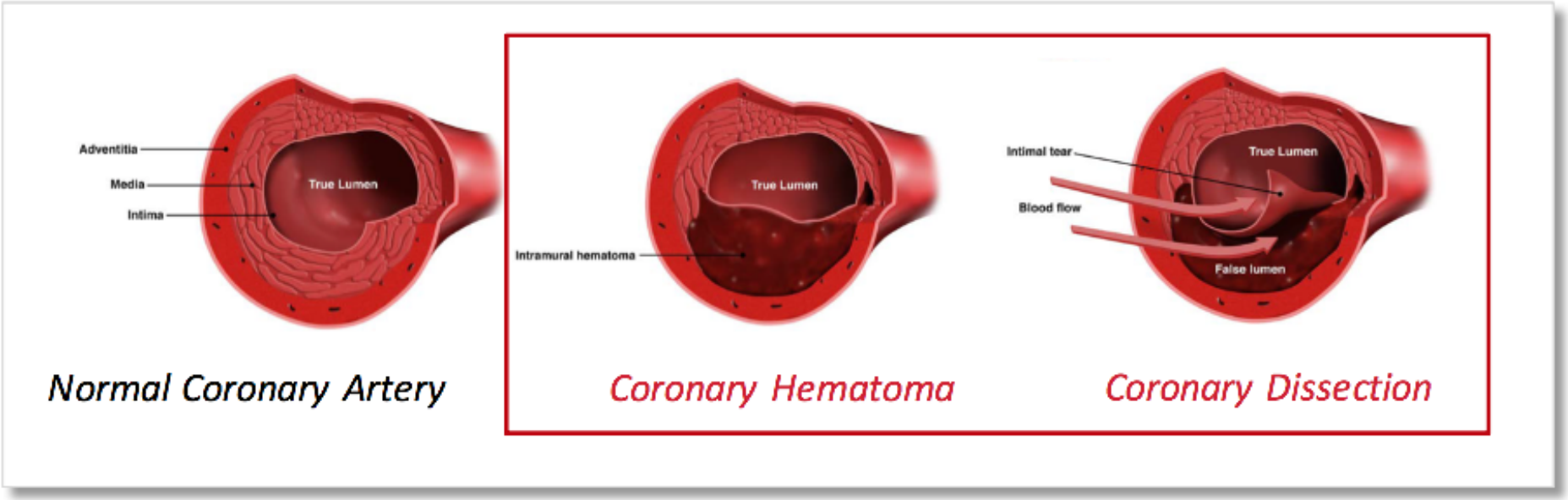
Spontaneous Coronary Artery Dissection
DISCO study

Géraud SOUTEYRAND
On behalf of DISCO study group

Spontaneous coronary dissection

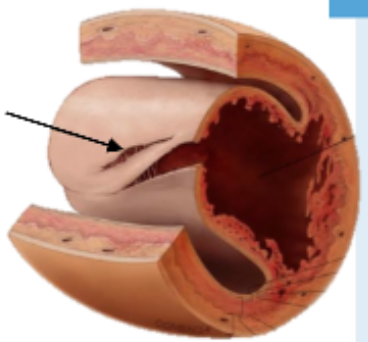
- **25-30 % of Non atheromatous ACS**



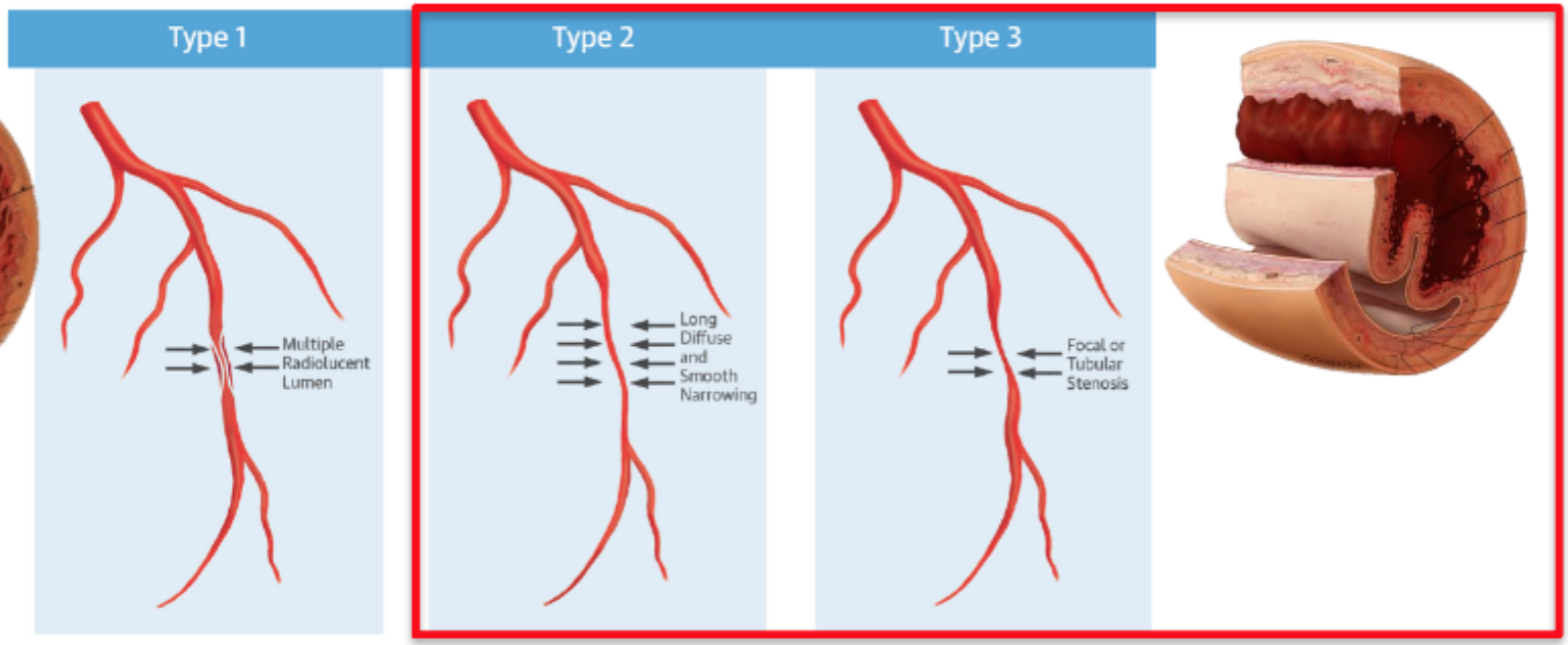
- **Illegitimate ACS** : young women without CV Risk Factor
- **Difficult and Underestimated Diagnosis**
- **Severe prognosis, Challenging Management**
- **Pathophysiology poorly known**

Spontaneous coronary dissection

- **Difficult and Underestimated Diagnosis**
  - **Atypical patient profile** : Women < 60 years , No risk factor
  - **Atypical angiographic signs**



Intimal rupture



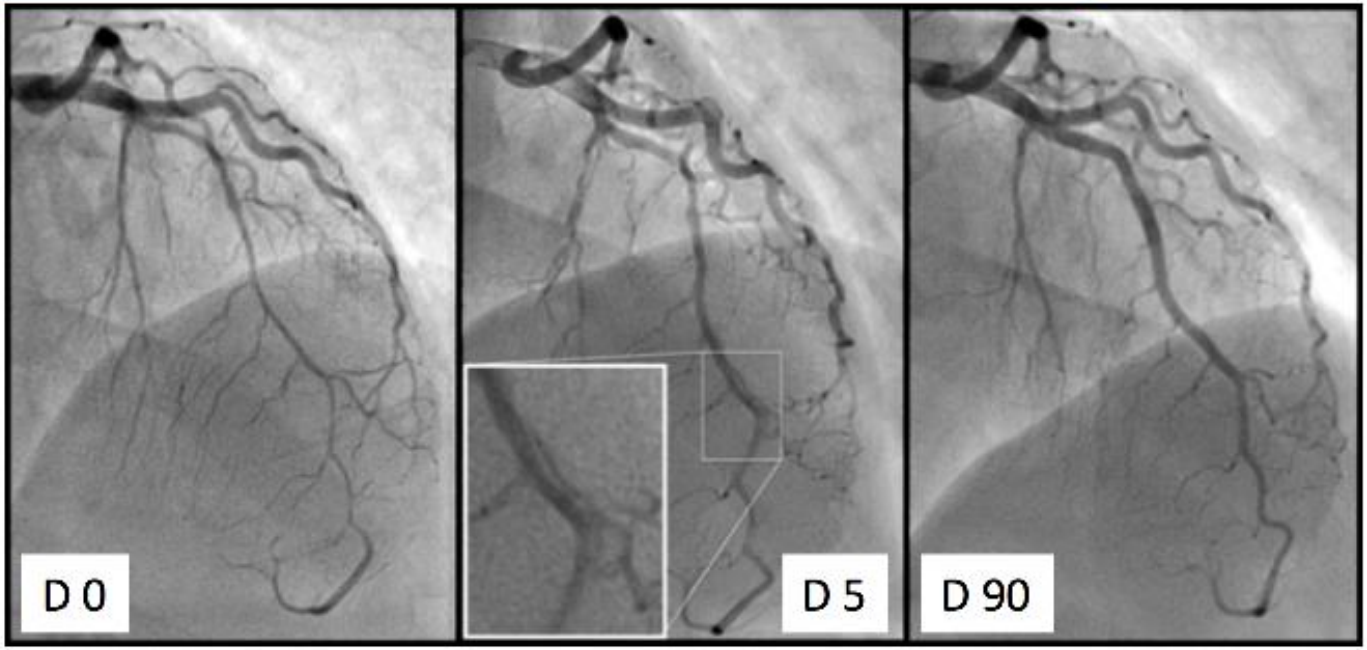
Saw J., J Am Coll Cardiol 2017
Vijayaraghavan R , Circulation 2014

