Congenital heart disease imaging

from on site to online

JESFC

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Anomalous origin of the coronary arteries

anoCor

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Statement of Financial Interest

I currently have, or have had over the last two years, an affiliation or financial interests or interests of any order with a company or I receive compensation or fees or research grants with a commercial company :

☑ I do not have any potential disclosure to report

AAOCA : anomalous aortic origin of coronary arteries

Imaging tools

- Diagnosis of AAOCA
- Relevance of AAOCA
- Myocardial ischemia
- Therapeutic management
- Follow-up after correction

Diagnosis of AAOCA

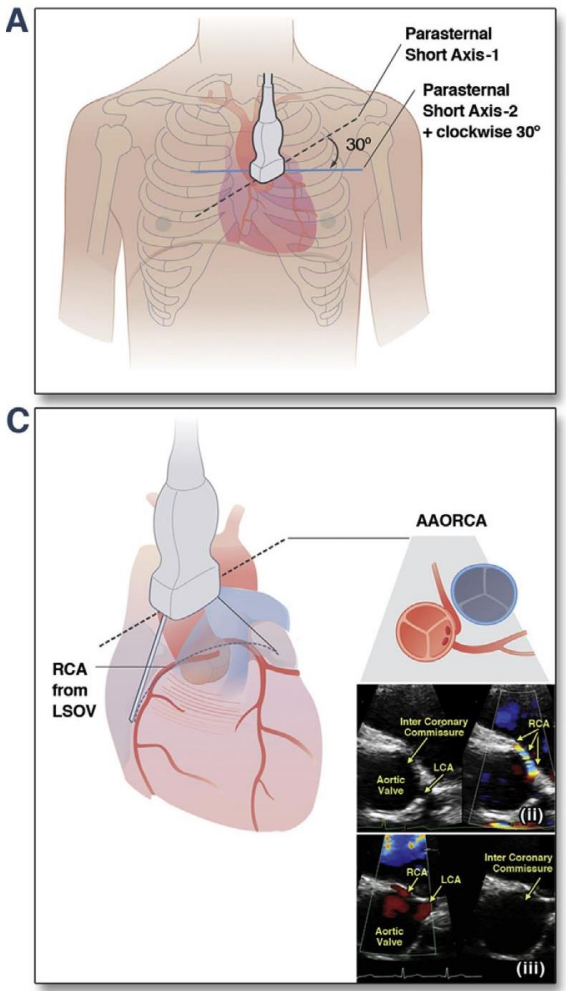
Echocardiography

Transthoracic echocardiography

- In children : most valuable diagnostic tool
- In adults : limited acoustic window

Transthoracic echocardiography in children for pre participation screening program

