

# Douleur thoracique (lors de la remise des prix d'une compétition de VTT) chez un sportif de 36 ans



L Mangin  
6 juin 2012

- Patient de 36 ans sans antécédent
- Violente douleur retrosternale constrictive à irradiation bibrachiale après un effort sportif de compétition de VTT (après la remise des prix)
- PEC à J+3,USIC du Ch d'annecy
- Examen clinique négatif, rythme sinusal spontanément à 35 bpm, PA 106/60 mmHg
- Absence de FRCV à l'interrogatoire, pas de prise d'agent pharmacologique dopant ou de stupéfiant

ID:  
Nom:

Sexe:

cm

Date naiss:

kg

mmHg

Ans

1130 Bradycardie sinusale

1938 Bradycardie extrême

EW = C  
au repos

Médicament:

Symptômes:

Historique:

Fréquence ventriculaire 35 bpm

Intervalle PR 200 ms

durée QRS 100 ms

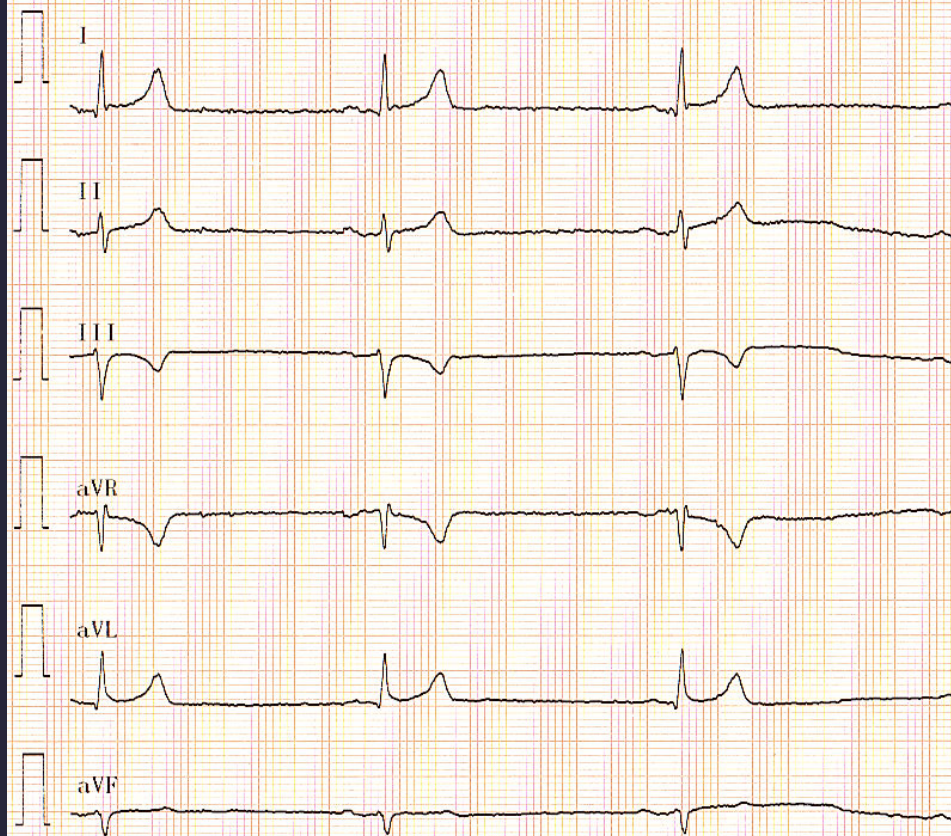
int. QT/QTc 466/370 ms

axe P/QRS/T 41/-25/6 °

ampl RV5/SV1 1.690/0.835 mV

ampl RV5+SV1 2.525 mV

10 mm/mV 25 mm/s Filtre: H50 d 35 Hz

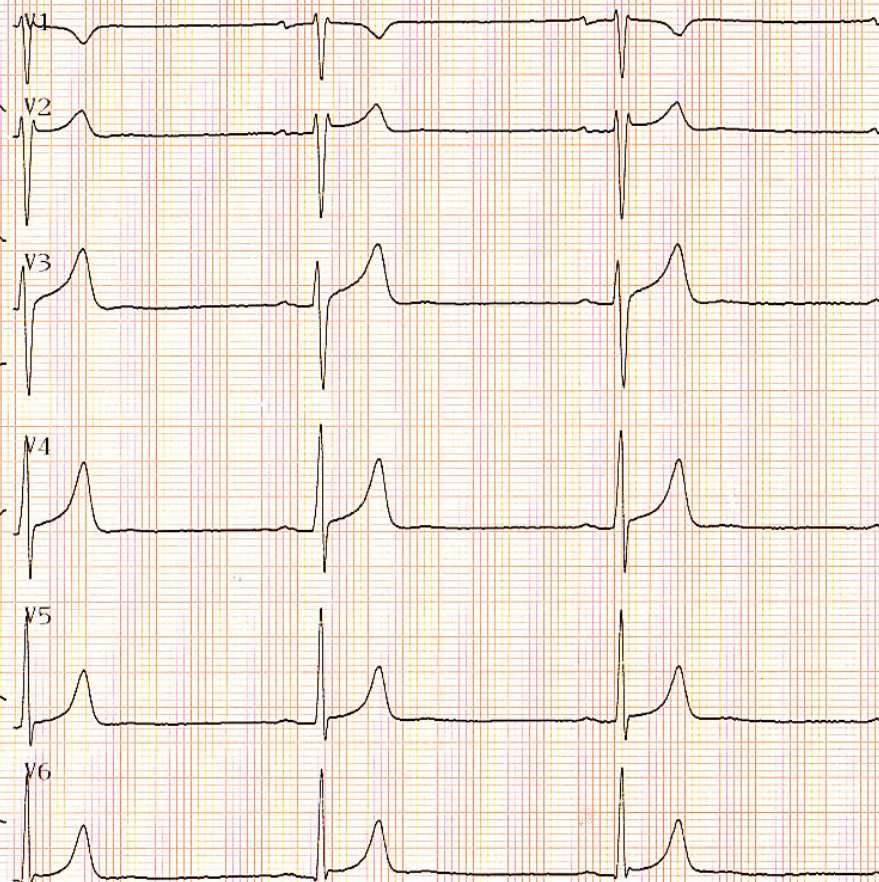


9140 \*\* Rythme ECG anormal\*\*

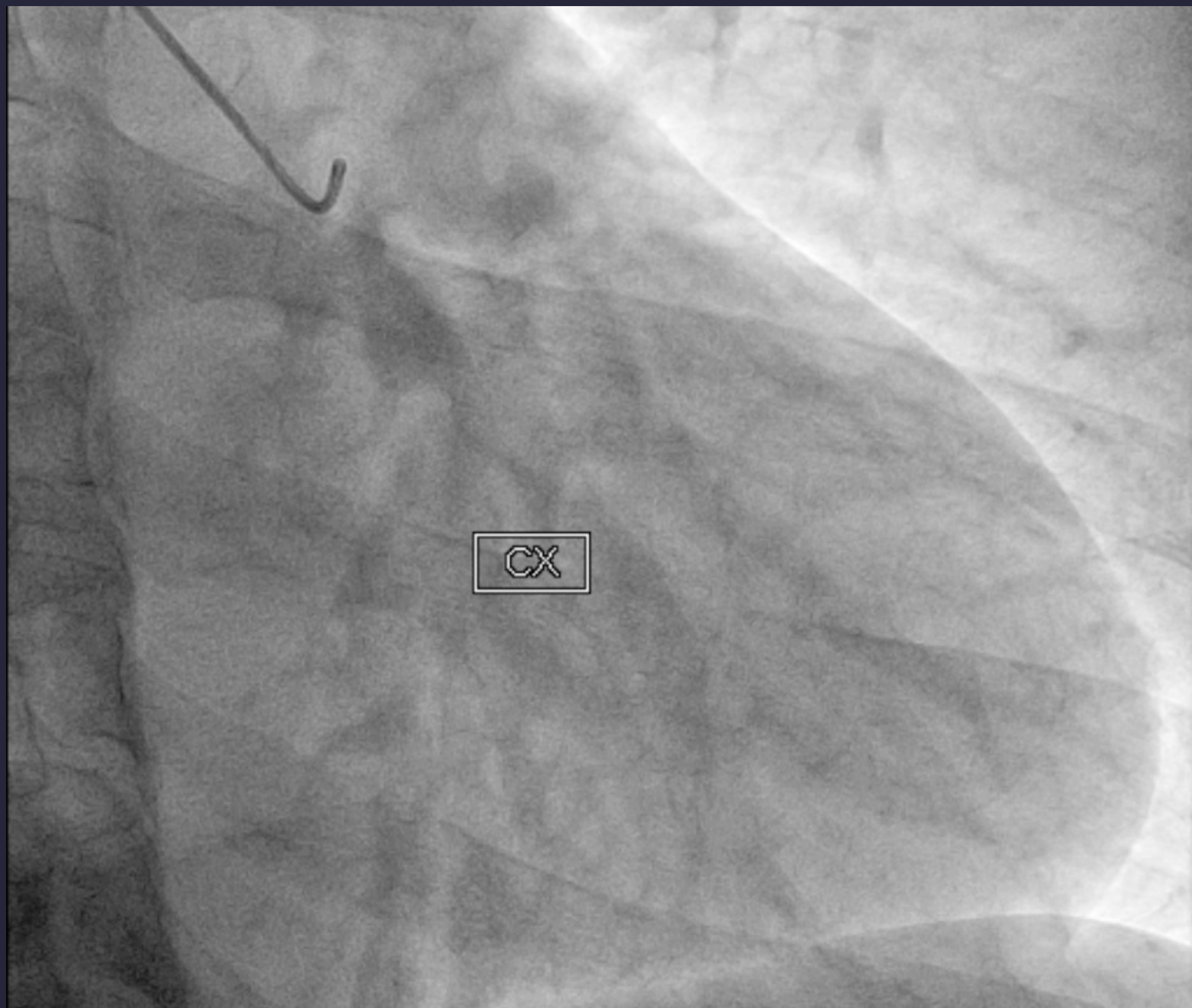
Rapport non confirmé

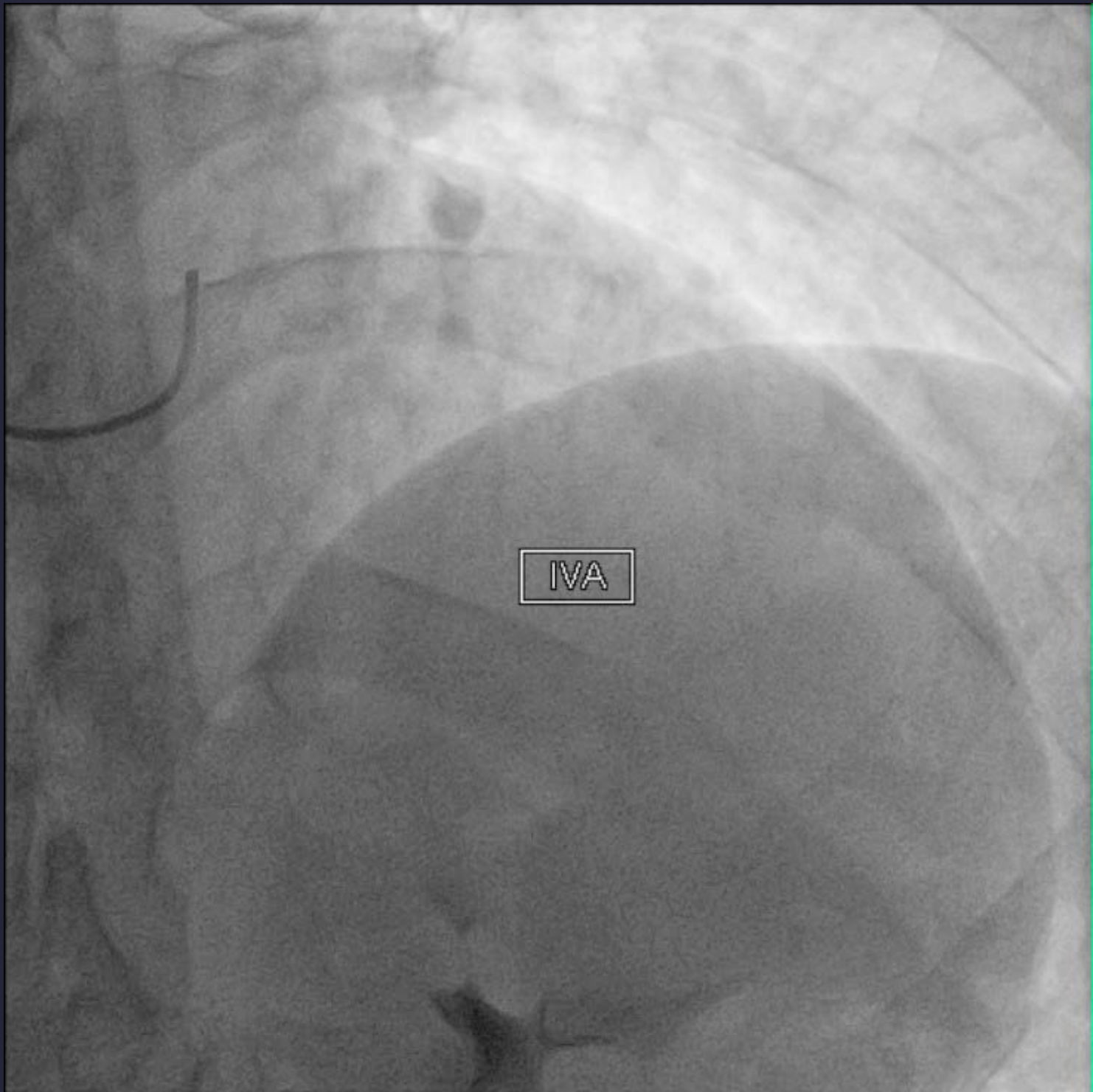
Revu par:

