



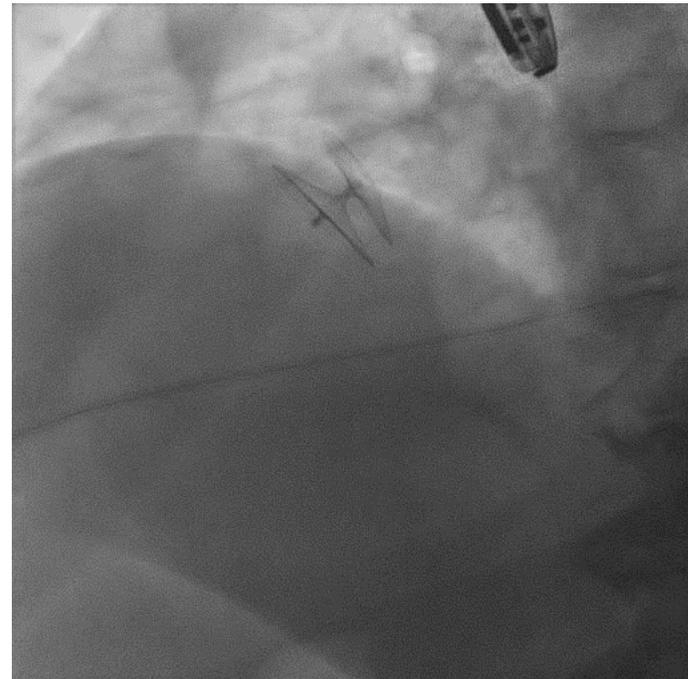
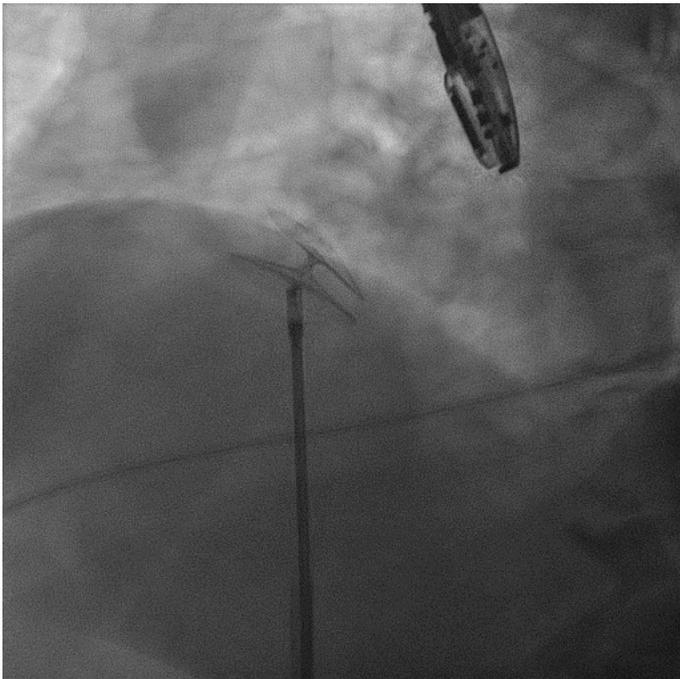
ACTION Study Group
Institute of Cardiology
Pitié-Salpêtrière Hospital
Paris - France



CARDIO
RUN
2023

FOP et CIA de l'adulte: quand et comment fermer?