- Standardized protocols
- Visualization of coronary ostia

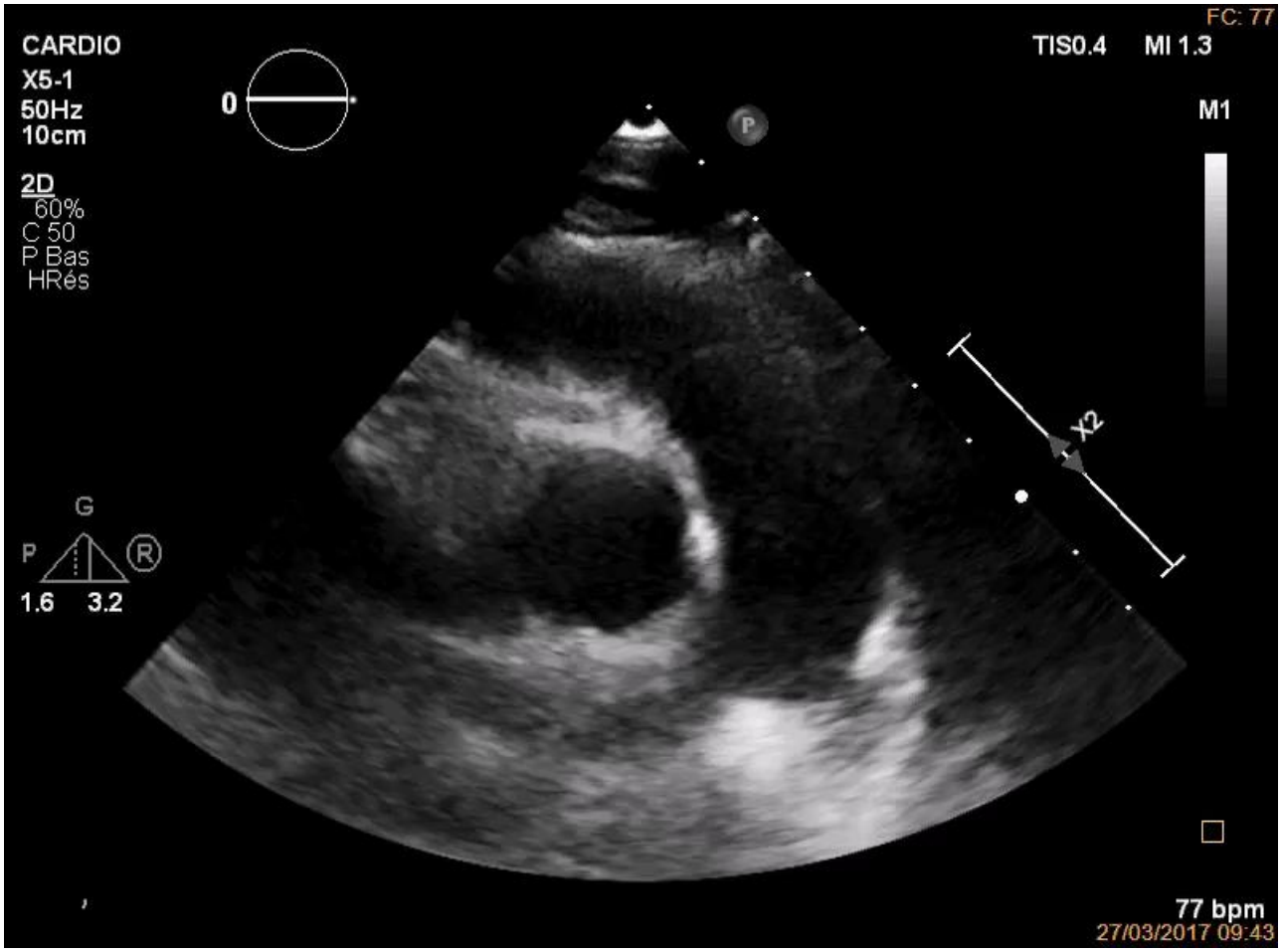


Courtesy of Xavier Iriart (Bordeaux)

