FOURTEENTH PANAFRICAN COURSE ON INTERVENTIONAL CARDIOLOGY

PAFCIC 2013

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PCI of coronary anomalies: What are the challenges

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ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS

GROUPE HOSPITALIER BICHAT-CLAUDE BERNARD

Disclosure of conflicts of interest: none

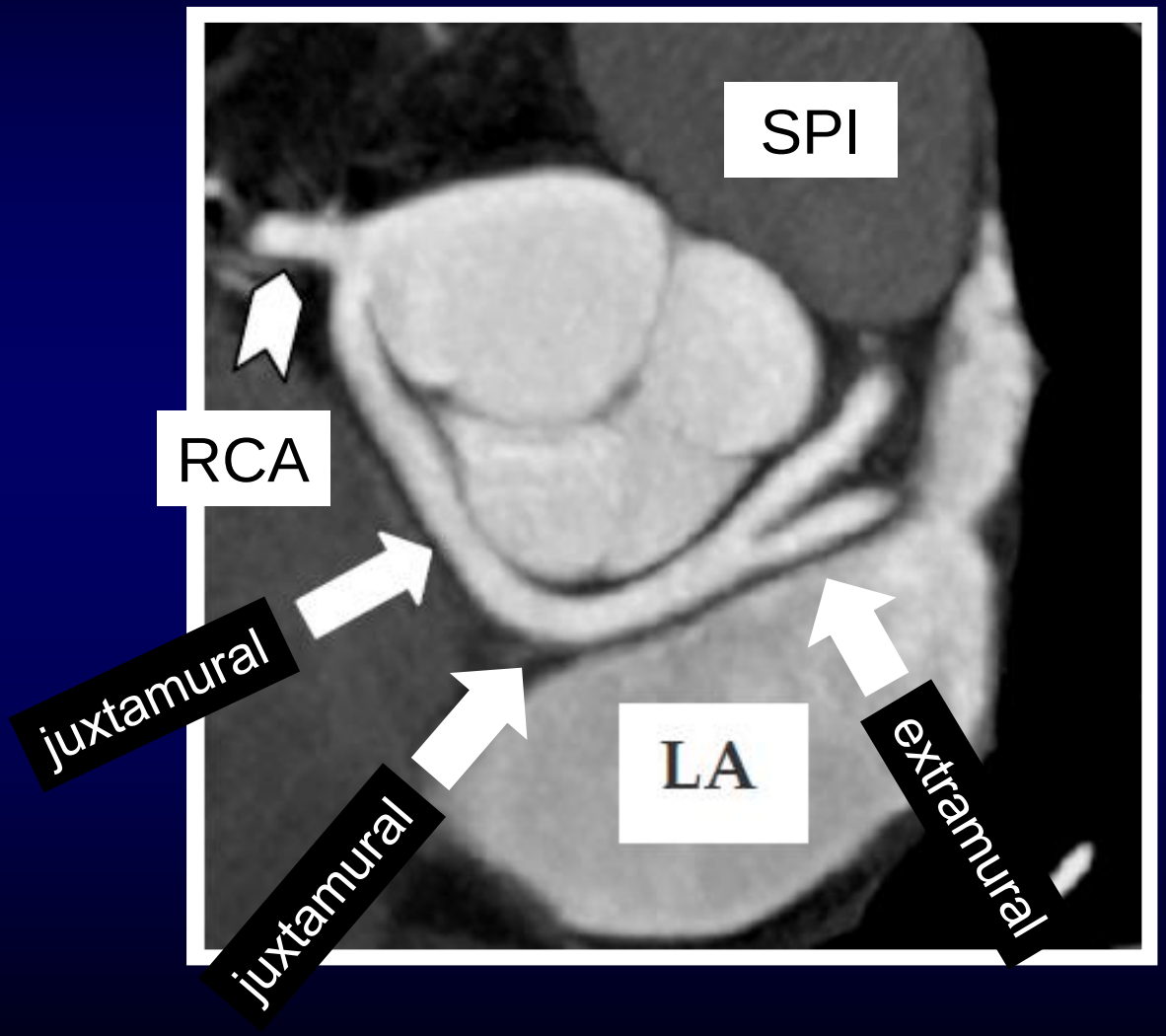
Angiographic prevalence of proximal anomalous connections of coronary arteries

Adult population with no large vessels disease

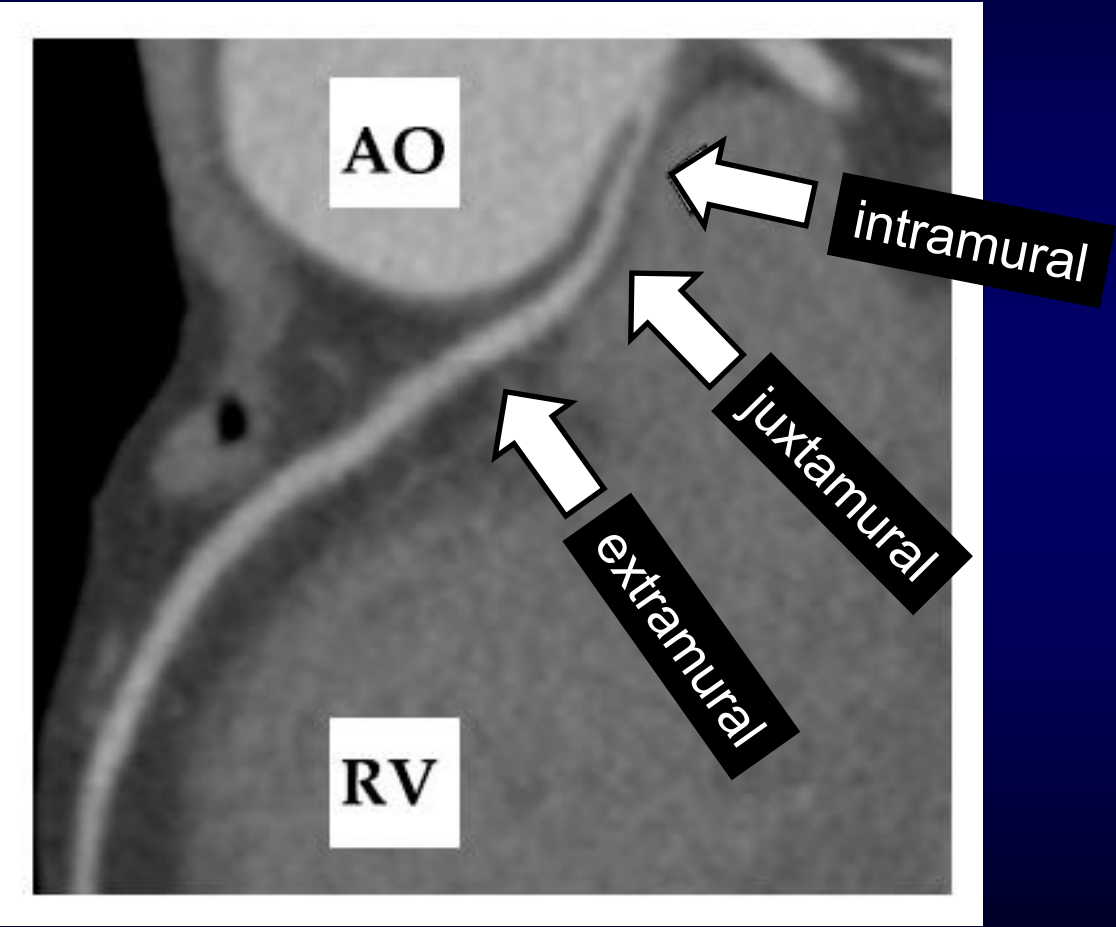
Global prevalence ~ 0.5%

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

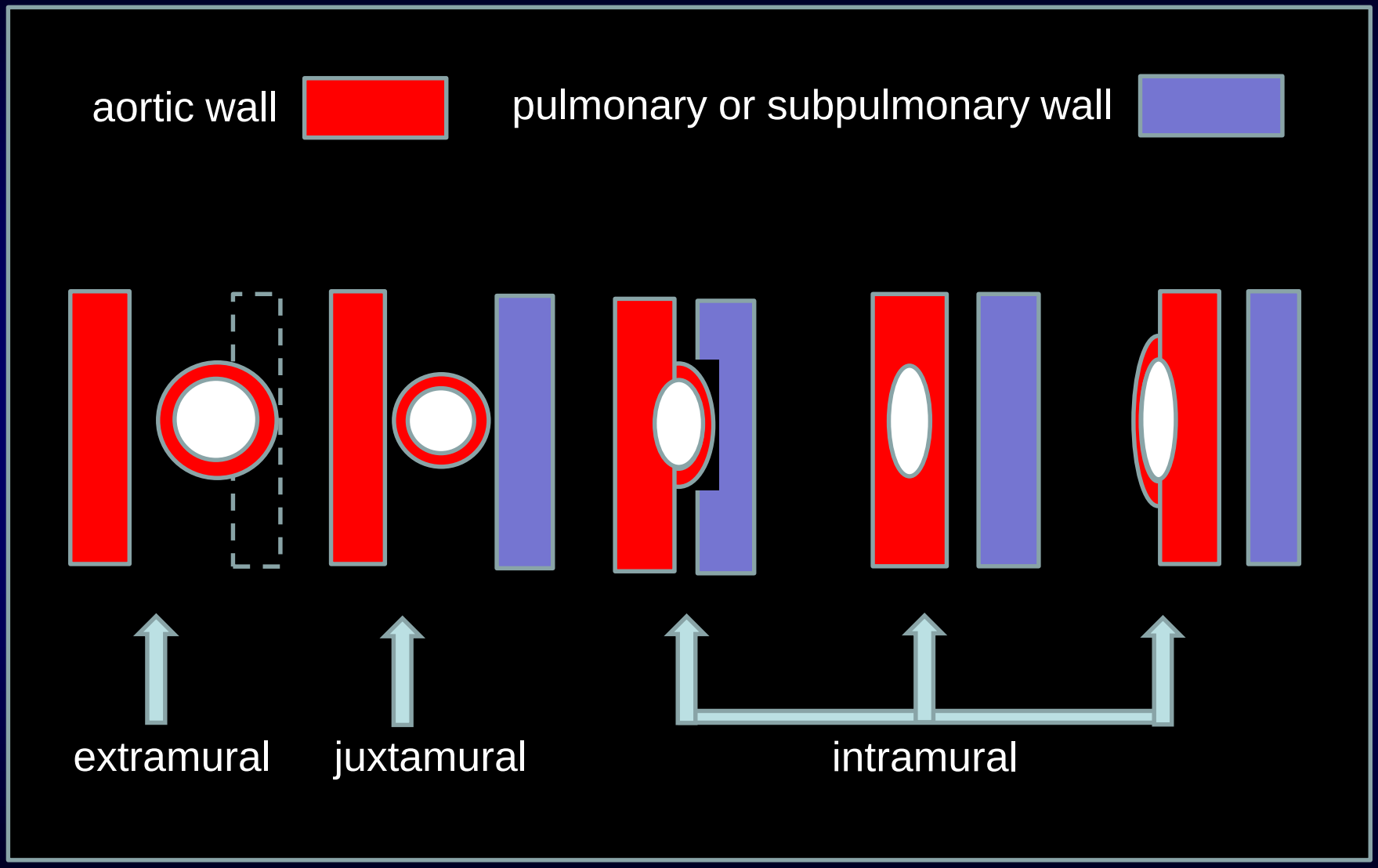
Retroaortic course of CX artery with no intramural pathway



