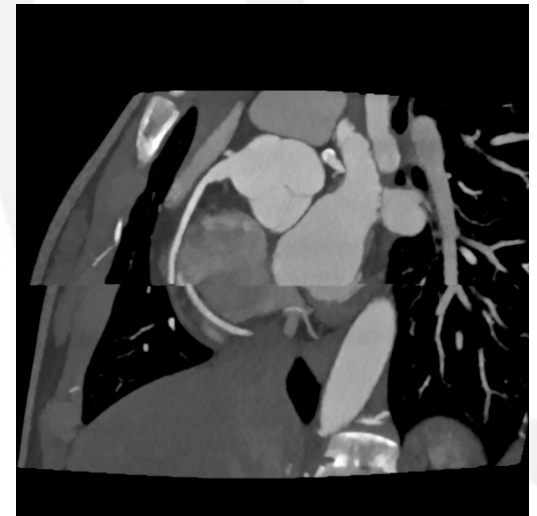
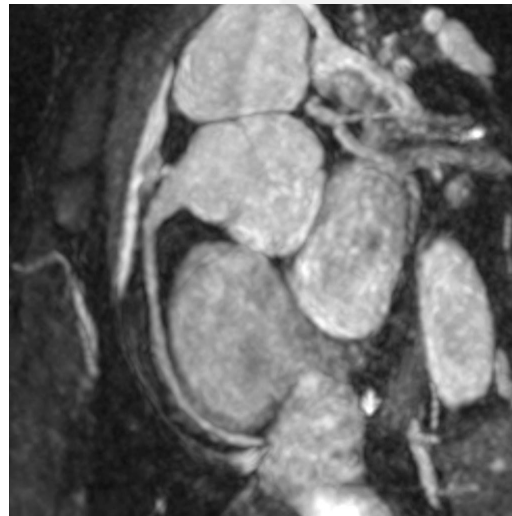
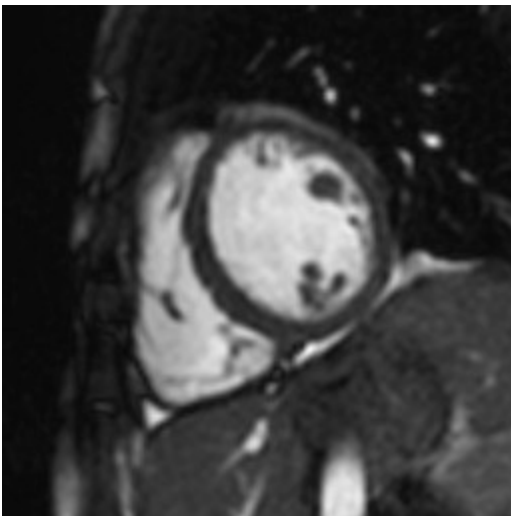
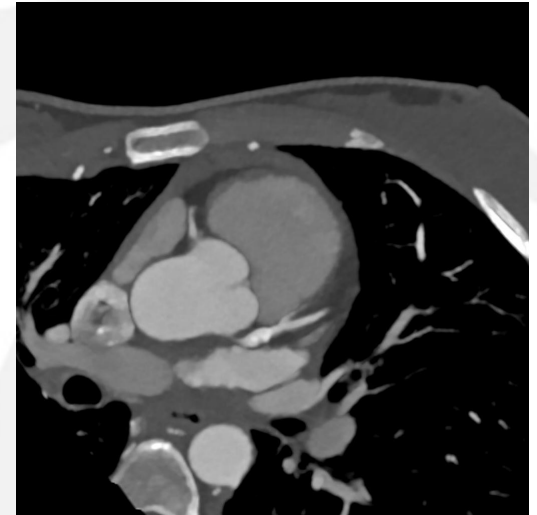
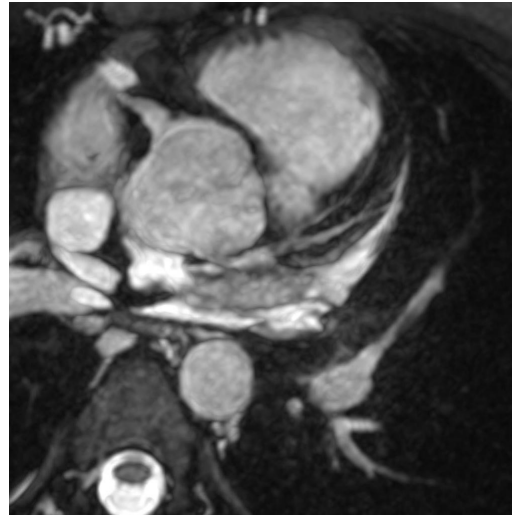
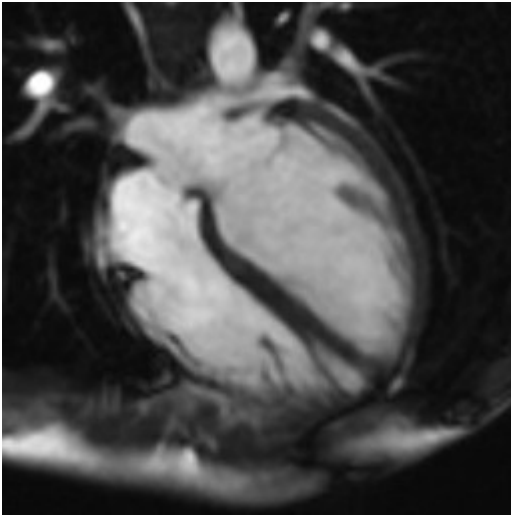
Kawasaki: persistáló RCA ectasia



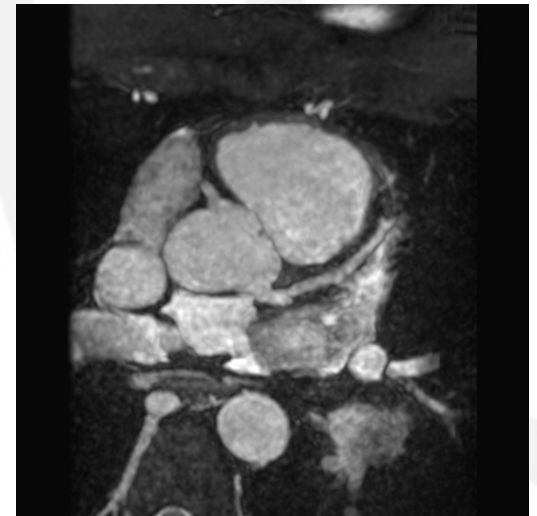
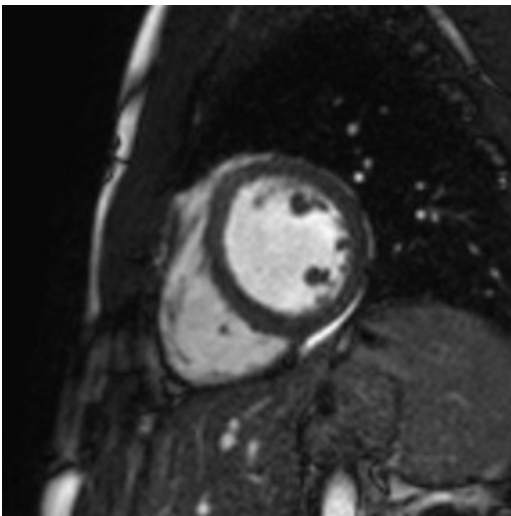
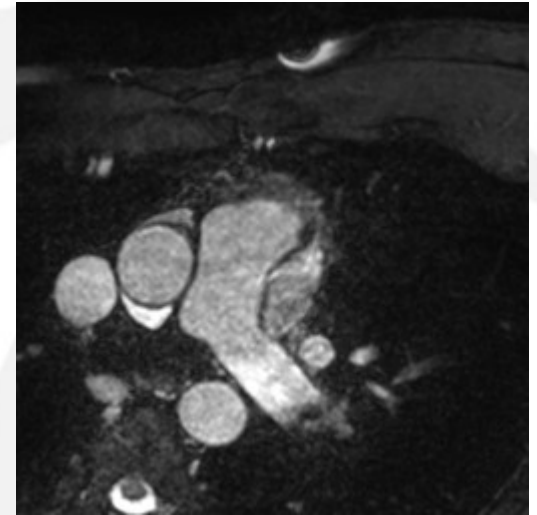
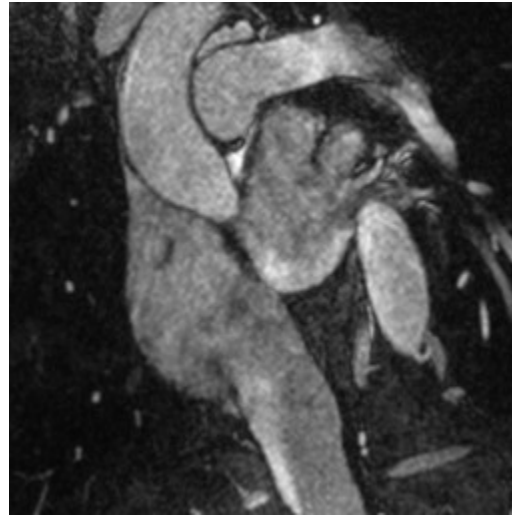
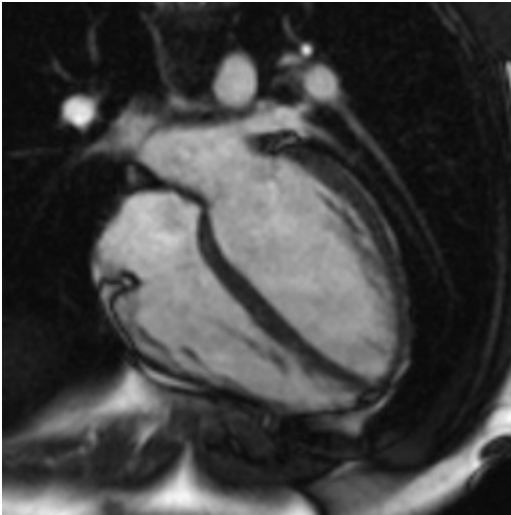
Kawasaki: meszes RCA plakk



Kawasaki persistalo coronaria eltérések

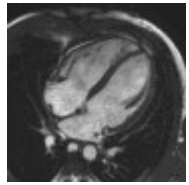


Kawasaki, RCA ectasia, stenosis?