Spontaneous coronary dissection

- **Severe Prognosis, Challenging Management**
  - Sudden death, Acute Myocardial Infarction
  - High Mortality, Challenging Revascularization
- **Conservative treatment is often the best option**

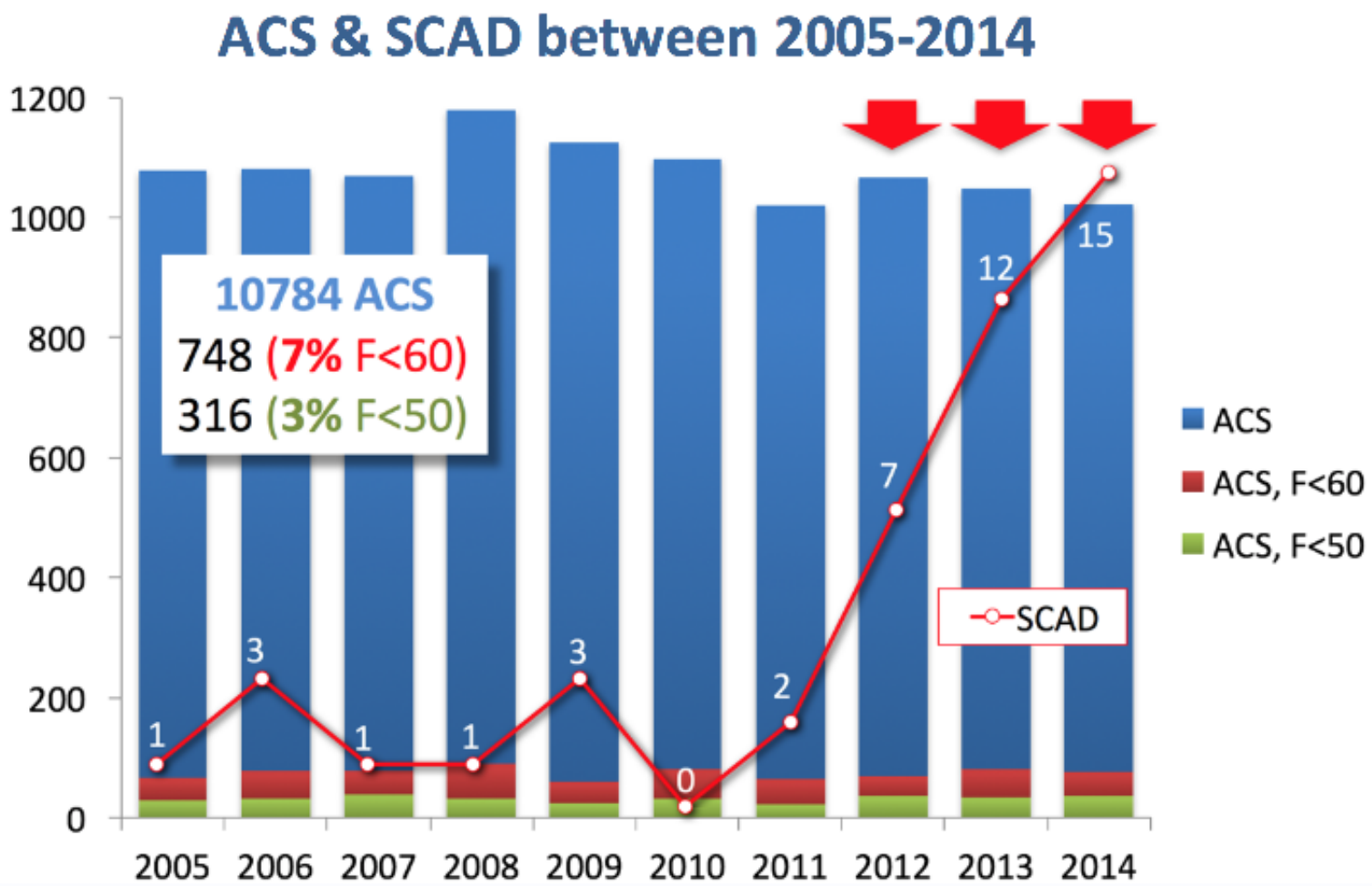
Miss J,

42 years old, NSTEMI
3 months later
Asymptomatic
LVEF=70%



Why DISCO?

Clermont- Ferrand registry



Why DISCO?

Clermont- Ferrand registry

Prevalence of SCAD

Woman <60 years-old
«illegitimate ACS»

Angiography for STEMI or NSTEMI **1%**

↓

Female **3,5%**

↓

Under age 60 **11%**

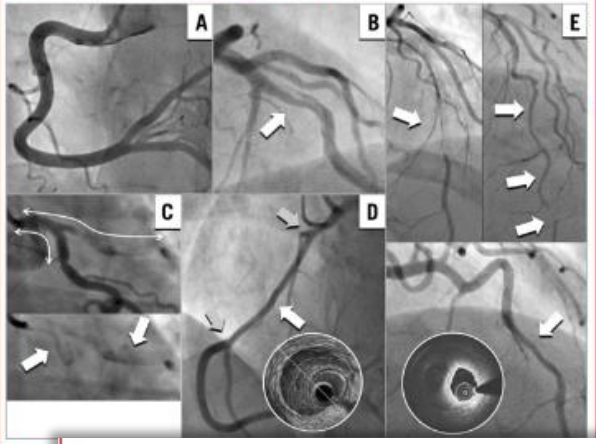
↓

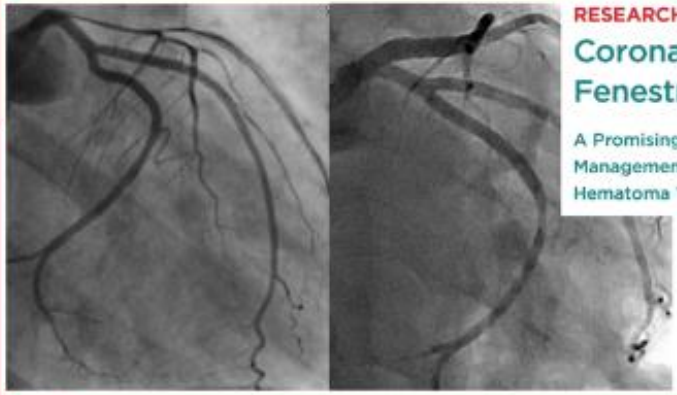
Under age 60 & CVRF ≤ 2 **≈ 30%**

Why DISCO?