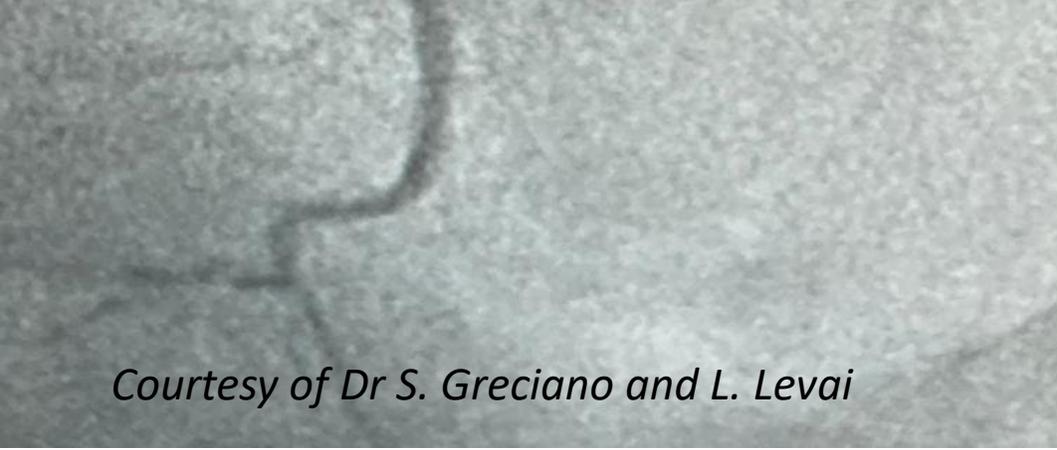
G. Montalescot



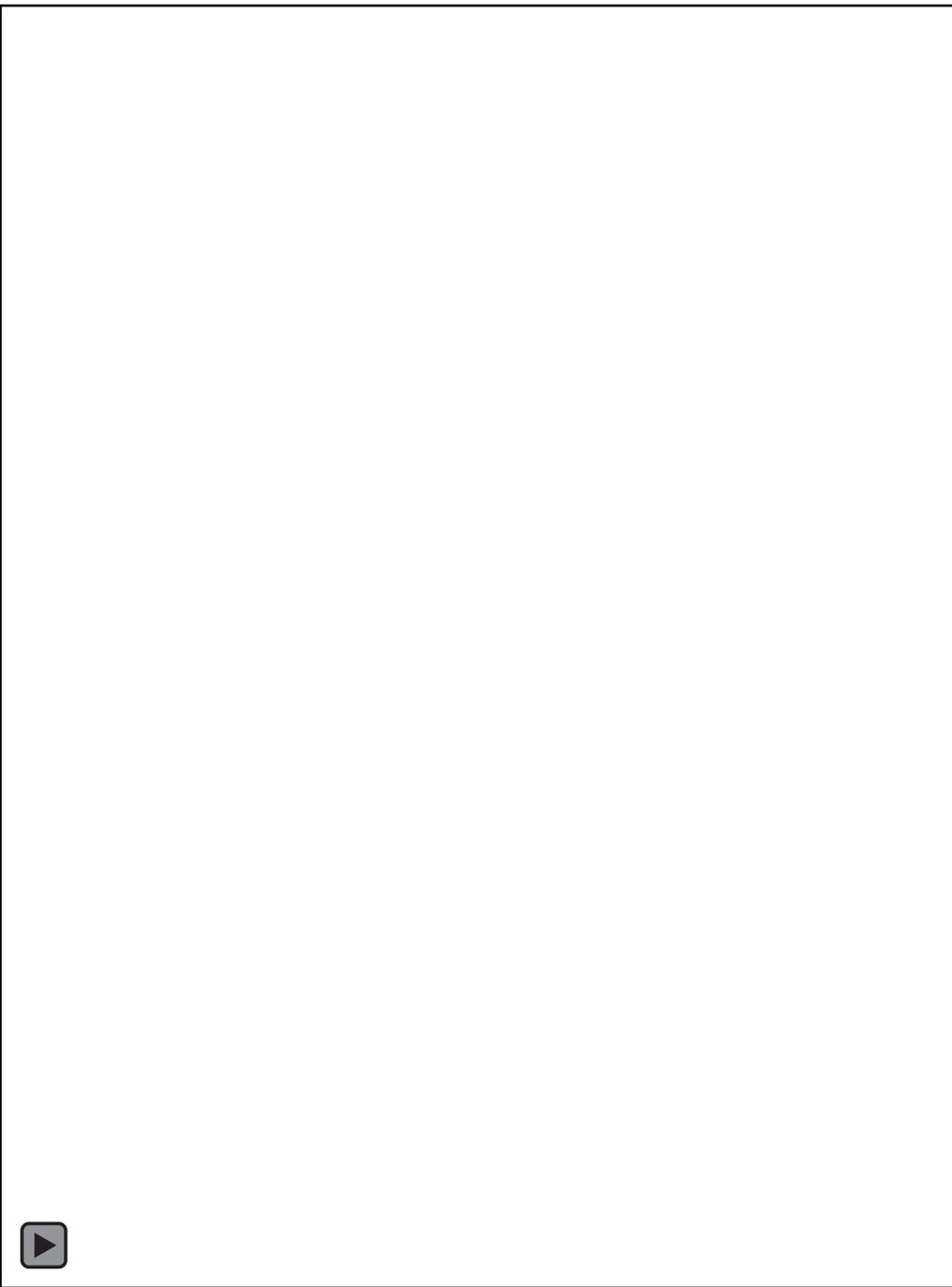
L'embolie paradoxale existe-t-elle?