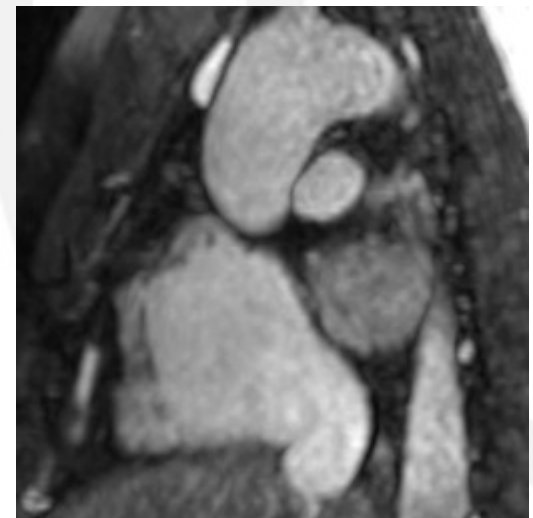
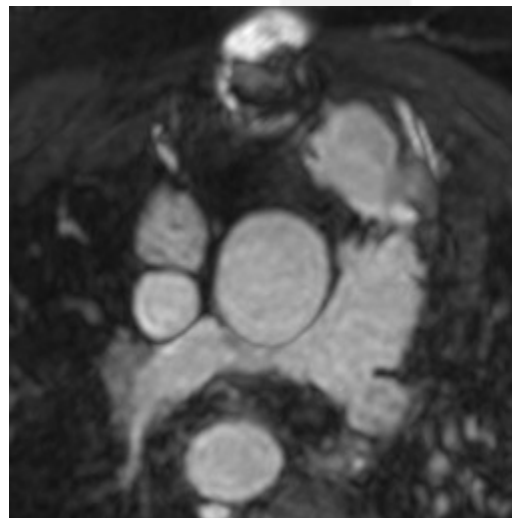
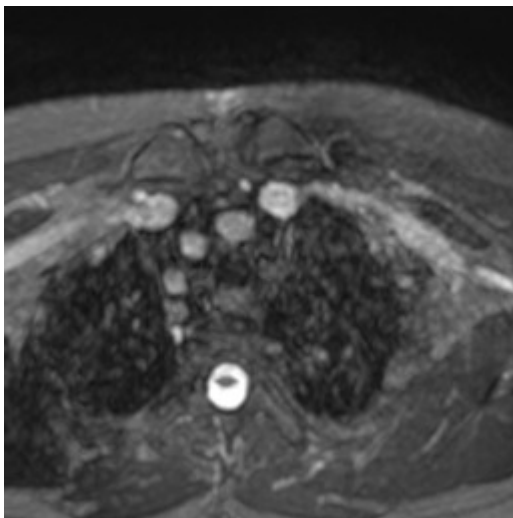
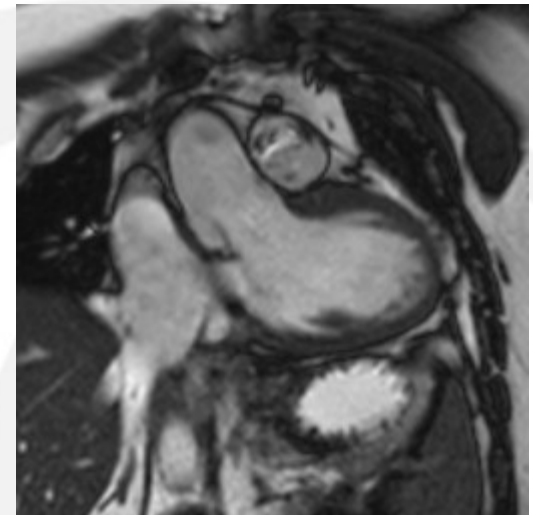
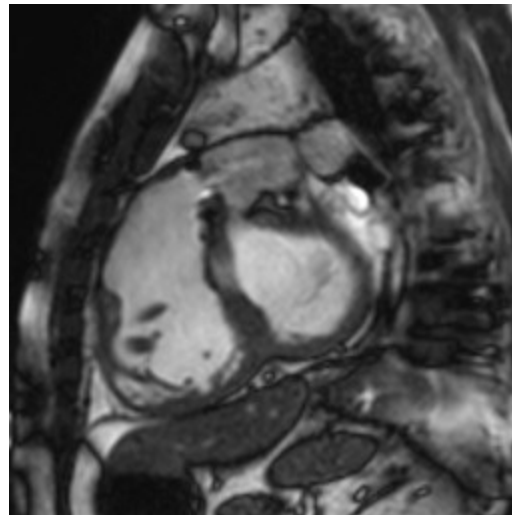
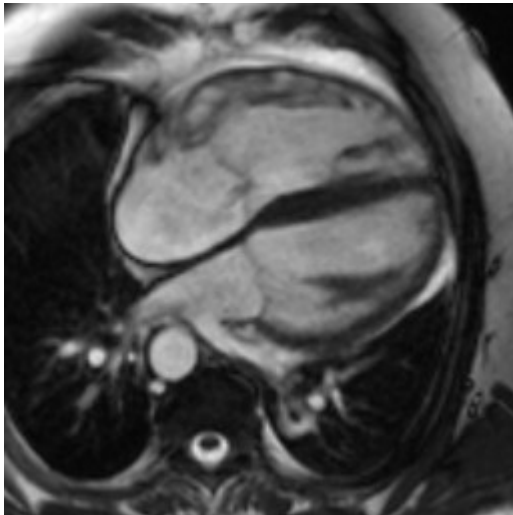
MR coronaria angiographia



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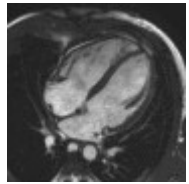


Biocor-25, 373cm/s, 56/26Hgmm, 26%





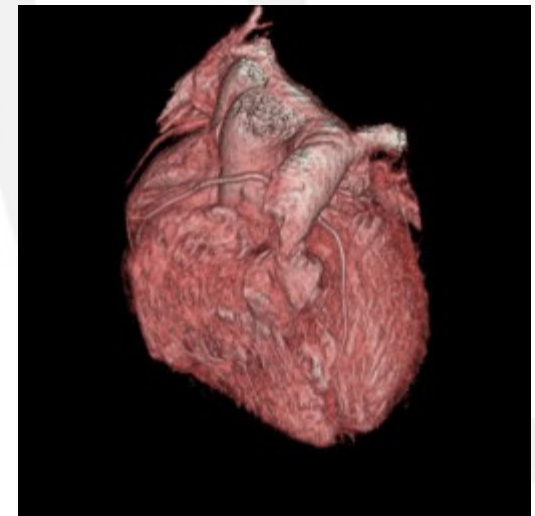
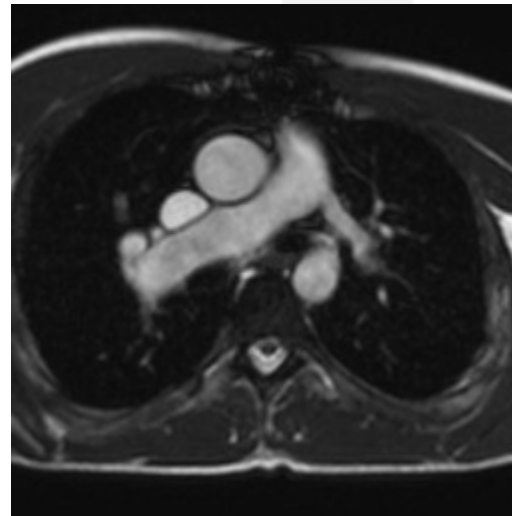
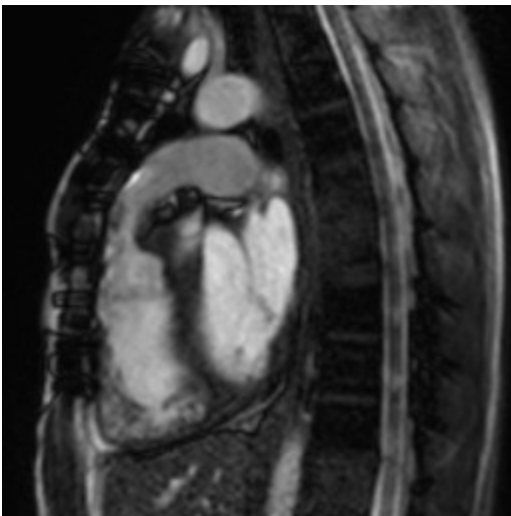
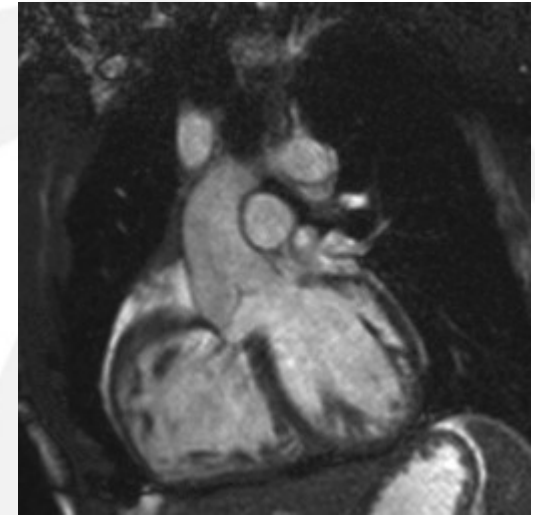
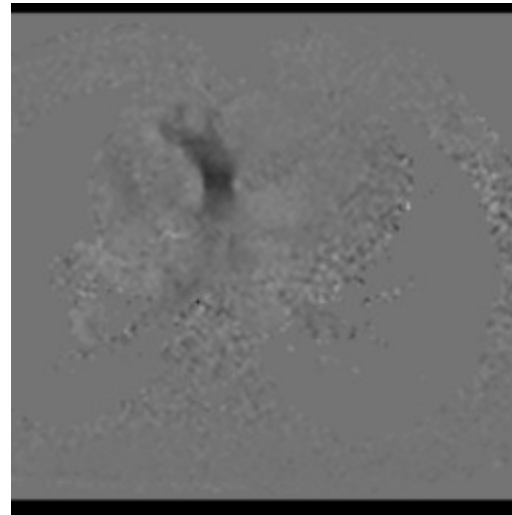
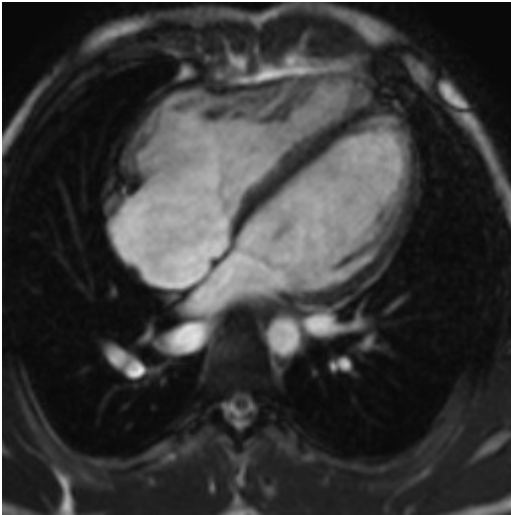
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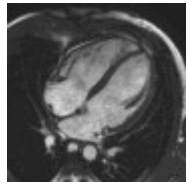