Diagnosis of AAOCA

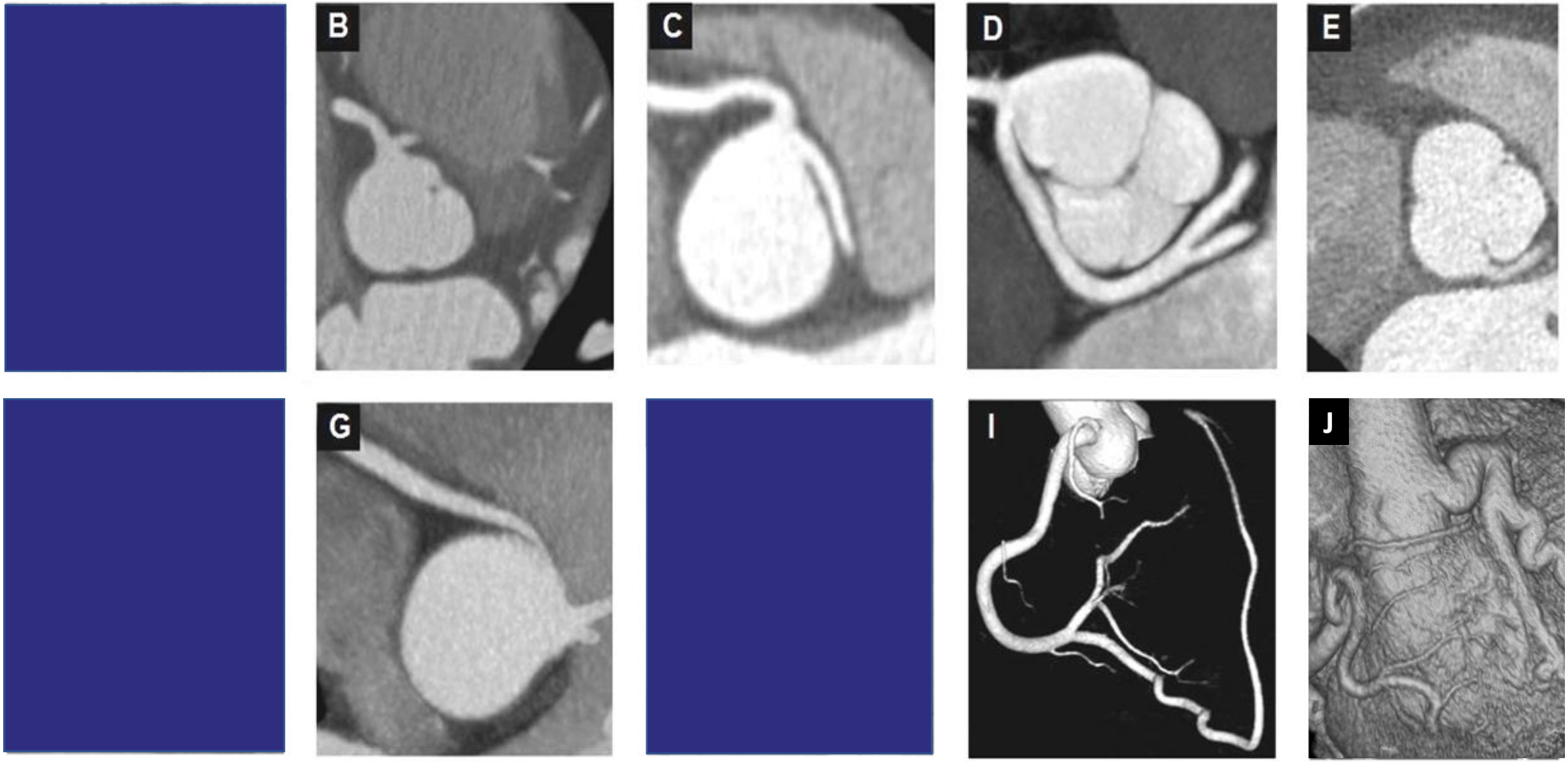
Echocardiography

- 17-year-old boy
- Pre syncope after exertion



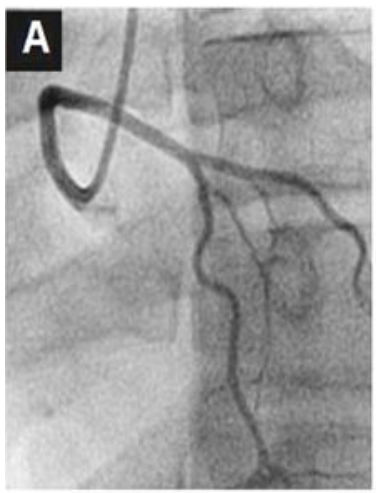
Diagnosis of AAOCA

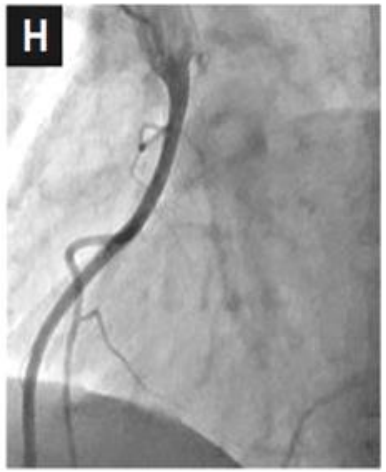
Coronary CT angiography



Diagnosis of AAOCA

Coronary angiography



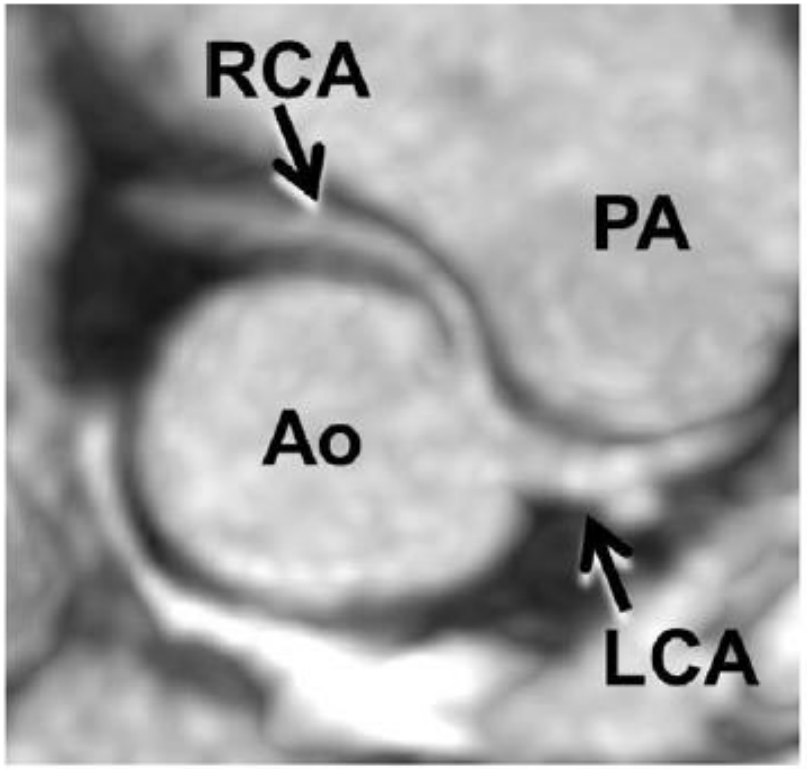


Diagnosis of AAOCA

Cardiac MRI

- US guidelines
- CMRI recommended over coronary CTA in youngs
- Experienced centers

