Rencontres Interventionnelles - Transradial Approach

Prague, Czech Republic,

Thursday 29th & Friday 30th September 2011

ANOMALOUS ORIGIN of CORONARY ARTERIES and TRANSRADIAL APPROACH: HOW to MANAGE ?

Pierre Aubry, MD
on behalf of the ANOCOR Working Group

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Paris, France

INSTITUTE FOR CLINICAL AND EXPERIMENTAL MEDICINE
DEPARTMENT OF CARDIOLOGY

Disclosure of a conflict of interest : none

Transradial approach

Transfemoral approach

Management of anomalous origins of coronary arteries

Impact of the arterial route

No data in the literature

Transradial approach

Transfemoral approach

Similar issues

- Access to aortic root
- Correct coronary opacification
- Diagnosis of anomalous origin
- Identification of ectopic course
- Risk stratification
- Management

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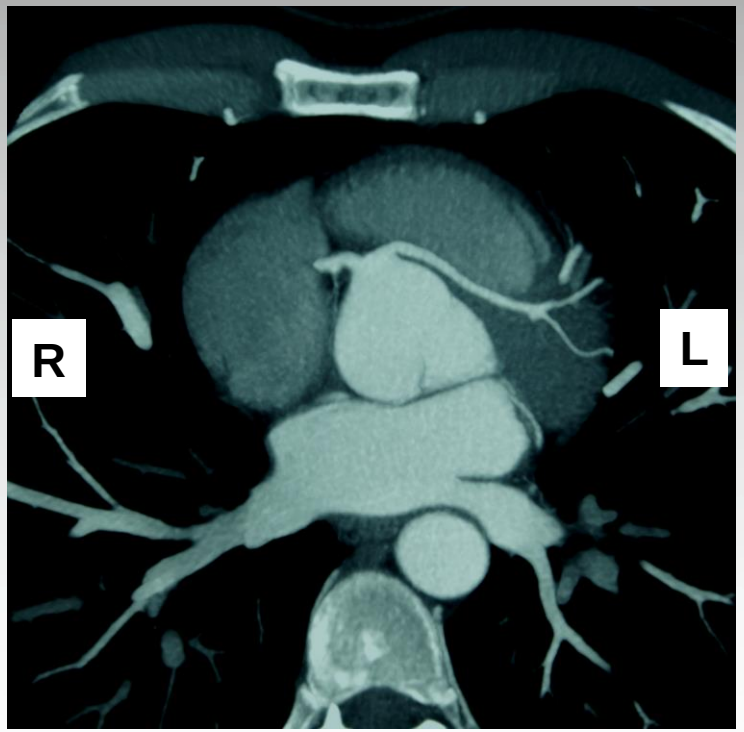
Angiographic prevalence of anomalous origins

Authors	Coronary angiograms n	Anomalous connections n	Anomalous connections %
Angelini, 1999	1,950	34	1.7
Aydinlar, 2005	12,059	39	0.3
Cieslinski, 1993	4,016	22	0.5
Garg, 2000	4,100	35	0.9
Kardos, 1997	7,694	39	0.5
Ouali, 2009	7,330	20	0.3
Rigatelli, 2003	5,100	34	0.7
Tuncer, 2006	70,850	110	0.2
Yamanaka, 1990	126,595	734	0.6
Total	236,694	1,067	0.45

Angiographic prevalence of anomalous origins regarding the type of anomaly

Type of anomaly	%
Anomalous aortic connection of the left main coronary artery	0.02
Anomalous aortic connection of the left anterior descending coronary artery	0.02
Anomalous aortic connection of the circumflex coronary artery	0.3
Anomalous aortic connection of the right coronary artery	0.1
Anomalous connection with the pulmonary artery	0.008
Single artery	0.04

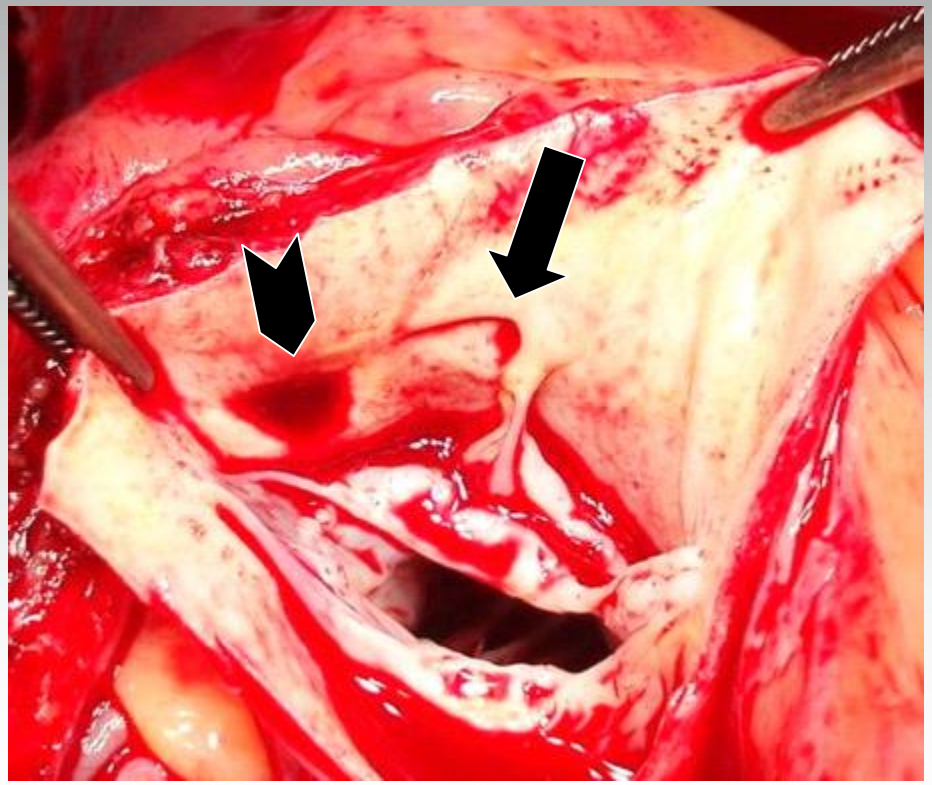
Computed tomography angiography



Computed tomography prevalence of anomalous origins

Authors	Computed tomography n	Anomalous connections n	Anomalous connections %
Fujimoto, 2011	5,869	74	1.3
Rodriguez-Granillo, 2009	577	6	1.0
Schmitt, 2005	1,738	24	1.4
Total	8,184	104	1.3