PA+VSD, HS, LPA stenosis, anomalia





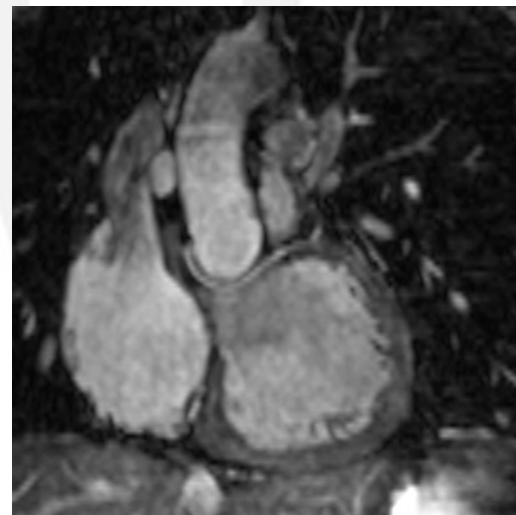
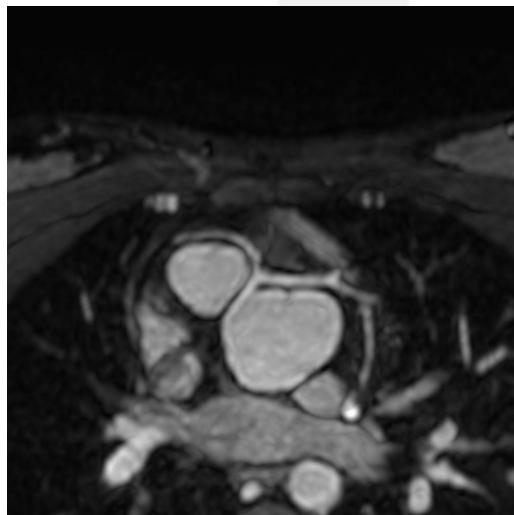
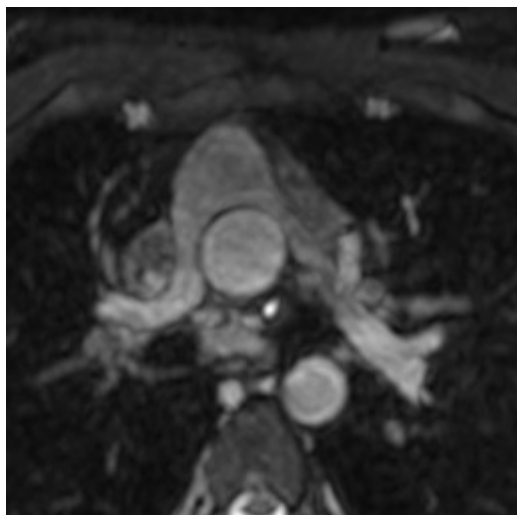
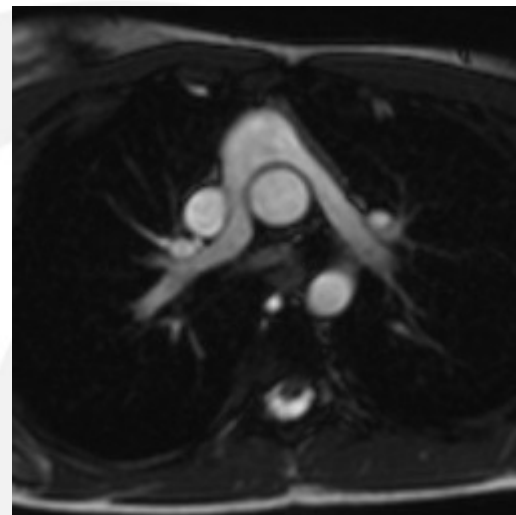
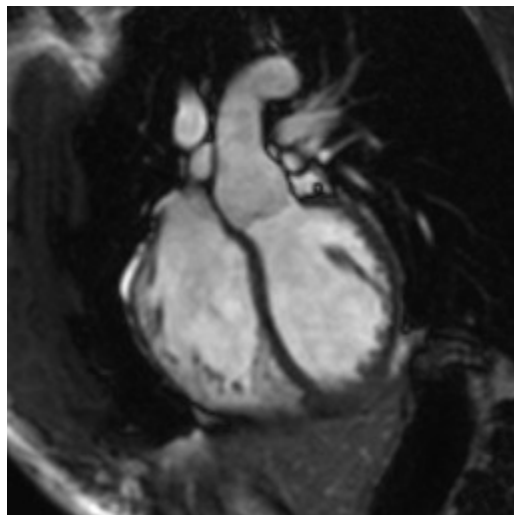
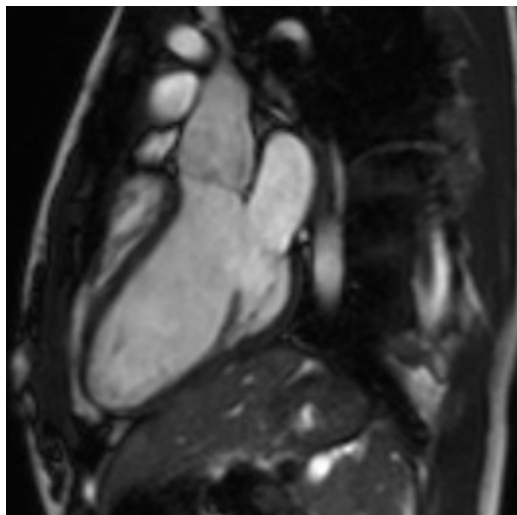
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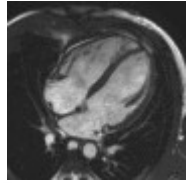