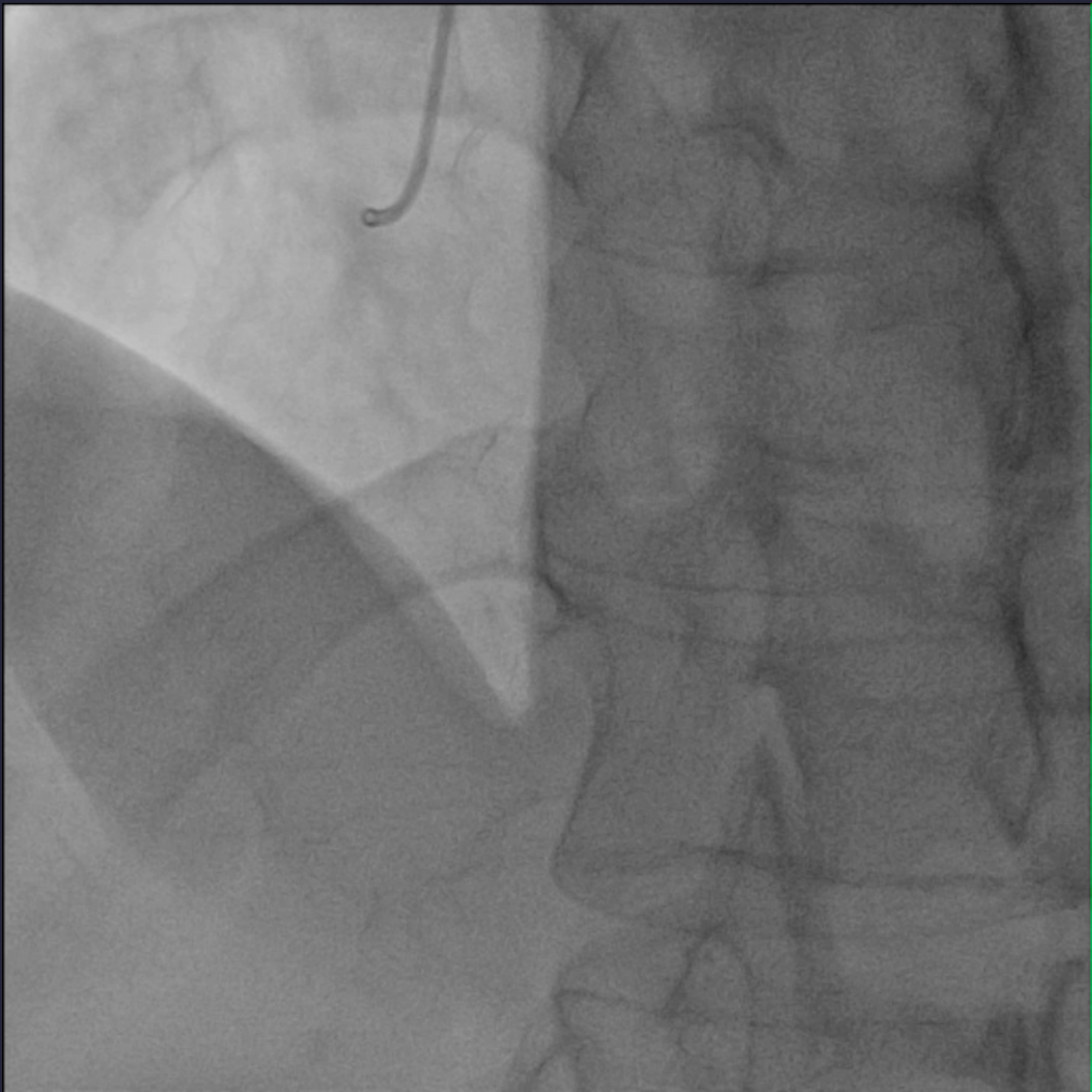
10 mm/mV

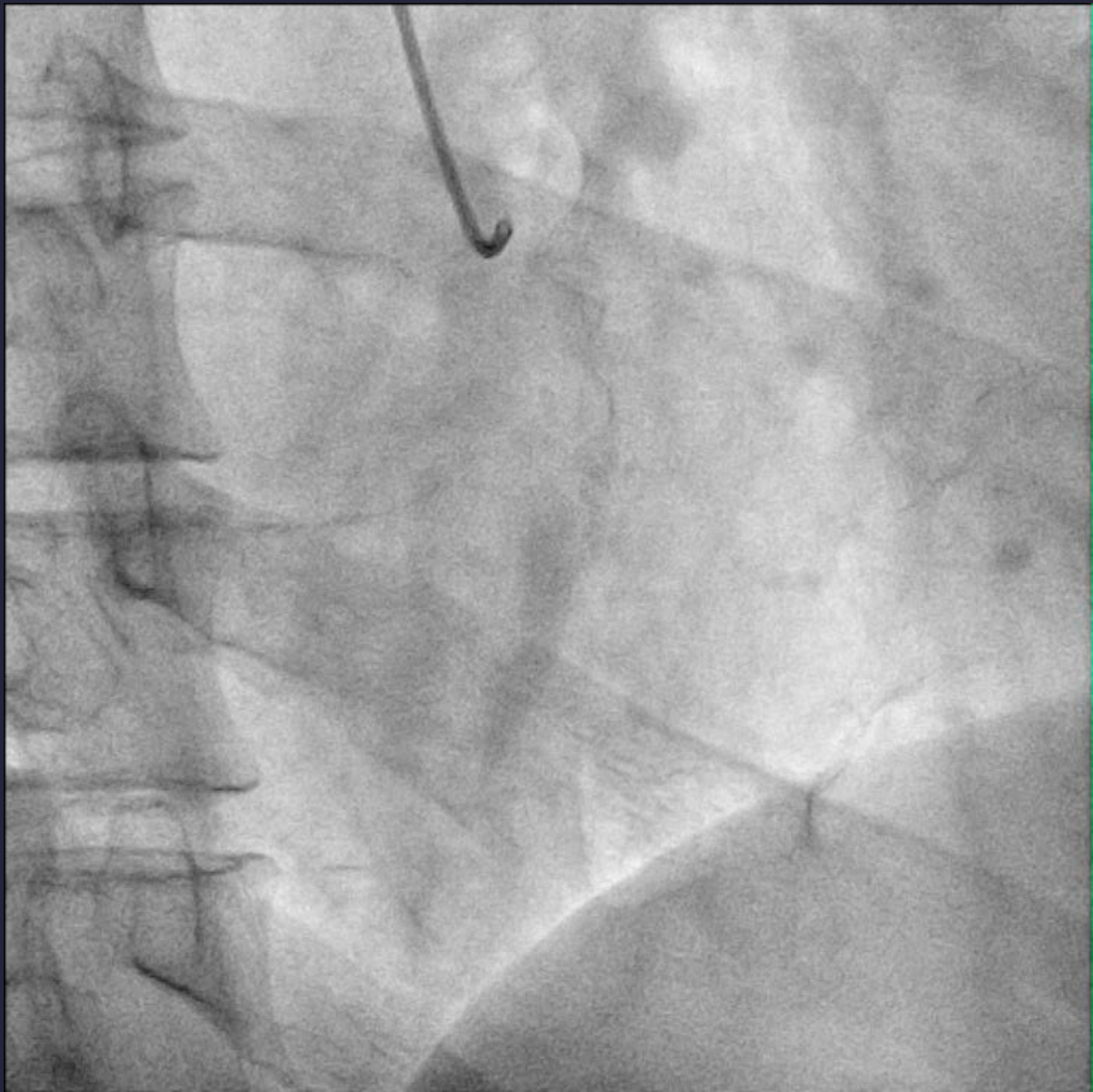


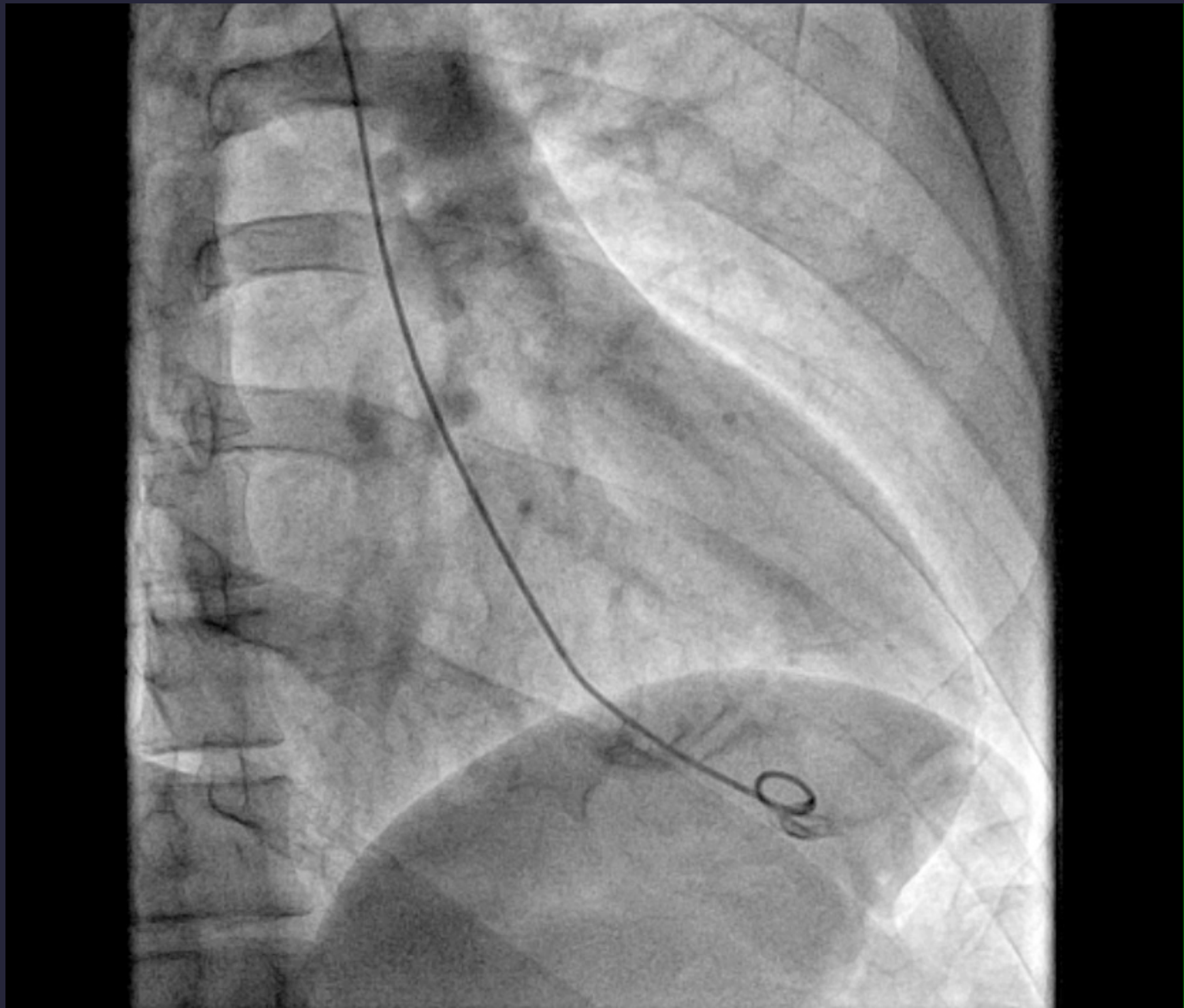
- ETT : VG normal, sans trouble de la fonction contractile globale ou segmentaire, péricarde sec, VDt normal
- Biologiquement : Troponine à 25, pic CPK à 350. LDL 1;4 g/l, HDL 0,65 et HbA1c 5,5%. CRP à 12mg/ml
- Ac anticardiolipides et anti B2 glyoprotéines, ANCA -
- Coronarographie