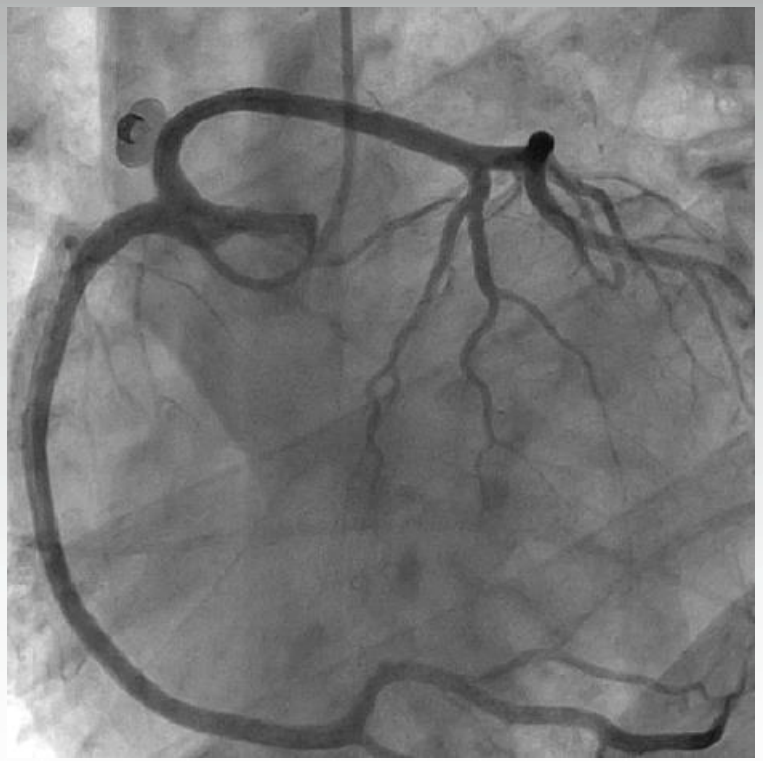
Correct opacification = good canulation



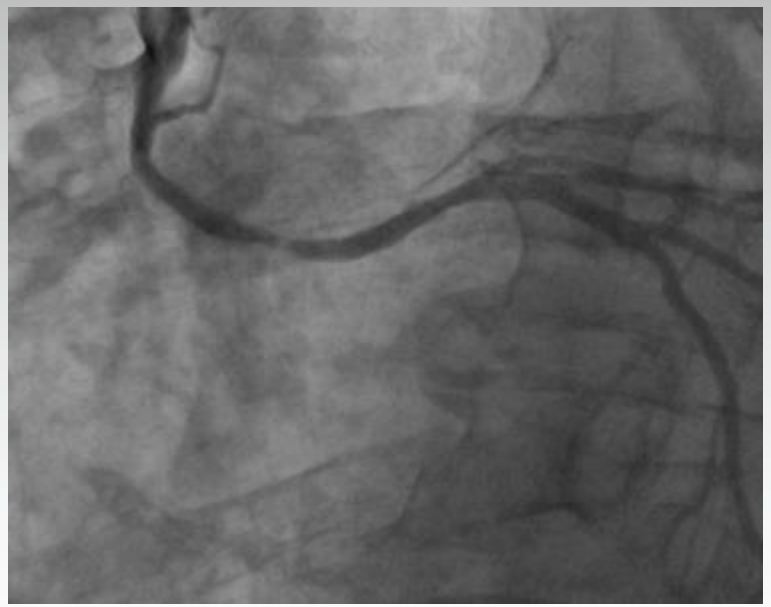
How to classify anomalous origins

type I	anomalous connection with the opposite sinus
type II	anomalous connection with the contralateral artery
type III	anomalous connection with the appropriate sinus
type IV	anomalous connection with the non-coronary sinus
type V	anomalous connection above the sinotubular junction
type VI	single coronary artery
type VII	anomalous connection with the pulmonary artery
type VIII	other abnormalities

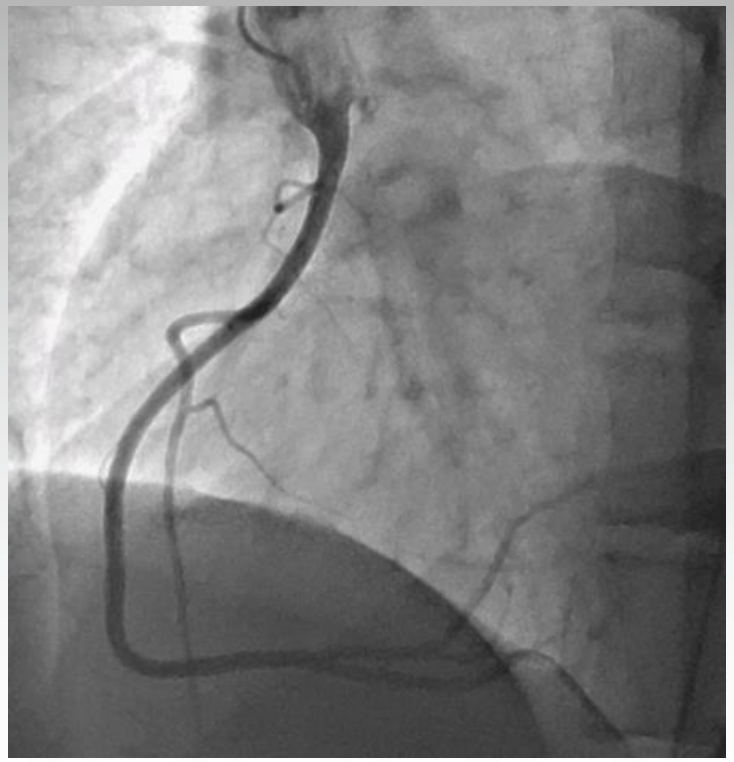
Anomalous connection with the contralateral artery