French Expertise

How and when to suspect spontaneous coronary artery dissection: novel insights from a single-centre series on prevalence and angiographic appearance





RESEARCH CORRESPONDENCE

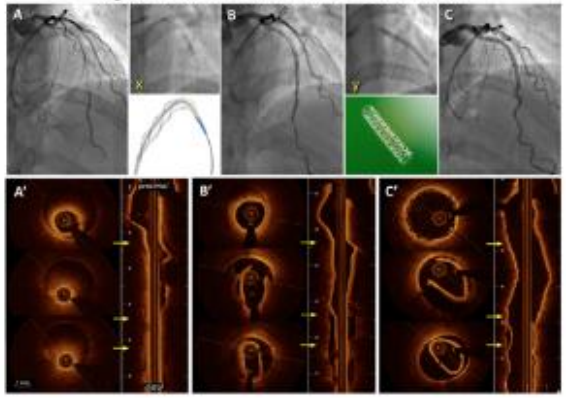
Coronary Artery Fenestration

A Promising Technique for Rescue Management of Spontaneous Intramural Hematoma With Luminal Compression

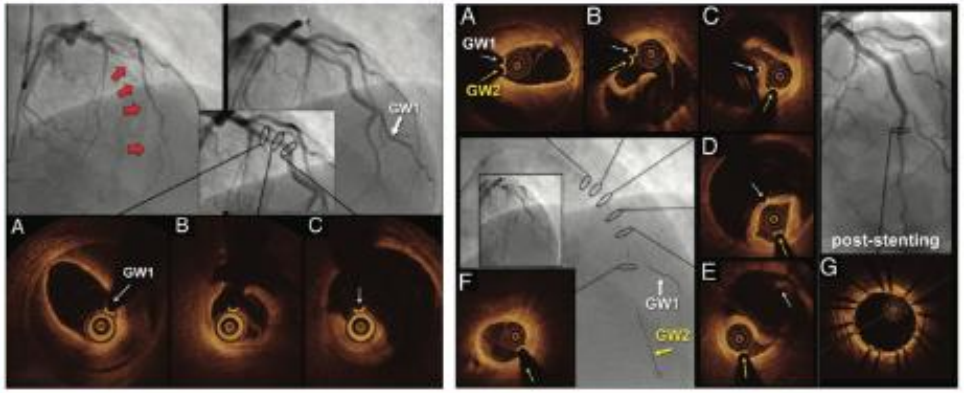
European Society of Cardiology, acute cardiovascular care association, SCAD study group: a position paper on spontaneous coronary artery dissection

Coronary Artery Fenestration Guided by Optical Coherence Tomograhy Before Stenting

New Interventional Option in Rescue Management of Compressive Spontaneous Intramural Hematoma



Contribution of guidance by optical coherence tomography (OCT) in rescue management of spontaneous coronary artery dissection



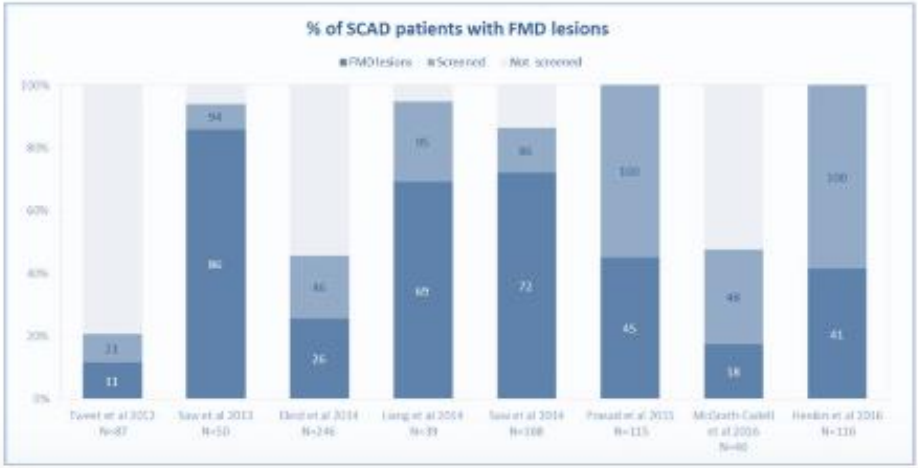
Fibro Muscular Dysplasia & SCAD

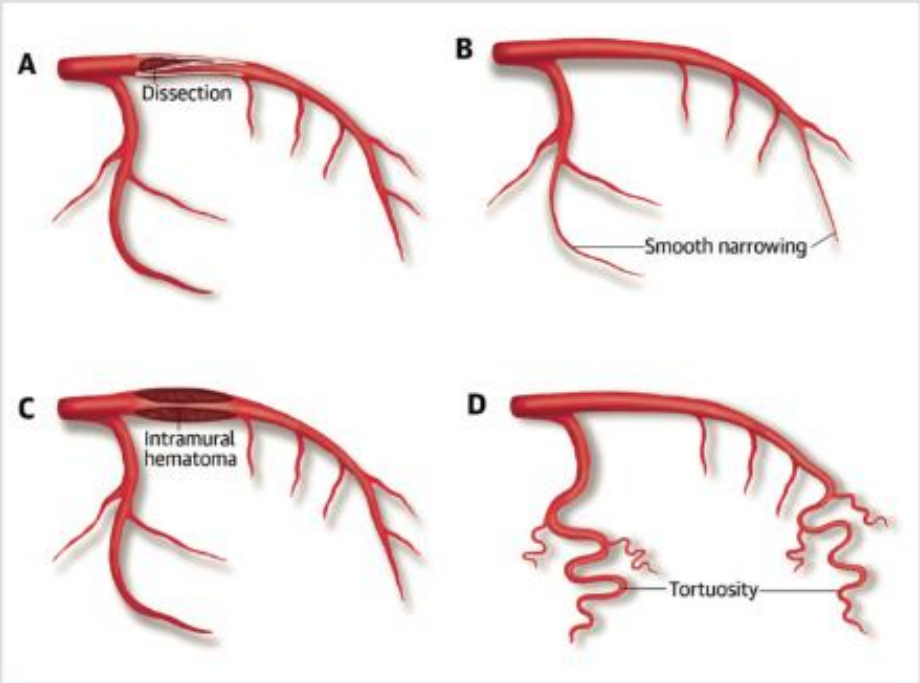
Coronary Artery Manifestations of Fibromuscular Dysplasia

Michelis KC, J Am Coll Cardiol 2014

- **Link FMD-SCAD unknown before 2005**
- **Same profiles : Women 95%, 50 years-old**

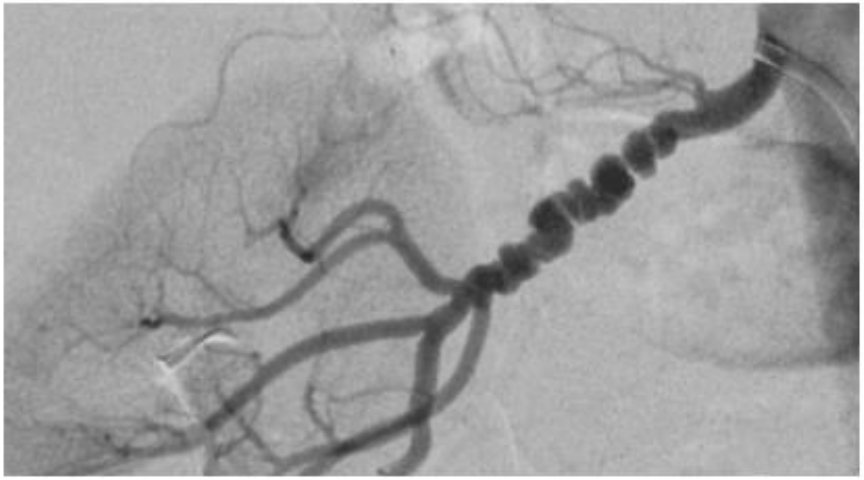
Recents studies : 50-86% FMD





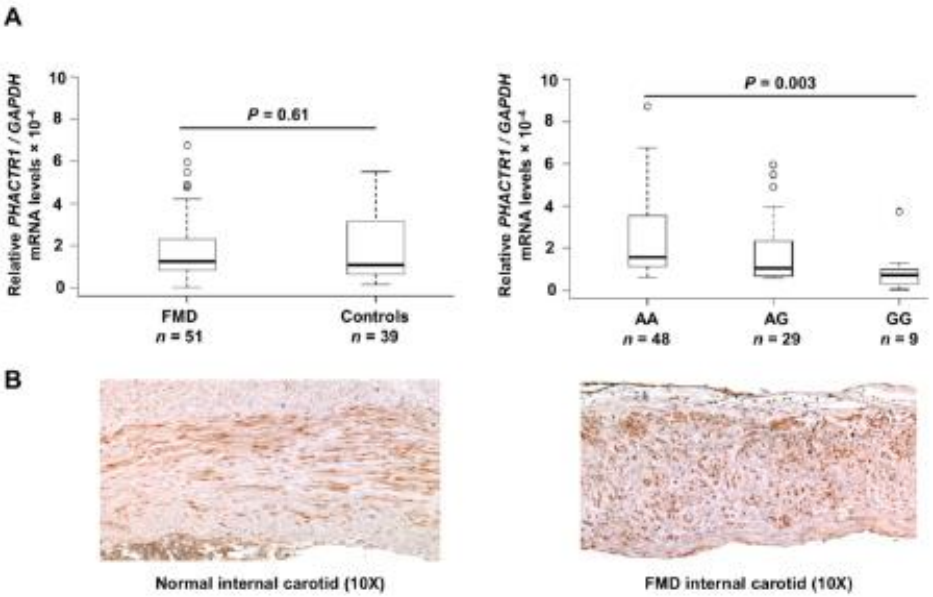
CENTRAL ILLUSTRATION Angiographic Features of Fibromuscular Dysplasia Involving the Coronary Arteries