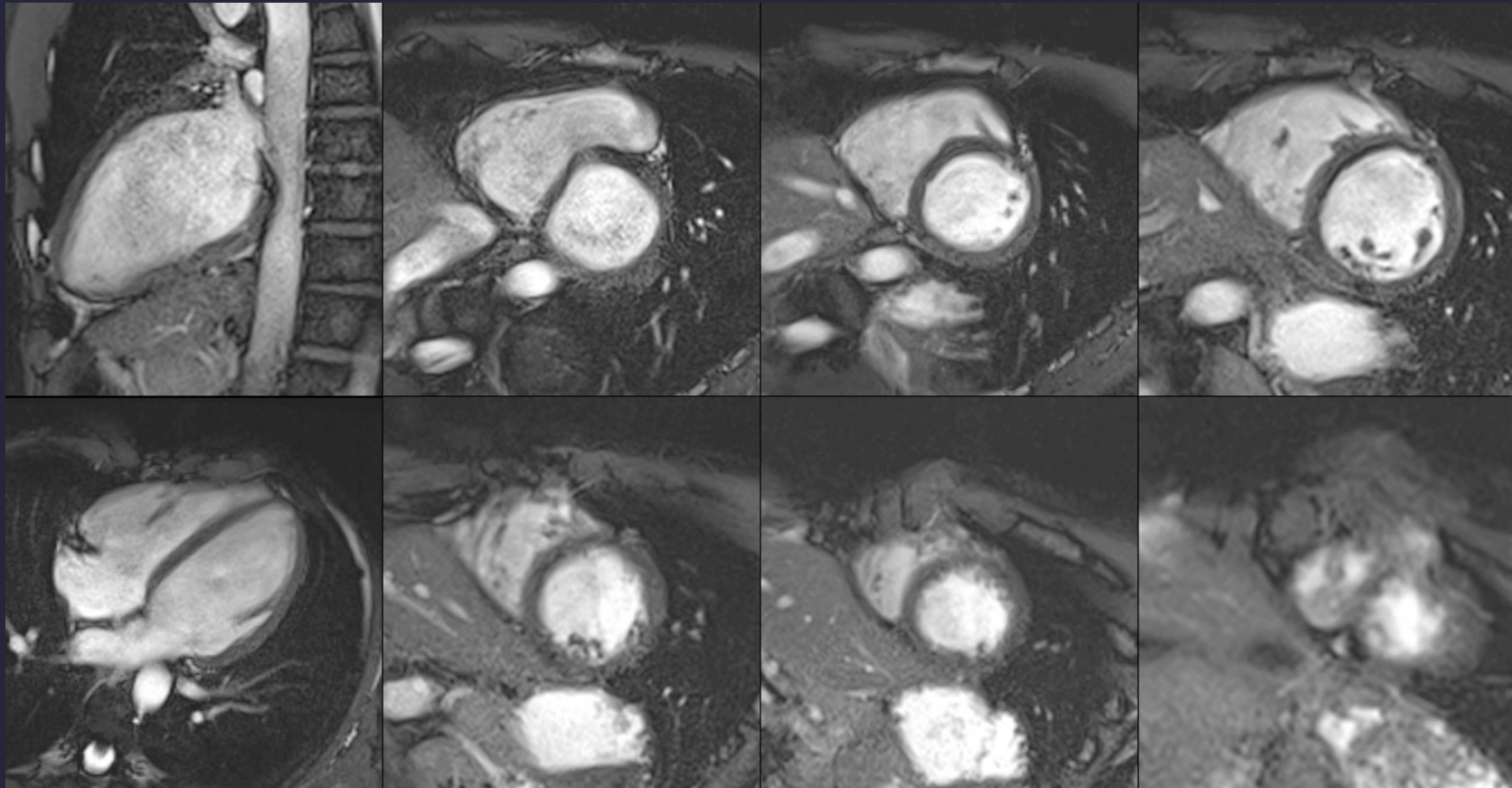




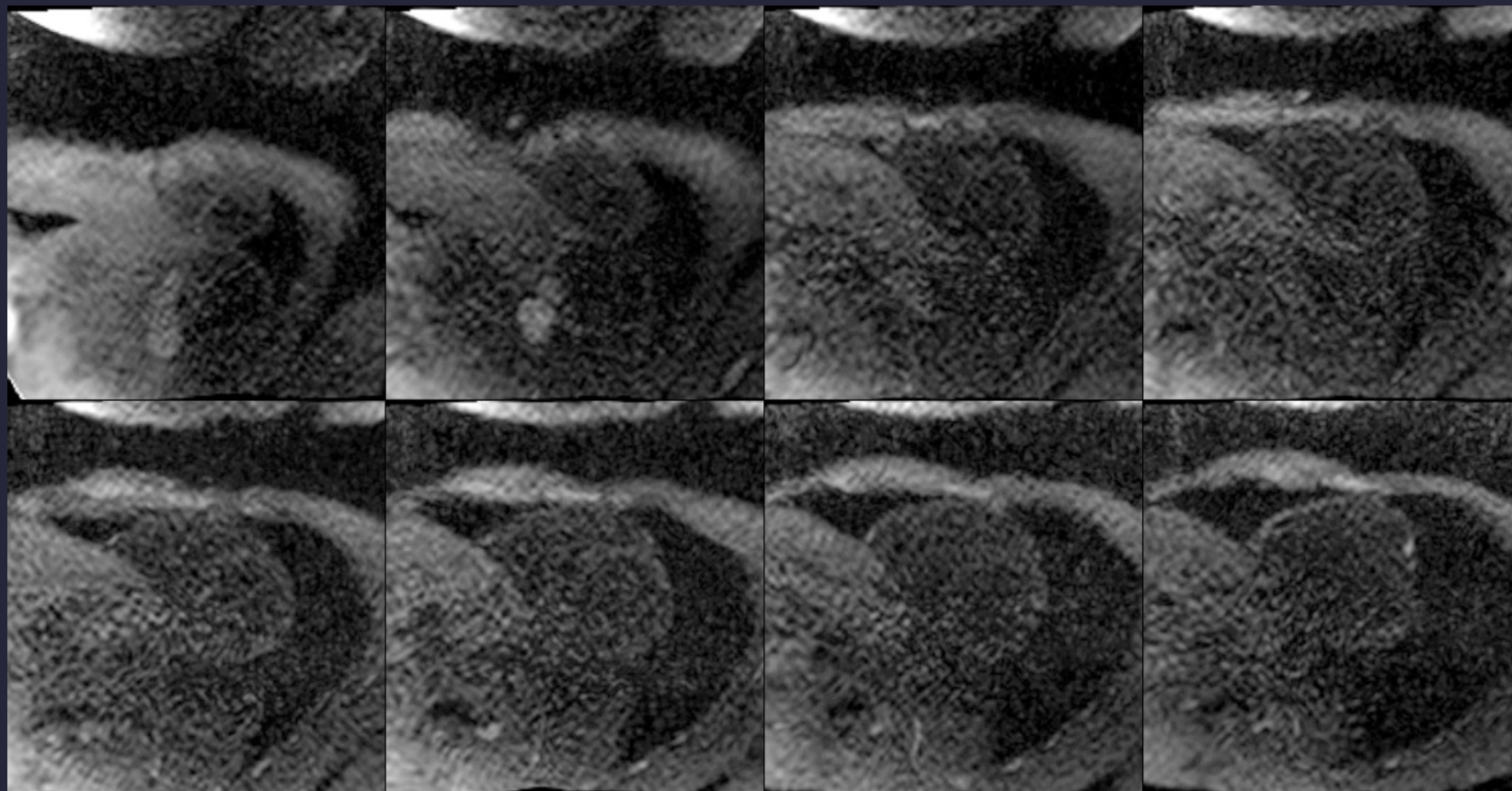
Quelles sont vos hypothèses dignostiques,  
Que proposez vous ?