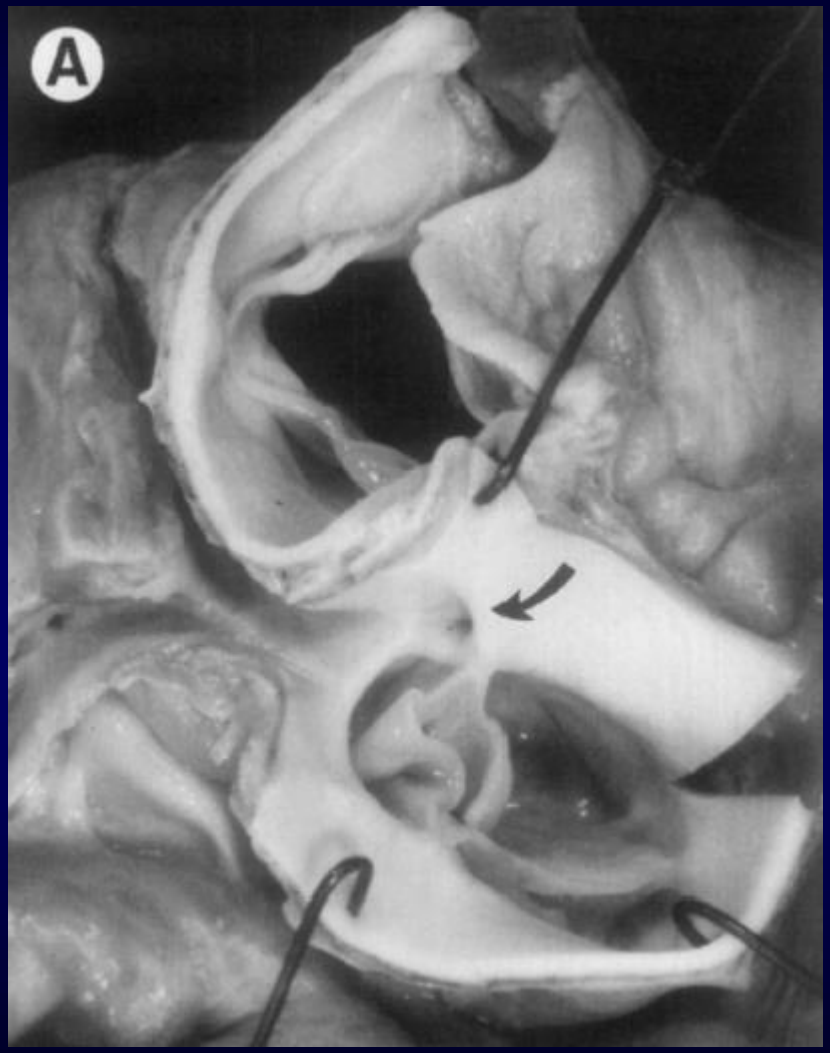
Preaortic course of right coronary artery with intramural pathway



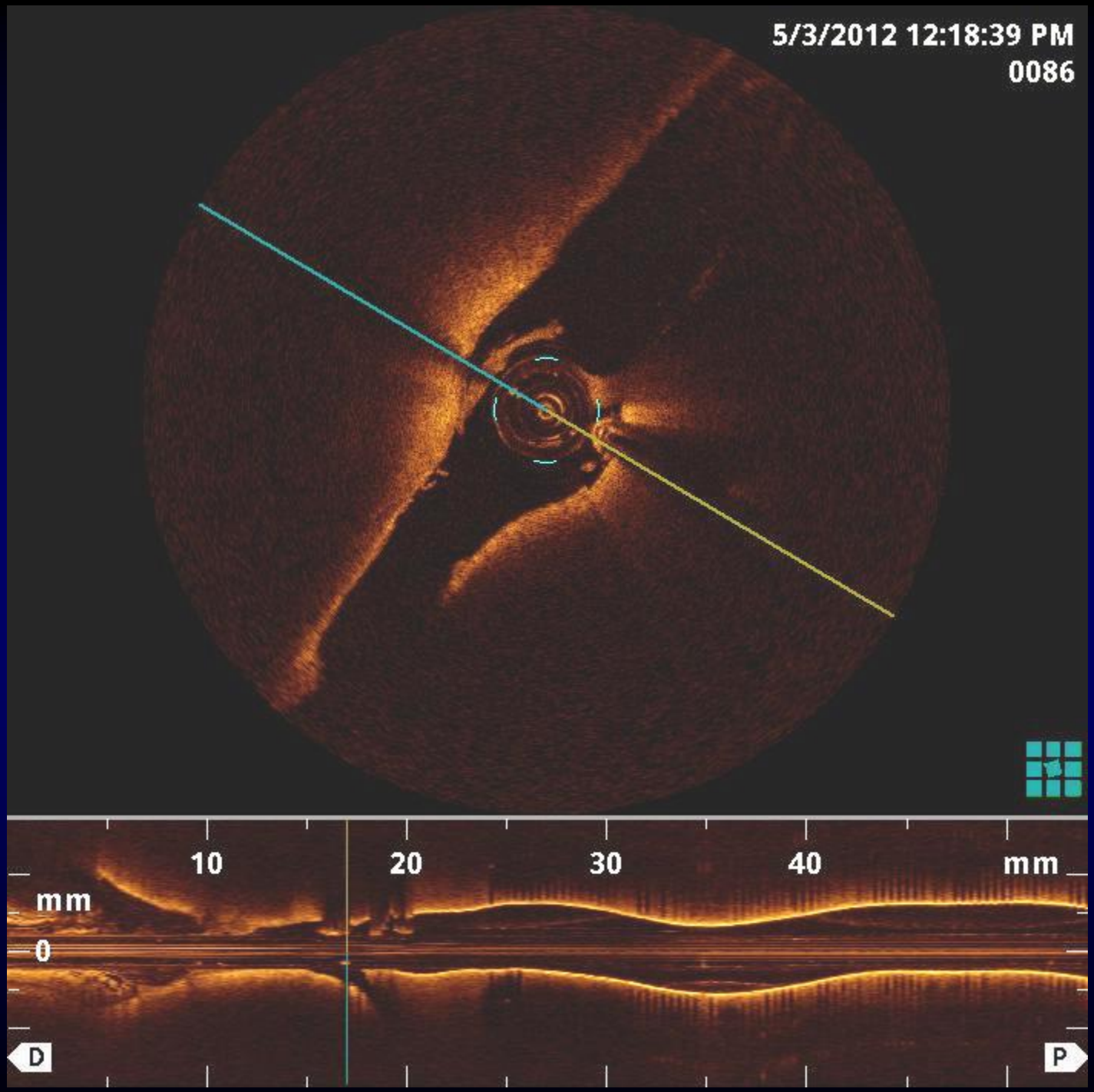
Preaortic course with intramural pathway



Intramural aortic pathway of coronary artery



Frescura G et al. Human Pathology 1998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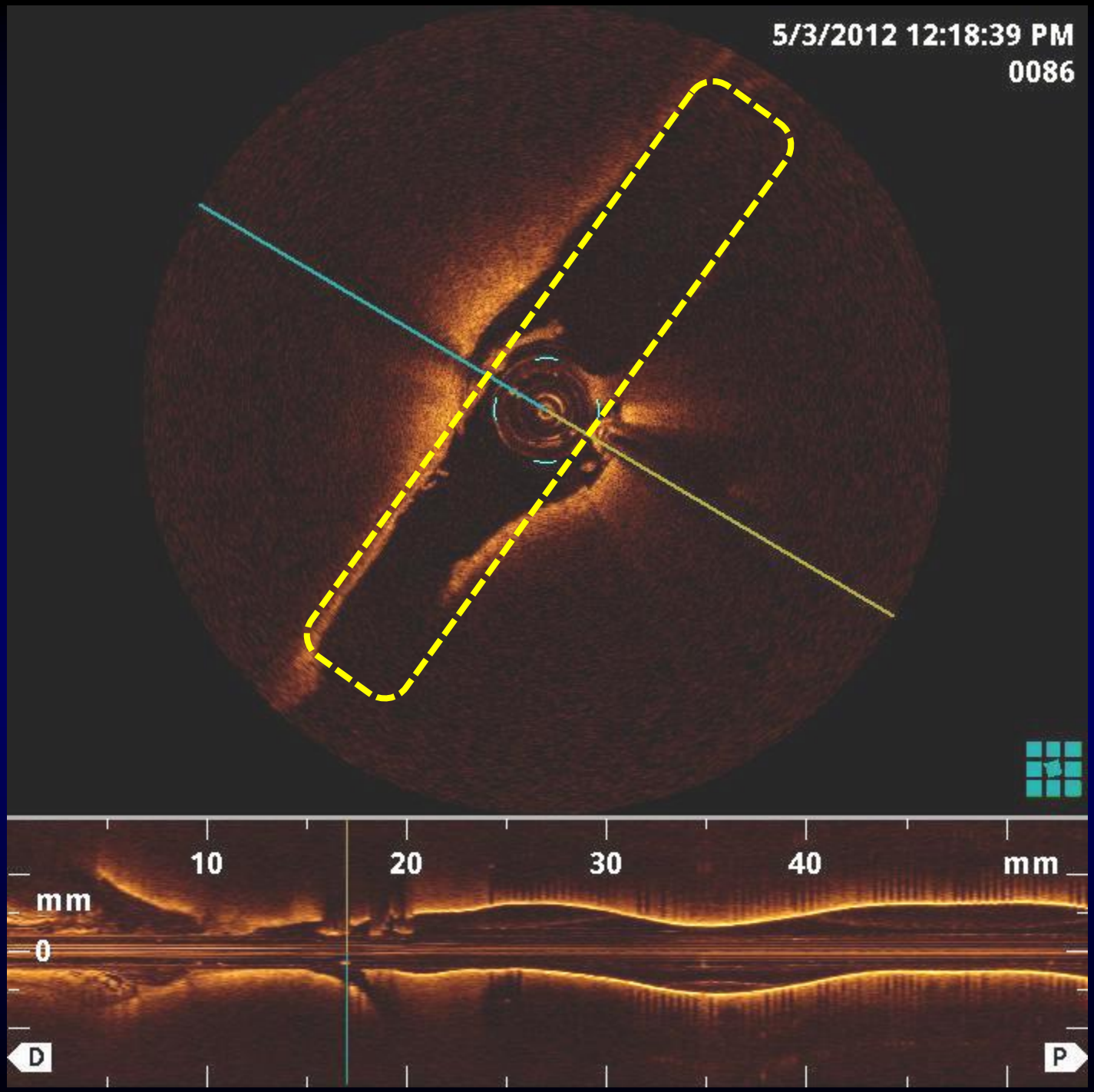
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PCI OF CORONARY ANOMALIES: WHAT ARE THE CHALLENGES