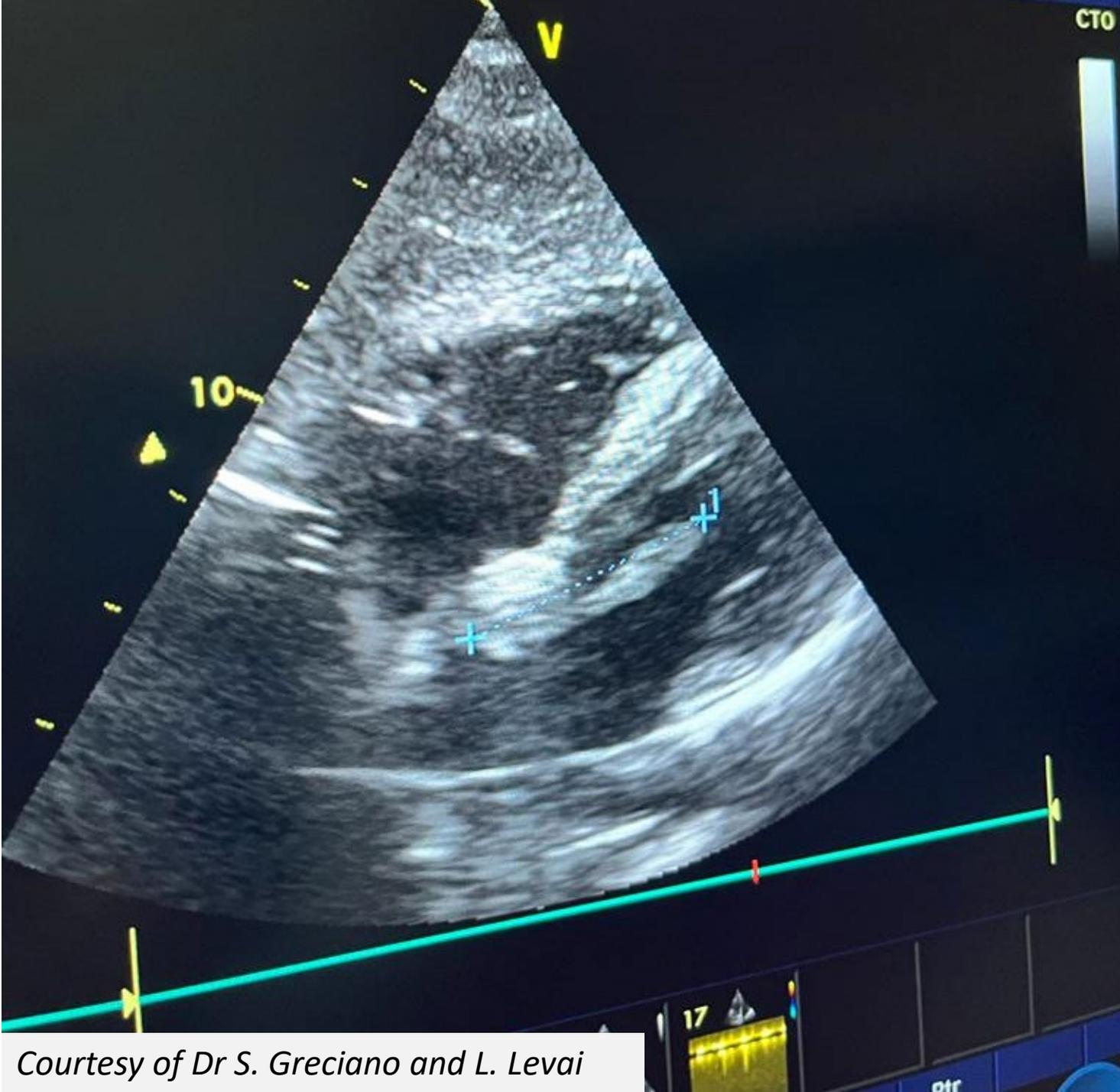
L'embolie paradoxale n'existe pas!