Anomalous connection with the opposite sinus



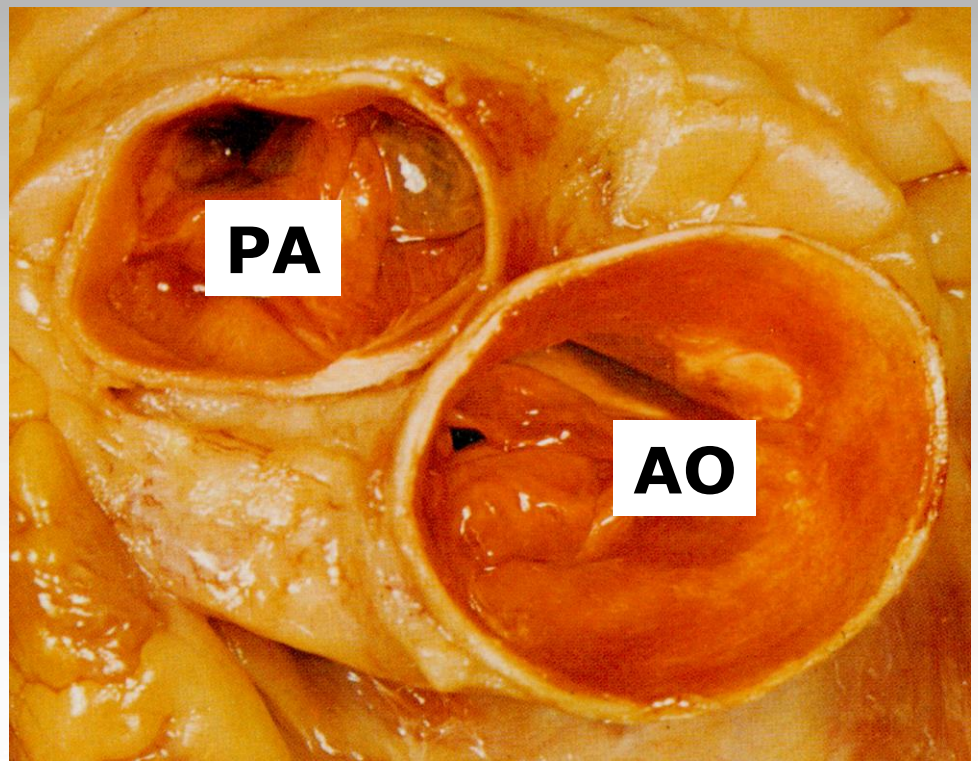
High take-off from the aorta



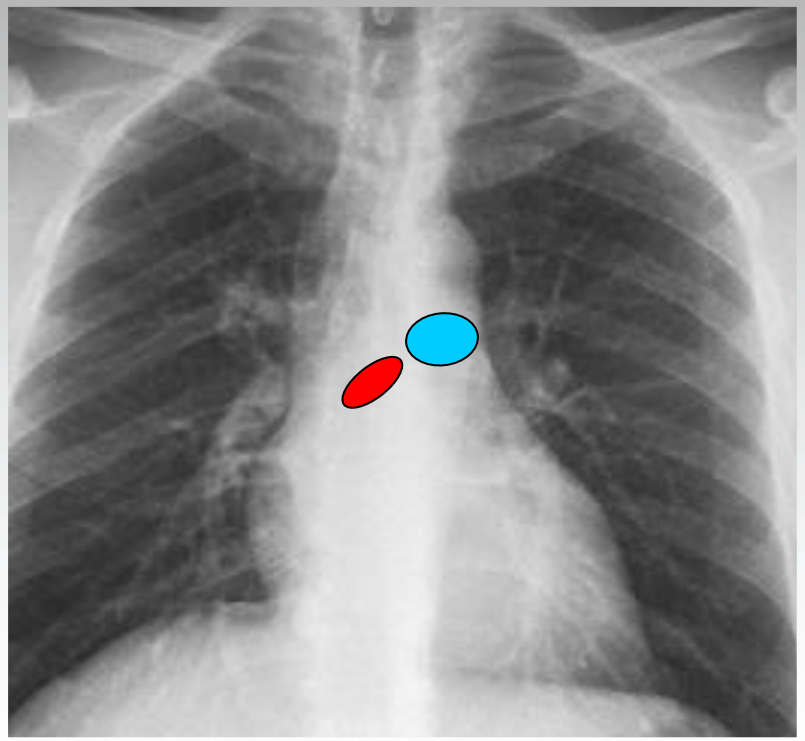
Single coronary artery

Anomalous connection with the pulmonary artery

Interarterial course : an old concept



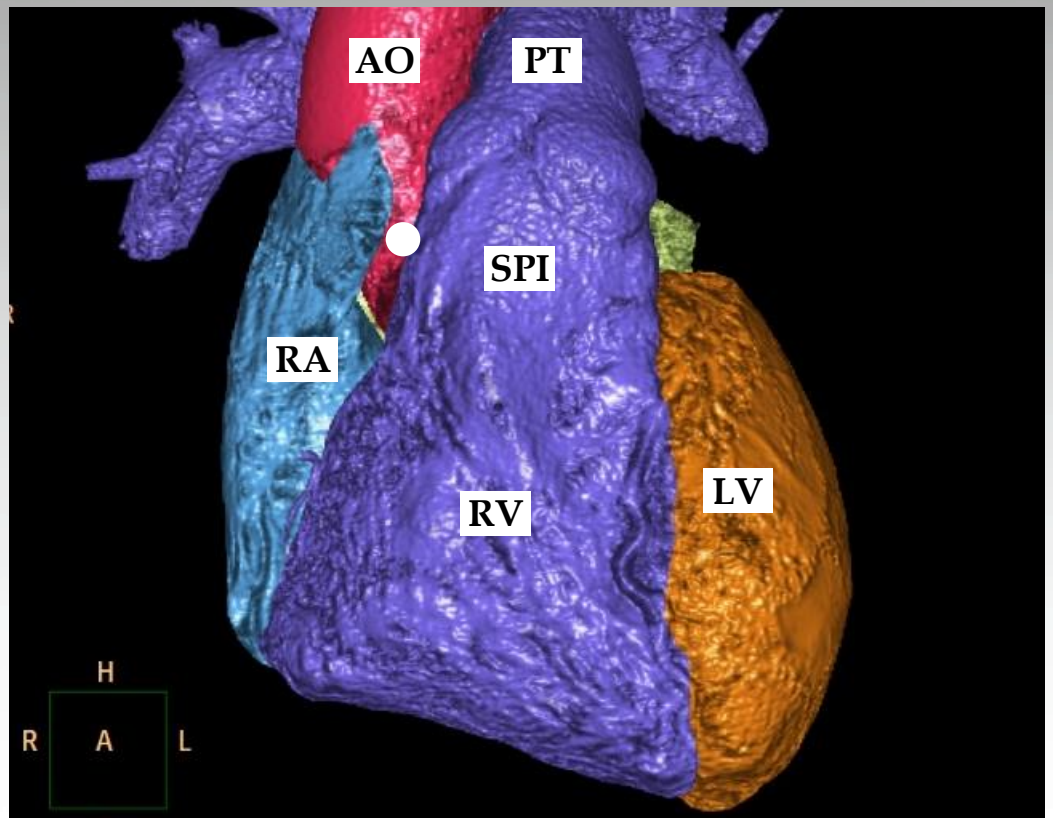
Aortic (red) and pulmonary (blue) annulus