Percutaneous treatment of an anomalous coronary artery with coronary artery disease

- Accurate diagnosis of the coronary abnormality
- Adequate opacification/cannulation of the coronary artery
- Sufficient support of the guiding catheter

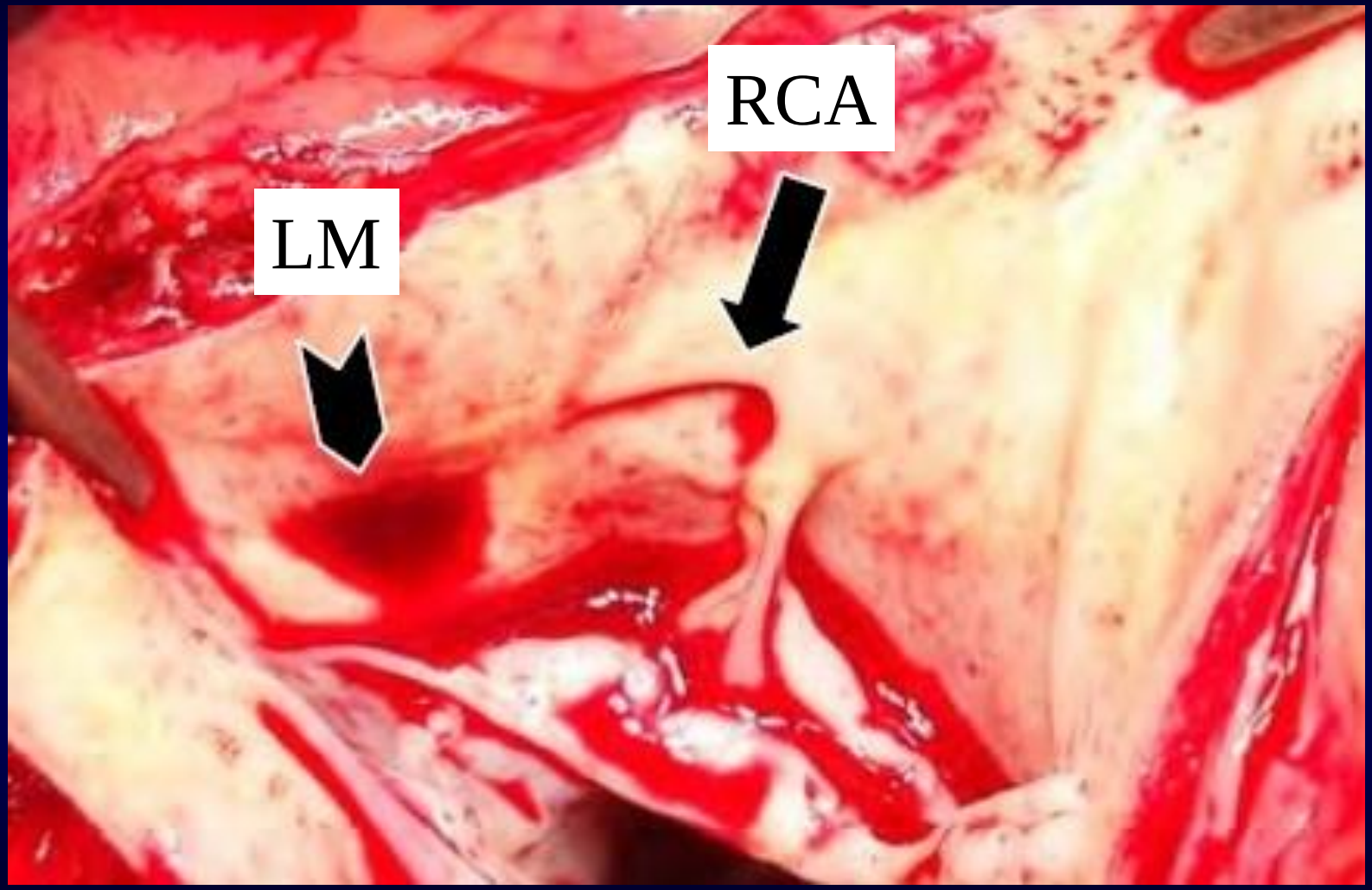
PCI OF CORONARY ANOMALIES: WHAT ARE THE CHALLENGES

Accurate diagnosis of the coronary abnormality

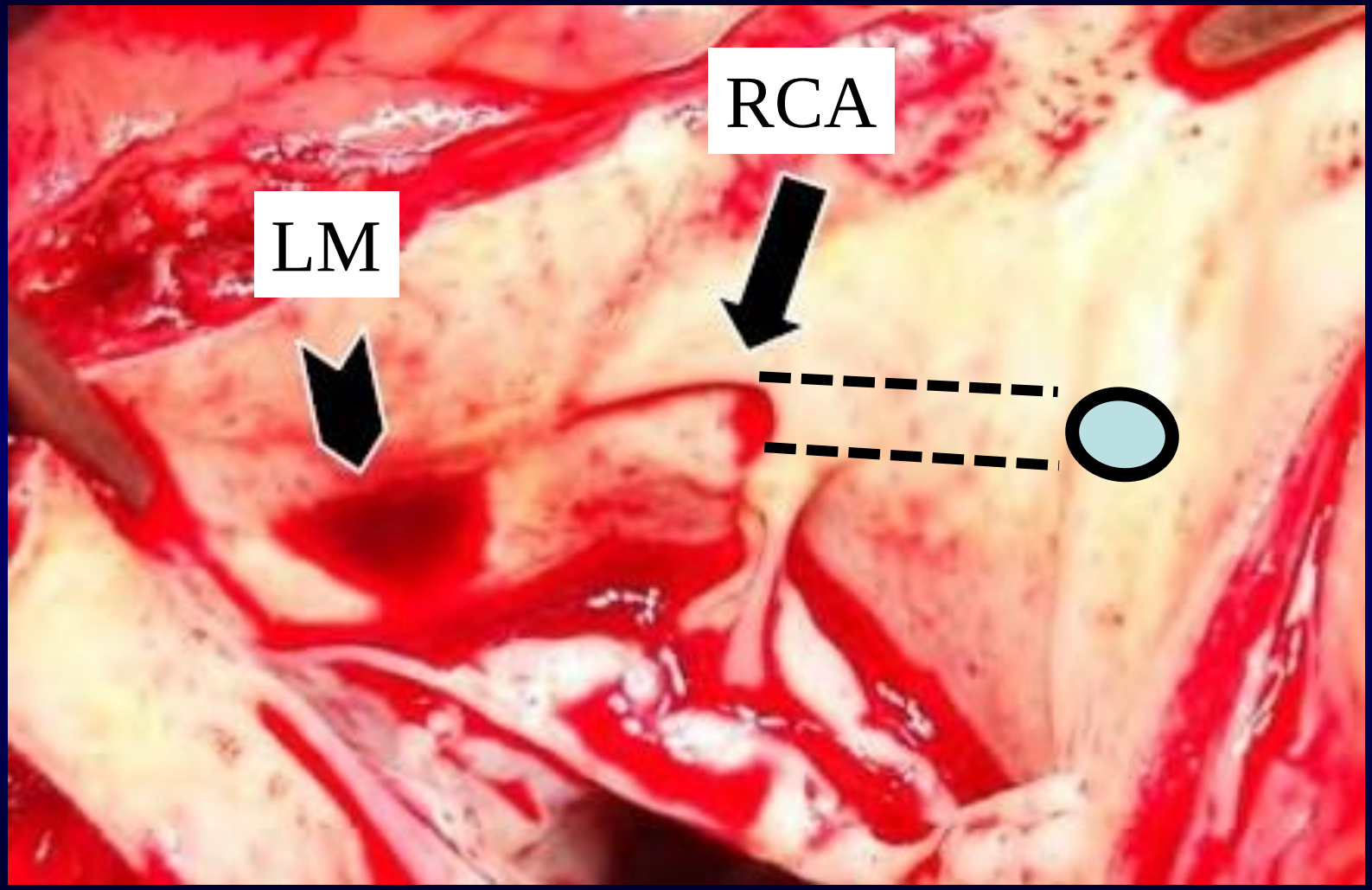
Non invasive multislice imaging
Cardiac CT scan