- Cycliste, virée au lac de Constance (600km!)
- EP au retour
- Infarctus antérieur ensuite



Courtesy of Dr S. Greciano and L. Levai





Courtesy of Dr S. Greciano and L. Levai

Lutter contre les contre-vérités!

1. L'embolie paradoxale existe!
2. Elle peut toucher les coronaires et bien d'autres artères non cérébrales!
3. La thrombectomie coronaire marche!
4. La fermeture du FOP est bon pour la prévention CV!
5. Le sport intensif est mauvais pour la prévention CV!

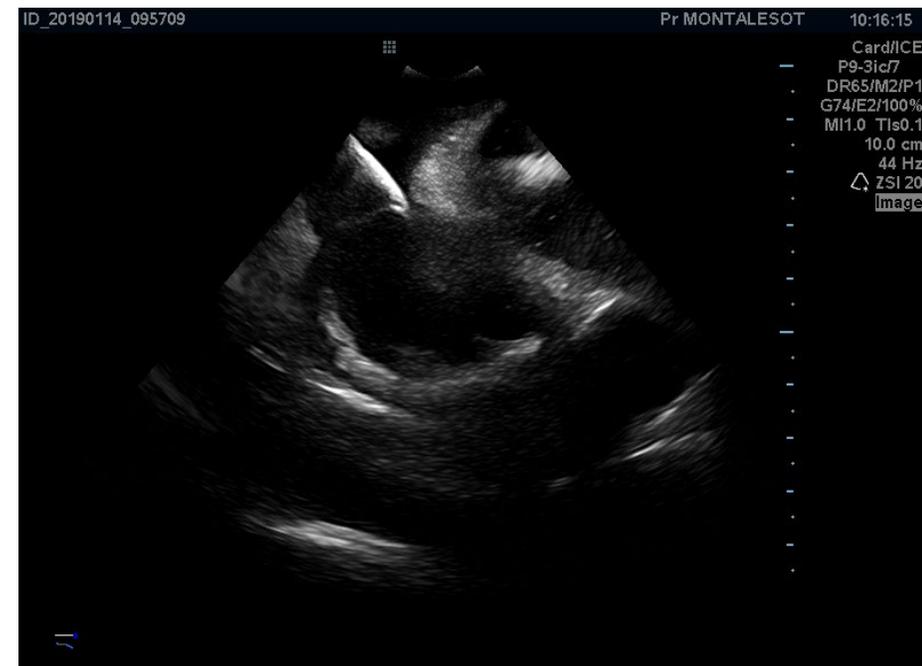