AO

AO

Relationships of normal RCA with cardiac structures



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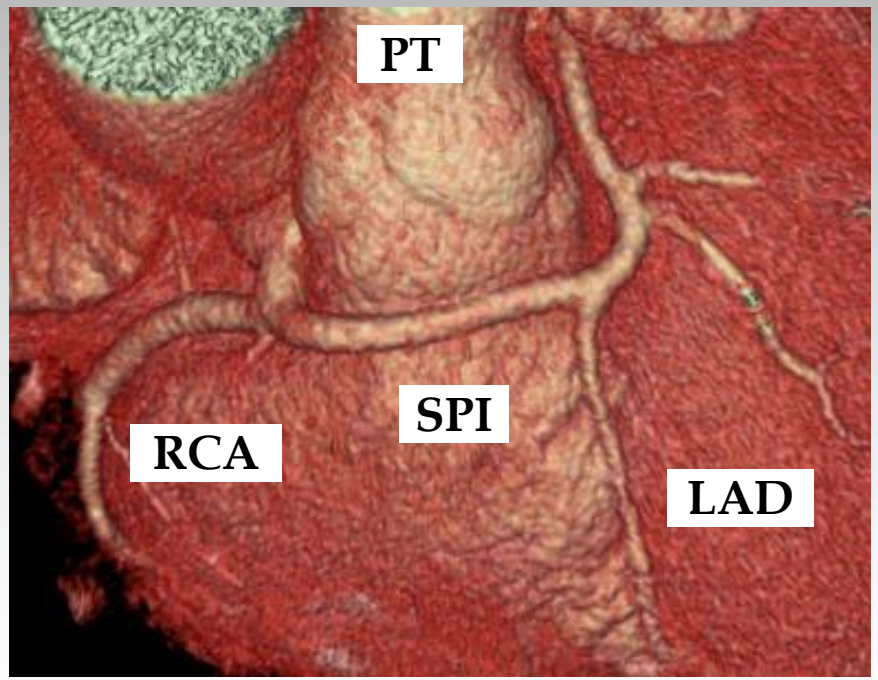