- Limited use in adults

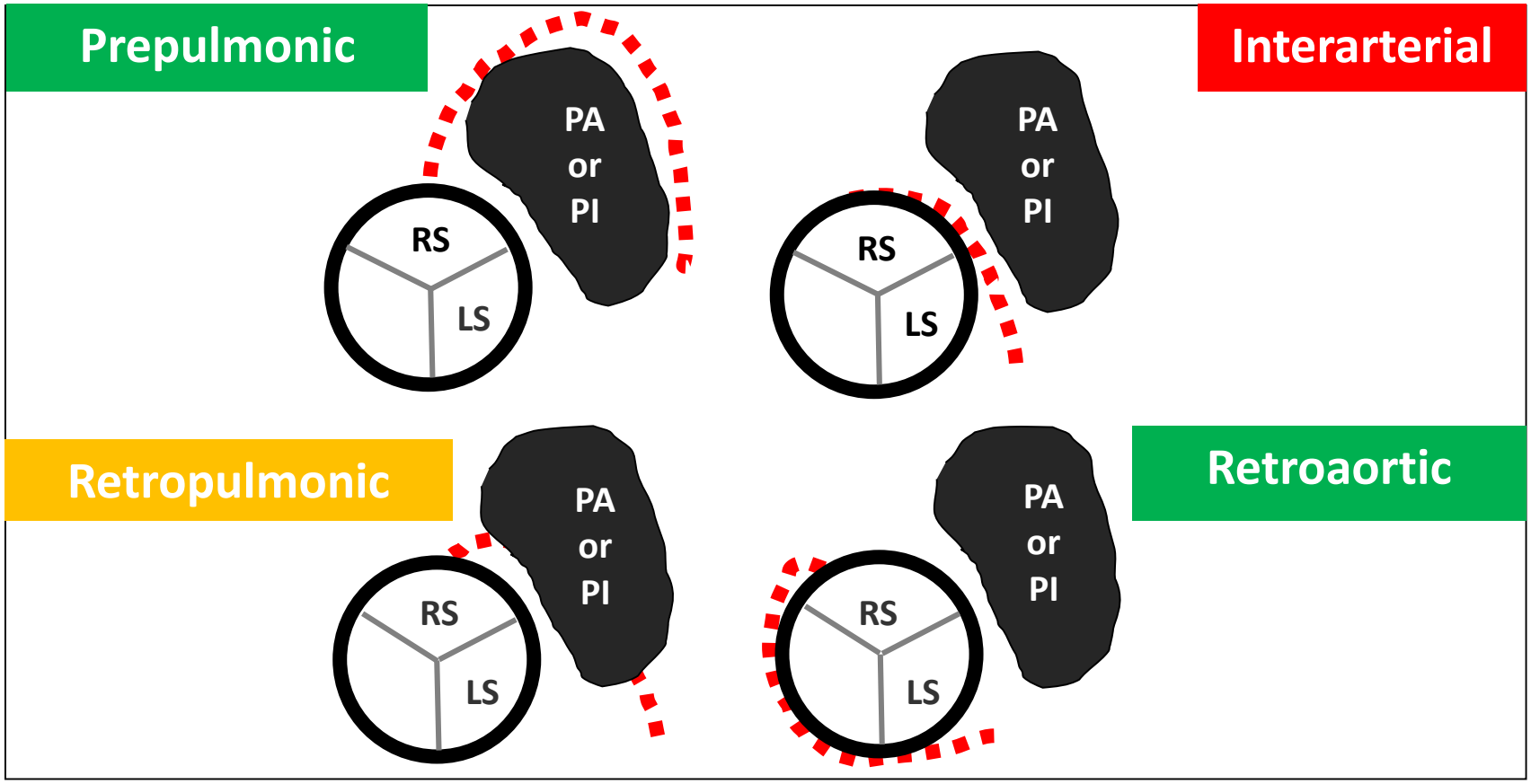


Harris AH et al. Ann Thor Surg 2015

Relevance of AAOCA

Risk of sudden cardiac death/myocardial ischemia

AAOCA without known risk ⟷ AAOCA with known risk

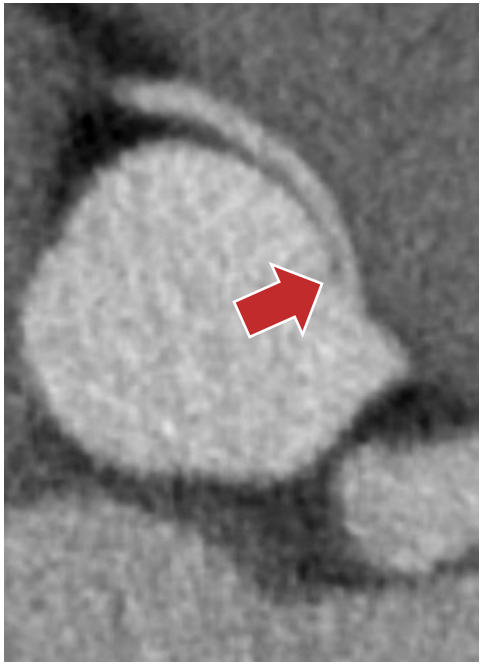


Relevance of AAOCA

Coronary CT angiography

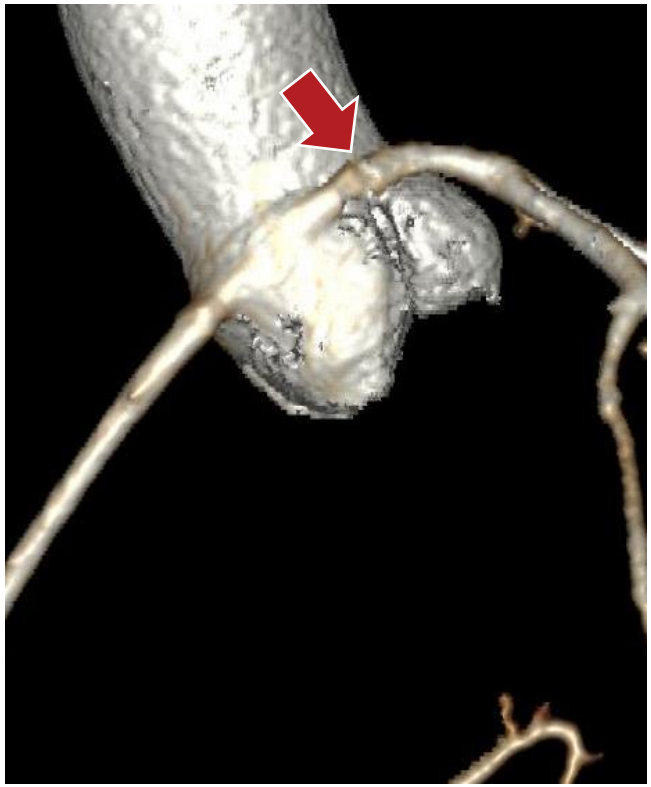