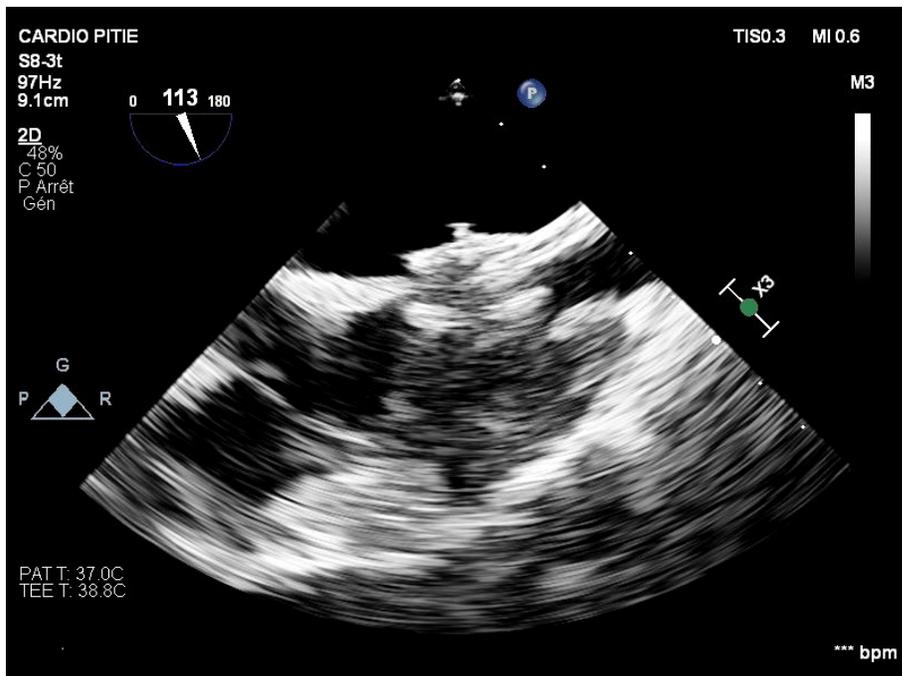
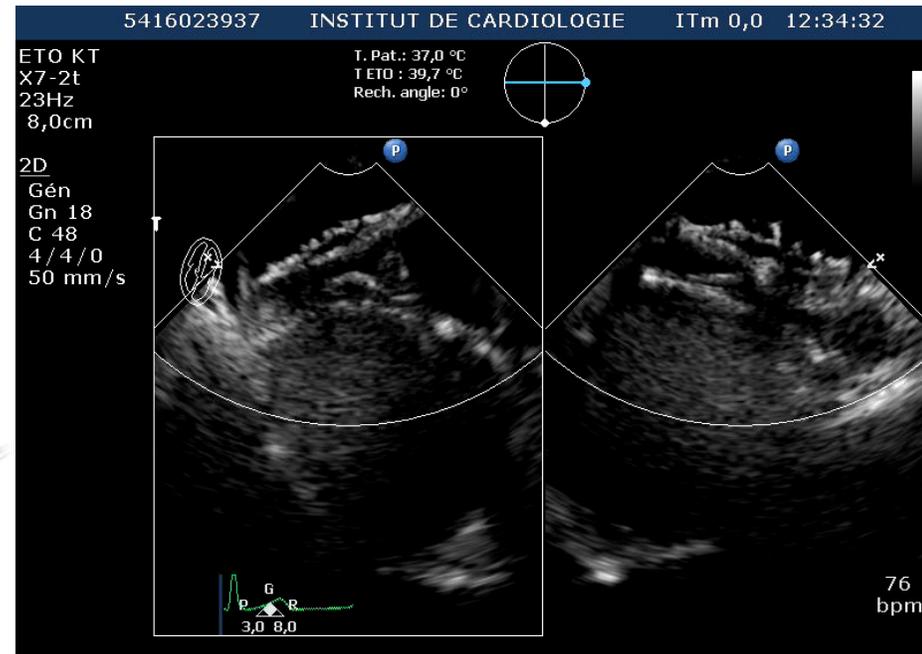
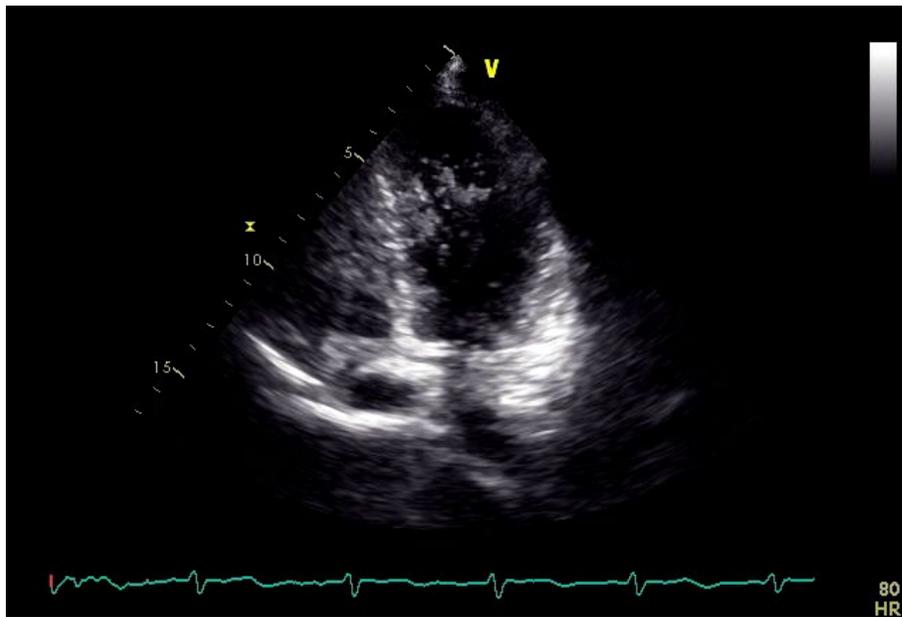
Quand rechercher un FOP?

Quand rechercher:

1. Devant tout accident ischémique symptomatique ou pas,
→ dans la circulation artérielle (cérébrovasculaire, mais pas seulement)
→ sans autre cause retrouvée
2. Mais aussi, en cas de désaturation ou de syndrome platypnée-orthodeoxie
3. Egalement, en cas d'accident de décompression chez un plongeur
4. En cas de neurochirurgie en position assise

Comment rechercher un FOP?