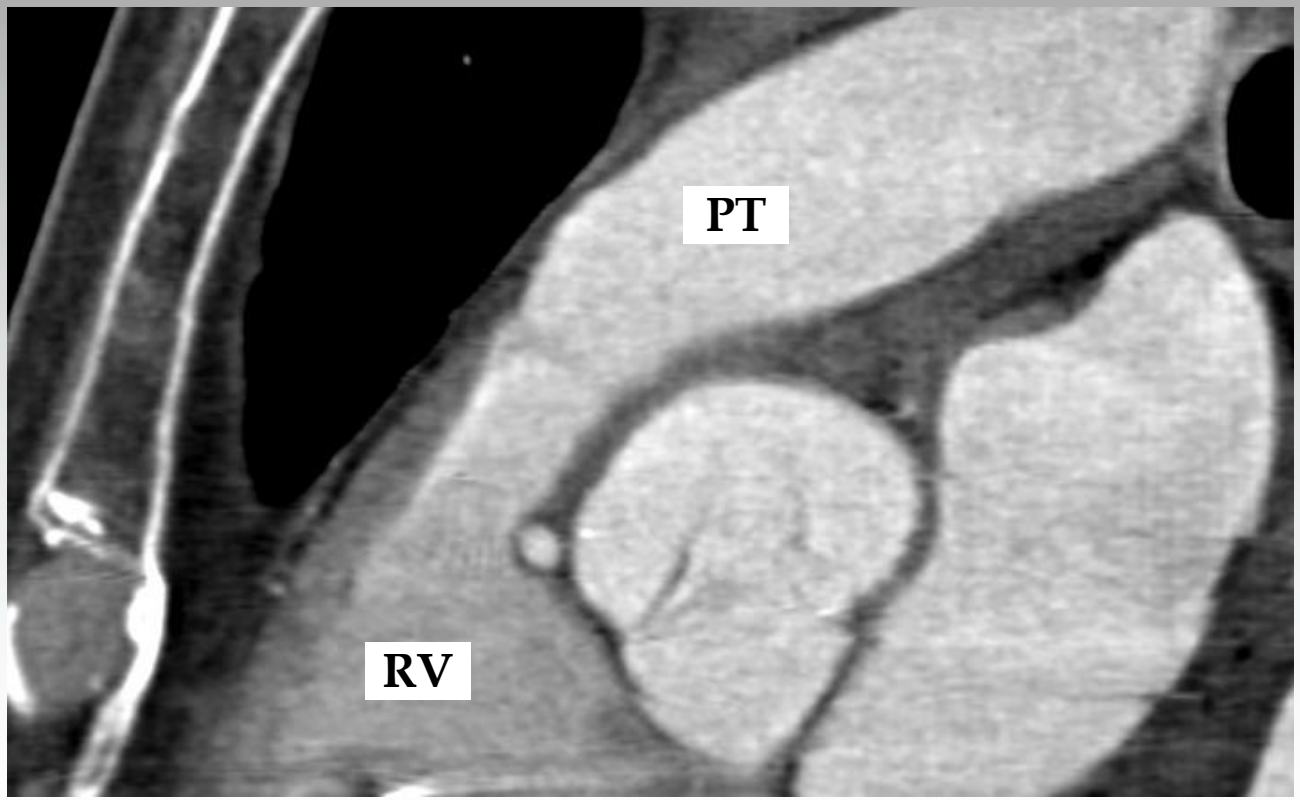
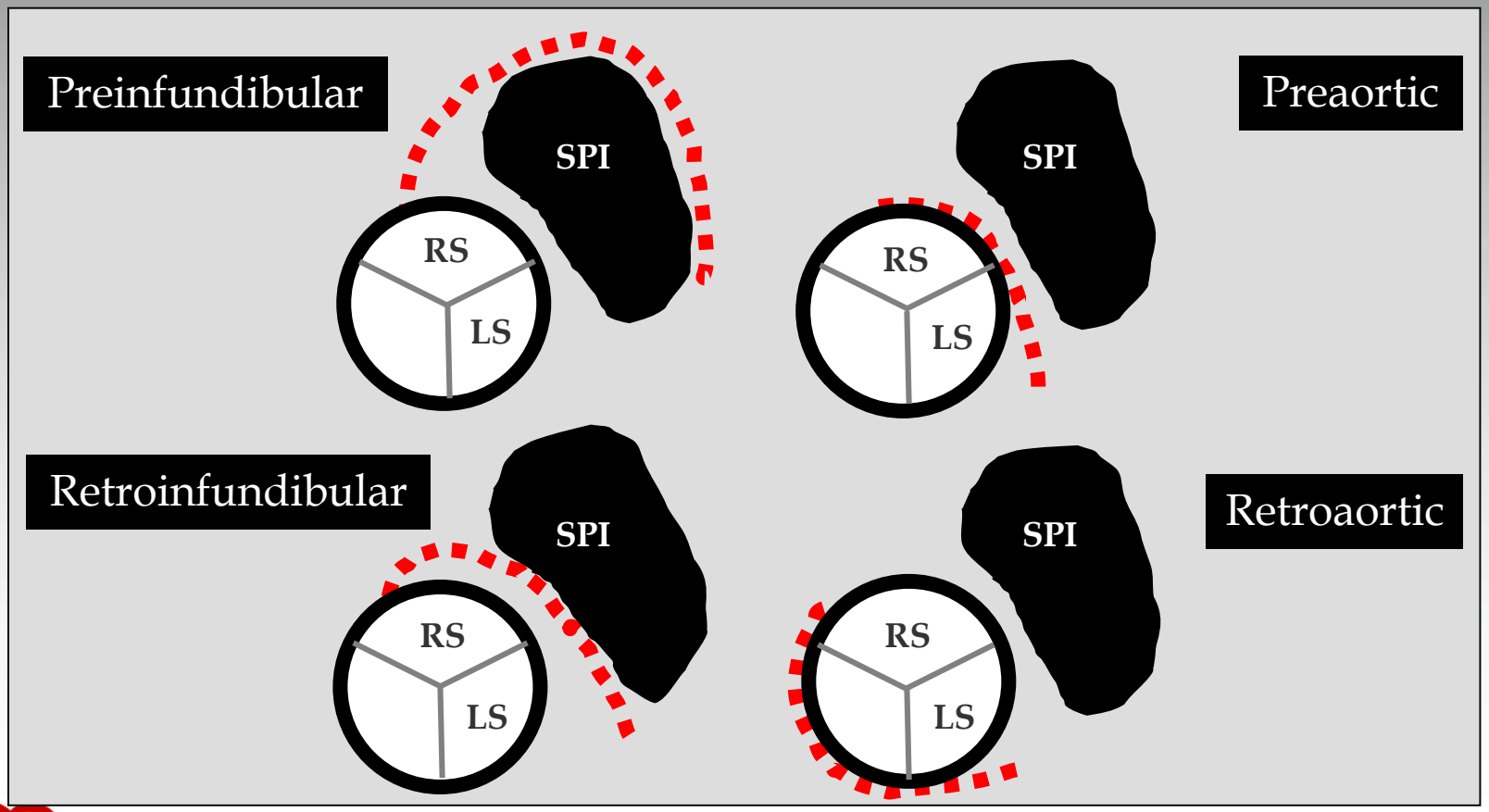
Ectopic LMCA with preinfundibular course