d-TGA, 00: switch, coronaria anomália





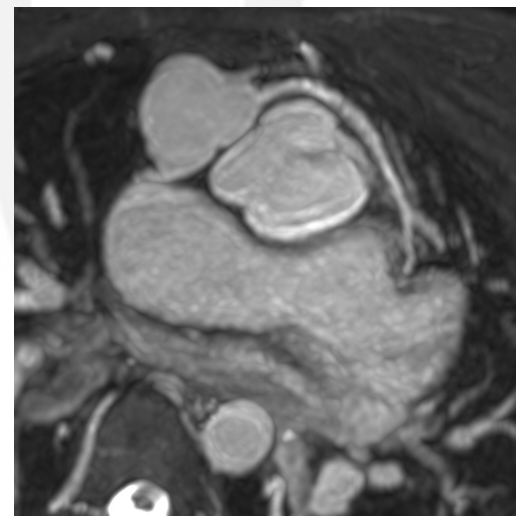
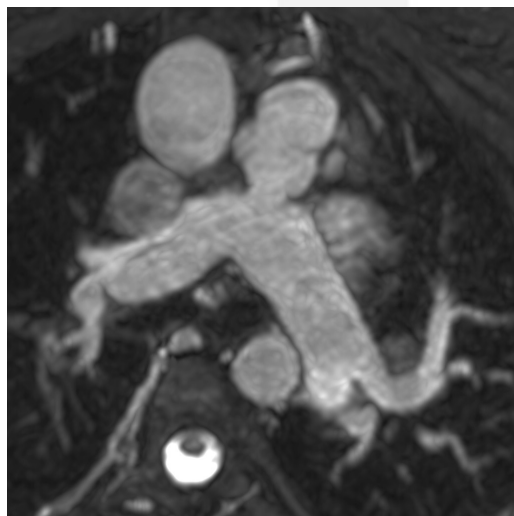
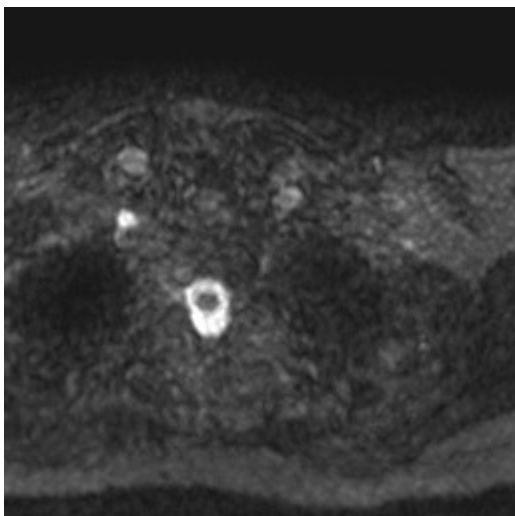
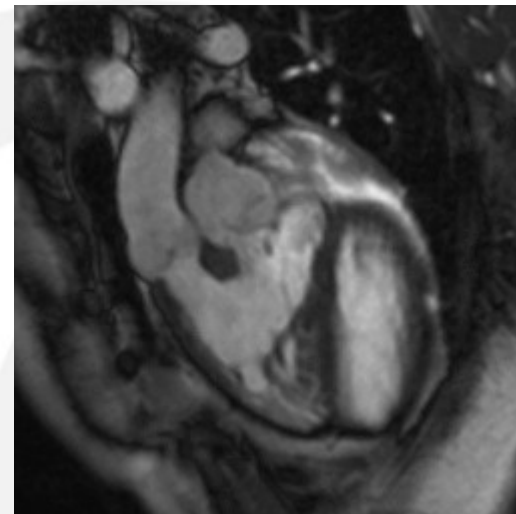
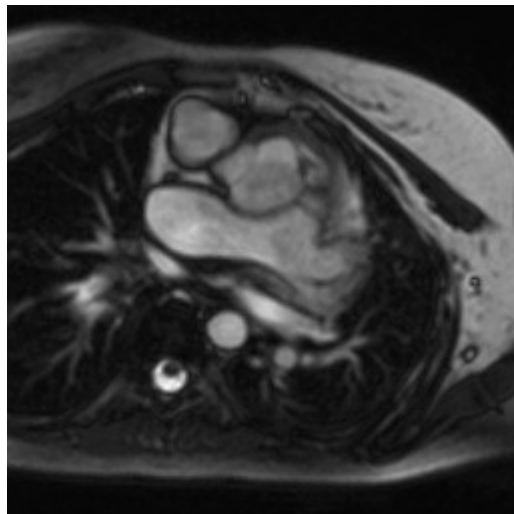
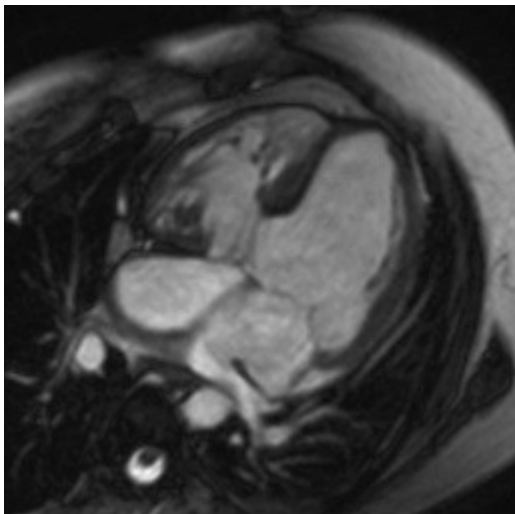
MR coronaria angiographia



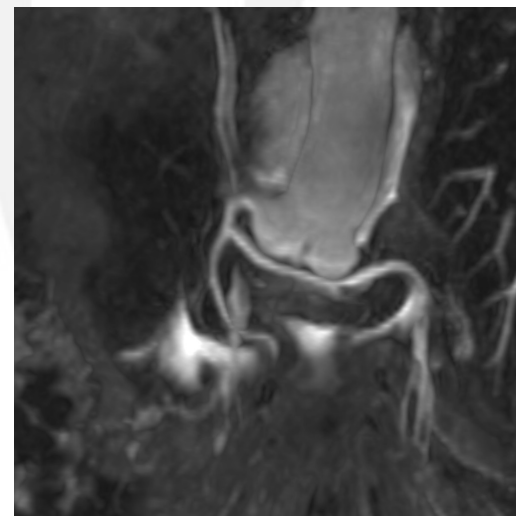
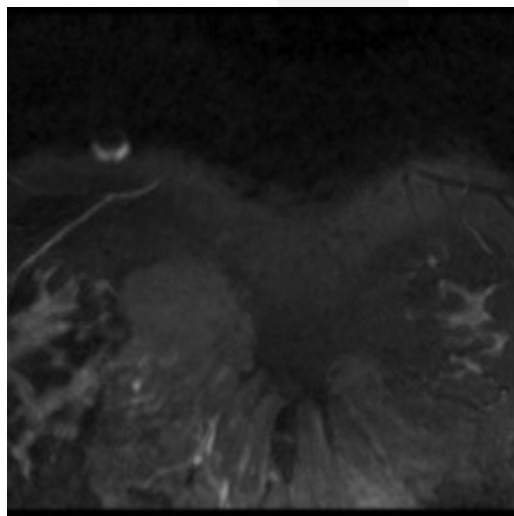
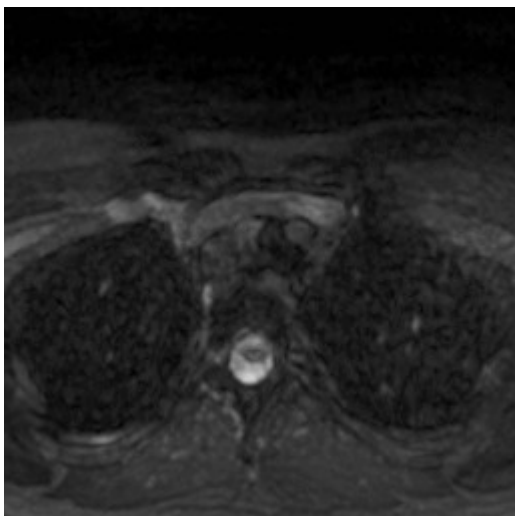
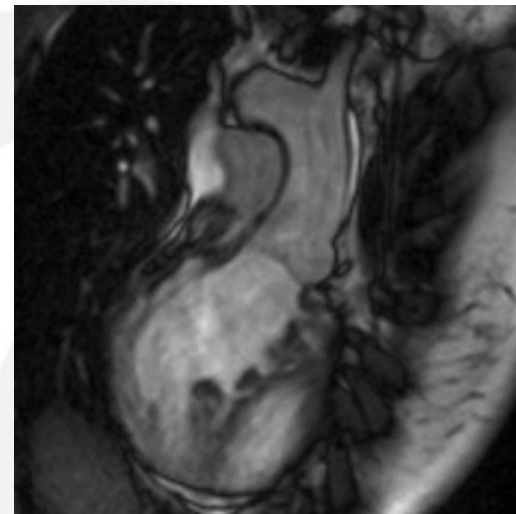
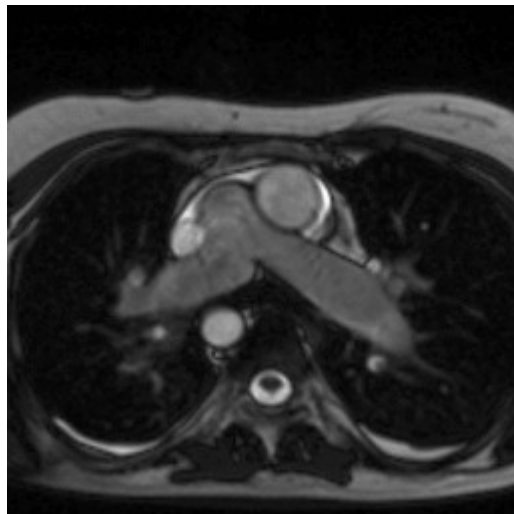
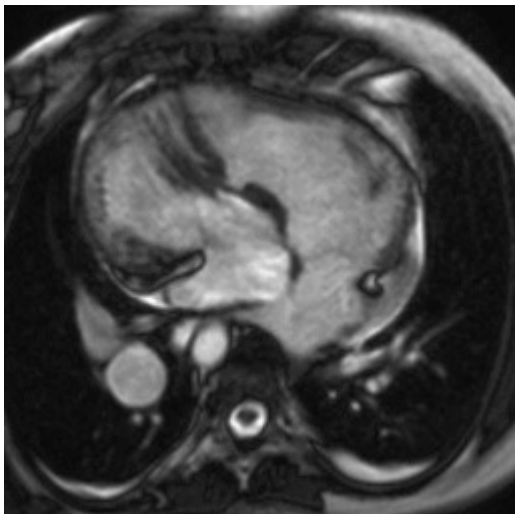
- Kawasaki betegség
- Fallot tetralógia (FIV vagy TOF)
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- Nagyér transzpozíció (TGA)
- **Kettős kiáramlású jobb kamra (DORV)**
- Truncus arteriosus communis
- Bland-White-Garland (BWG)
- Coarctatio (COA)