AAOCA with known risk

right AAOCA



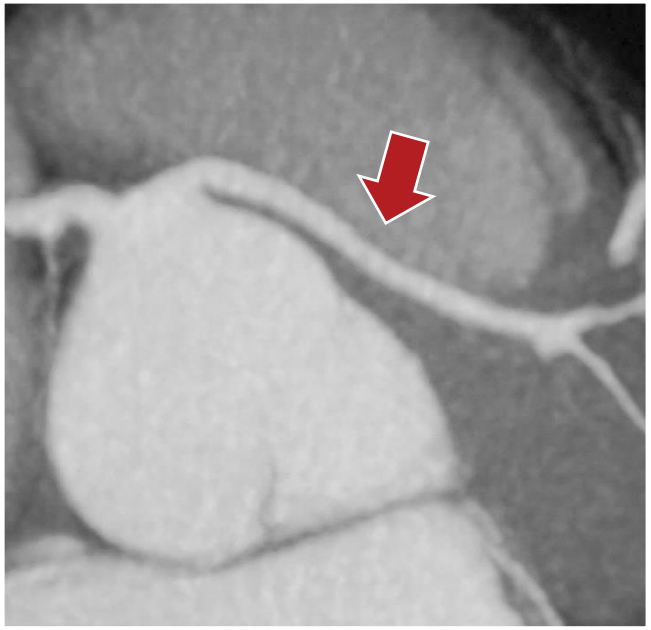
interarterial course

left AAOCA



interarterial course

left AAOCA

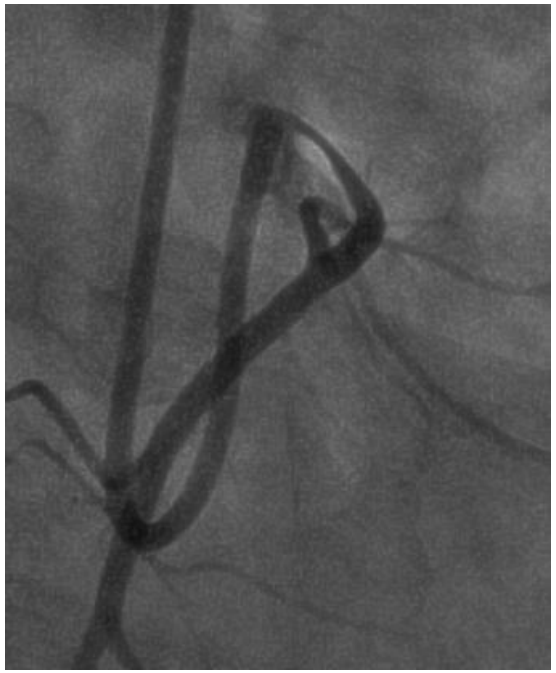


retropulmonic course

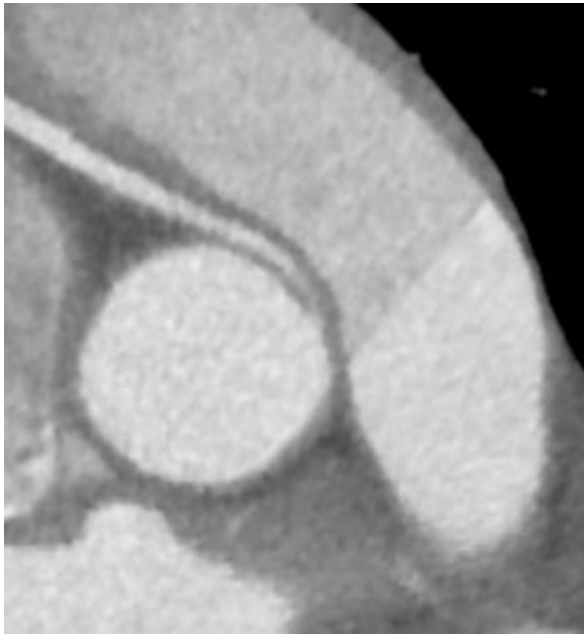
Relevance of AAOCA

Identification of intramural aortic course

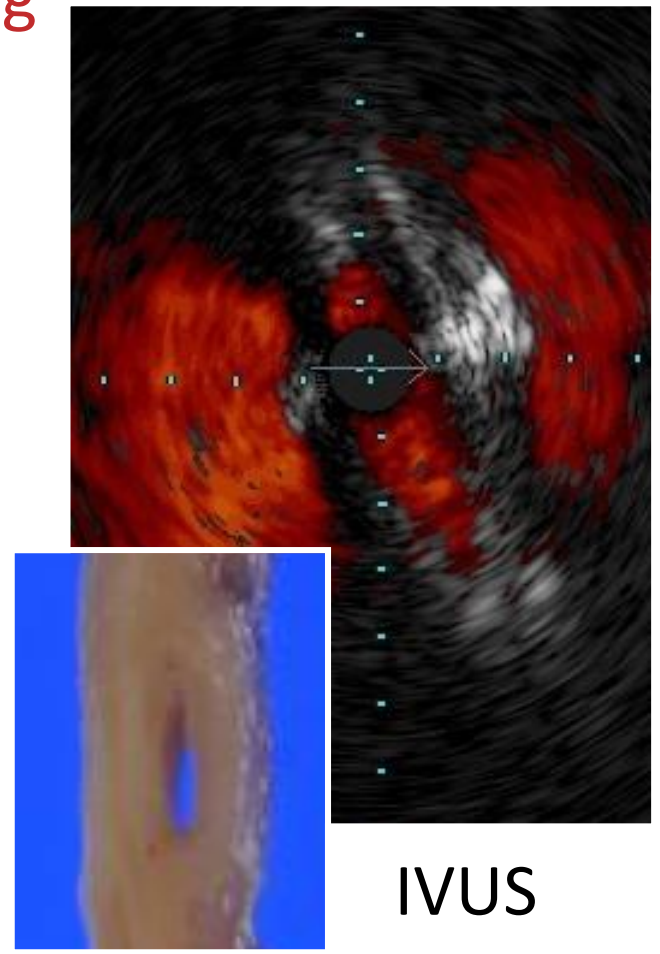