- Decrease in misdiagnosis
- Decrease in erroneous interpretation

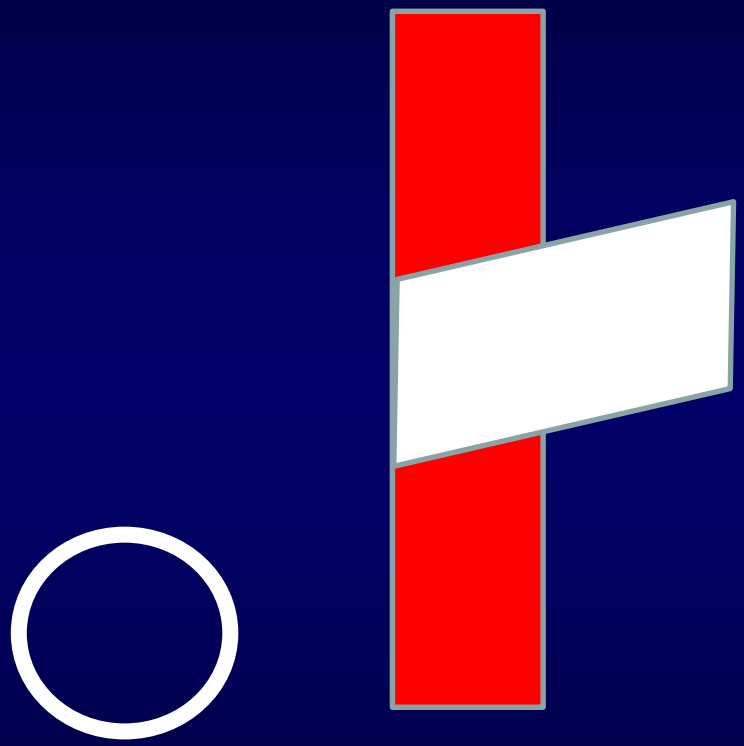
Ectopic connection of RCA



Ectopic RCA with intramural pathway

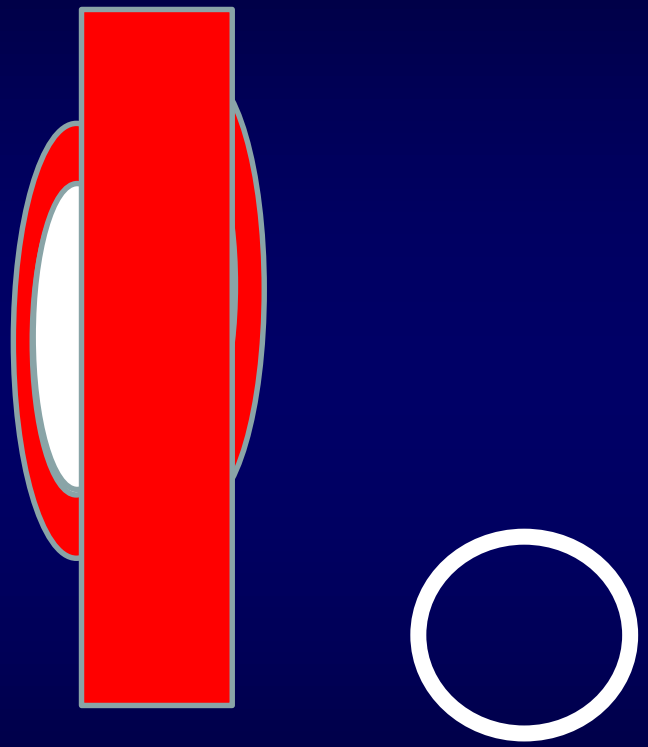


Normal connection



Coaxial position
Cannulation

Ectopic connection



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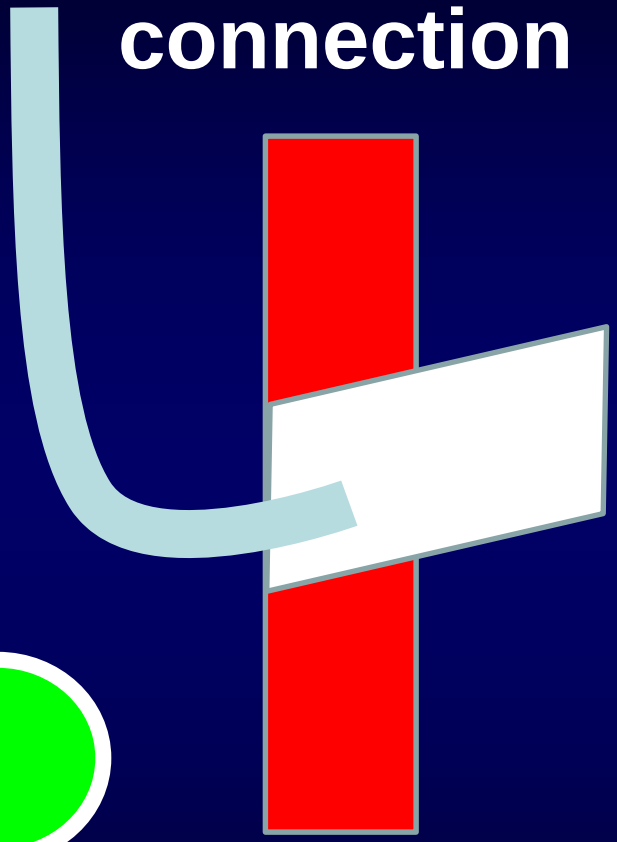

Coaxial position
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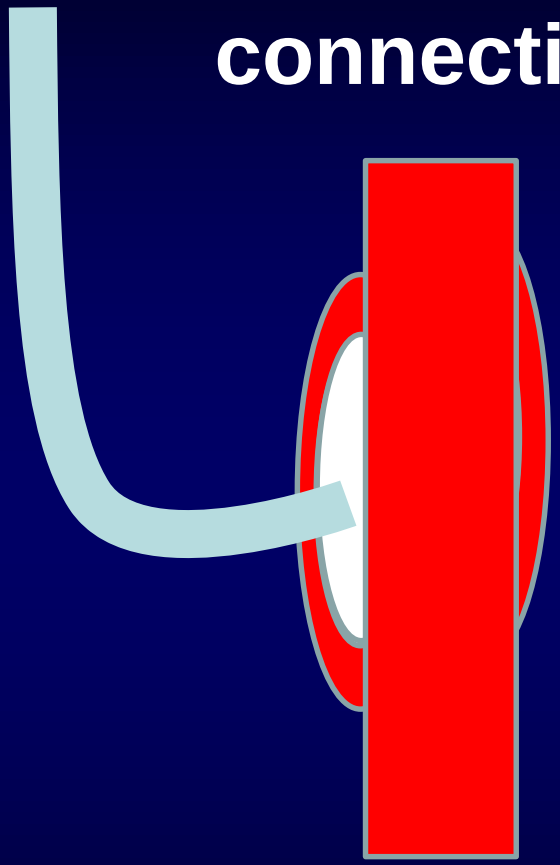

Coaxial position
Cannulation

Opacification of anomalous connection

RCA arising from left coronary sinus

Catheters

- Amplatz Left 2.0 or 3.0
- Extra Back-Up 3.5 or 4.0
- Judkins Left 4.0
- Amplatz Right 2.0
- Multipurpose
- Judkins Right 4.0 or 5.0

no dedicated catheter

CASE REPORT
Korean Circ J 2008;38:179-183

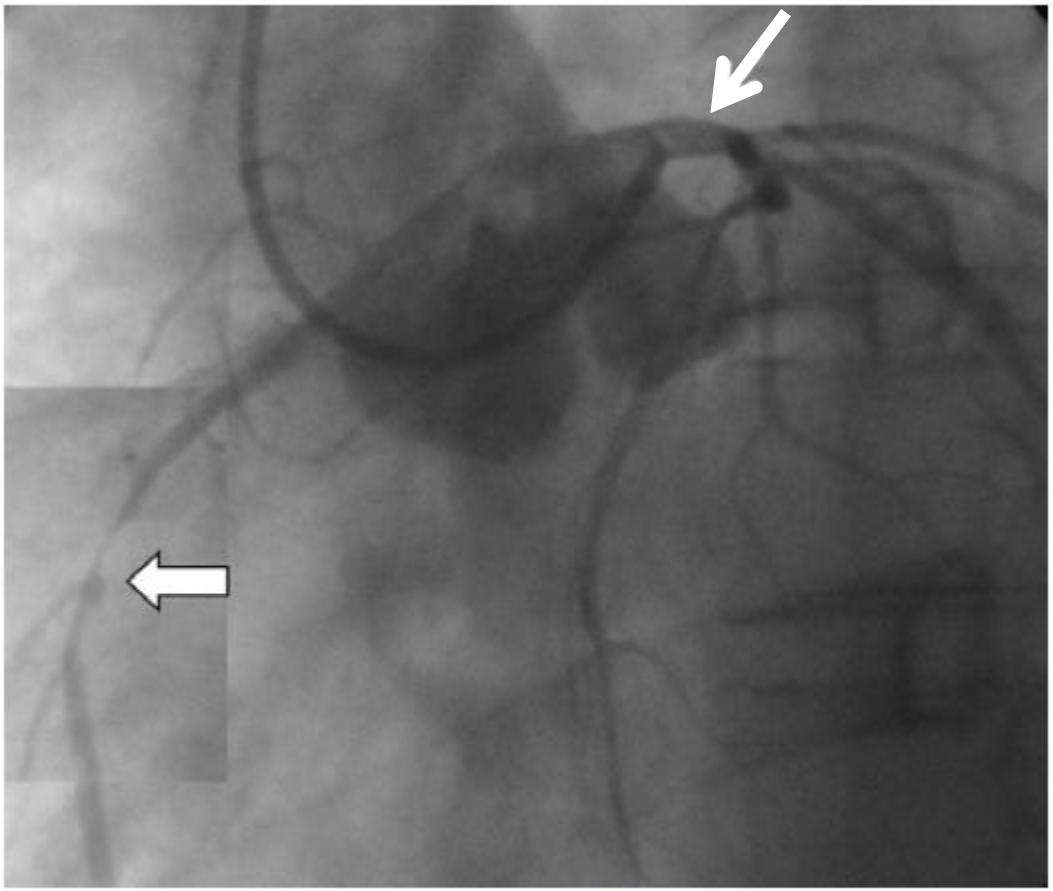

Fig. 2. Baseline coronary angiogram showed an anomalous right coronary artery (RCA) ostium (small arrow) and subtotal occlusion of the mid-RCA (large arrow).