Ectopic LMCA with retroinfundibular course



Anomalous courses of ectopic LCA from right sinus



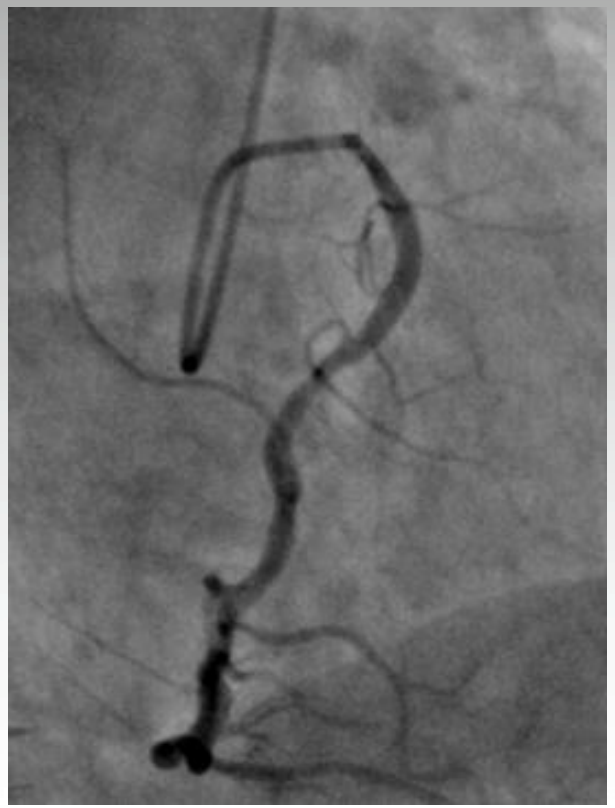
How to identify anomalous course at risk

type A	preinfundibular course
type B	retroinfundibular course
type C	preaortic course with intramural path
type D	preaortic course without intramural path
type E	retroaortic course
type F	absent proximal ectopic course
type G	other ectopic courses

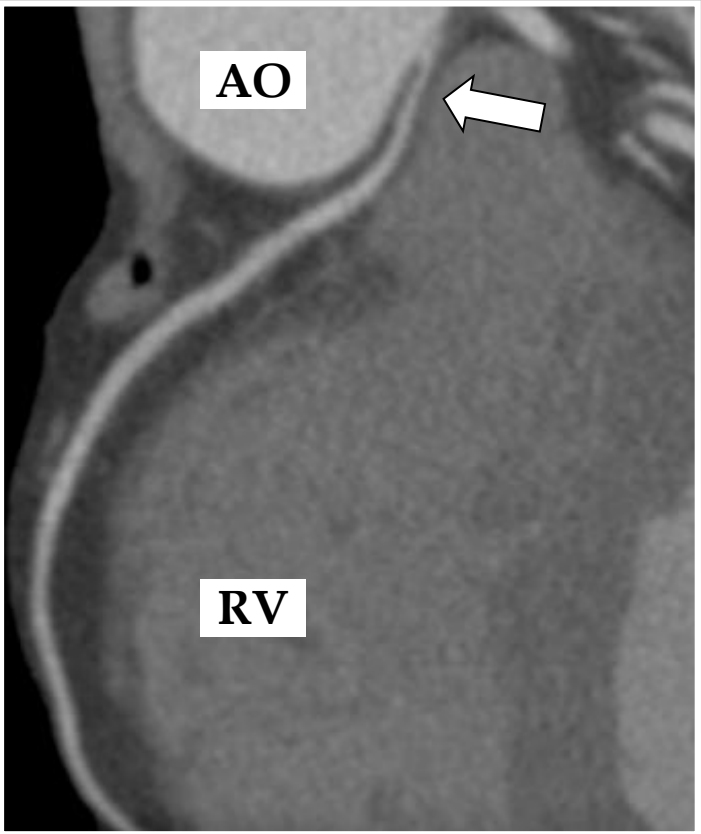
How to identify an intramural segment

Characteristics	TTE	MRA	CTA	SCA	IVUS
Invasive	no	no	no	yes	yes
Ionizing radiation	no	no	yes	yes	yes
Iodine contrast media use	no	no	yes	yes	yes
Spatial resolution (mm)	0.8	1.2 x 1.8	0.5	0.3	0.15 (axial)
Visualization of adjacent structures	++	+++	+++	no	no
3-D reconstruction	no	yes	yes	no	no
Visualization of orifice	no	+	+	+	+++
Identification of intramural segment	+	+	+	+	+++
Identification of ectopic course	+	+++	+++	++	no
Identification of CAD	no	+	++	+++	+++ (limited)

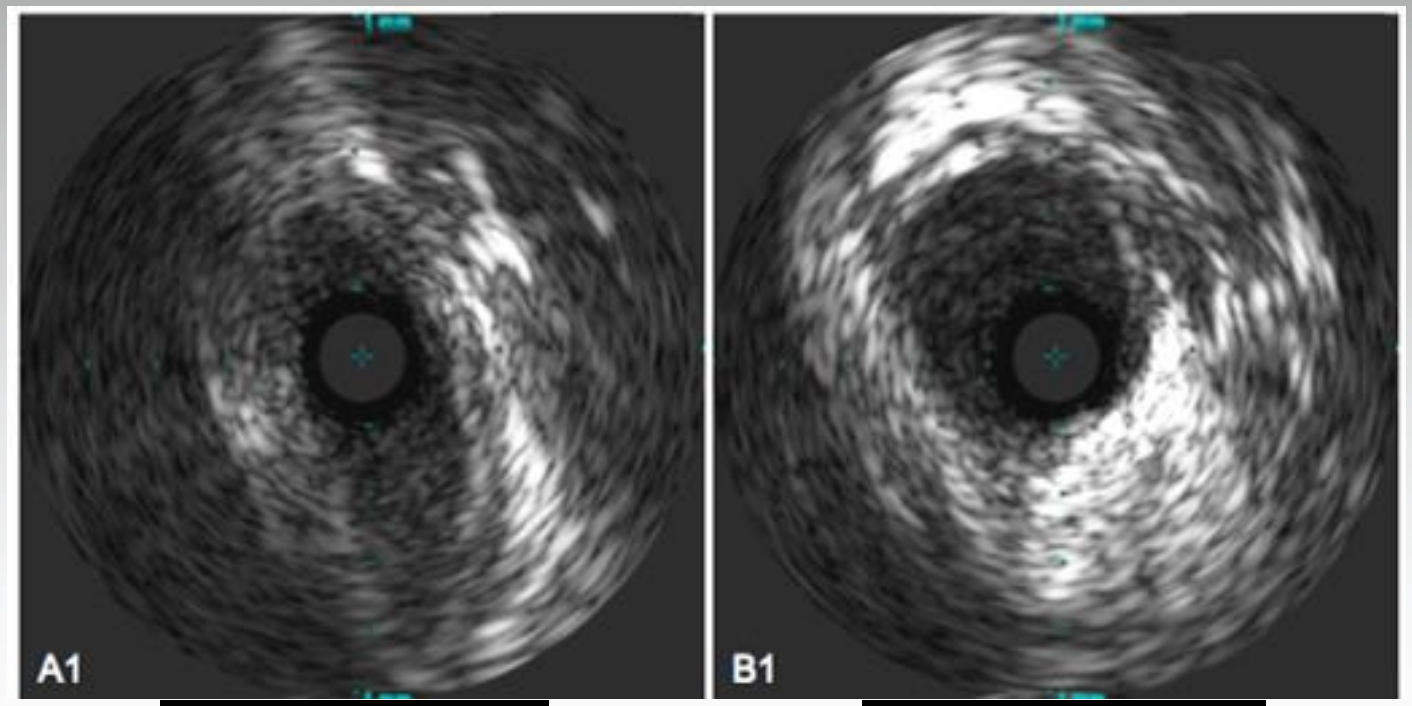
Selective coronary angiography of ectopic RCA