Multimodality imaging



Angio



CT angio

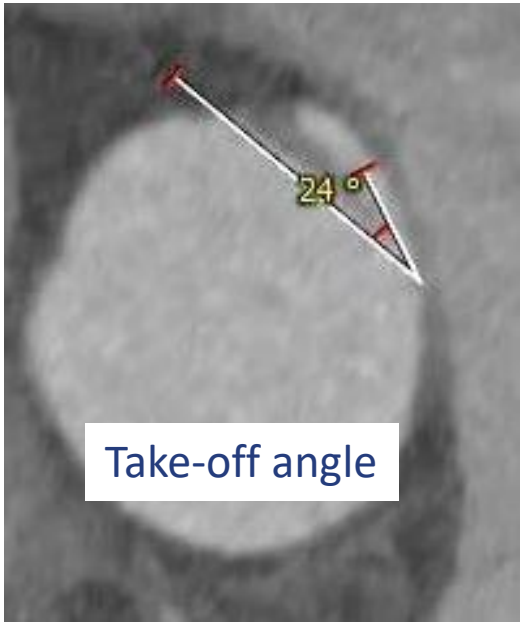


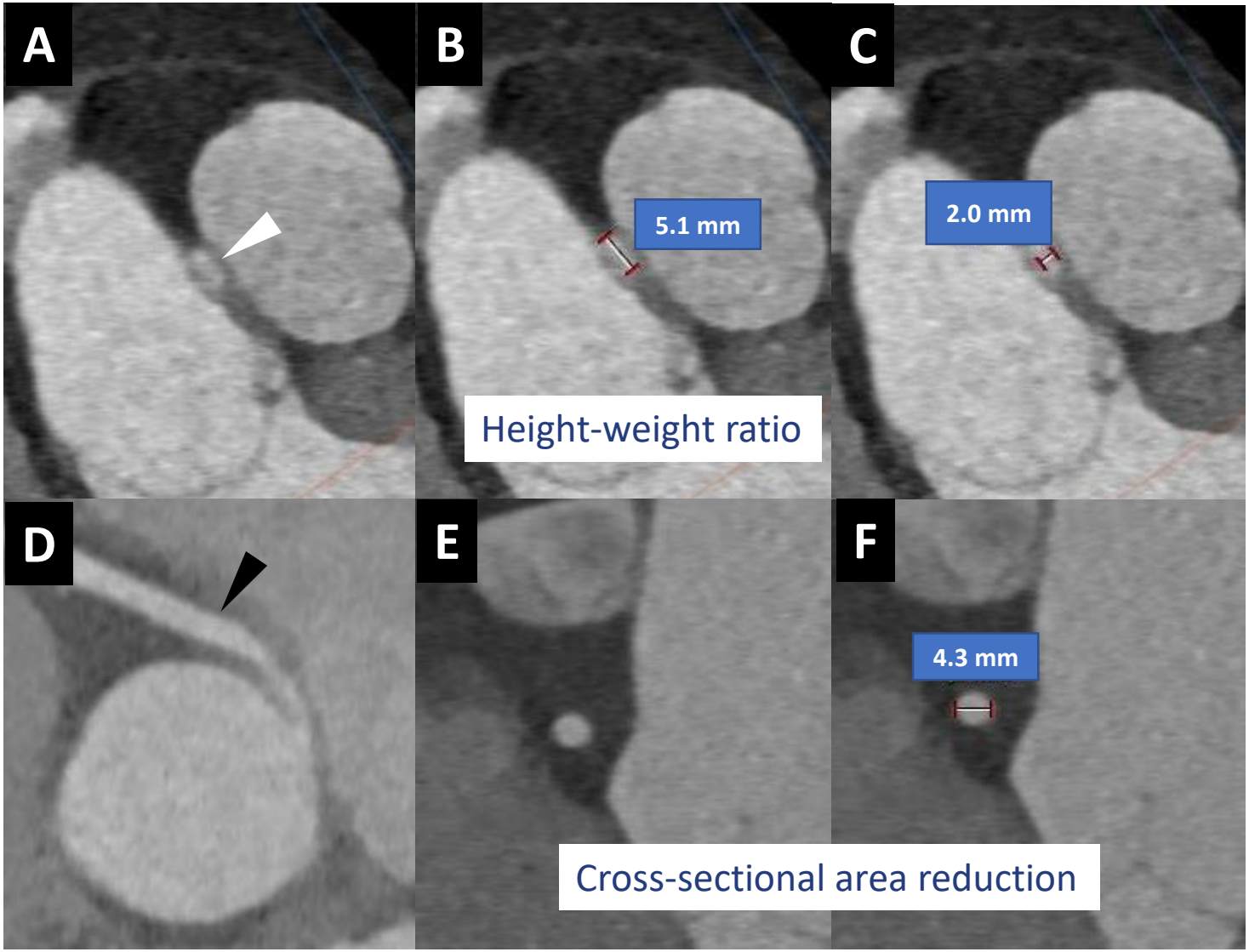
IVUS

Hata Y et al. Cardiovasc Pathol 2014.

Relevance of AAOCA

Identification of anatomic high-risk features





Myocardial ischemia

Non invasive ischemia testing/Invasive ischemia testing

- TT echocardiography