Fibro Muscular Dysplasia & SCAD



RESEARCH ARTICLE

PHACTR1 Is a Genetic Susceptibility Locus for Fibromuscular Dysplasia Supporting Its Complex Genetic Pattern of Inheritance



1100 pts vs 3800 control

rs9349379 mutation = **+ 39 % risk FMD**

Kiando SR, Jeunemaitre X, Bouatia-Naji N, PLOS Genetics 2016

DISCO study

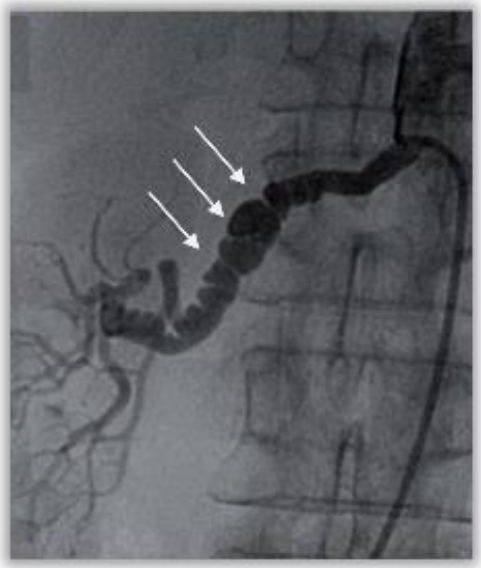
61 French Centers - 424 inclusions

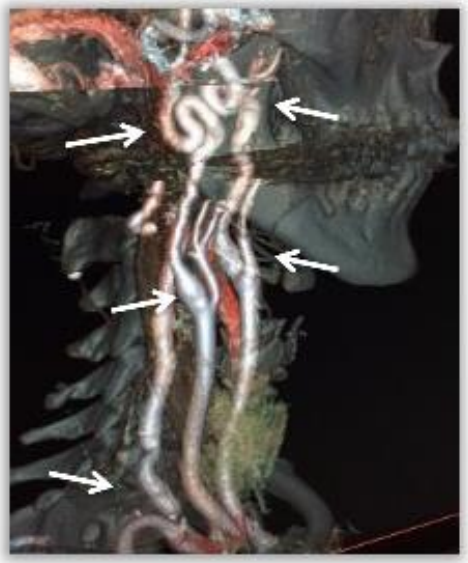
373 SCAD (Corelab validation)

Characteristics of population, Angiographic Analysis

Genetic analysis

Phenotypic imaging analysis (≈50% DFM)





DISCO study

Characteristics of the population (n=373)		
Age (mean, years)	51.5 +/-10.3	
Women	338	90.6 %
Patients < 60y	286	76.7 %
Women < 60y	253	67.8 %
Obesity	59	16.3 %
Hypertension	119	31.9 %
Dyslipidemia	61	2.0 %
Diabetes	13	3.5 %
Active Smoking	93	25.1 %
Family History	71	19.2 %
Number of CVRF	1.1 +/-1.0	
≤ 2 CVRF	334	90.0 %

« illegitimate » Acute Coronary Syndrome in young woman without CardioVascular risk factor

DISCO study

Clinical Presentation (n=373)		
STEMI	167	45.0 %
NSTEMI	190	51.2 %
Stable Angina	1	0.3 %
Troponine Release	253	95.4 %
Typical Chest Pain	336	90.8 %
Cardiac Arrest	21	5.7 %
Cardiogenic Shock	7	2.0 %

Typical presentation of ACS in atypical patient

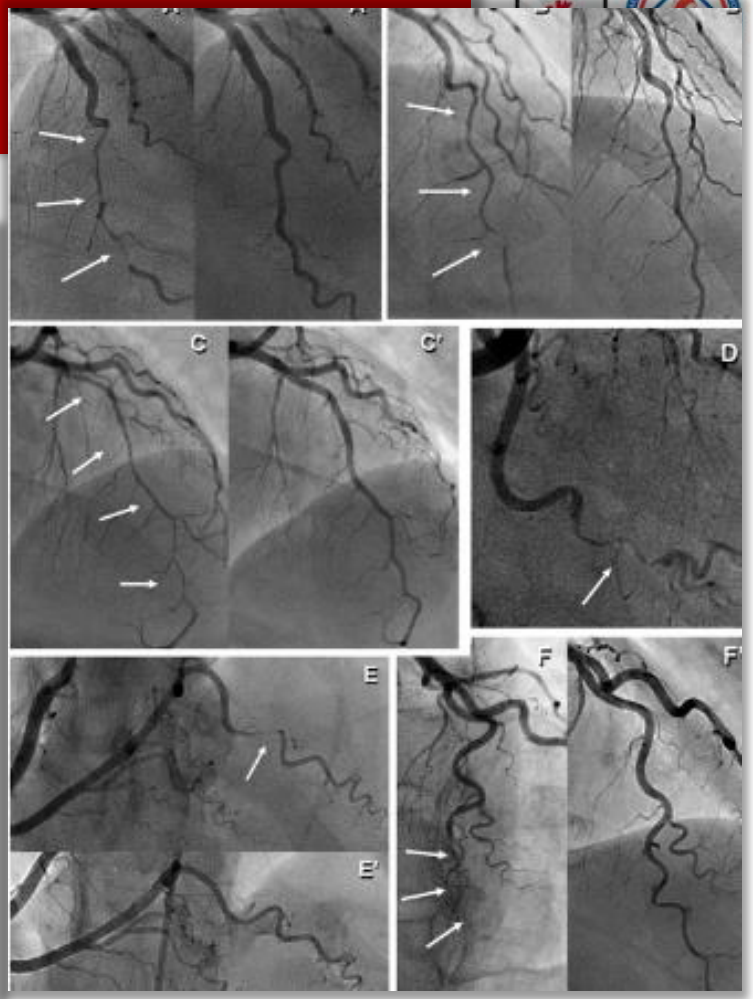
DISCO study

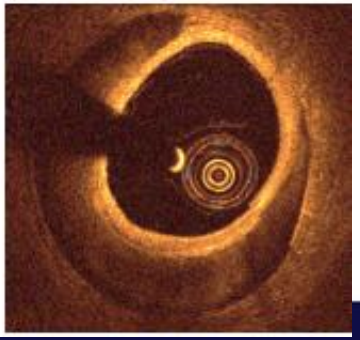
Risk Factor and Potential Triggers (n=373)		
Systemic Inflammatory Disease	5	1.4 %
Peripartum Period	15	4.4 %
Parity (W)	2	
Oral Contraception (W)	59	18.4 %
Menopausal (W)	165	51.2 %
Hormonal Substitution (W)	26	8.1 %
Consumer of Drugs	10	2.7 %
Emotion	170	46.0 %
Exercise	46	12.4 %

Emotion or Exercise may trigger a SCAD

DISCO study

Angiographic Analysis (n=369)			
SCAD conformed		369	100.0 %
Mono Vessel SCAD		346	93.8 %
Multi Vessel SCAD		23	6.2 %
Vessel Involved	LAD	59	58.5 %
	Circumflex	165	31.4 %
	RCA	26	16.8 %
	Left Main	10	2.2 %
TIMI Flow	0	77	20.9 %
	1	26	7.0 %
	2	50	13.6 %
	3	216	58.5 %
SCAD form	Intimal Flap	51	13.8 %
	Hematoma	310	84.0 %
	Mixed	8	2.2 %





DISCO study

Therapeutic Options and Prognosis (n=373)			
Acute Management	Conservative	314	84.2 %
	PCI	58	15.5 %
	Surgery	1	0.3 %
Final Management	Conservative	294	78.8 %
	PCI	78	20.9 %
	Surgery	1	0.3 %
Endocoronary Imaging		67	18.0 %
Medical Treatment	Aspirine	352	94.4 %
	B-Blockers	315	84.5 %
Hospital Mortality		0	0.0 %
1 year Follow-up	Mortality	0	0.0 %
	Asymptomatic	199	84.0 %
	Free MACE	219	92.4 %
	Recurrence	6	2.5 %
	LVEF (%)	59.7	+/- 7.2