CT angiography of ectopic RCA



Intravascular ultrasonography of ectopic RCA

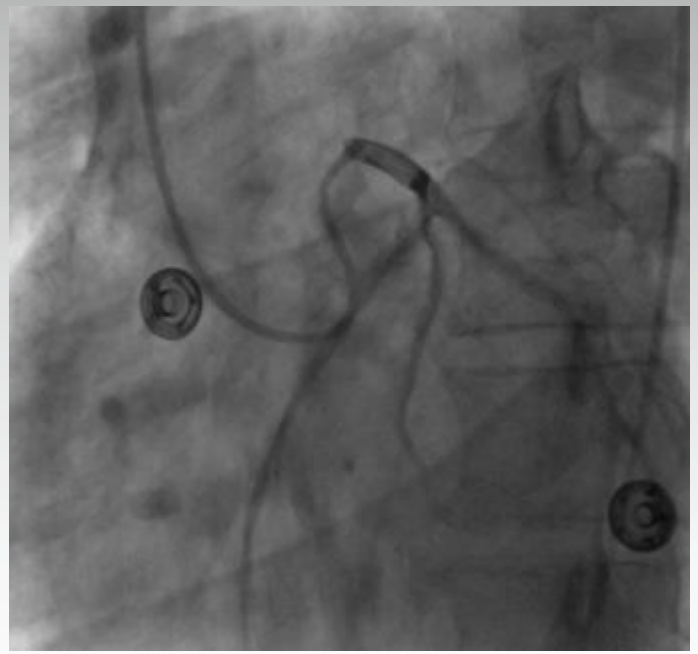


Intramural path **Extramural path**

Clinical case

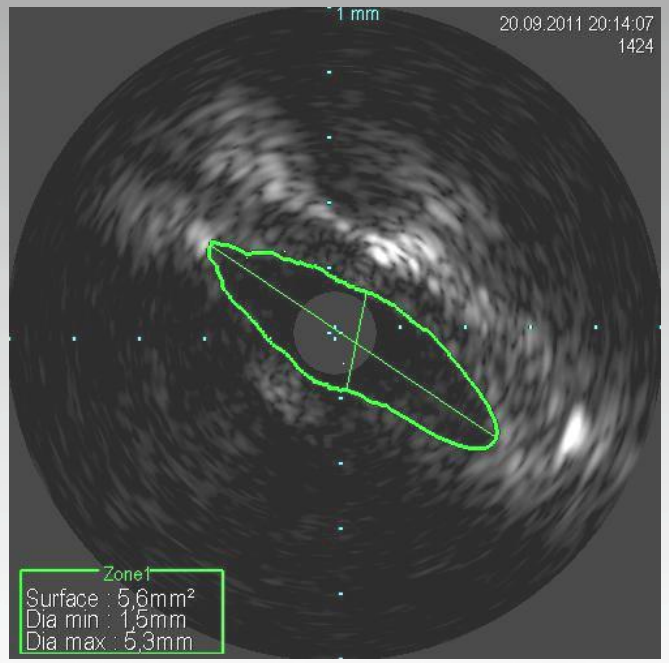
- 42 year-old male
- Smoker
- Rest and exertion chest pain
- EKG abnormalities
- Normal cardiac enzymes
- Selective coronary angiography

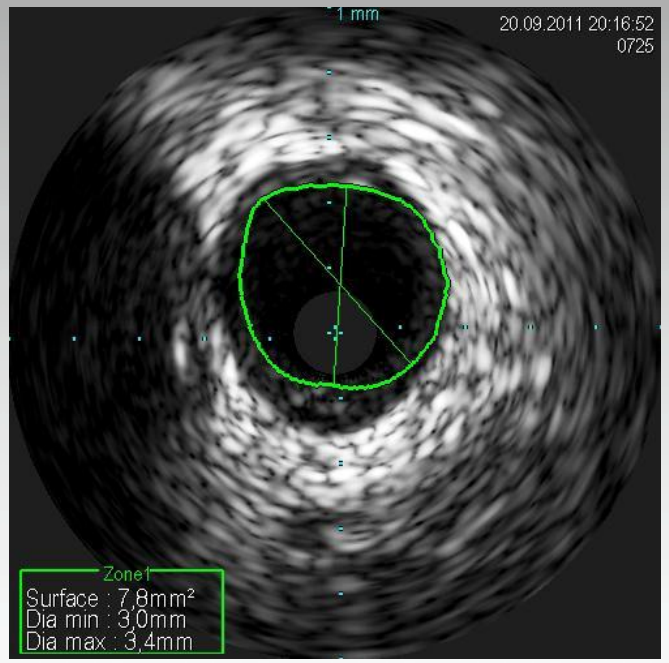
Selective coronary angiography



Anomalous origins of coronary arteries and transradial approach

Intravascular ultrasonography (IVUS)