- Single-photon emission CT
- Cardiac MRI
- Physiological evaluation (iFR, FFR)
- Endovascular imaging (IVUS/OCT)

- Low incidence of ischemia detection
- Limits of exercise stress protocols
- Dynamic obstruction associated

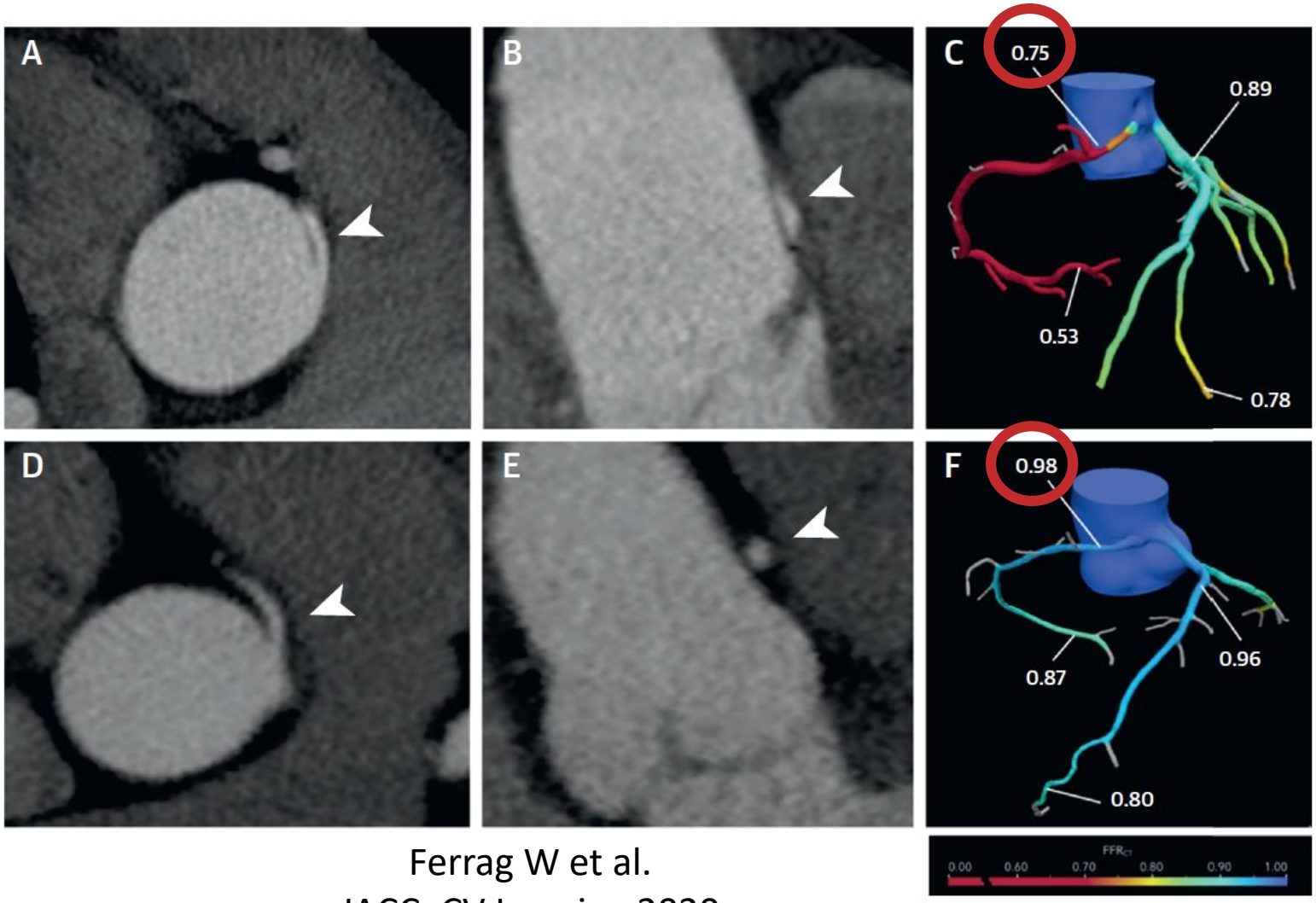
Dobutamine infusion
+ chronotropic /+ inotropic stress
Better protocol?