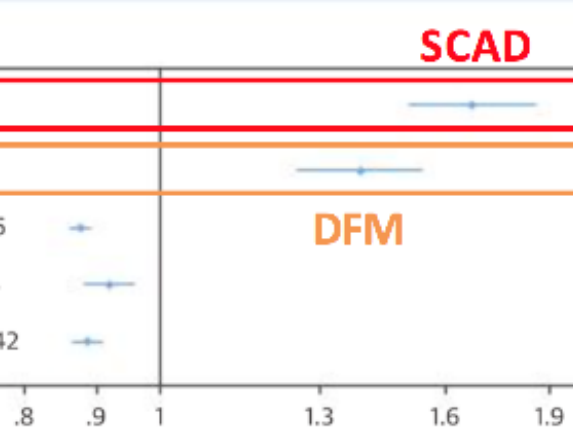
Excellent prognosis

DISCO study

Association of the *PHACTR1/EDN1* Genetic Locus With Spontaneous Coronary Artery Dissection

FIGURE 2 Associations Between rs9349379 and SCAD Were Compared With the Associations Previously Reported Between FMD and CAD/AMI Globally and Those Stratified by Sex

Disease	Case/Control	OR (95% CI)	EAF	P Value	Study
SCAD	1,055/7,190	1.67 (1.50-1.86)	0.63	6.76×10^{-21}	Current Study
FMD	1,154/3,895	1.39 (1.25-1.54)	0.63	7.40×10^{-10}	Kiando et al. 2016
MI	43,171/127,176	0.88 (0.86-0.89)	0.59	1.81×10^{-42}	Nikpay et al. 2015
Women CAD	9,105/30,428	0.92 (0.88-0.96)	0.57	6.09×10^{-5}	Nikpay et al. 2015
Men CAD	30,428/36,042	0.89 (0.86-0.91)	0.56	1.83×10^{-19}	Nikpay et al. 2015



+ 67 %

+ 39 %

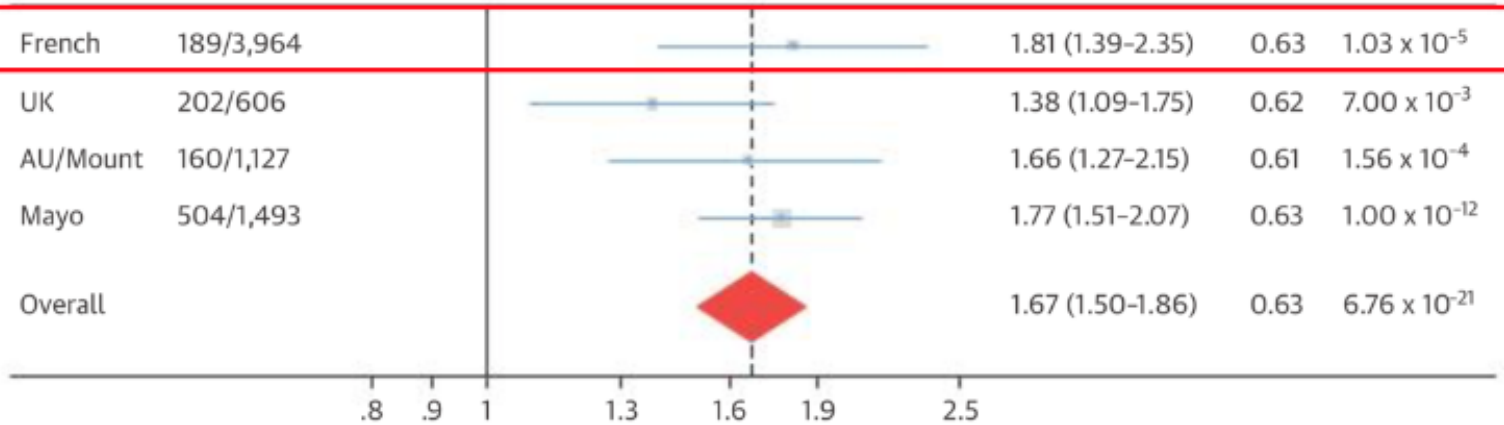
Adlam D, J Am Coll Cardiol 2019

DISCO study

Association of the *PHACTR1/EDN1* Genetic Locus With Spontaneous Coronary Artery Dissection

FIGURE 1 Forest Plot Shows Associations in Individual Studies and the Global Genetic Association Between rs9349379 and SCAD

Study	Case/Control	OR (95% CI)	EAF	p Value
French	189/3,964	1.81 (1.39–2.35)	0.63	1.03×10^{-5}
UK	202/606	1.38 (1.09–1.75)	0.62	7.00×10^{-3}
AU/Mount	160/1,127	1.66 (1.27–2.15)	0.61	1.56×10^{-4}
Mayo	504/1,493	1.77 (1.51–2.07)	0.63	1.00×10^{-12}
Overall		1.67 (1.50–1.86)	0.63	6.76×10^{-21}



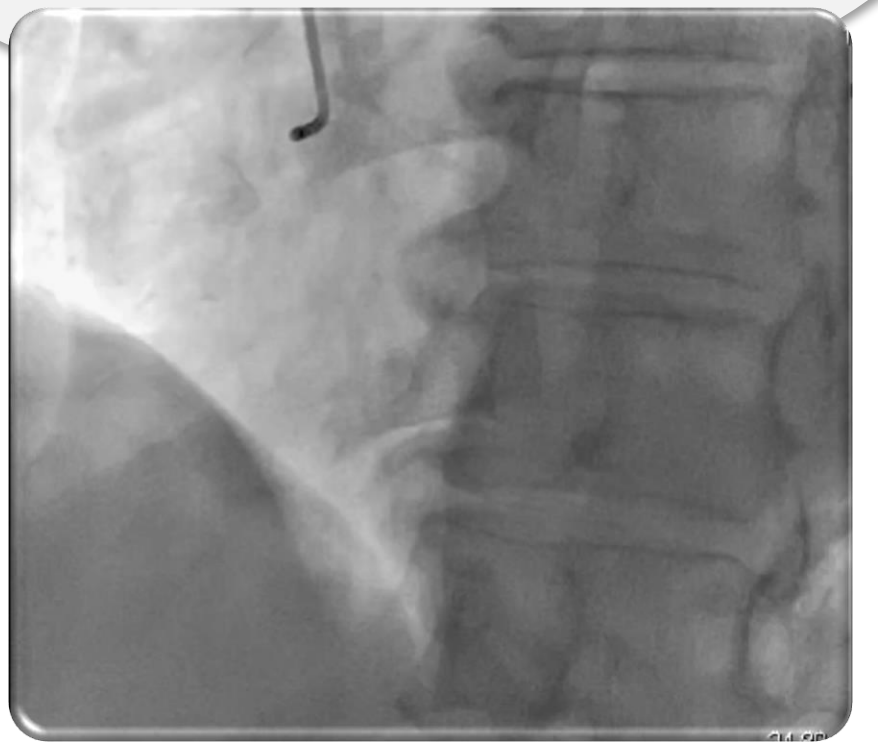
+ 81 %

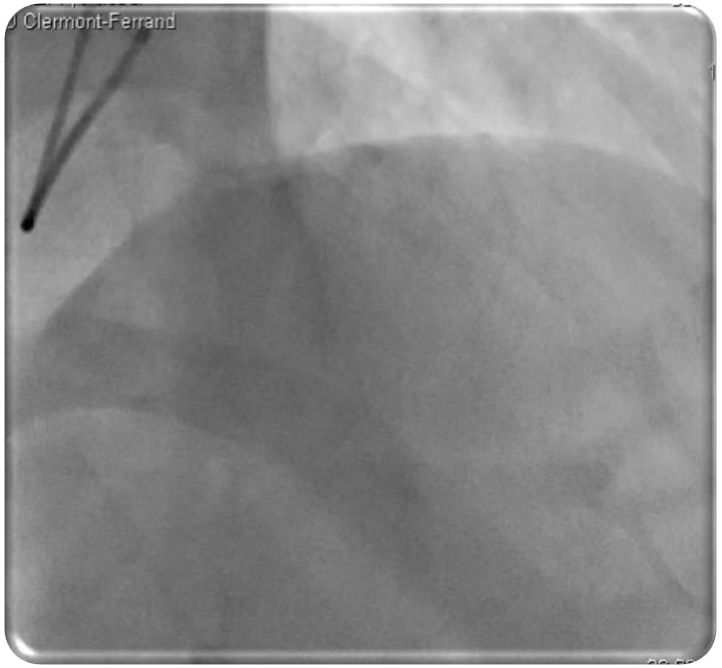
Adlam D, J Am Coll Cardiol 2019

DISCO study

Angiographic example

Ms 60 years old
High blood pressure
Stroke in 2016
10/2017 : ACS with troponine +
LV : EF 65%