DORV: coronaria eredési anomalia

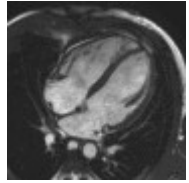


DORV: coronaria eredési anomália





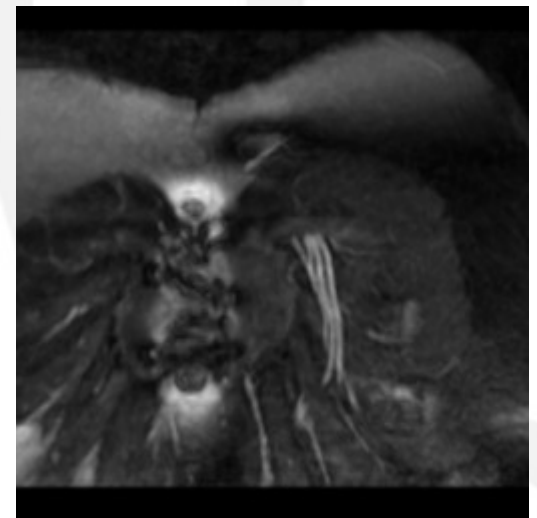
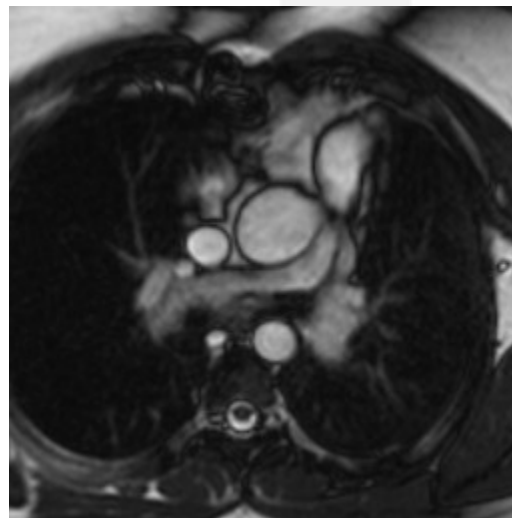
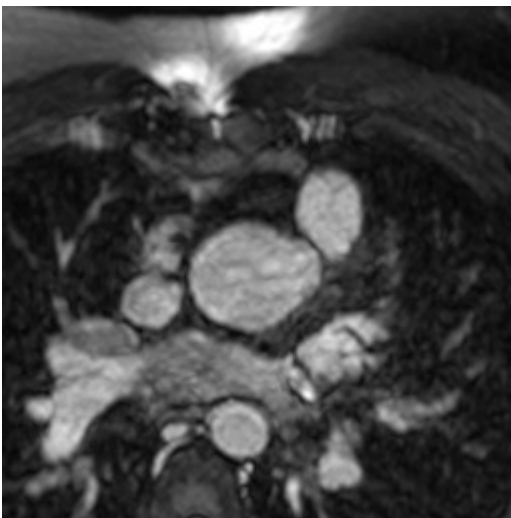
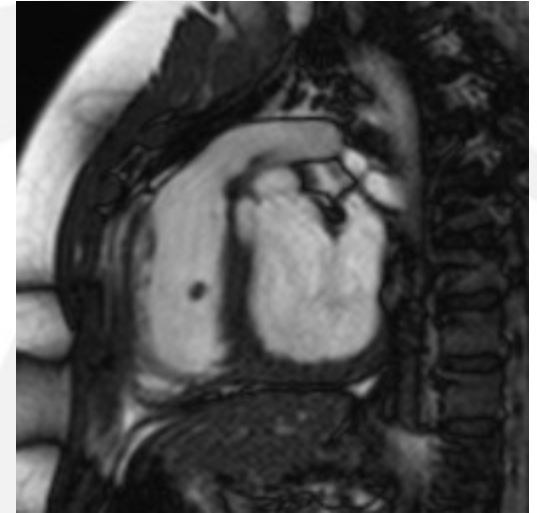
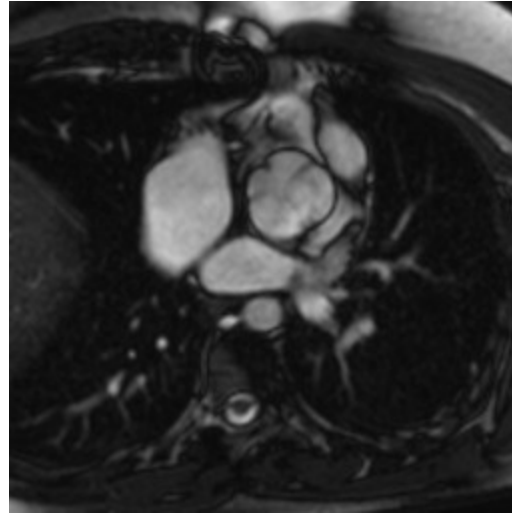
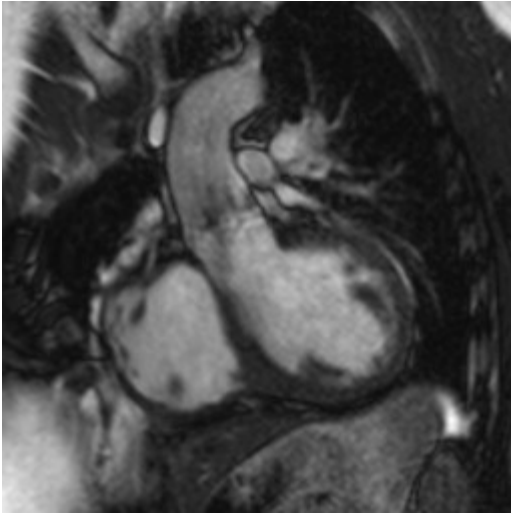
MR coronaria angiographia



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- Coarctatio (COA)

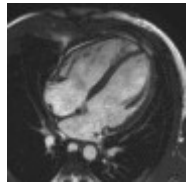


Truncus I, coronaria eredési anomália





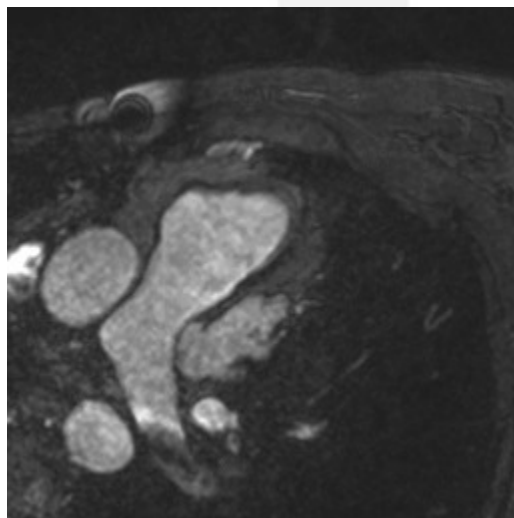
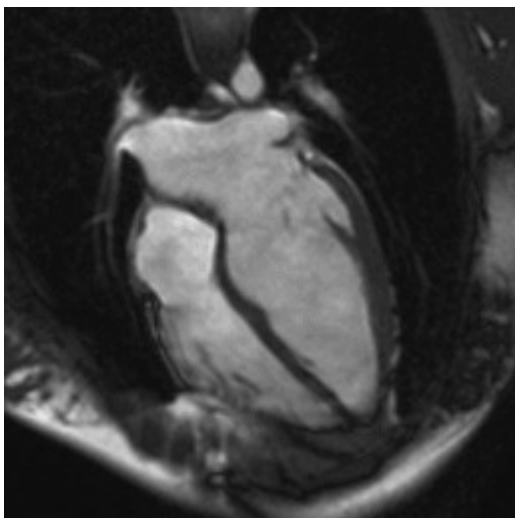
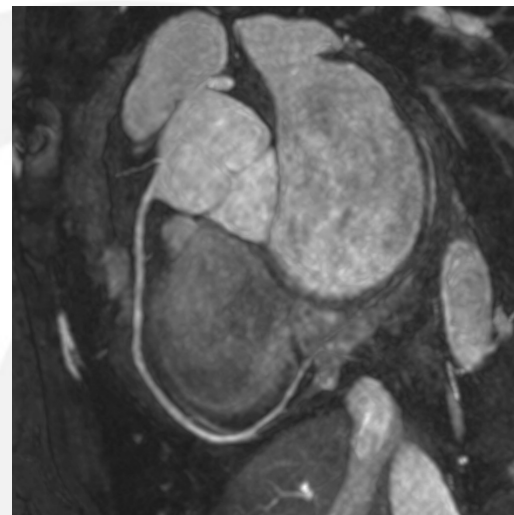
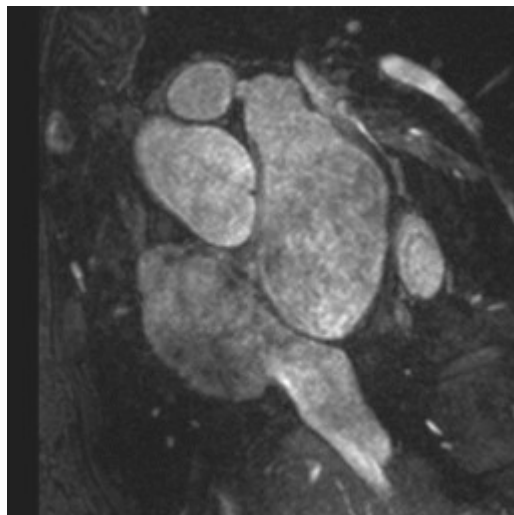
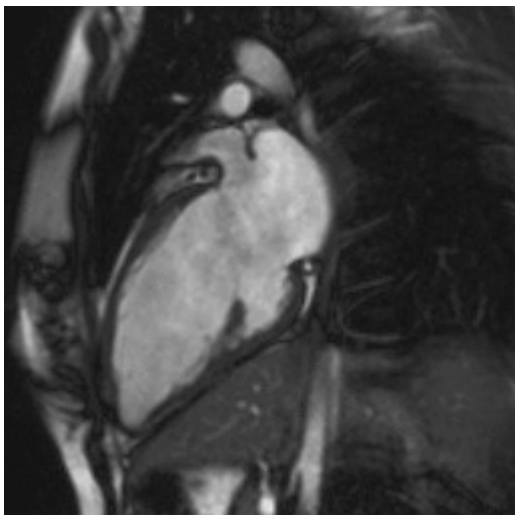
MR coronaria angiographia