IRM

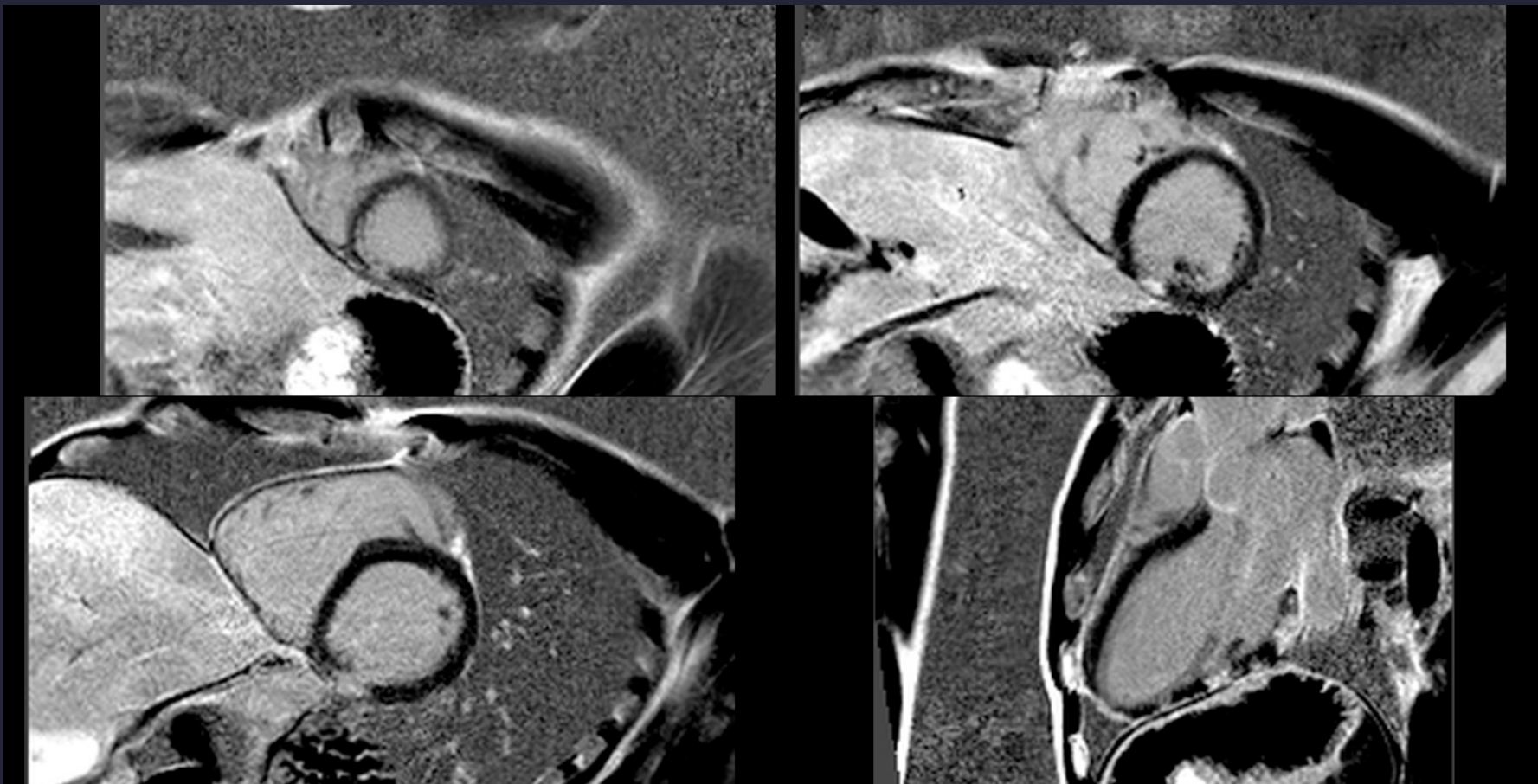
# séquences CINE



# Séquences de perfusion

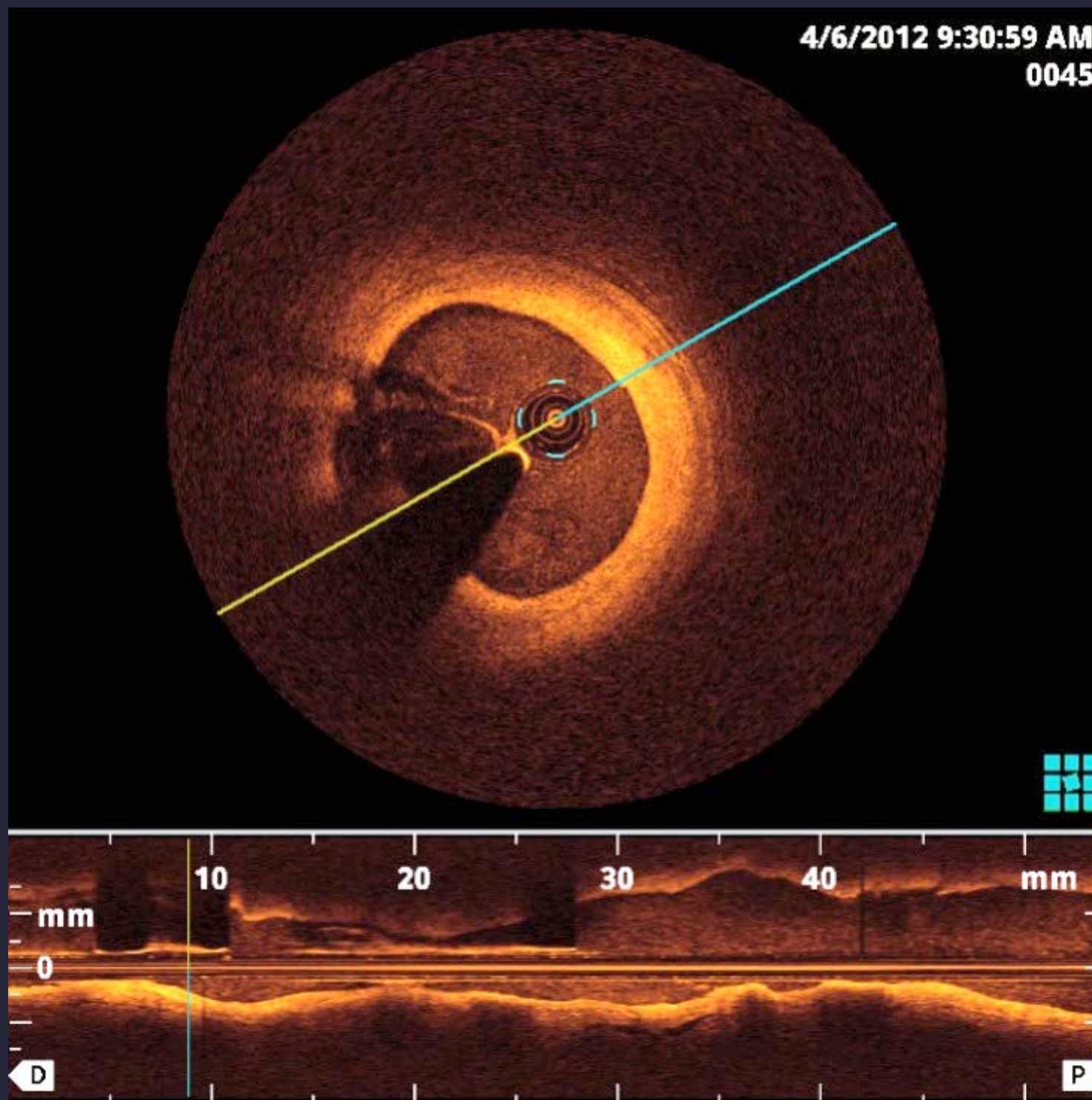


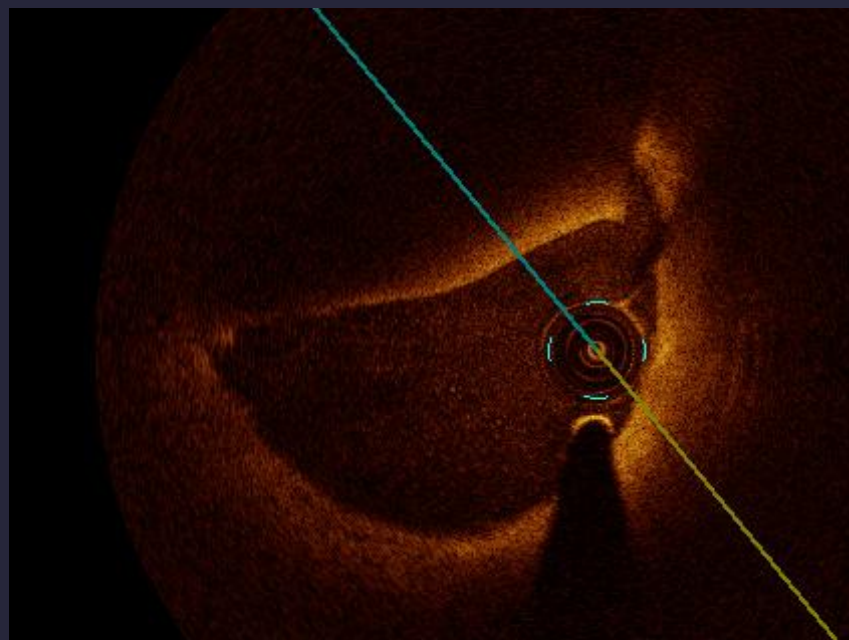
# séquences de rétention tardive



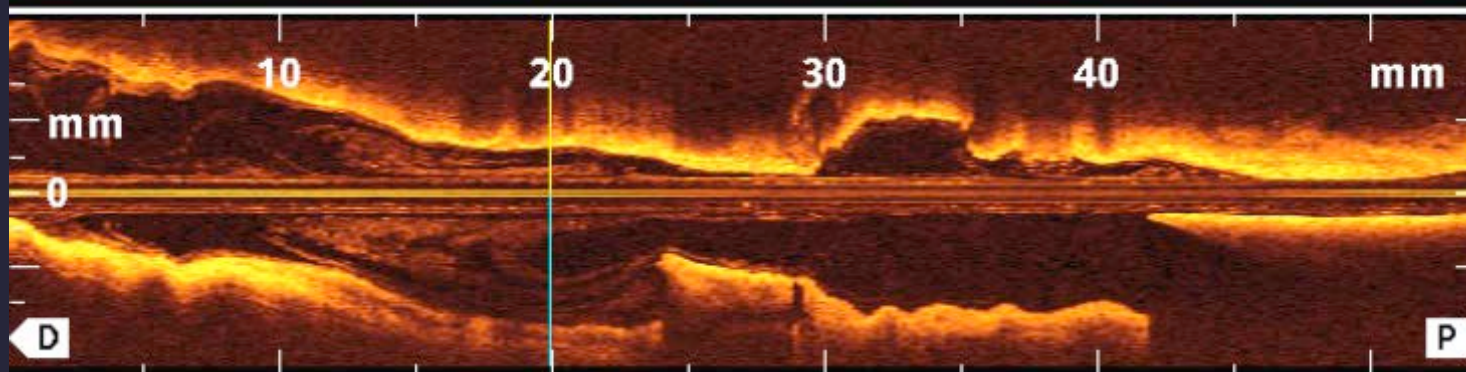
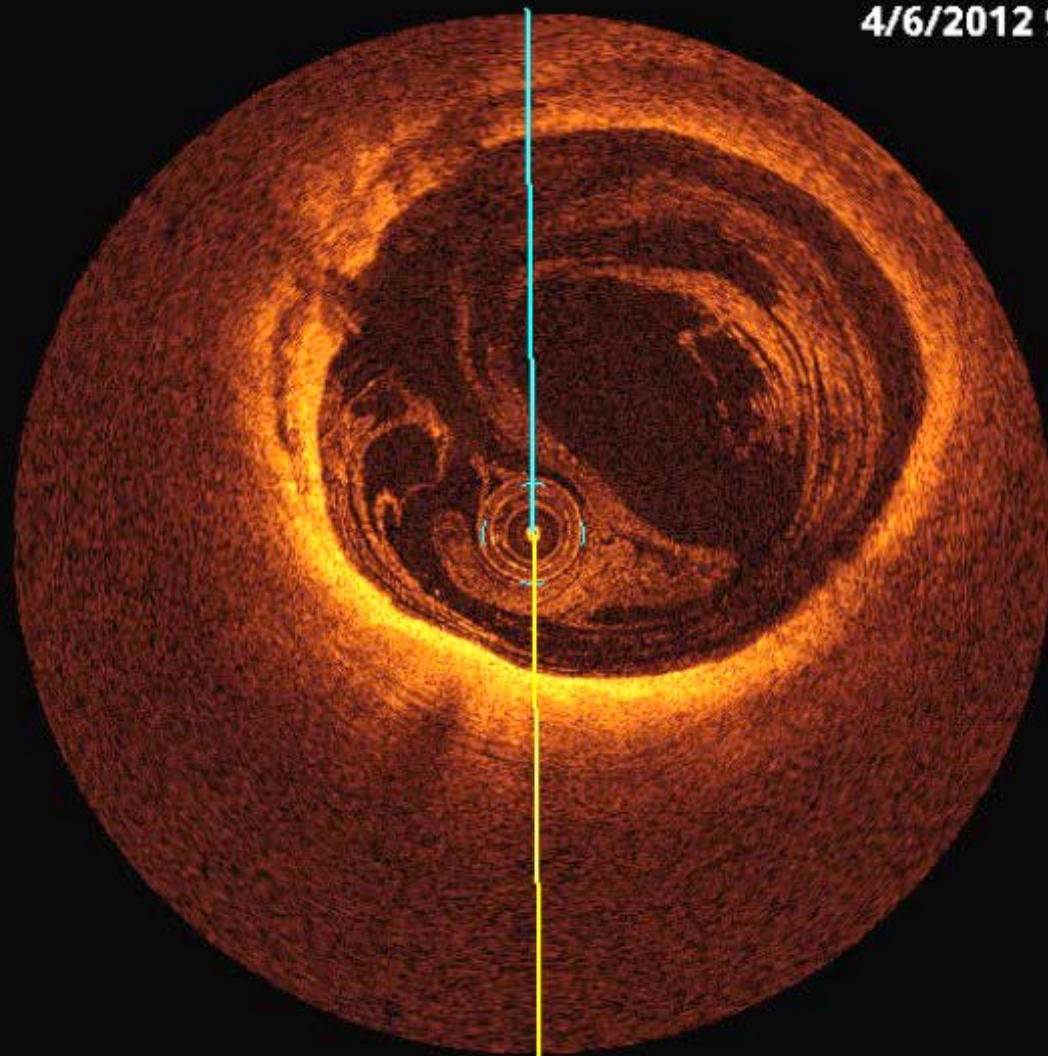
Que proposez vous ?

4/6/2012 9:30:59 AM  
0045





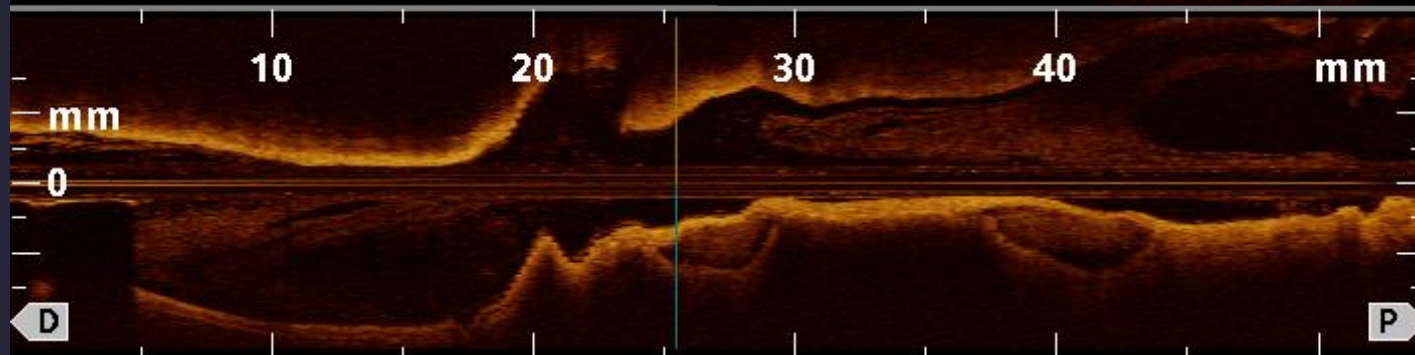
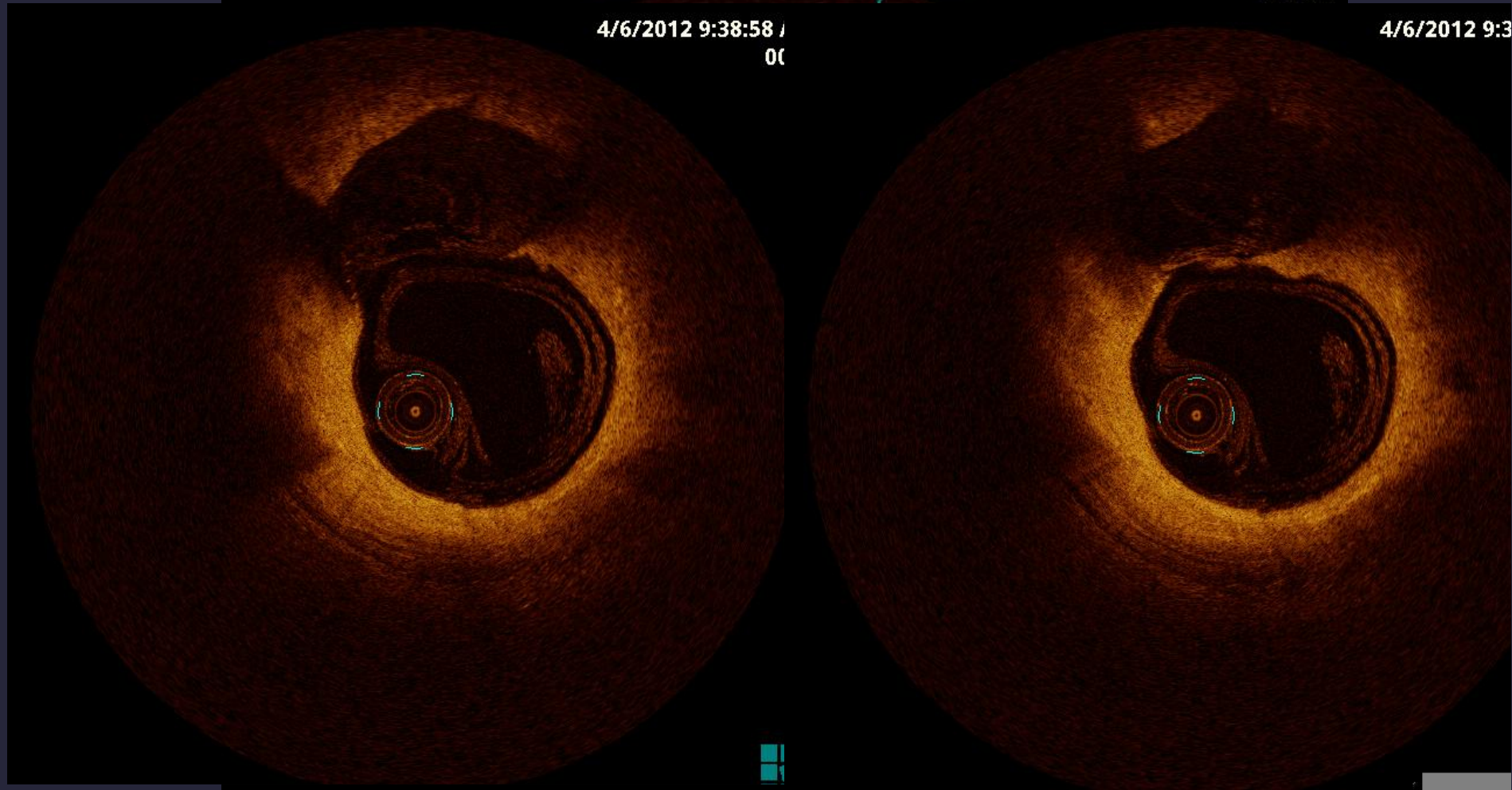
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0100