Exams are reassuring

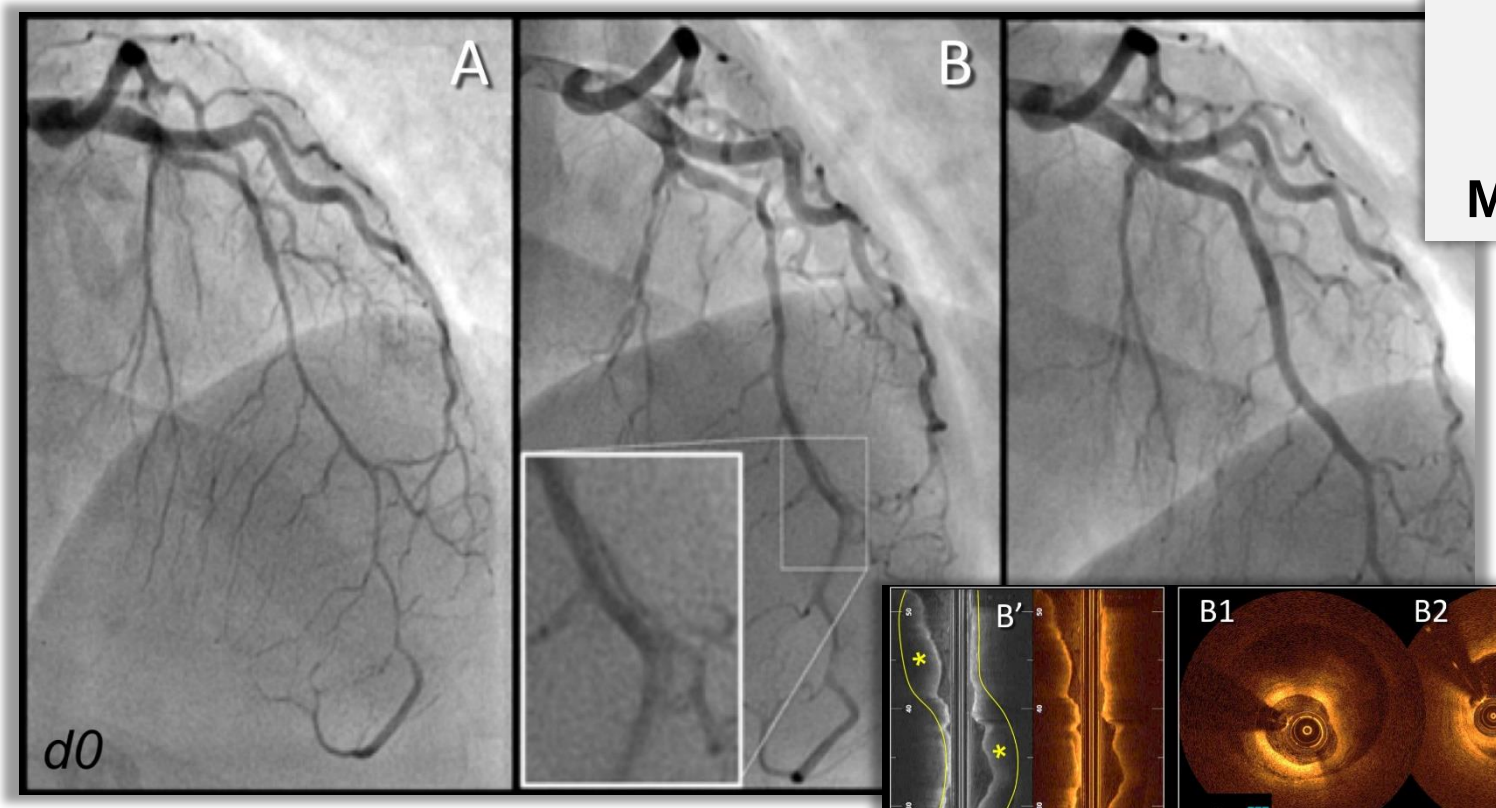
Go Back home!