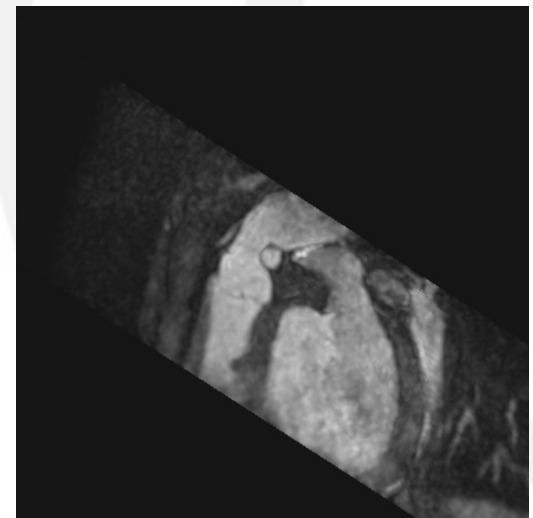
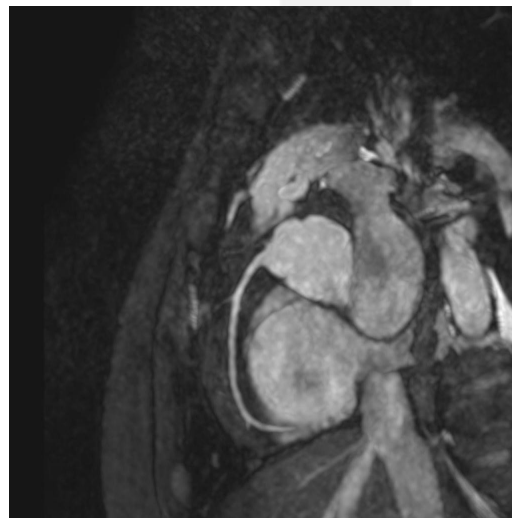
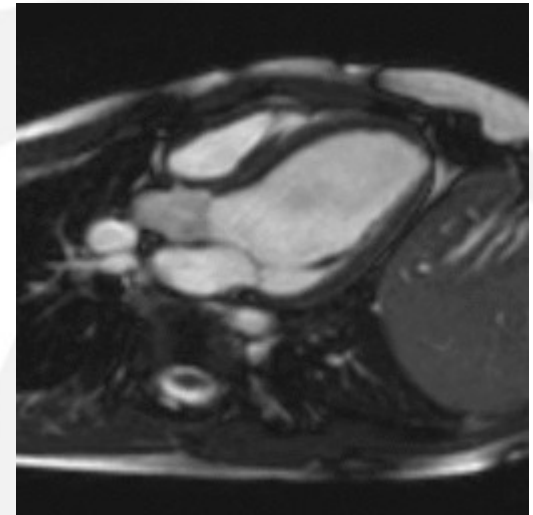
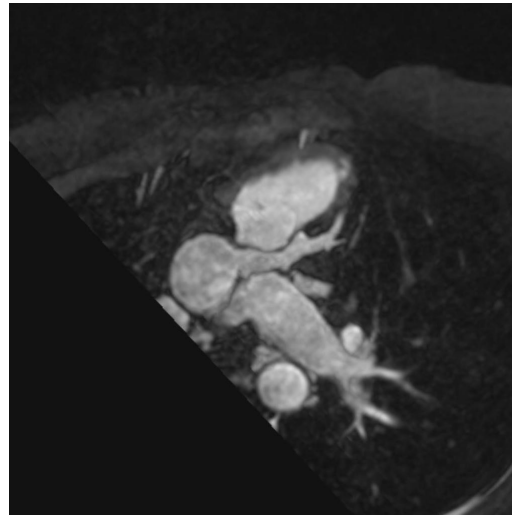
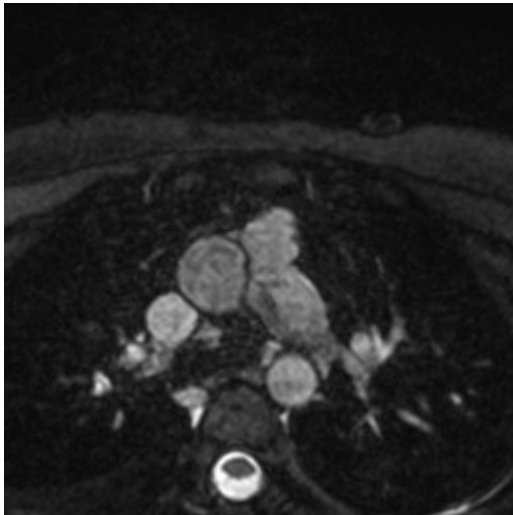
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- Coarctatio (COA)



Bland-White-Garland: replantáció

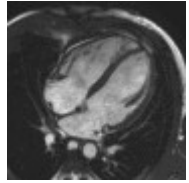


Bland-White-Garland: Takeuchi repair





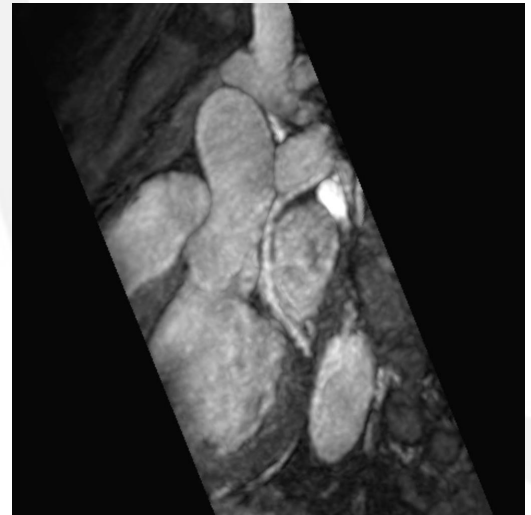
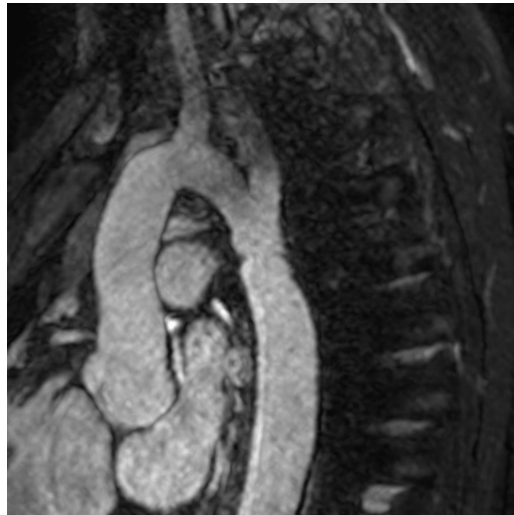
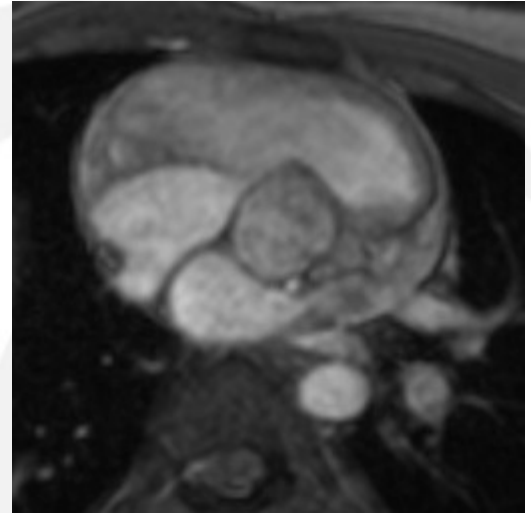
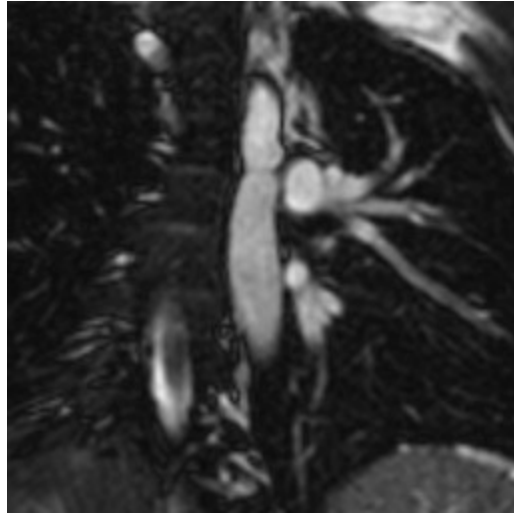
MR coronaria angiographia