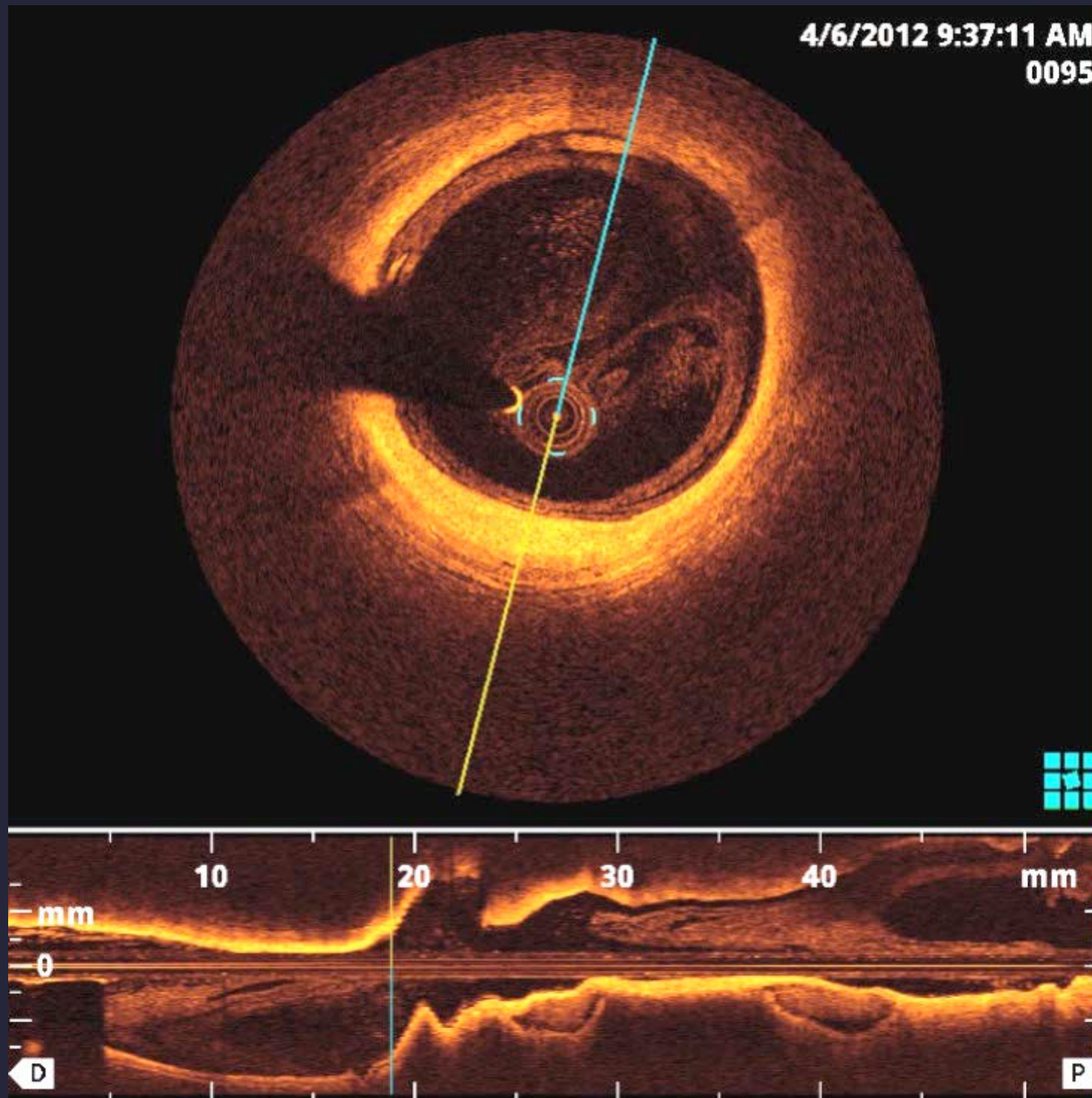
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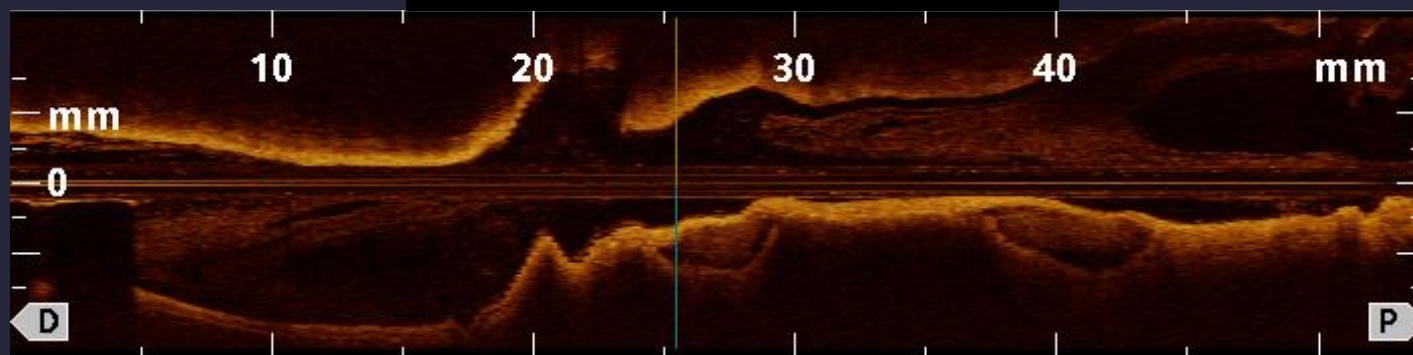
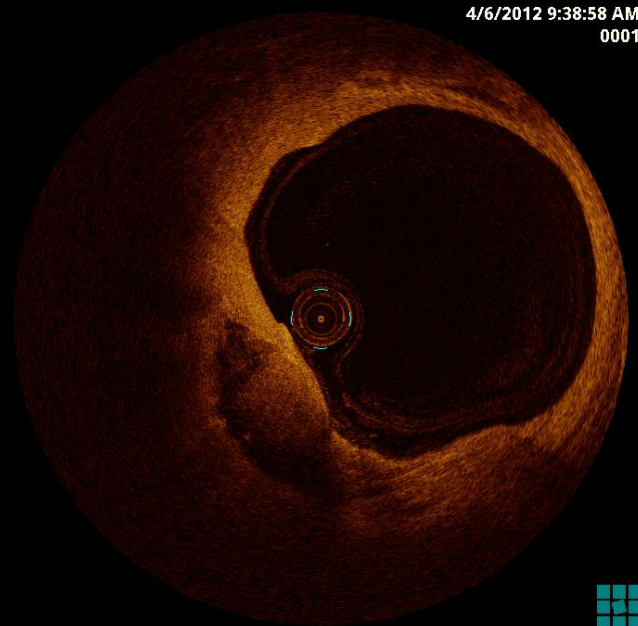
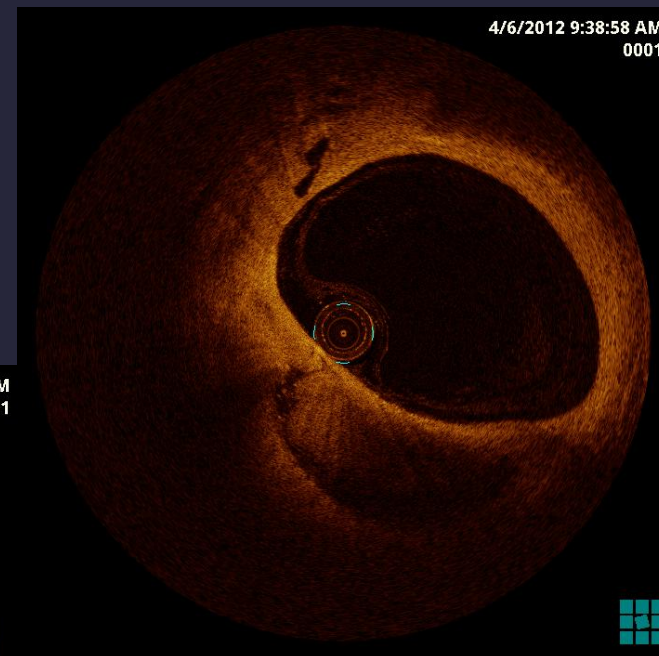
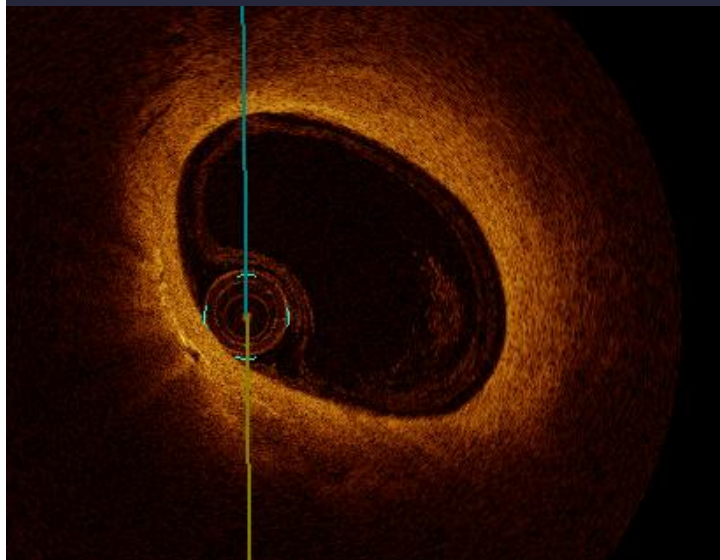
4/6/2012 9:38:58 /  
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4/6/2012 9:3



4/6/2012 9:37:11 AM  
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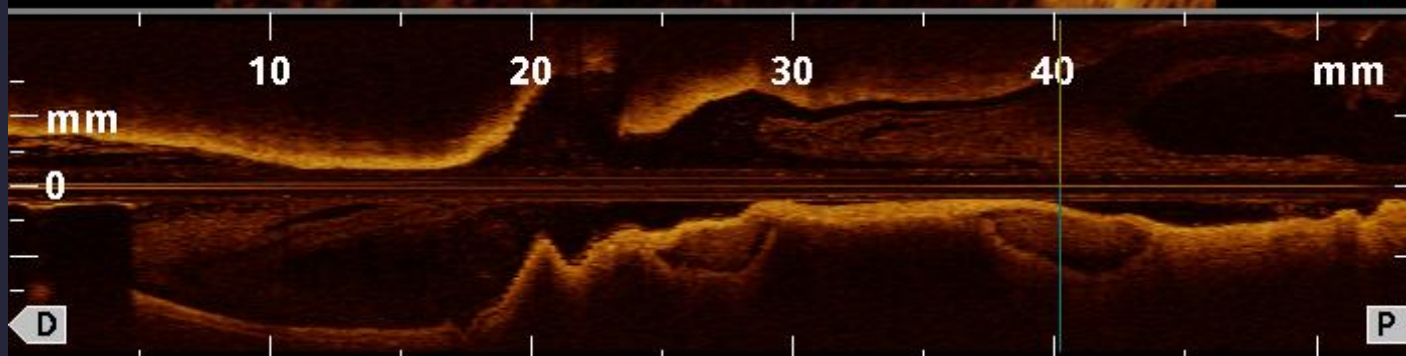