Jong Yeon Kim, MD[1], Sang Goo Yoon, MD[1], Joon Hyung Doh, MD[1,2], Hyun Min Choe, MD[1], Sung Uk Kwon, MD[1], June Namgung, MD[1], Sung Yun Lee, MD[1] and Won Ro Lee, MD[1]

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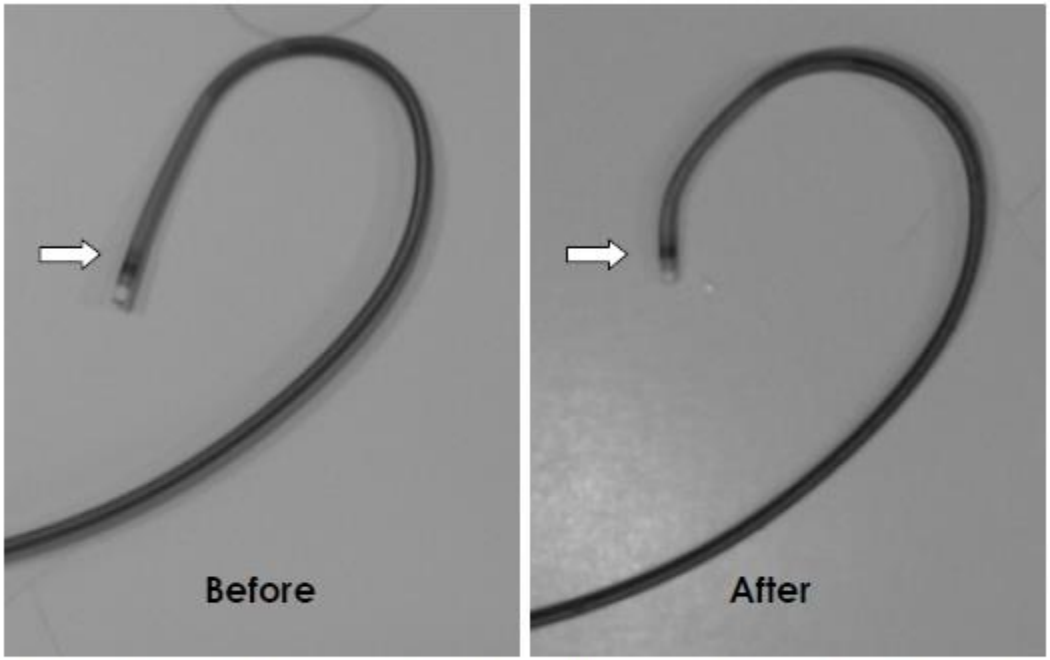

Fig. 3. 5 French launcher EBU4 guiding catheter. Before: the natural shape of the EBU4 guiding catheter. After: the manually manipulated EBU4 guiding catheter (arrow) using a hair dryer. EBU: extra-backup.

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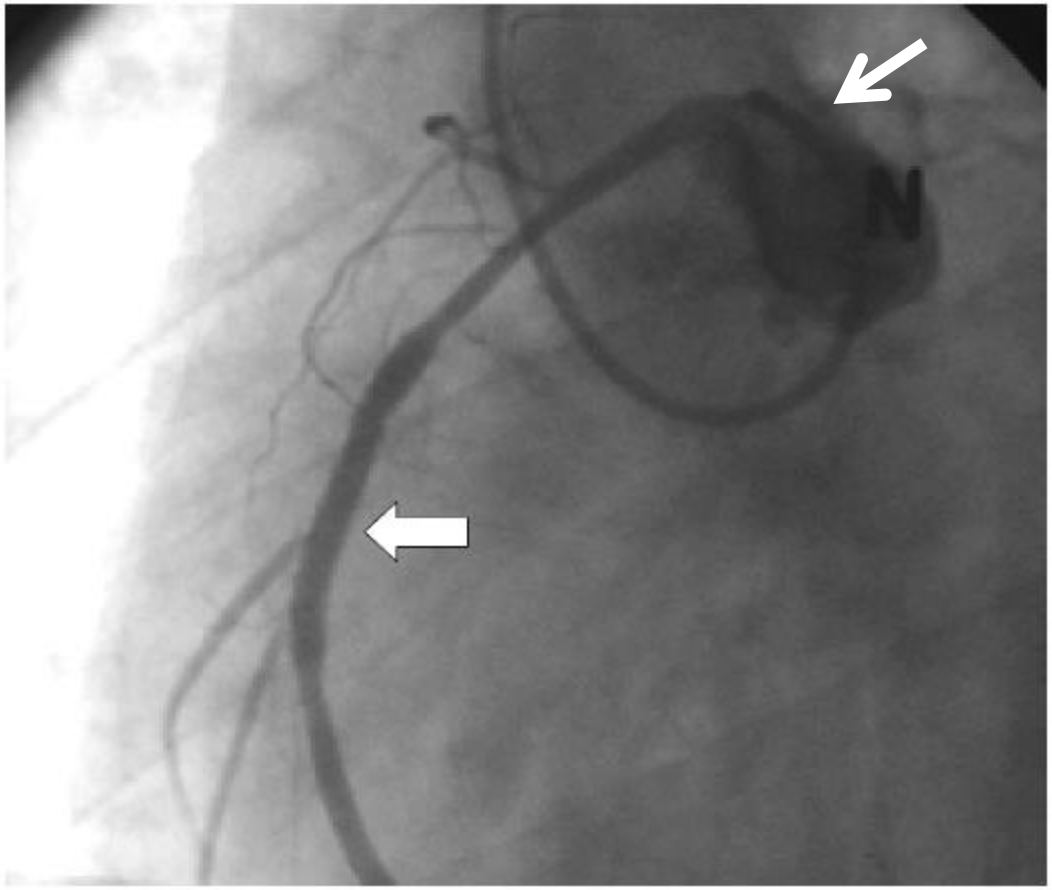

Fig. 4. The final coronary angiogram showed a successfully implanted stent at the mid right coronary artery (arrow).

Jong Yeon Kim, MD[1], Sang Goo Yoon, MD[1], Joon Hyung Doh, MD[1,2], Hyun Min Choe, MD[1], Sung Uk Kwon, MD[1], June Namgung, MD[1], Sung Yun Lee, MD[1] and Won Ro Lee, MD[1]

Opacification of anomalous connection

RCA arising from left coronary sinus

My technique

(in case of failure of adequate opacification with usual technique)

1. Left anterior oblique projection
2. Use of 5/6F guiding catheters
3. Use of Amplatz Left or Extra Back-Up catheters
4. Cannulation of the left ostium
5. Push the catheter gently to extubate from the ostium
6. Torque the catheter slowly and clockwise
7. Tip of the catheter may arrive facing the ectopic ostium
8. Opacification of the ectopic coronary artery
9. Rapid insertion of a guide wire (optional)

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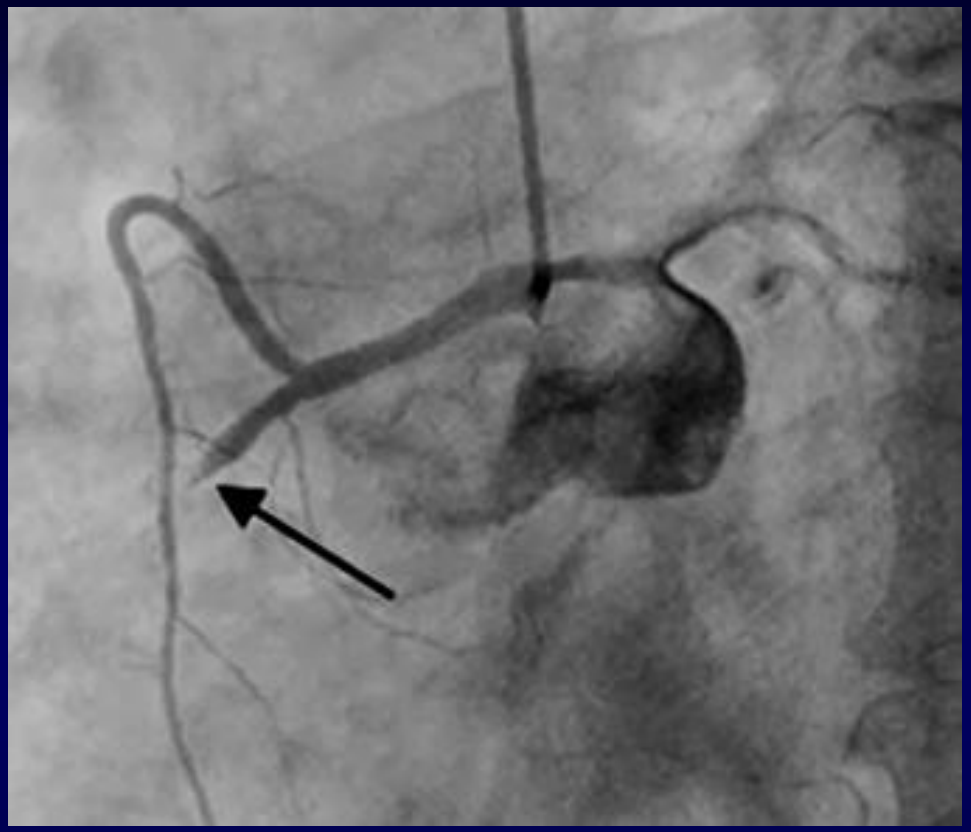
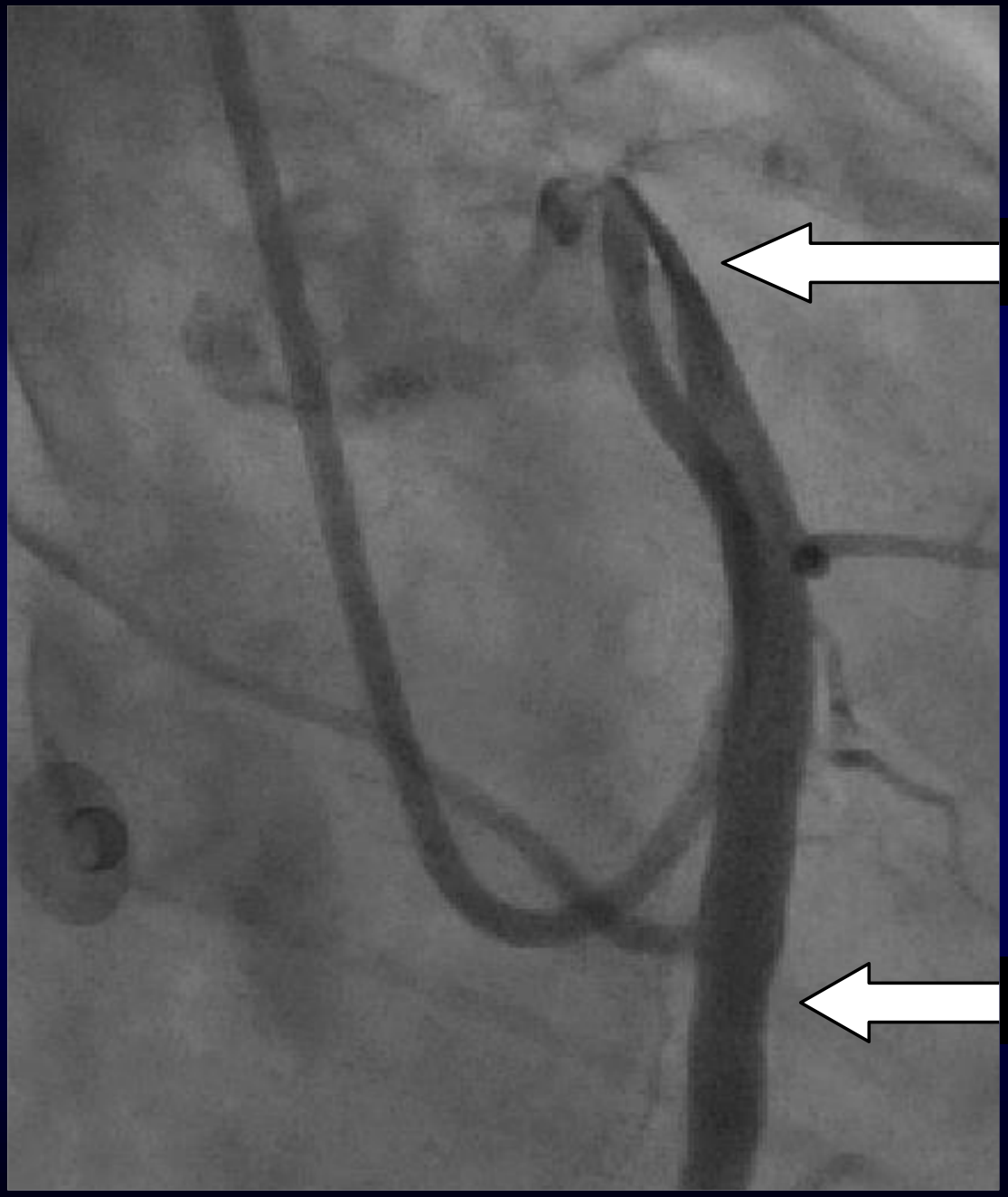
Ectopic connection and associated CAD