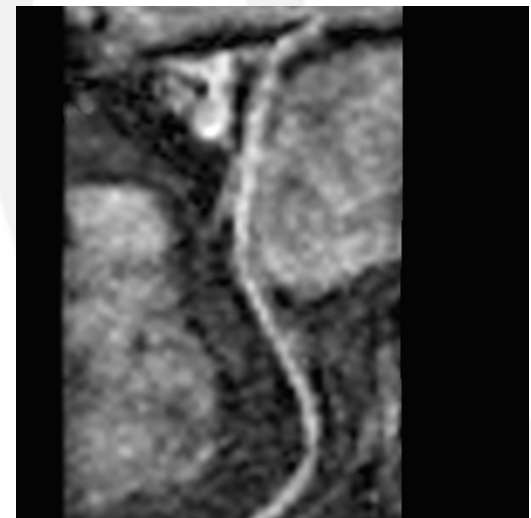
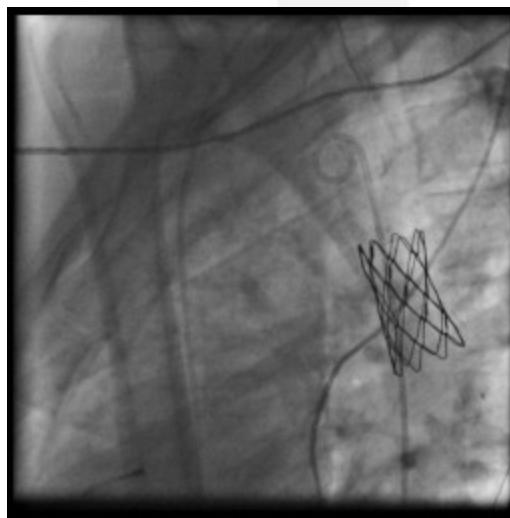
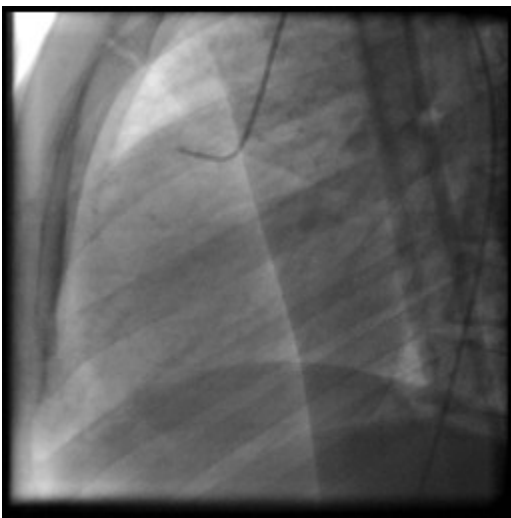
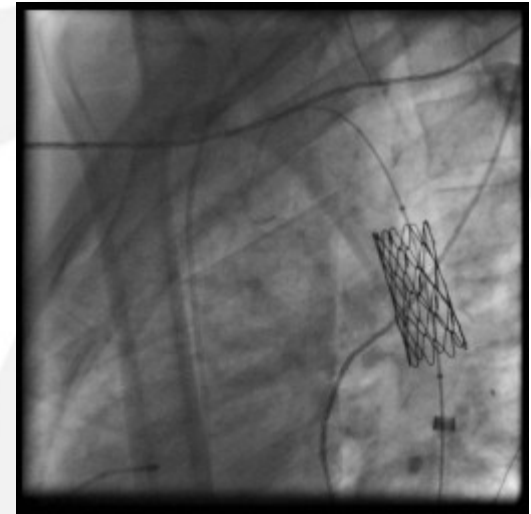
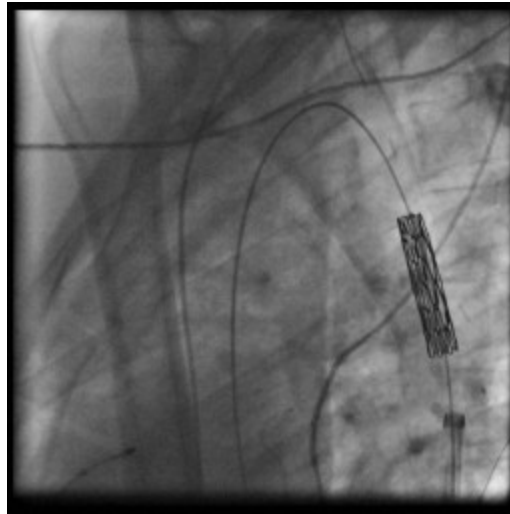
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- Bland-White-Garland (BWG)
- **Coarctatio (COA)**



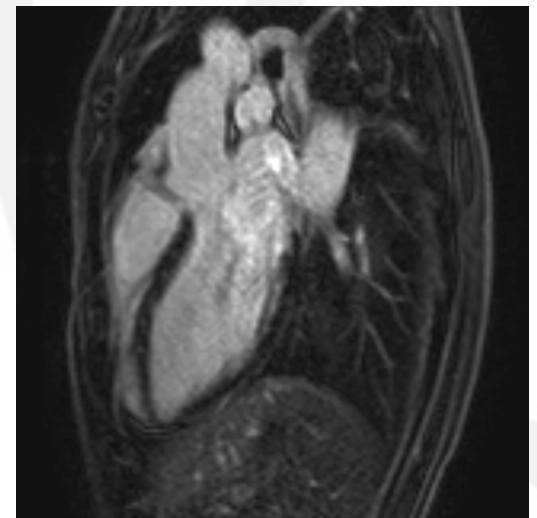
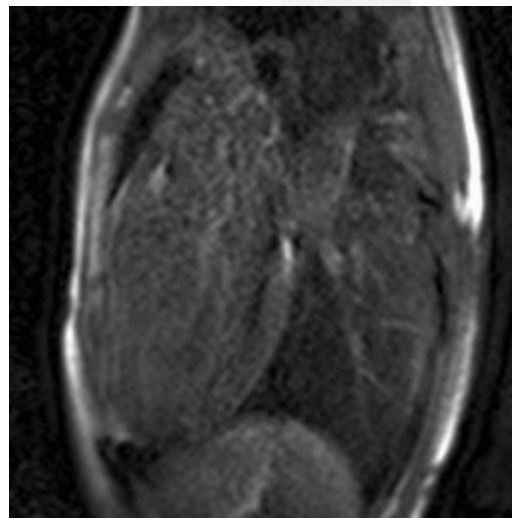
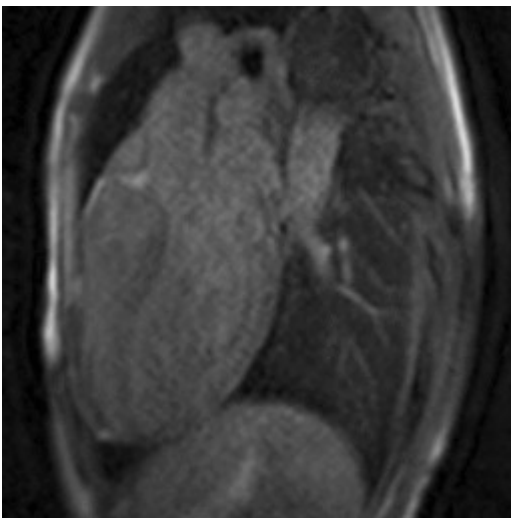
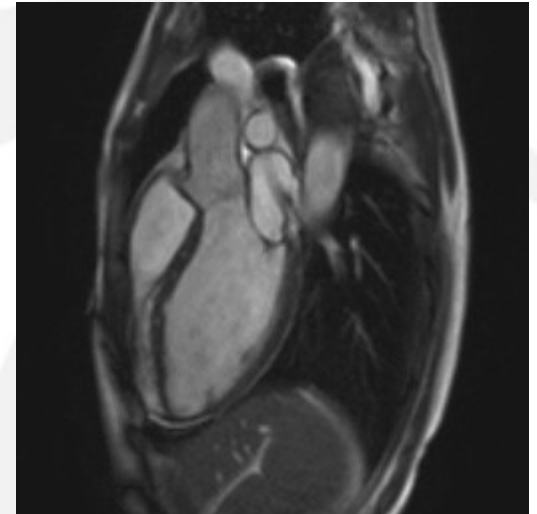
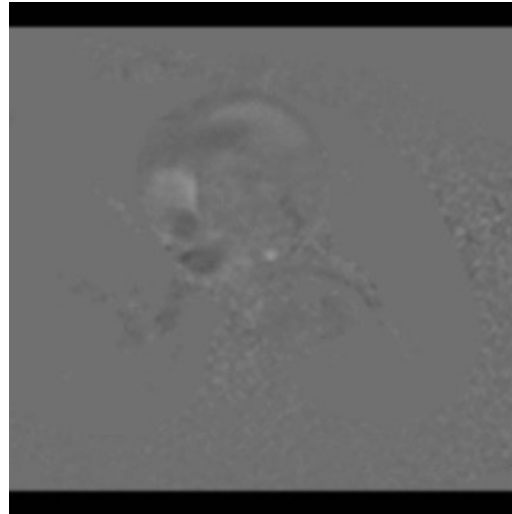
reCoA, bicusp AO, ALCAPA: RPA-CX