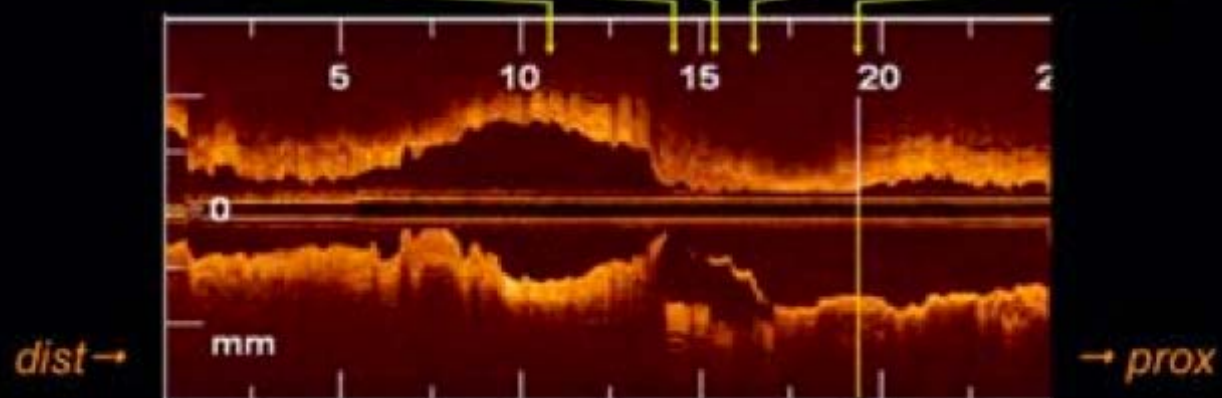
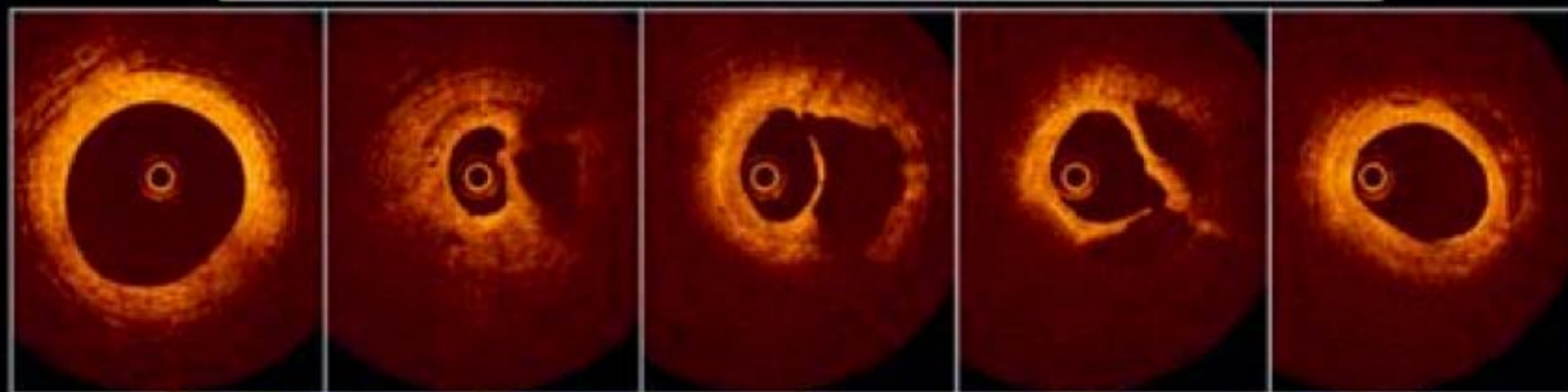
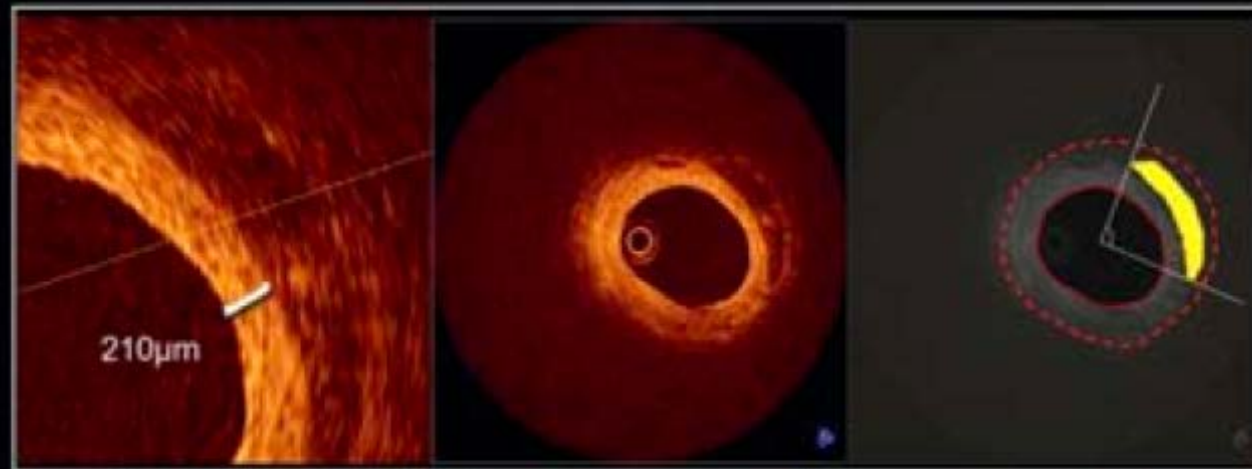


A Length: 0.08mm

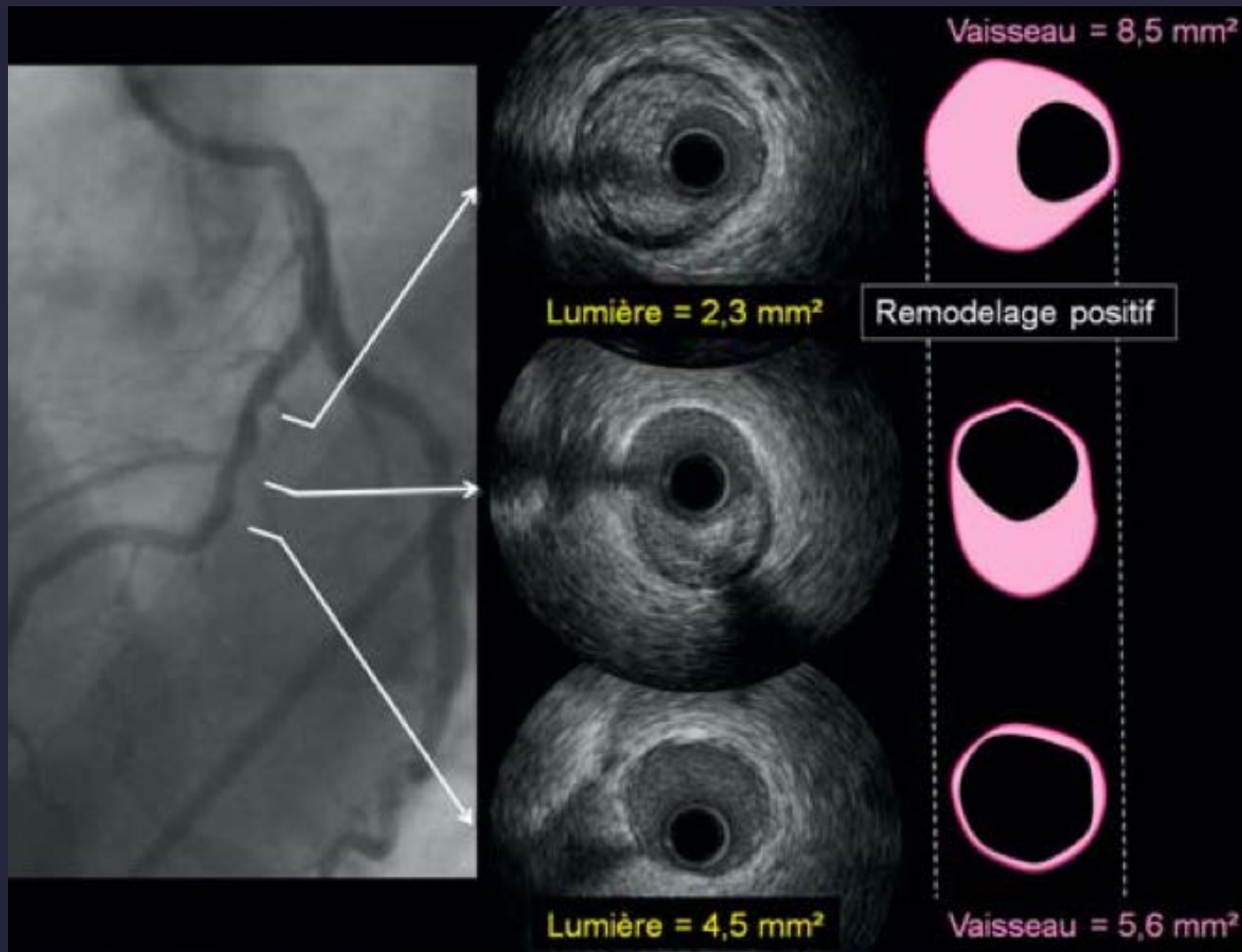
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Zoom: 5.3x





# La plaque vulnérable

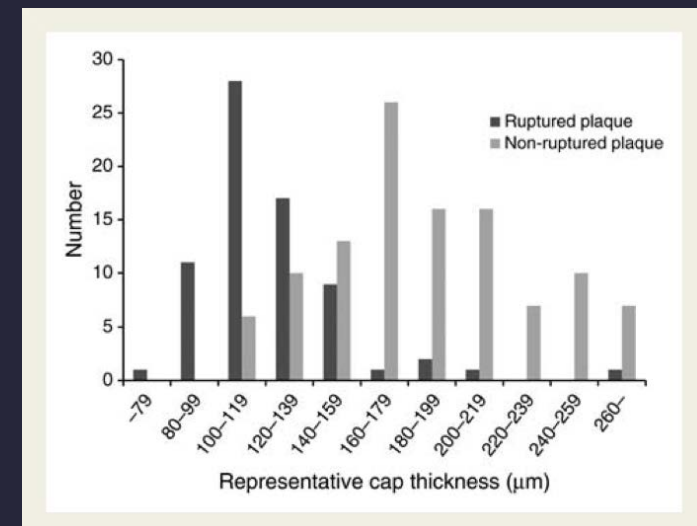
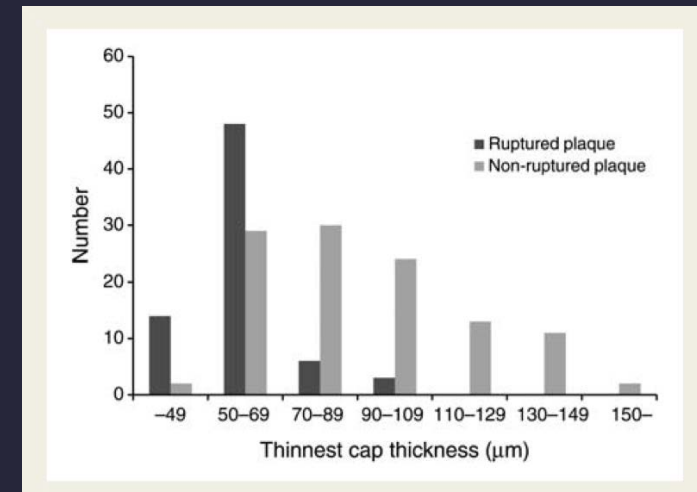
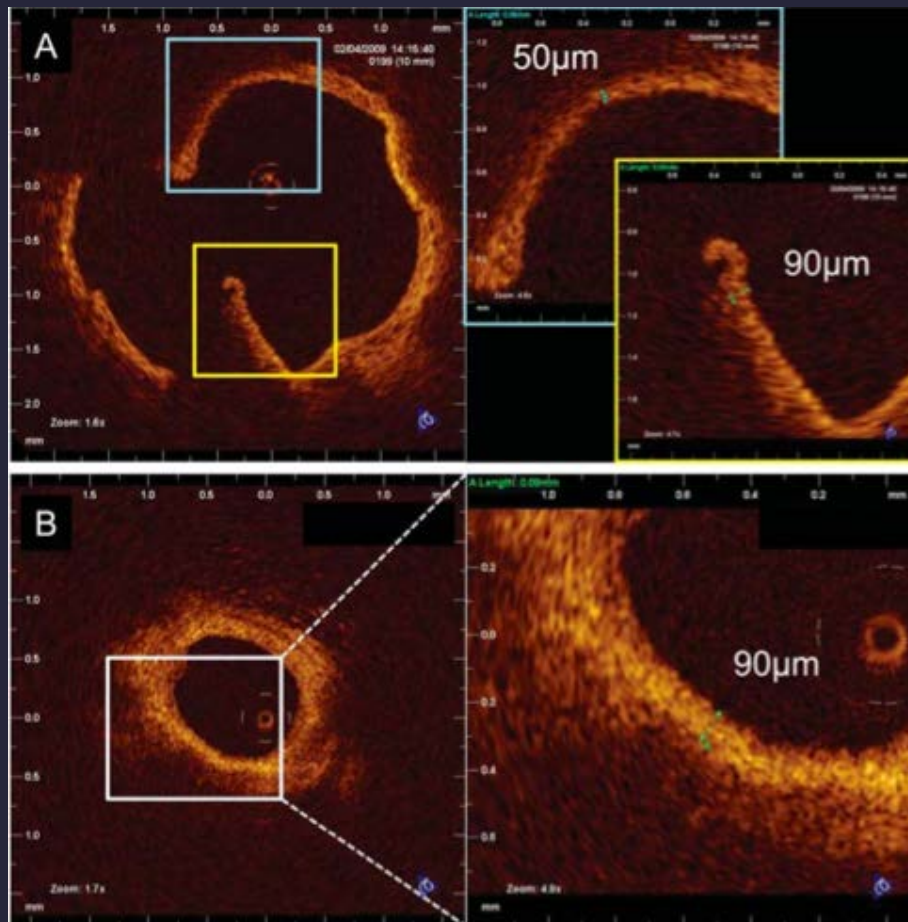