Two challenges :

- opacification of the ectopic vessel
- good back-up support


intramural pathway
atheroma plaque

Preaortic course with intramural segment and atheroma: association?

PubMed : no publications

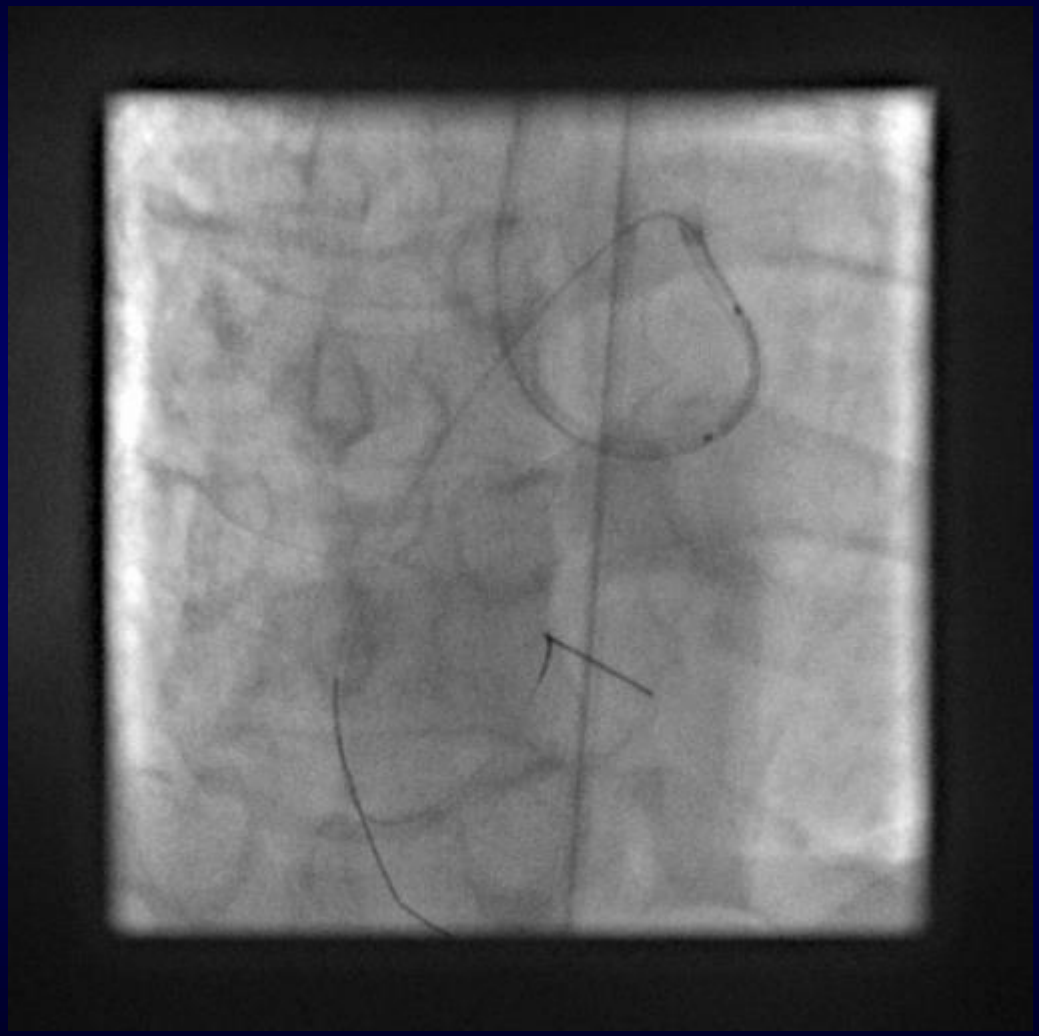
Intramural aortic course: anatomical feature protective against atherosclerotic process ?

PCI of RCA arising from left coronary sinus

How to improve back-up support

- Additional guide wire in ectopic artery
- Additional guide wire in non ectopic coronary
- Anchoring technique with balloon