Myocardial ischemia

Coronary CT angiography and FFR-CT images

Right-AAOCA with intramural pathway

Right-AAOCA without intramural pathway



Ferrag W et al.
JACC: CV Imaging 2020

Therapeutic management

ESC guidelines

ESC European Society of Cardiology
European Heart Journal (2021) 42, 563–645
doi:10.1093/eurheartj/ehaa554

ESC GUIDELINES

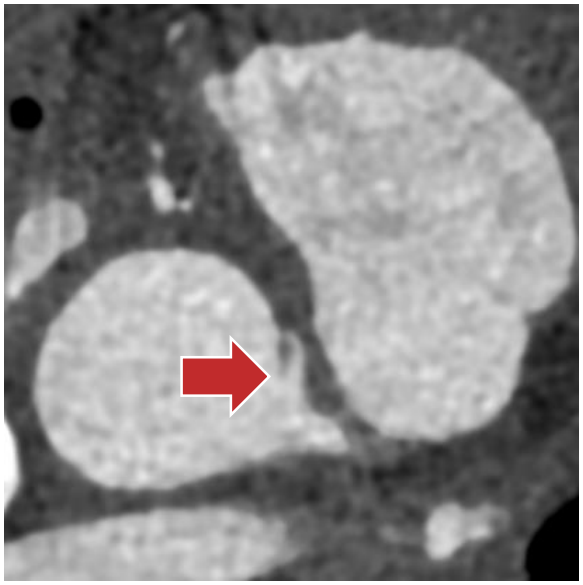
2020 ESC Guidelines for the management of adult congenital heart disease

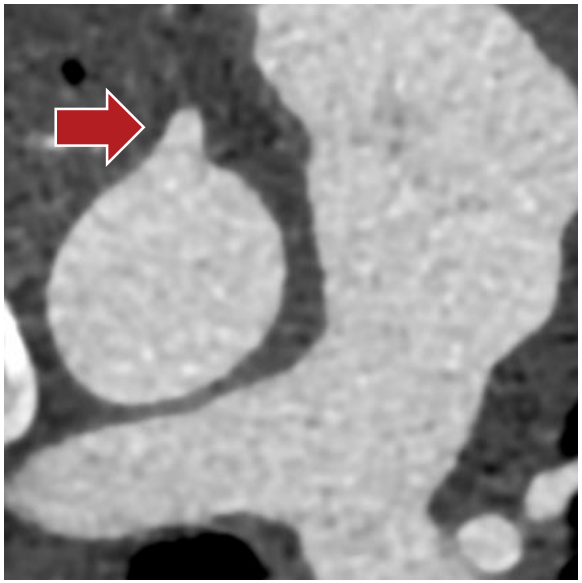
Anomalous aortic origin of the coronary artery		
Surgery is recommended for AAOCA in patients with typical angina symptoms who present with evidence of stress-induced myocardial ischaemia in a matching territory or high-risk anatomy.[c]	I	C
Surgery should be considered in *asymptomatic* patients with AAOCA (right or left) and evidence of myocardial ischaemia.	IIa	C
Surgery should be considered in *asymptomatic* patients with AAOLCA and no evidence of myocardial ischaemia but a high-risk anatomy.[c]	IIa	C
Surgery may be considered for symptomatic patients with AAOCA even if there is no evidence of myocardial ischaemia or high-risk anatomy.[c]	IIb	C
Surgery may be considered for *asymptomatic* patients with AAOLCA without myocardial ischaemia and without high-risk anatomy[c] when they present at young age (<35 years).	IIb	C
Surgery is not recommended for AAORCA in asymptomatic patients without myocardial ischaemia and without high-risk anatomy.[c]	III	C

Follow up after correction

Coronary CT angiography

Surgical correction of right AAOCA with neo-ostium creation





Angioplasty of right AAOCA with stenting

Conclusions

- CT in first line for the diagnosis of AAOCA
- Identification of AAOCA at risk by CT
- Identification of anatomic high-risk features by CT/endovascular imaging/angio
- Non invasive/invasive functional imaging (myocardial ischemia)
- Scores for risk stratification not yet available
- Therapeutic decision-making often difficult