CXA & coarctatio: stent beültetés

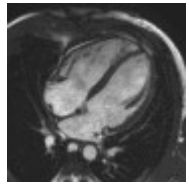


CX-RPA anomalia: perfúziós zavar





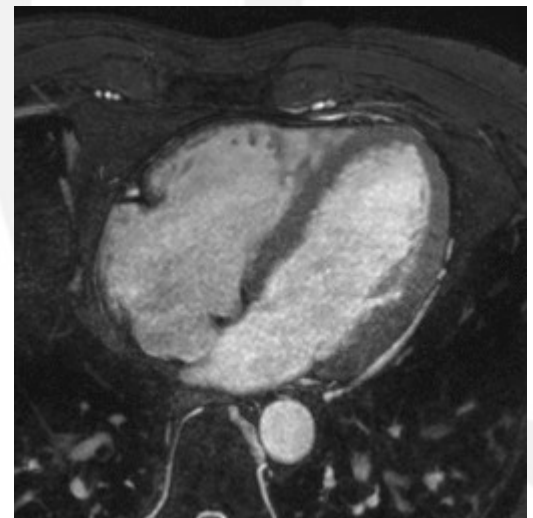
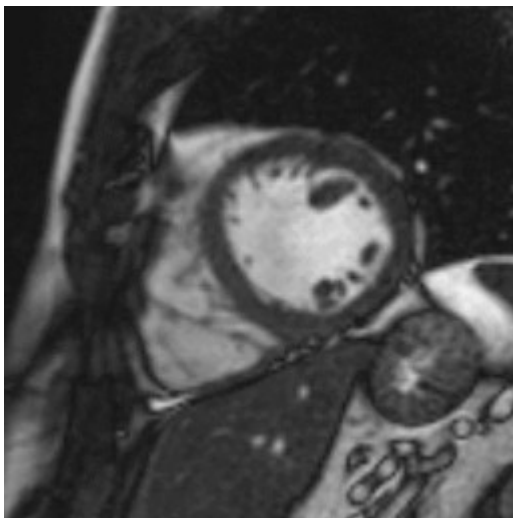
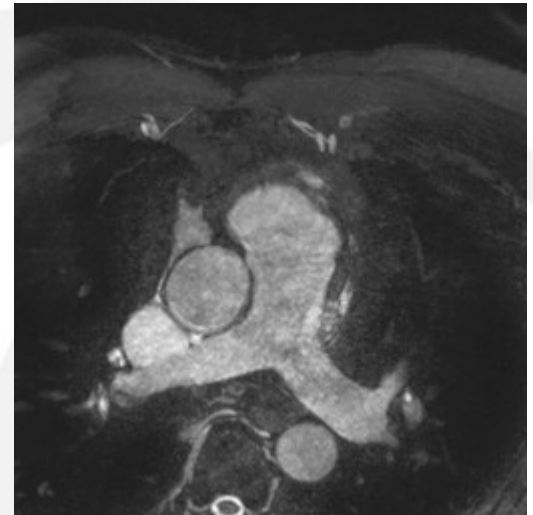
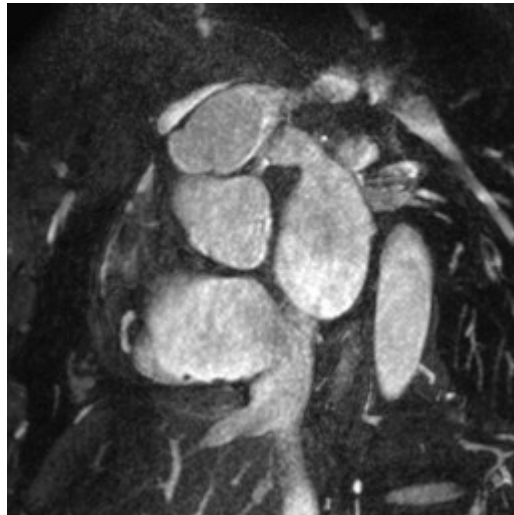
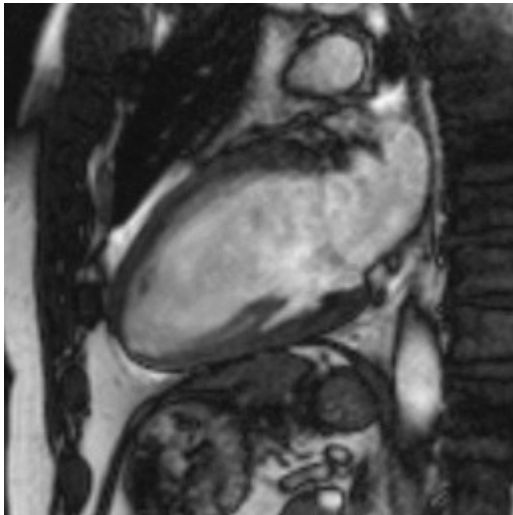
MR coronaria angiographia



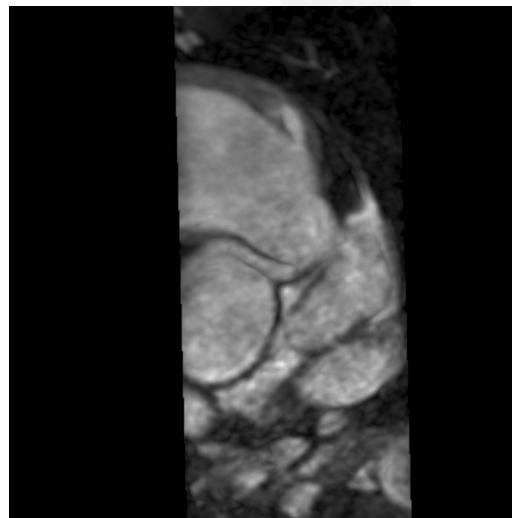
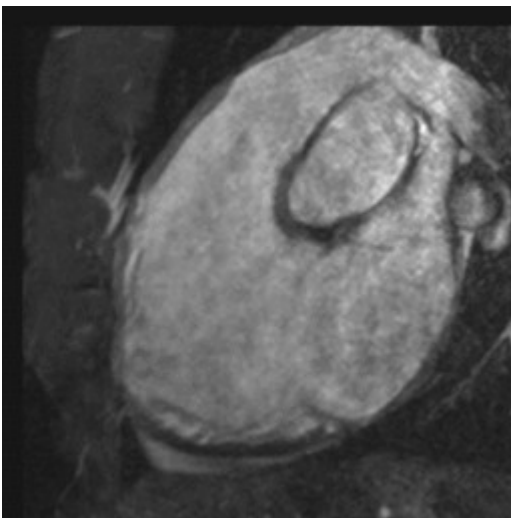
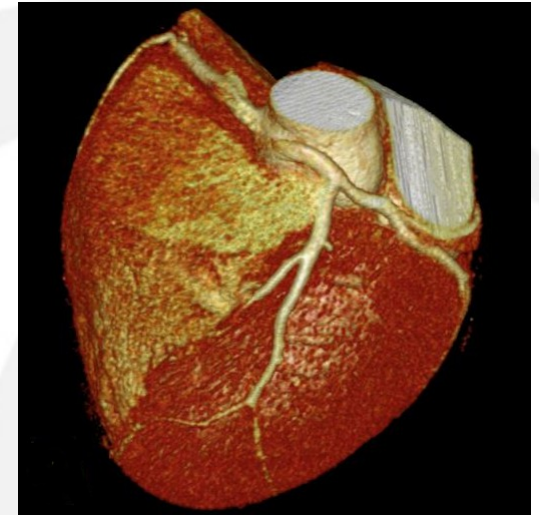
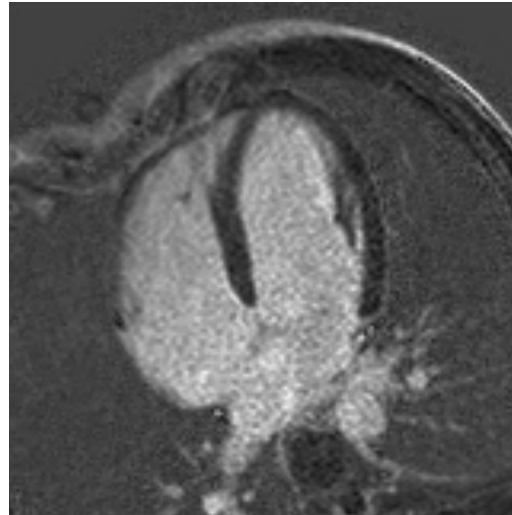
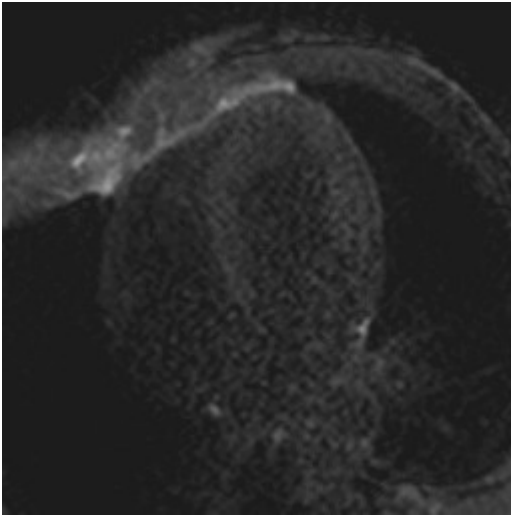
- Nem jár sugárterheléssel
- 1.5T térerőn kontrasztanyag adásra sincs szükség
- A szívritmus lehet gyors, csak szabályos legyen és ne ingadozzon
- A fali felrakódások a jelenlegi technikával CT-vel látszanak jól
- Számos veleszületett szívbetegségben fontos ismerni a koszorúereket



RCA-ból eredő retroaorticus CX



Öttusázó: veszélyes anomália



Köszönet

- prof Kádár Krisztina
- prof Simor Tamás
- Vágó Hajni, prof Merkely Béla
- Balázs Gyuri, prof Hüttl Kálmán
- Suhai Feri, Czibalmos Csilla, Csécs Ibolya, Dohy Zsófi
- Asszisztenseink, tudományos diákkörös hallgatóink



VSZÉK – Szív MR labor