# A partir de 182 plaques riches en lipides

## 71 rompues

## 111 non rompues

Taishi Yonetsu<sup>1</sup> European Heart Journal (2011) 32, 1251–1259



# A partir de 182 plaques riches en lipides

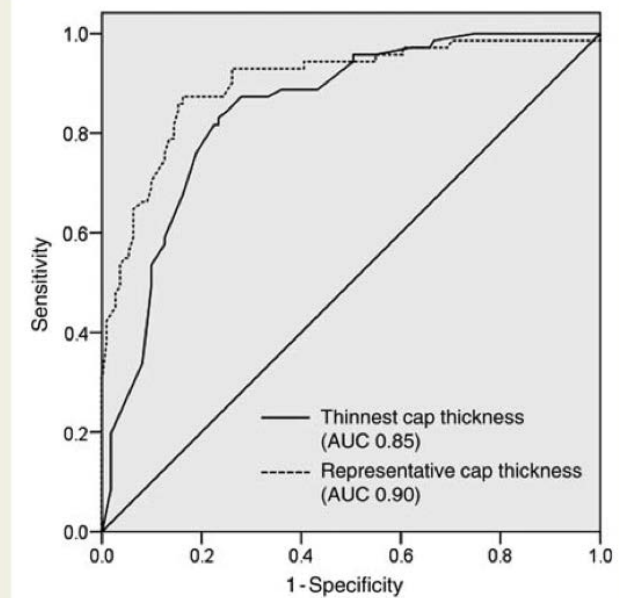
## 71 rompues

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**Table 3** Threshold values obtained in the present study

|                                                       | Thinnest cap thickness | Most representative cap thickness |
|-------------------------------------------------------|------------------------|-----------------------------------|
| Median value                                          |                        |                                   |
| Ruptured plaque (n = 71), $\mu\text{m}$               | 54 (50–60)             | 116 (103–136)                     |
| Non-ruptured plaque (n = 111), $\mu\text{m}$          | 80 (67–104)            | 182 (156–216)                     |
| Value in 95% of ruptured plaque, $\mu\text{m}$        | <80                    | <188                              |
| The best cut-off value in ROC analysis, $\mu\text{m}$ | <67                    | <151                              |



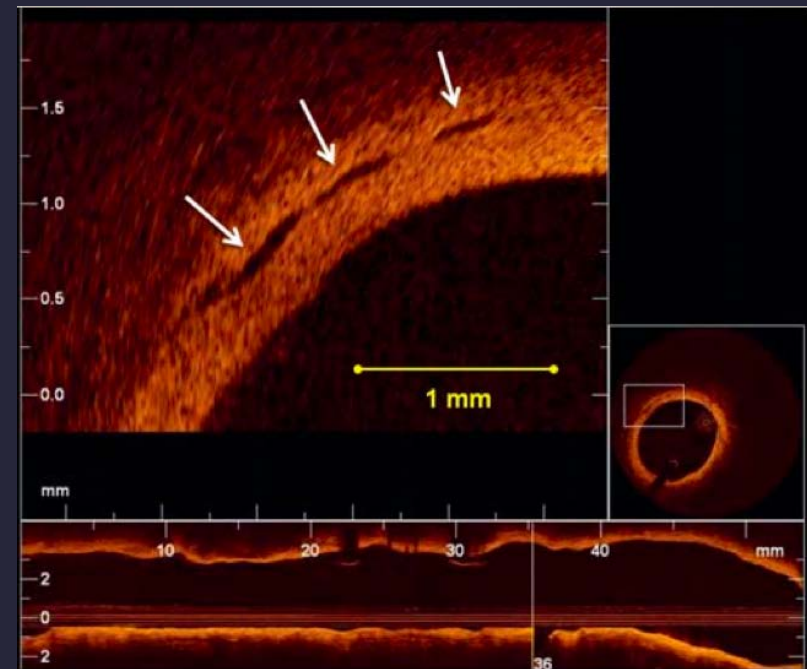
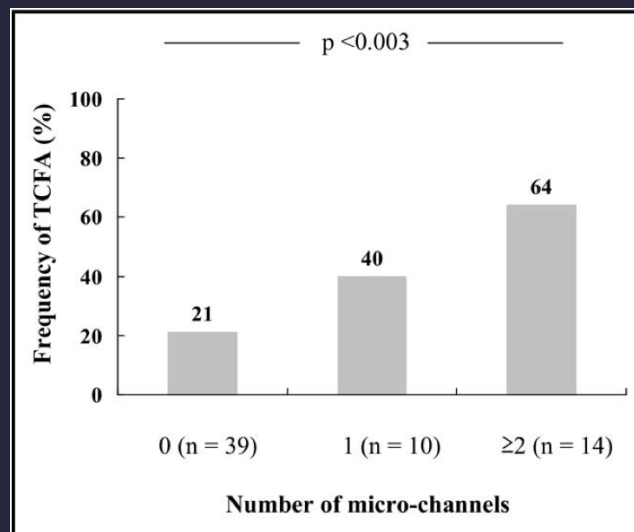
**Figure 6** Receiver operating characteristic curves for measurements of fibrous cap thickness for prediction of fibrous cap rupture. AUC, area under the curve.

The best cut-offs for predicting rupture were  
 <67  $\mu\text{m}$  (OR: 16.1, CI: 7.5–34.4,  $P < 0.001$ ) for the thinnest cap thickness  
 <151  $\mu\text{m}$  (OR: 35.6, CI: 15.0–84.3,  $P < 0.001$ ) for most representative cap thickness.

# Microchenneaux

Hironori Kitabata, MD,  
Am J Cardiol 2010;105:1673–1678

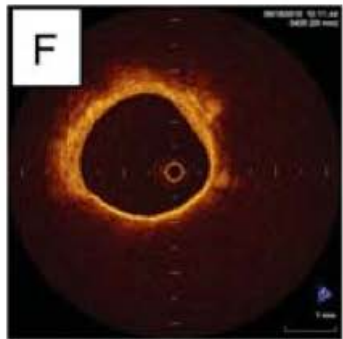
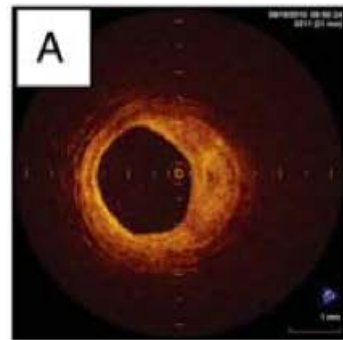
- Remodelage positif : 67 vs 36% (p 0.02)
- présence dans 45% des SCA vs 21% si angor stable
- TCFA (plaque lipidique >2cadrants et chappe <70microns) 54 vs 21% 0.012
- CRPhs 0.27 vs 0.13 mg/dl (p 0.015)



# Critères prédictifs de progression de plaque

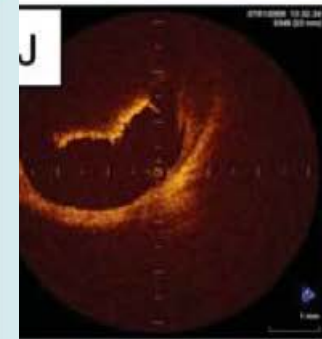
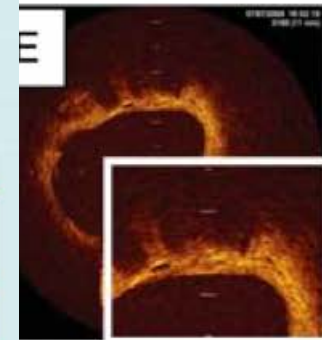
Eur Heart J. 2012 Jan;33(1):78-85. [Uemura](#)

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**Table 4** Association of 10 optical coherence tomography-based plaque characteristics and subsequent progression

|                    | Univariate analysis |         |
|--------------------|---------------------|---------|
|                    | OR (95% CI)         | P-value |
| Eccentric          | 3.30 (0.73–14.4)    | 0.230   |
| Concave shape      | 3.83 (0.85–16.7)    | 0.160   |
| Intimal laceration | 10.20 (2.77–37.8)   | <0.001  |
| Rupture            | 4.90 (0.78–31.23)   | 0.325   |
| Microchannel       | 20.00 (4.78–82.6)   | <0.001  |
| Lipid pool         | 2.16 (0.57–8.06)    | 0.222   |
| TCFA               | 20.00 (4.78–82.6)   | <0.001  |
| Macrophage         | 9.60 (2.60–35.6)    | 0.001   |
| Calcium            | 1.33 (0.41–4.30)    | 0.890   |
| Thrombus           | 12.00 (2.18–64.32)  | 0.002   |

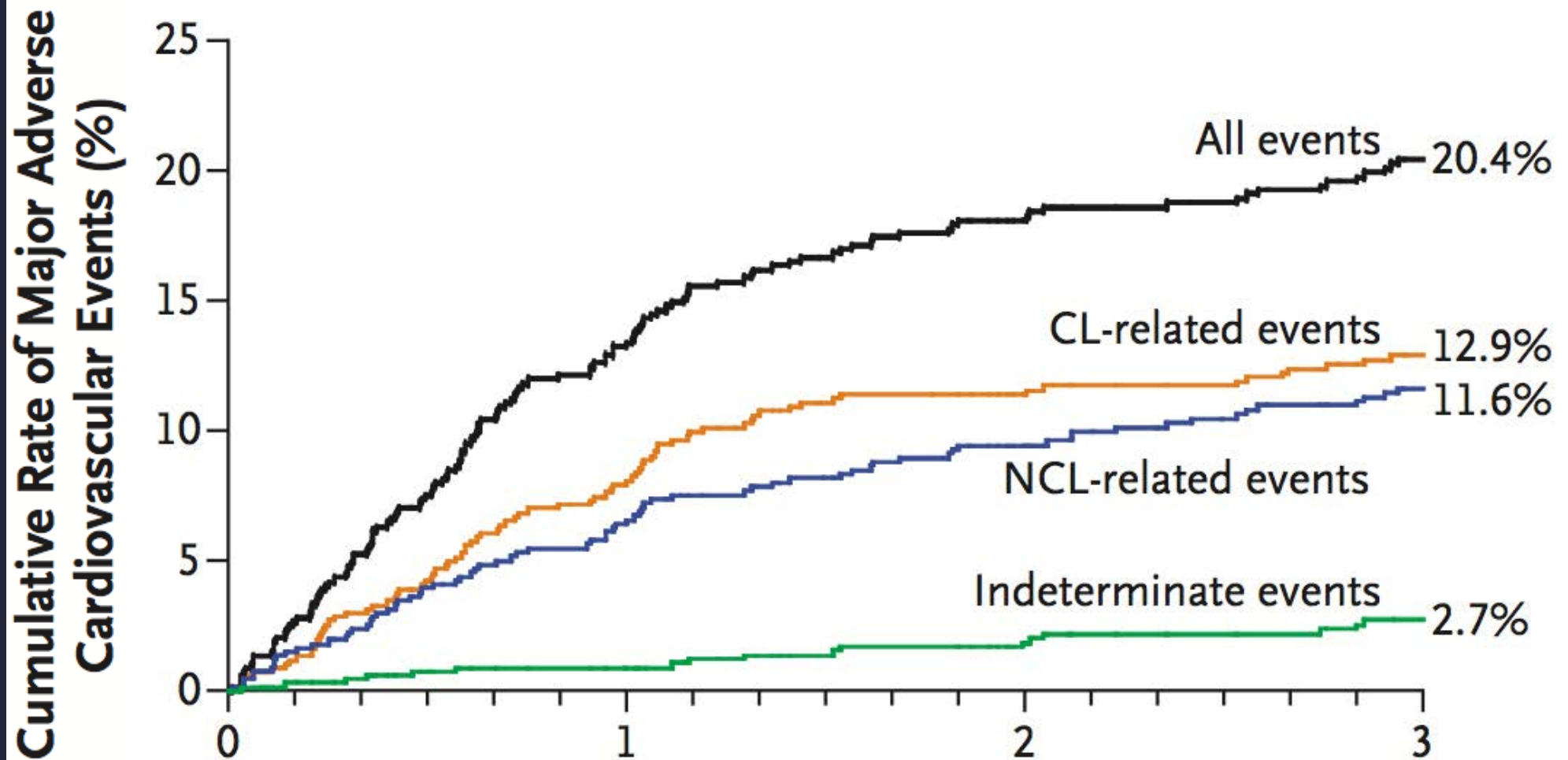


**Figure 1** Ten complex optical coherence tomography-based plaque characteristics. (A) Eccentric plaque distribution; (B) concave lumen shape; (C) lipid pool; (D) microchannel; (E) thin fibrous cap covering lipid pool; (F) concave lumen shape; (G) lipid pool; (H) macrophage image; (I) microchannel; (J) thin fibrous cap covering lipid pool.

ues. (A) Eccentric plaque distribution; (B) concave lumen shape; (C) lipid pool; (D) microchannel; (E) thin fibrous cap covering lipid pool; (F) concave lumen shape; (G) lipid pool; (H) macrophage image; (I) microchannel; (J) thin fibrous cap covering lipid pool.