DISCO study

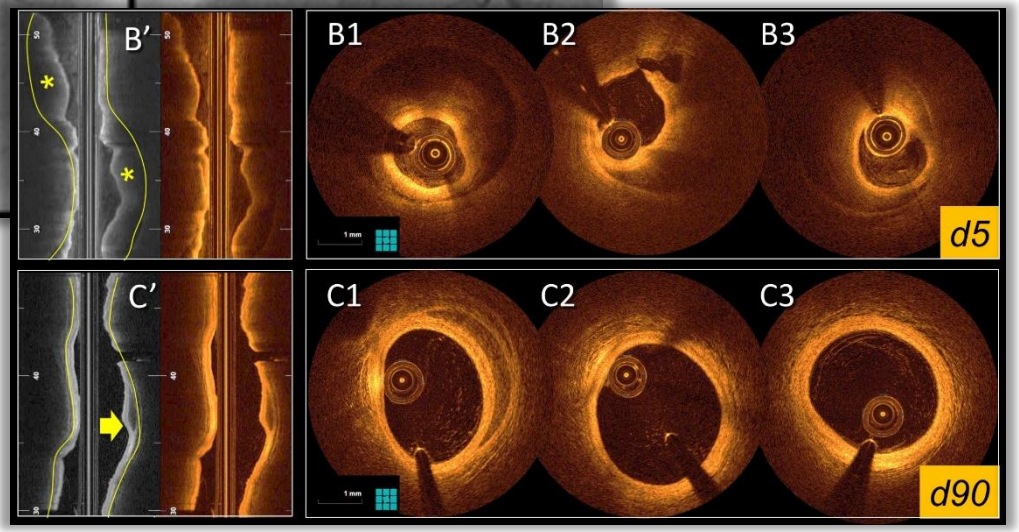
Angiographic example

DISCO study

Angiographic example



woman
42 years old
ACS
Medical therapy

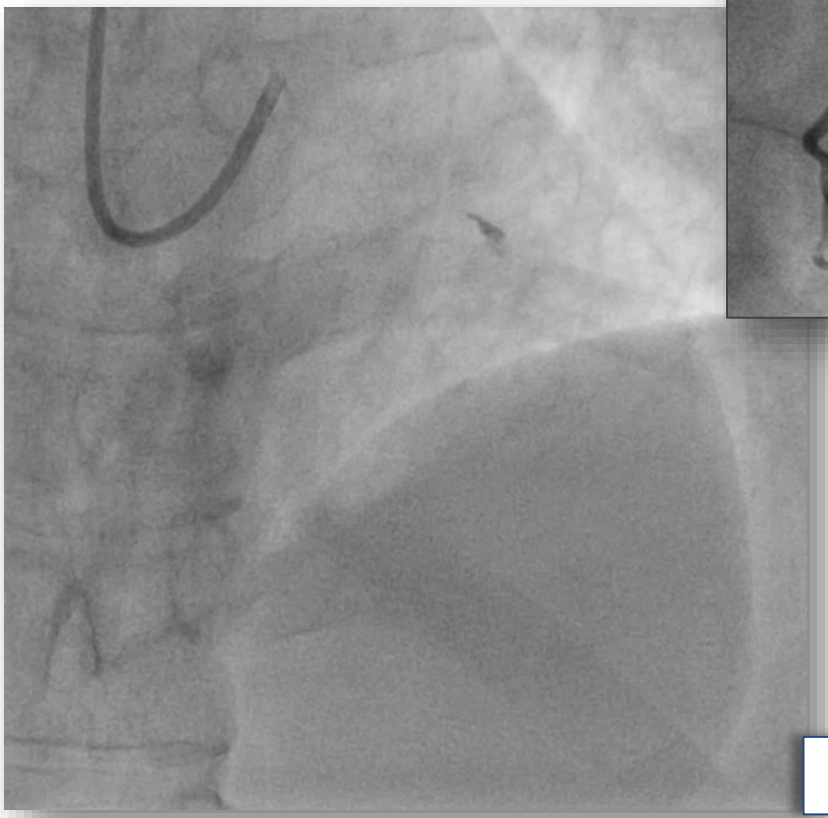


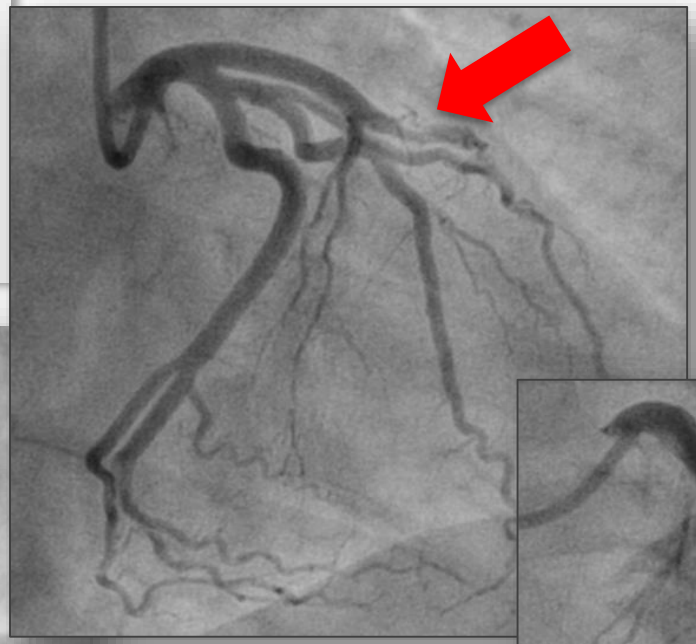
DISCO study

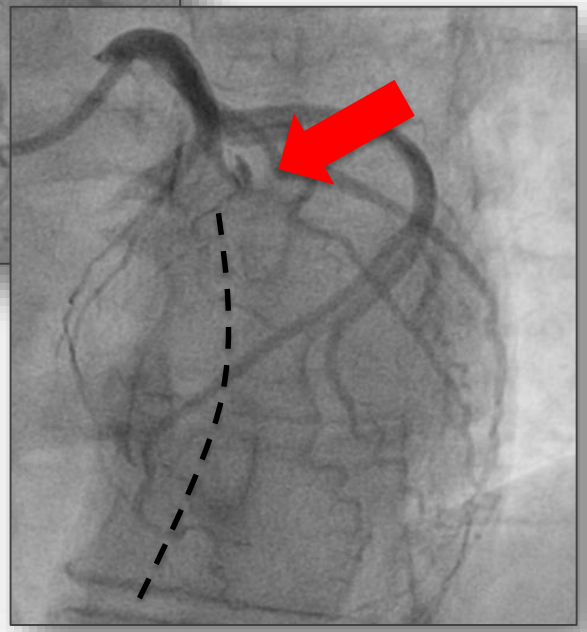
Ms B. 42 years

no CVR
ACS ST+ antérior, Killip 4

Angioplasty H3





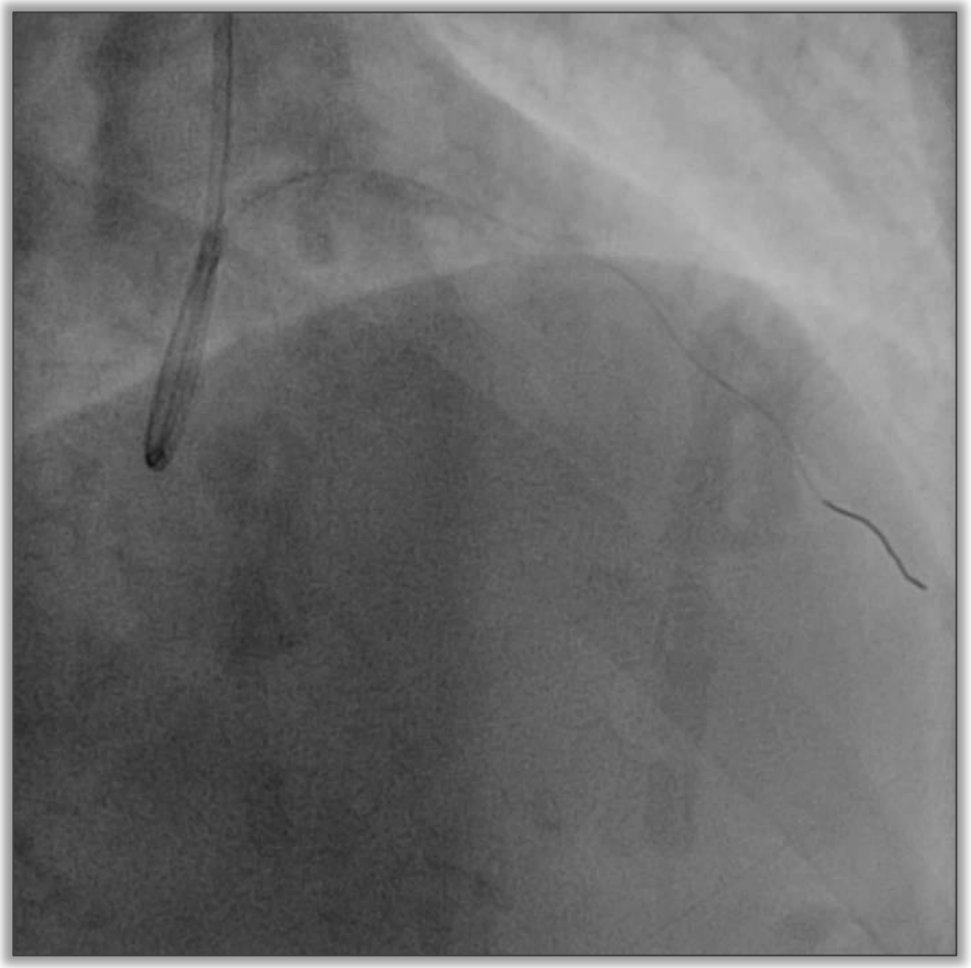


Combaret N, Eur Heart J Card Imaging 2013

DISCO study

Difficult crossing ++
(>30mn) with wire (GW1)

Possible diagnosis of SCAD
Direct stenting LAD ?
(3.5 x 20mm)



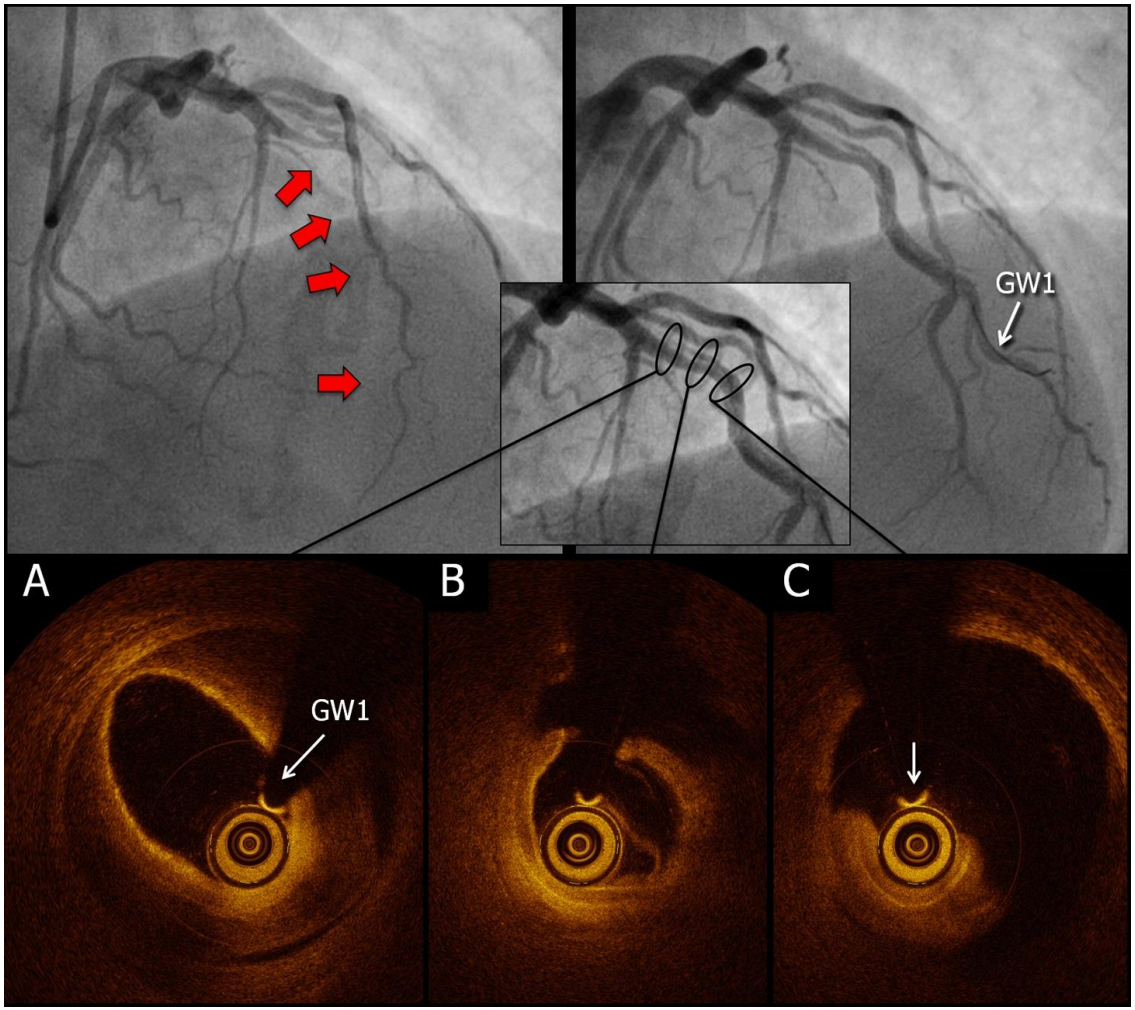
Combaret N, Eur Heart J Card Imaging 2013

DISCO study

OCT on GW1

Wire in the false lumen!