PCI of RCA arising from left coronary sinus



Opacification of anomalous connection

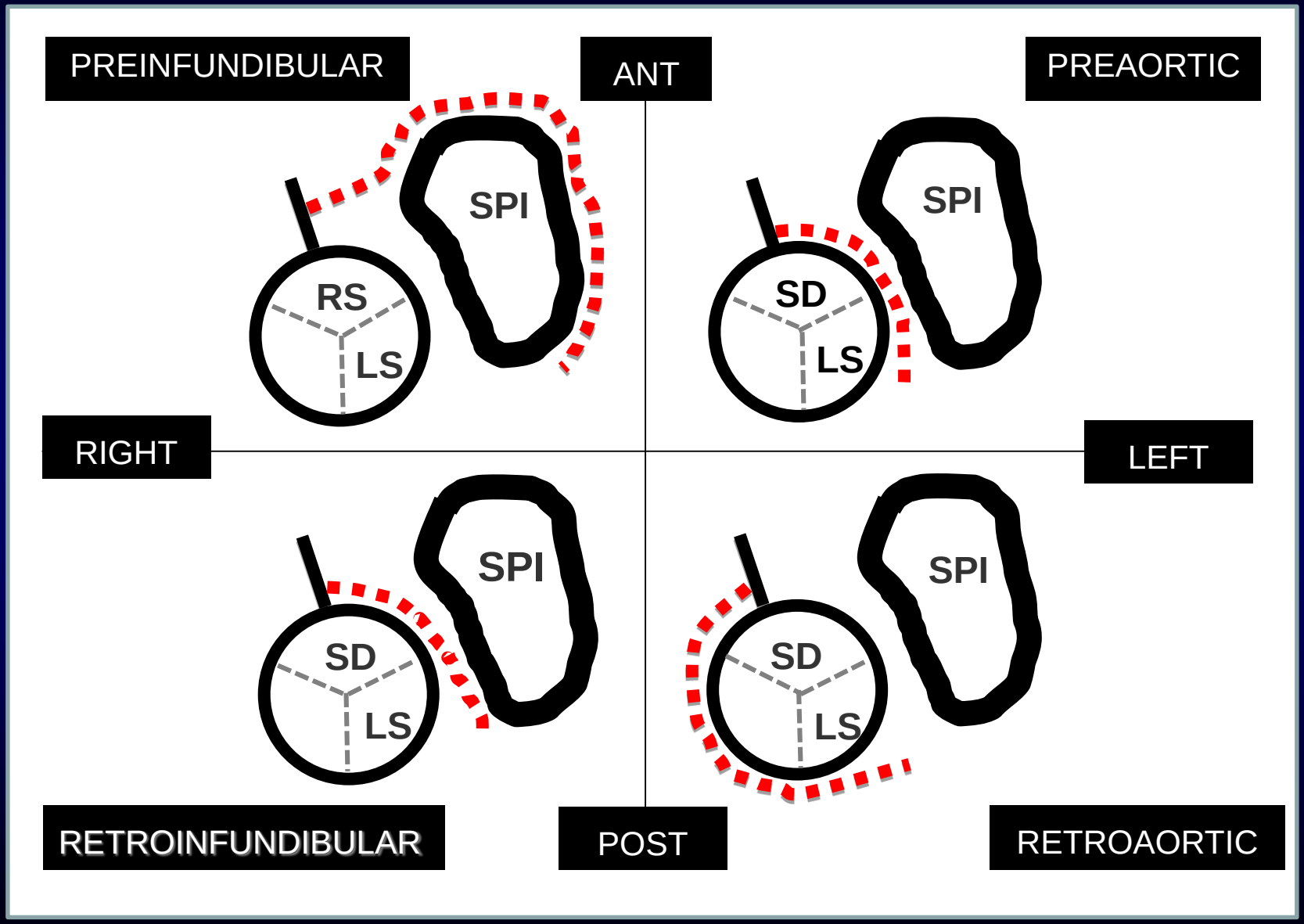
CX arising from right coronary sinus

Catheters

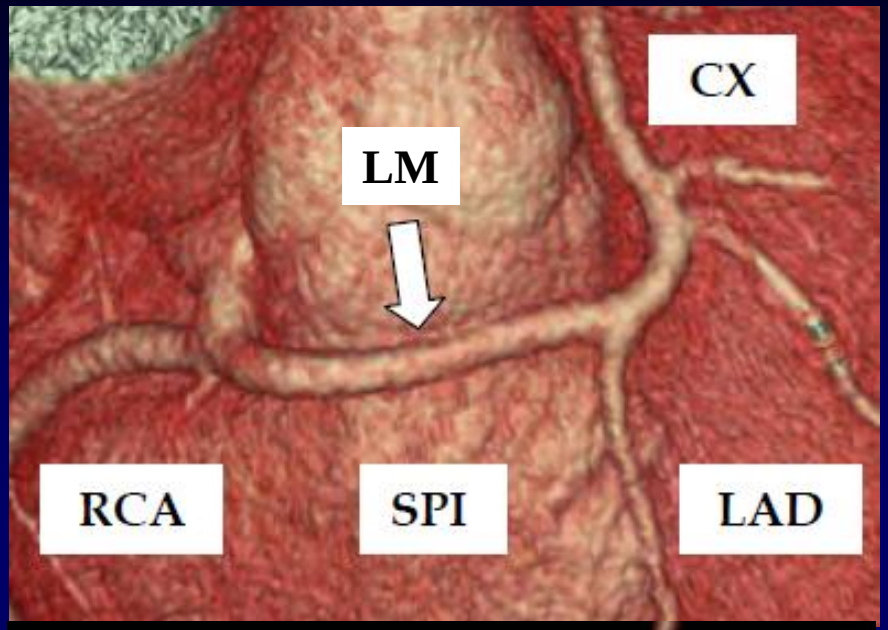
- Judkins Right 4.0
- Multipurpose
- Amplatz Left 1 or 2
- Amplatz Right 1 or 2

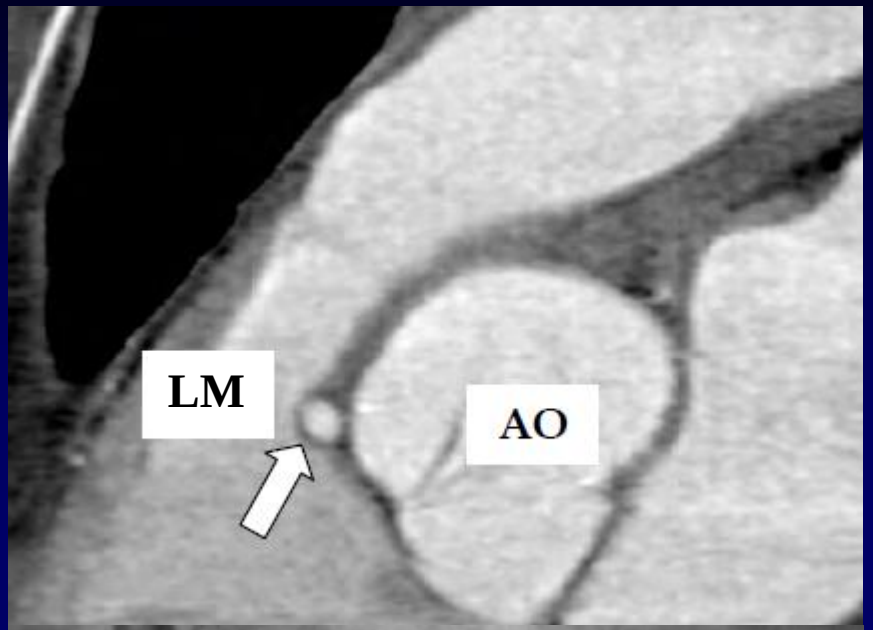
no dedicated catheter

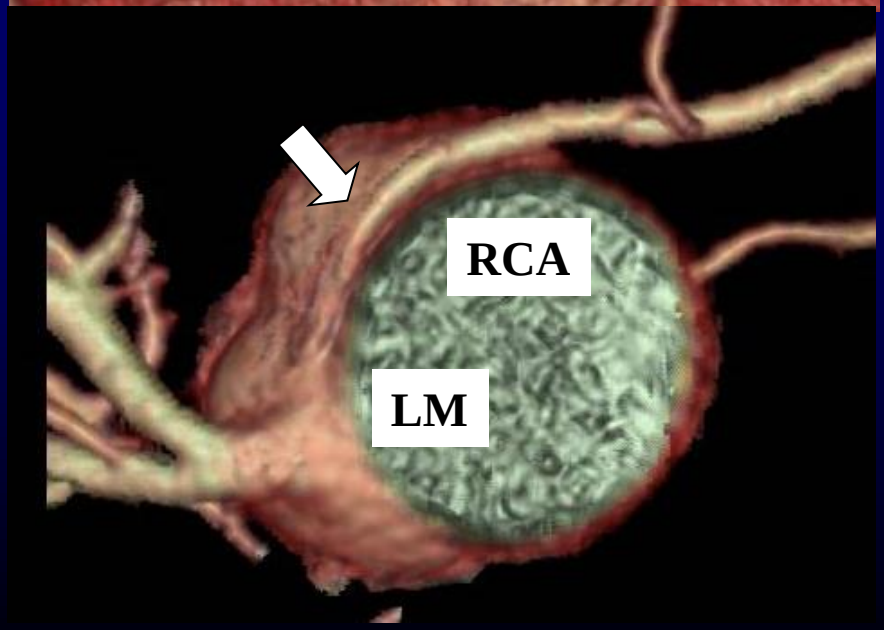
Possible ectopic courses of left main

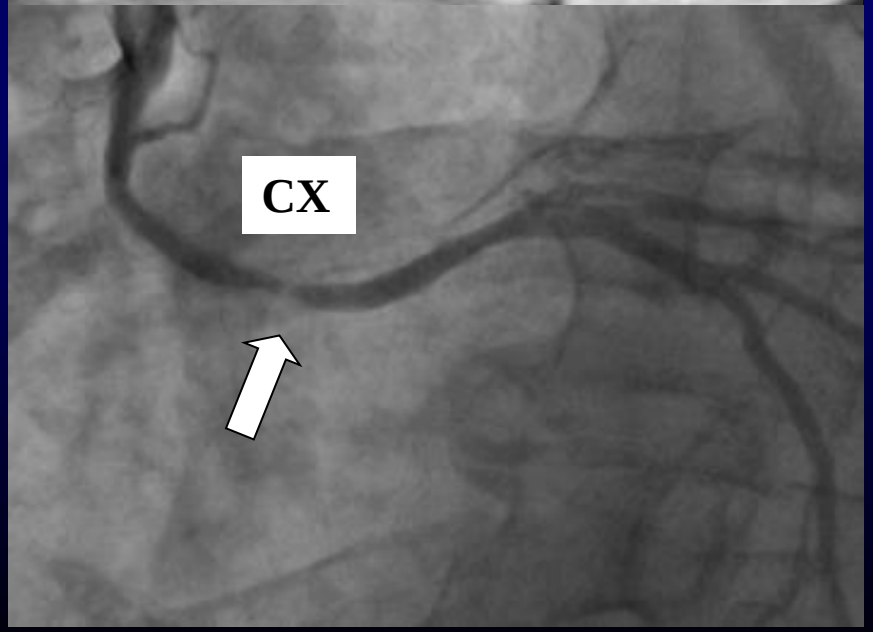


Ectopic segment and CAD prevalence









Ectopic segment and CAD prevalence

Adult population > 35-year-old

Ectopic course	CAD prevalence
Preinfundibular course	low
Retroinfundibular course	low
Preaortic course (intramural segment)	unknown
Preaortic course (juxtamural segment)	low
Retroaortic course	high

Mechanisms to explain that the retroaortic segment is more likely to develop CAD remain unknown

Opacification of anomalous connection

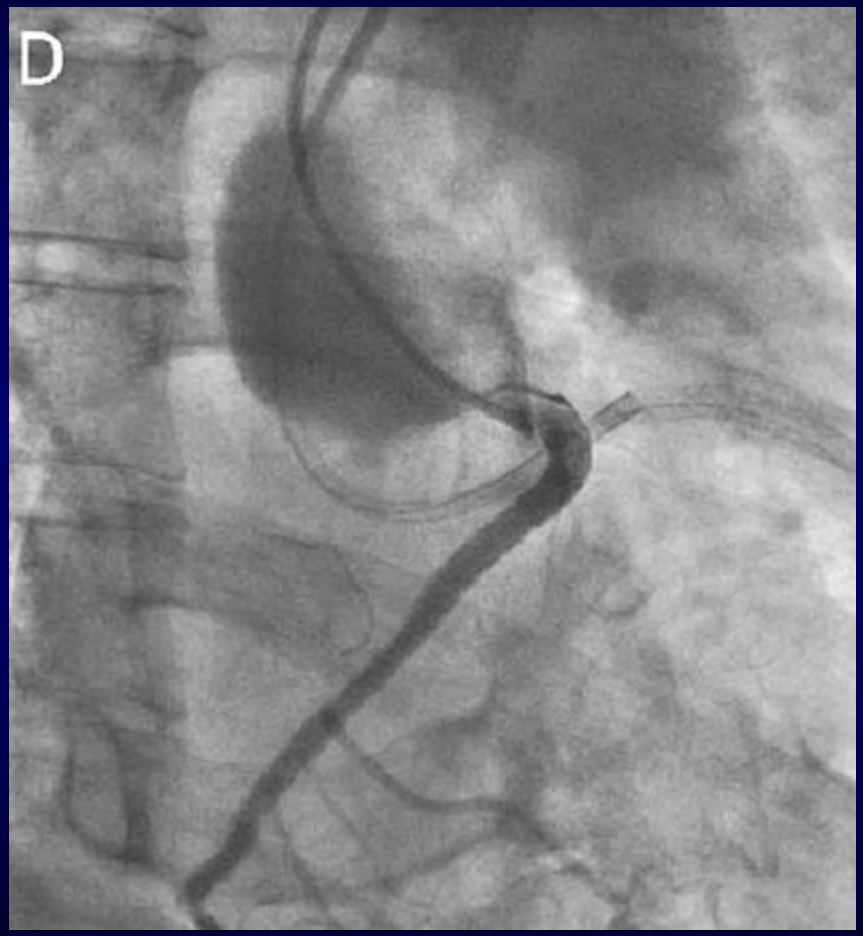
Risks

- Long procedures
- Numerous manoeuvers with catheters
- Large amount of contrast media
- Excessive exposition to radiation
- Traumatic dissection of proximal segment

Consider coronary CT scan …
Ad hoc PCI not recommended (lack of suitable catheter)
Femoral route better than radial route ?