Erosions intinales (61.5 vs. 8.9%,  $P < 0.01$ ),  
microchenneaux (76.9 vs. 14.3%,  $P < 0.01$ ),  
Pool lipidique (100 vs. 60.7%,  $P = 0.02$ ),  
thin-cap fibroatheroma (TCFA) (76.9 vs. 14.3%,  $P < 0.01$ ),  
Images de dépôts macrophagiques (61.5 vs. 14.3%,  $P < 0.01$ ),  
Thrombus intraluminal (30.8 vs. 1.8%,  $P < 0.01$ )

analyse de l'amplitude, mais aussi de la fréquence du signal ultrasonore réfléchi par la structure biologique permettrait d'en définir la nature : **IVUS-radiofréquence ou IVUS-VH** (Virtual Histology).

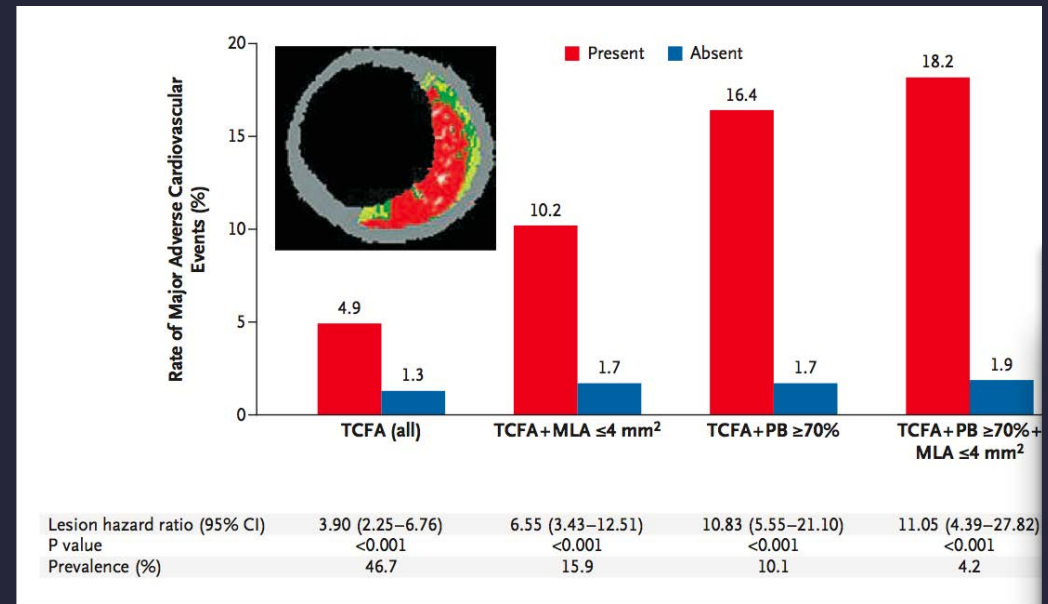


PROPECT Study 697 pts, 3,4 ans  
IVUS-VH sur 6-8 cm proximaux de tous les axes coronaires  
MACE : ACR, DC cardiaque IDM ou rehospitalisation pour progression de l'angor

Gregg W. Stone et al. N Engl J Med 2011;364:226-35.

**Table 3.** Independent Correlates of Major Adverse Cardiovascular Events Related to Nonculprit Lesions during Follow-up.\*

| Correlates                                       | Hazard Ratio<br>(95% CI) | P Value |      |
|--------------------------------------------------|--------------------------|---------|------|
| Predictors of patient-level events†              |                          |         |      |
| Insulin-requiring diabetes                       | 3.32 (1.43–7.72)         | 0.005   |      |
| Previous percutaneous coronary intervention      | 2.03 (1.15–3.59)         | 0.02    |      |
| Predictors of events at individual lesion sites‡ |                          |         |      |
| Plaque burden ≥70%                               | 5.03 (2.51–10.11)        | <0.001  | 9.6% |
| Thin-cap fibroatheroma                           | 3.35 (1.77–6.36)         | <0.001  | 4.9% |
| MLA ≤4.0 mm <sup>2</sup>                         | 3.21 (1.61–6.42)         | 0.001   | 5.3% |



**Table 3. Independent Correlates of Major Adverse Cardiovascular Events Related to Nonculprit Lesions during Follow-up.\***

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| Previous percutaneous coronary intervention      | 2.03 (1.15–3.59)      | 0.02    |
| Predictors of events at individual lesion sites‡ |                       |         |
| Plaque burden $\geq 70\%$                        | 5.03 (2.51–10.11)     | <0.001  |
| Thin-cap fibroatheroma                           | 3.35 (1.77–6.36)      | <0.001  |
| MLA $\leq 4.0$ mm <sup>2</sup>                   | 3.21 (1.61–6.42)      | 0.001   |

9,6%  
4.9%  
5.3%

0.3% 4.8% 10.5% et 18.2%  
si 0 | 2 ou 3 critères

# Effets des statines

**Stanley Chia** *Coron Artery Dis.* 2008 June ; 19(4): 237–242

**48** patients (26 sous statines, 22 sans statines)

Plaques rompues plus rares chez les patients déjà sous statines (8 vs. 36%;  $P = 0.03$ )

Avec une tendance avoir des chapes plus épaisses (épaisseur minimale de 78 vs. 49  $\mu\text{m}$ ;  $P = 0.07$ ).

[Takarada S](#), [Atherosclerosis](#). 2009 Feb;202(2):491-7.

40 pts post IDM, OCT sur lésion non coupable : 23 statine + et 17 statine -

contrôle à 9 mois : augmentation significative de l'épaisseur de la chape sous statines

151 $\pm$ 110 --> 280 $\pm$ 120 microm, ( $p < 0.01$ ) vs 153 $\pm$ 116 --> 179 $\pm$ 124 microm

soit une progression de 188 $\pm$ 64% vs. 117 $\pm$ 39% ( $p < 0.01$ ) (plus marquée dans le sous groupe des chapes les plus fines)

# La plaque vulnérable

- IVUS (résolution 80 microns, bonne pénétration)
  - Remodelage positif, surface de la plaque/vaisseau  $>40\%$ , plaque étendu à plus de 2 quadrants, importante composante lipidique
- OCT (résolution 10 microns, pénétration 1-2 mm)
  - Détection des TCFA (Thin Cap Fibro Atheroma) avec épaisseur  $< 65$  microm; accumulation de macrophages, présence de microcanaux intrapariétaux, (index de remodelage ratio de surfaces Plaque/ vaisseau parfois impossibles)

# Conférence de Bethesda

JACC Vol. 45, No. 8, 2005 April 19, 2005:1348–53

## Coronarien

Diagnostic d'ATS coronaire : I critère

ATCD d'IDM

tableau clinique d'Angor avec ischémie inducible

Athérosclérose coronaire identifiée qq soit la méthode (coro/TDM\*/IRM...)

*\*Score calcique élevé (100)*

*41% chez l'homme de 40 à 49 ans (13% chez la femme)*

*68% chez l'homme de 50 à 59 ans (27% chez la femme)*

# Conférence de Bethesda

JACC Vol. 45, No. 8, 2005 April 19, 2005:1348–53

## Coronarien

Diagnostic d'ATS coronaire : 1 critère

ATCD d'IDM

tableau clinique d'Angor avec ischémie inducible

Athérosclérose coronaire identifiée qq soit la méthode (coro/TDM\*/IRM...)

*Cesser entraînement / compétition jusqu'à récupération complète, 4 semaines après stent, selon consolidation sternale après PAC*

# Conférence de Bethesda

JACC Vol. 45, No. 8, 2005 April 19, 2005:1348–53

## Coronarien

Niveau de risque selon FEVG, test d'effort (ischémie, rythme, capacité d'effort\*),

\*10 METS 35 mlO<sub>2</sub>/Kg-min si <50 ans  
9 METS 31 mlO<sub>2</sub>/Kg-min entre 51 et 59 ans  
8 METS 28 mlO<sub>2</sub>/Kg-min entre 60 et 69 ans  
7 METS 24 mlO<sub>2</sub>/Kg-min après 70 ans

Cesser entraînement / compétition jusqu'à récupération complète, 4 semaines après stent, selon consolidation sternale après PAC

# Conférence de Bethesda

JACC Vol. 45, No. 8, 2005 April 19, 2005:1348-53

## Coronarien

Niveau de risque selon FEVG, test d'effort (ischémie, rythme, capacité d'effort\*),

Risque modérément élevé (tous les critères) :

FEVG > 50%,  
capacité d'effort\*,  
absence d'ischémie inducible, d'arythmie ventriculaire complexe (TV,  
doublets ou ESV > 10%),  
de sténose coronaire (>50% sur artère coronaire majeure) et  
revascularisation complète.



Sports classe IA IIA (...plus si très bas risque)  
Education (podrômes...), réévaluation annuelle

Risque substantiellement élevé (1 critère) :

FEVG < 50%,  
ischémie, arythmie ventriculaire inducibles  
sténose > 50% sur une artère coronaire majeure



Sports classe IA  
Education (podrômes...), réévaluation annuelle

*Cesser entraînement / compétition jusqu'à récupération complète, 4 semaines après stent, selon consolidation sternale après PAC*

|                                  |                                          |                                                                                                                                                             |                                                                                                                                            |                                                                                                                                                                             |
|----------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increasing Static Component<br>↑ | III. High<br>(>50% MVC)                  | Bobsledding/Luge*†, Field events (throwing),<br>Gymnastics*†, Martial arts*,<br>Sailing, Sport climbing,<br>Water skiing*†, Weight lifting*†, Windsurfing*† | Body building*†, Downhill skiing*†, Skateboarding*†,<br>Snowboarding*†, Wrestling*                                                         | Boxing*,<br>Canoeing/Kayaking,<br>Cycling*†, Decathlon,<br>Rowing, Speed-skating*†,<br>Triathlon*†                                                                          |
|                                  | II. Moderate<br>(20-50% MVC)             | Archery, Auto racing*†,<br>Diving*†, Equestrian*†,<br>Motorcycling*†                                                                                        | American football*, Field events (jumping), Figure skating*,<br>Rodeoing*†, Rugby*, Running (sprint),<br>Surfing*†, Synchronized swimming† | Basketball*, Ice hockey*,<br>Cross-country skiing (skating technique),<br>Lacrosse*, Running (middle distance),<br>Swimming, Team handball                                  |
|                                  | I. Low<br>( $<20\%$ MVC)                 | Billiards, Bowling, Cricket,<br>Curling, Golf, Riflery                                                                                                      | Baseball/Softball*, Fencing,<br>Table tennis, Volleyball                                                                                   | Badminton, Cross-country skiing (classic technique),<br>Field hockey*, Orienteering,<br>Race walking,<br>Racquetball/Squash,<br>Running (long distance),<br>Soccer*, Tennis |
|                                  | A. Low<br>( $<40\%$ Max O <sub>2</sub> ) | B. Moderate<br>(40-70% Max O <sub>2</sub> )                                                                                                                 | C. High<br>( $>70\%$ Max O <sub>2</sub> )                                                                                                  |                                                                                                                                                                             |
|                                  | Increasing Dynamic Component →           |                                                                                                                                                             |                                                                                                                                            |                                                                                                                                                                             |

Que dire au patient...?