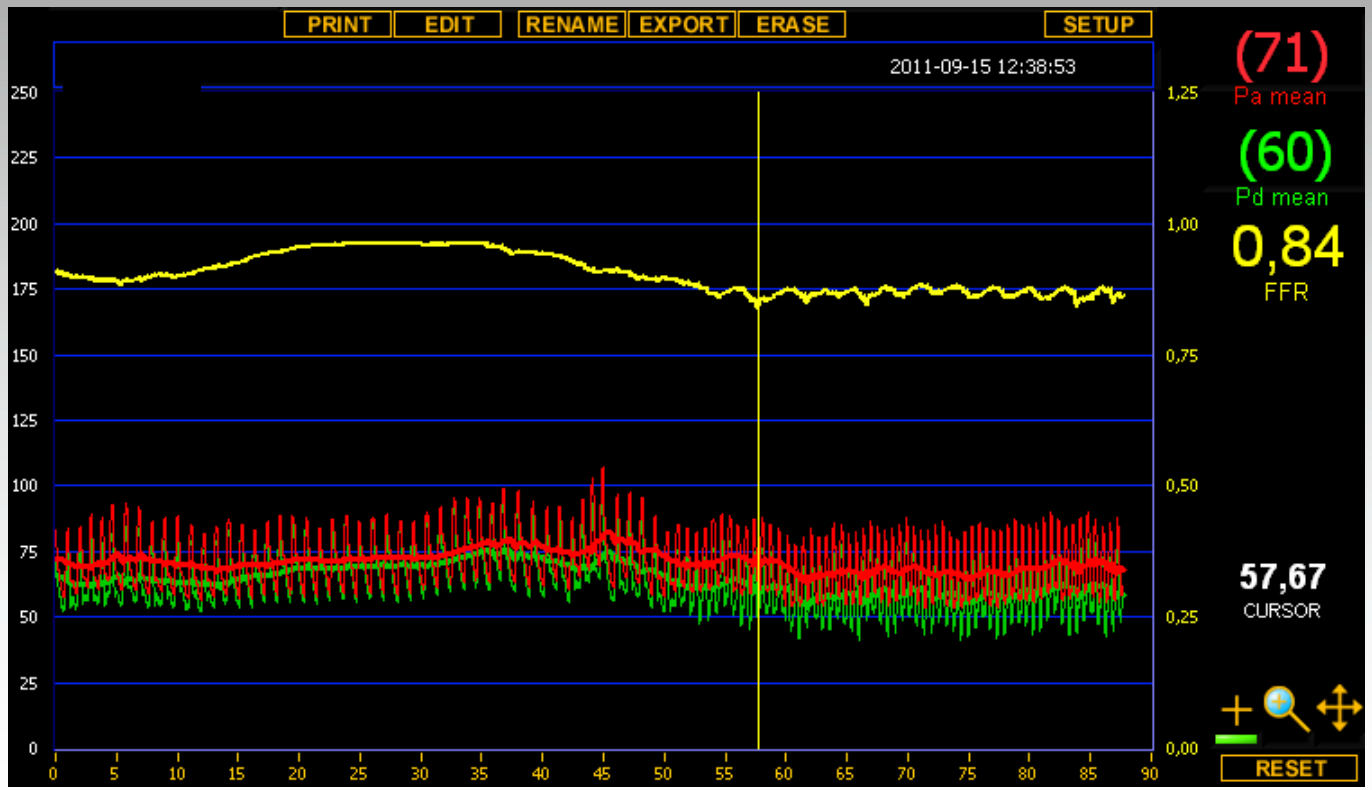




Surface reduction = 28%

Anomalous origins of coronary arteries and transradial approach

Fractional Flow Reserve (FFR)



How to treat anomalous origins

ACC/AHA 2008 Guidelines for the Management of Adults With Congenital Heart Disease

8.5. Recommendations for Congenital Coronary Anomalies of Ectopic Arterial Origin e208

J Am Coll Cardiol 2008;52:e143-263

How to treat anomalous origins

8.5. Recommendations for Congenital Coronary Anomalies of Ectopic Arterial Origin

CLASS I

3. Surgical coronary revascularization should be performed in patients with any of the following indications:
   a. Anomalous left main coronary artery coursing between the aorta and pulmonary artery. (*Level of Evidence: B*)
   b. Documented coronary ischemia due to coronary compression (when coursing between the great arteries or in intramural fashion). (*Level of Evidence: B*)
   c. Anomalous origin of the right coronary artery between aorta and pulmonary artery with evidence of ischemia. (*Level of Evidence: B*)

J Am Coll Cardiol 2008;52:e143-263

How to take a decision

	Low-risk	High-risk
Anomalous connection with the pulmonary artery	-	+
Preaortic course with intramural segment	-	+
Other courses with intramural segment	-	+
Other courses without intramural segment	+	-
Valve-like ostial stenosis	-	+
Other anomalous connections	+	-
History of aborted sudden death	-	+
History of chest pain related to exertion	-	+
History of syncope related to exertion	-	+
History of severe ventricular arrhythmias	-	+
Induced-myocardial ischemia	-	+
Any anomaly above age of 50 years*	+	-
Ectopic segment with significant atherosclerotic lesion	-	+

Clinical case

- Preaortic course with intramural segment
- Nuclear stress imaging : no inferior ischemia
- Age >35 years
- Conservative treatment
- Beta-blockers
- No intensive exercise
- Inclusion in ANOCOR study

Take home messages

- High volume operators are often faced with anomalies.
- Most of anomalies are benign.
- Difficulties of canulation are unrelated to the arterial approach.
- Tomography imaging is essential to limit the risk of misdiagnosis.
- Identification of preaortic course with intramural segment is crucial.
- IVUS may be an interesting tool.
- Surgical repair is recommended in high risk anomalies.
- PCI remains still to be assessed.

END