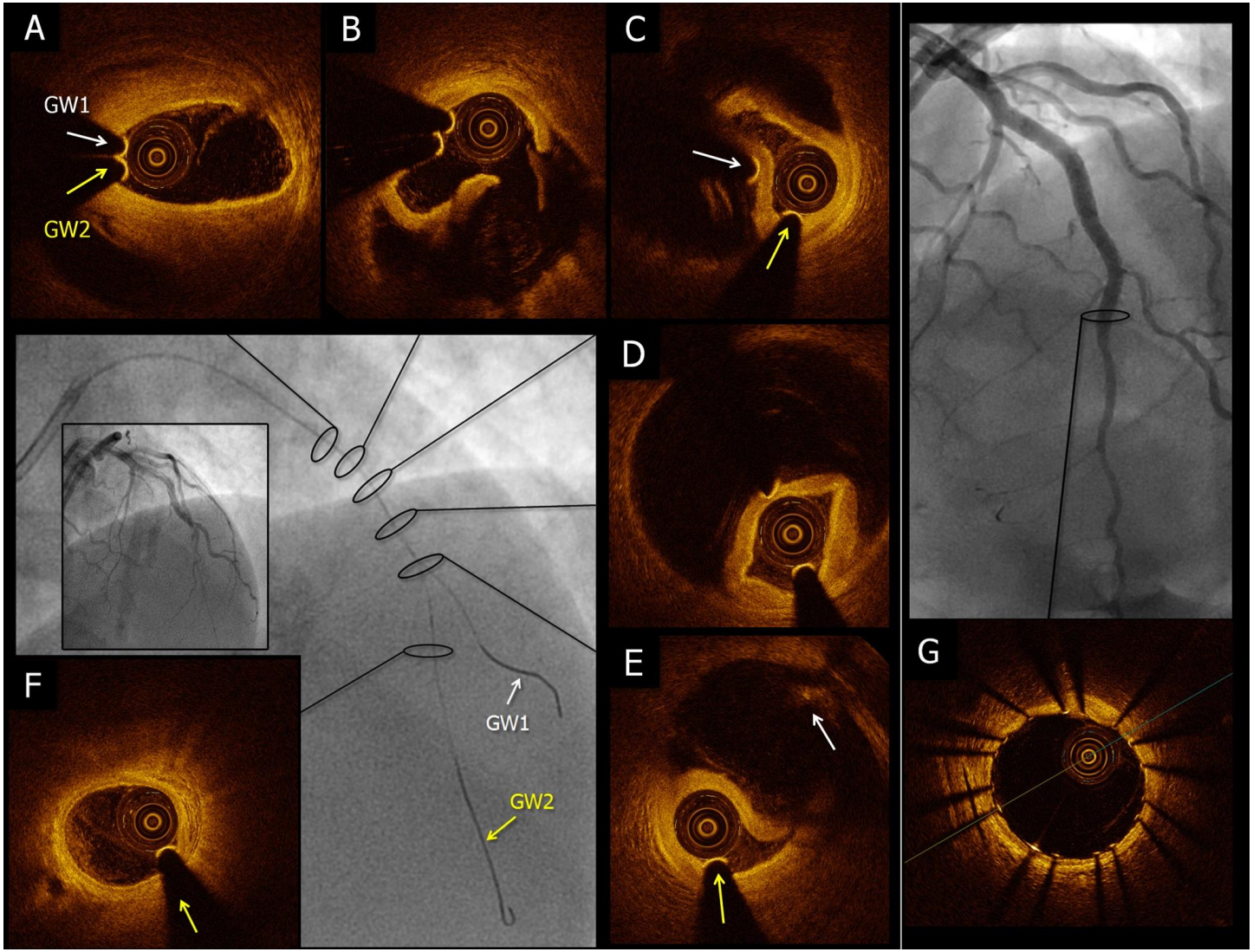
Al-Daraji, Histopathology 2005



DISCO study

Stenting on GW2 guided by OCT

Post-stenting Control



CONCLUSIONS

DISCO

CACI

Spontaneous Coronary Artery Dissection

- Non exceptionnal cause of ACS, severe prognosis
- Underestimated prevalence, cases increasing

- **DISCO study confirms :**
  - Profile of patients
  - Good prognosis with conservative management
  - **Association FMD – SCAD**

- **DISCO have saved Lives**

Acknowledgments

Scientific Committee

Hakim Benamer
Sara Bouajila
Nabila Bouatia-Naji
Nicolas Combaret
Xavier Jeunemaitre
Stéphane Manzo-Silberman
Pascal Motreff
Géraud Souteyrand
Christian Spaulding

Clinical Research Assistant

Elodie Chazot

Acknowledgments

Un grand MERCI à ...

Dr Edouard GERBAUD	(CHU Bordeaux)
Pr Gilles RIOUFOL	(CHU Lyon, Louis Pradel)
Dr Brahim HARBAOUI	(CHU Lyon, La Croix Rousse)
Dr Didier BRESSON	(GHR Mulhouse et Sud Alsace)
Pr Nicolas MENEVEAU	(CHU Besançon)
Dr Loïc BELLE	(CH Annecy)
Dr Grégoire RANGE	(CH Chartres)
Pr Guillaume CAYLA	(CHU Nîmes)
Dr Thibault LHERMUSIER	(CHU Toulouse)
Dr Mathieu PANKERT	(CH Avignon)
Dr Stephane MANZO-SILBERMAN	(Hôpital Lariboisière)
Dr Emmanuel BOIFFARD	CHD Vendée)
Dr Emmanuelle FILIPPI	(CH Vannes)
Dr Vincent ROULE	(CHU Caen)
Dr Jean Louis GEORGES	(CH Versailles)
Dr Arnaud FLUTTAZ	(CH Métropole Savoie)
Dr Stéphanie MARLIERE	(CHU Grenoble)
Dr Grégory DUCROCQ	(Hôpital Bichat)
Dr Hakim BENAMER	(Hôpital La Roseraie)
Dr Louis LE BIVIC	(CHU Limoges)
Dr Yann VALY	(CH La Rochelle)
Dr Hakim BENAMER	(Hôpital privé Jacques Cartier)
Dr Emmanuel SALENGRO	(Hôpital Villeneuve St Georges)
Dr René KONING	(Clinique Saint-Hilaire)
Dr Arsène MONNIER	(Polyclinique Courlancy)
Dr Gaetan KARILLON	(Hôpital Simone Veil)
Dr Norbert MAYAUD	(Clinique Convert Bourg en Bresse)
Dr Antoine GERBAY	(CHU St-Etienne)
Dr David HOUPE	(CH Valenciennes)
Dr Fabien DE POLI	(CH Haguenau)
Dr Olivier DUBREUIL	(CH St Joseph St Luc)
Dr Christophe SAINT-ETIENNE	(CHU Tours)
Dr Christophe CAUSSIN	(Institut Mutualiste Montsouris)
Dr Johanne SILVAIN	(Hôpital La Pitié-Salpêtrière)
Dr Amer ZABALAWI	(CH Saint-Brieuc)
Pr Christian SPAULDING	(Hôpital Européen Georges Pompidou)
Dr Laurent BALI	(CH Cannes)
Dr Philippe BRUNEL	(Clinique de Fontaine)
Dr Stanislas CHAMPIN	(CH Valence)
Pr Yves COTTIN	(CHU Dijon)
Pr Martine GILARD	(CHU Brest)
Dr Pierre AUBRY	(CH Gonesse)
Dr Marc BEDOSSA	(CHU Rennes)
Dr Nicolas DELARCHE	(CH Pau)
Dr Patrick DUPOUY	(Hôpital d'Antony)
Pr Olivier VARENNE	(Hôpital Cochin)
Pr Emmanuel TEIGER	(Hôpital Henri Mondor)
Dr Aurélie MANCHUELLE	(Hôpital Privé Bois Bernard)
Dr Mathieu VALLA	(CHR Metz-Thionville)
Dr Philippe COMMEAU	(Polyclinique Les Fleurs)

...et à toutes leurs équipes