Treatment of Aortocoronary Dissection Complicating Anomalous Origin Right Coronary Artery and Chronic Total Intervention with Intravascular Ultrasound Guided Stenting

Sayed M. Abdou,[1] MD, and Chiung-Jen Wu,[2*] MD



Catheterization and Cardiovascular Interventions 78:914–919 (2011)

PCI OF CORONARY ANOMALIES: WHAT ARE THE CHALLENGES

Percutaneous treatment of a coronary abnormality

- Accurate diagnosis of the anomalous connection
- Identification of coronary abnormalities requiring correction
- Role of PCI ?

PCI OF CORONARY ANOMALIES: WHAT ARE THE CHALLENGES

Percutaneous treatment of a coronary abnormality

Coronary abnormalities requiring correction

High risk anatomy

- Anomalous connections with preaortic course
- Preaortic courses with intramural segment

Coronary abnormalities requiring a correction

How to treat anomalous connections

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

J Am Coll Cardiol 2008;52:e143-263

Coronary abnormalities requiring a correction

How to treat anomalous connections

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

Ectopic intramural course

Specific treatement with angioplasty

World Journal of Cardiology

Online Submissions: http://www.wjgnet.com/1949-8462office
wjc@wjgnet.com
doi:10.4330/wjc.v3.i2.54

World J Cardiol 2011 February 26; 3(2): 54-56
ISSN 1949-8462 (online)

CASE REPORT

Right coronary artery from the left sinus of valsalva: Multislice CT and transradial PCI

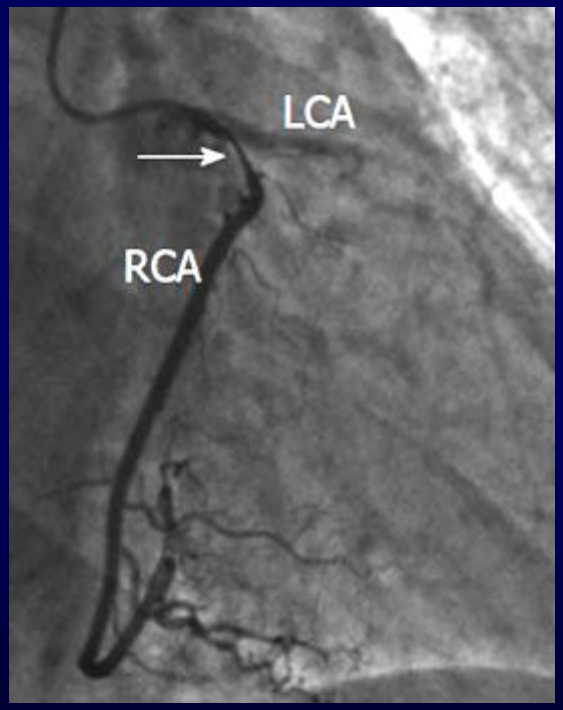
Rodrigo Bagur, Onil Gleeton, Yoann Bataille, Sylvie Bilodeau, Josep Rodés-Cabau, Olivier F Bertrand

Ectopic intramural course

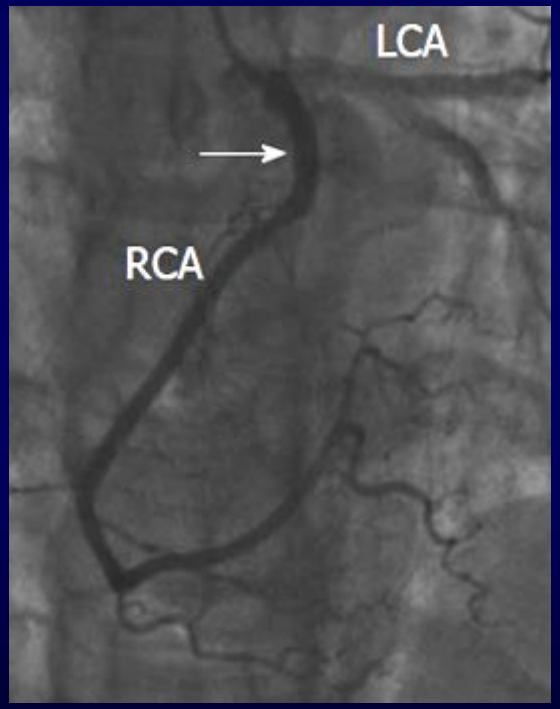
Specific treatement with angioplastie

Case report

42 year old-woman - angina - isotopic inferior ischemia - no atheroma

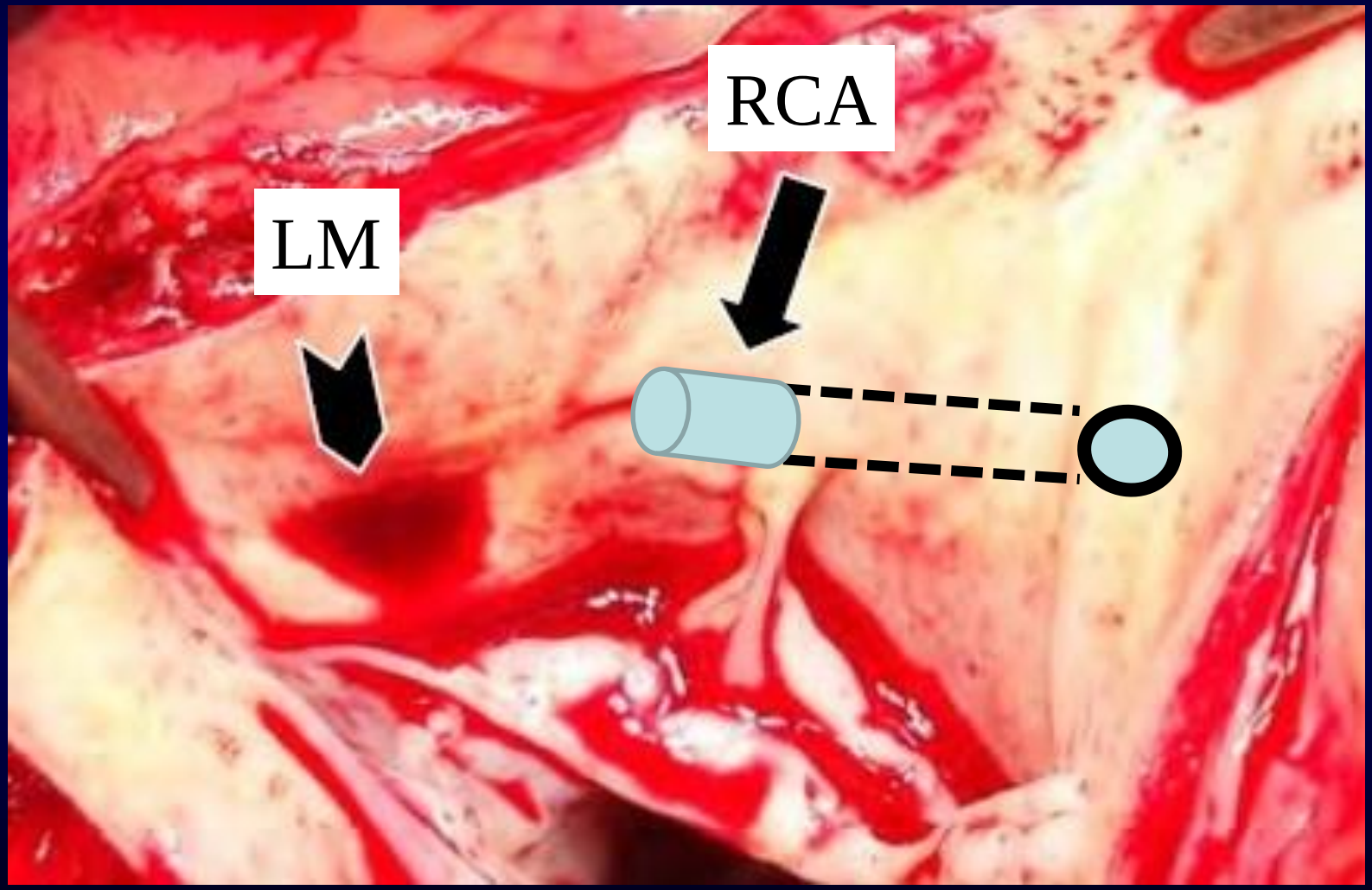


Ectopic RCA
Amplatz Left 2.0
BMS
3.5 x 16 mm



Ectopic connection of RCA

Specific treatement with angioplasty



Ectopic course with intramural course

Interventional correction

Efficacy and safety of percutaneous traitement with stenting remain to be demonstrated

PCI of coronary anomalies

What are the challenges ?
What are the secrets of success ?

- Knowledge of cardiac anatomy
- Liberal use of cardiac computed tomography
- Large choice of guiding catheters
- Techniques to improve back-up support
- Help from a more experienced colleague
- And patience …

PCI of coronary anomalies

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PCI of coronary anomalies

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- Large choice of guiding catheters
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PCI of coronary anomalies

Acknowledgements to ANOCOR Group
French interventional cardiologists (n=73)

ANOCOR study

- Ongoing observational prospective study
- Cohort of 460 adults with no structural heart disease
- Proximal anomalous connections of coronary arteries
- Enrollment closed on 31 january 2013
- Primary end-point : type of specific treatment after the discovery of the coronary abnormality (no treatment, medical treatment, PCI, or surgery)
- Follow-up at 1, 3 and 5 years

This study is supported by the

GACI
Groupe Athérome et Cardiologie Interventionnelle
de la Société Française de Cardiologie

www.sfcardio.fr