4 outils

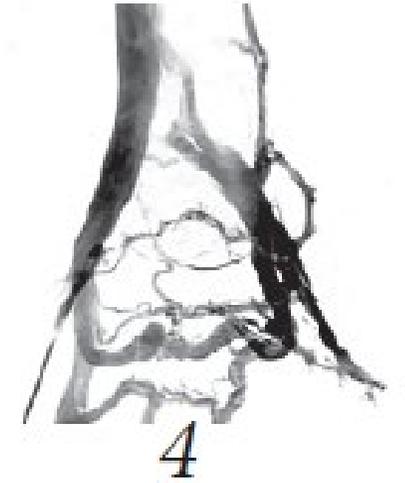
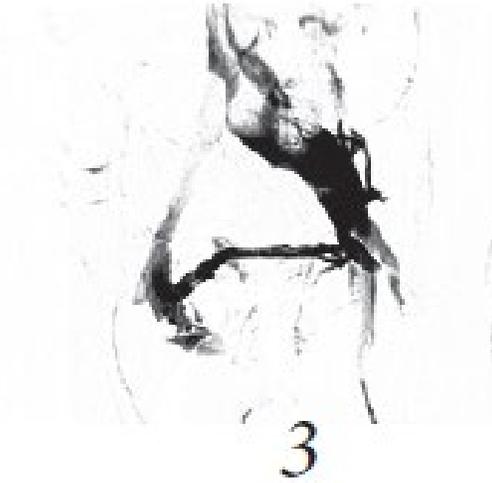


Rechercher la source d'embolie?

Rechercher:

1. ATCD de MVTE, varices, hémorroïdes etc...
2. ATCD de thrombophilie
3. ATCD autre d'embolie
4. ATCD familial d'AVC jeune voire de FOP
5. Type d'AVC
6. Circonstance: immobilisation, voyages, SAS
7. Autre grande cause d'embolie (FA)
8. La probabilité que l'AVC soit lié au FOP (Rope score)
9. Migraines
10. Sévérité emboligène du FOP (shunt, ASIA, Chiari, Eustachi)

Interrogatoire - imagerie



MVTE;
Varicocèles;
Hémorroïdes;
Saphenectomies;

Indications pour fermer?

Libellés

PFO closure

Transcatheter PFO closure is recommended in patients fulfilling all the following criteria:

- age 16–60 years
- recent (≤ 6 months) ischaemic stroke (although this delay can be extended if prolonged detection of AF is necessary);
- PFO associated with an ASA (> 10 mm) or with a right-to-left shunt > 20 microbubbles (a large shunt was defined in RCTs by the passage of > 20 , 25 or 30 microbubbles) or a diameter ≥ 2 mm;
- PFO felt to be the most likely cause of the stroke after a thorough aetiological evaluation by a stroke specialist (see Tables A1, A2 and A3).

Arch Cardiovasc Dis. 2019;112(8-9):532-542

« The position of our societies is to perform percutaneous closure of a PFO in carefully selected patients aged from 18 to 65 years with a confirmed cryptogenic stroke, TIA, or systemic embolism and an estimated high probability of a causal role of the PFO as assessed by clinical, anatomical and imaging features. »

EuroIntervention 2019;14:1389-1402

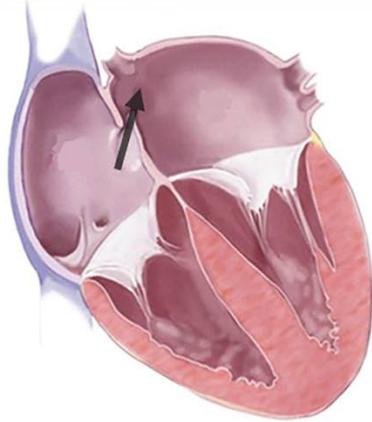
Peut-on fermer chez les > 60 ans?

Older patients

1,221 patients
Presumed PFO-related ischemic event
Percutaneous PFO closure



388 patients > 60 years



883 patients ≤ 60 years

Anatomic characteristics:
Moderate/Large R-L shunt 89.7%
Interatrial septal aneurysm 61.4%

Anatomic characteristics:
Moderate/Large R-L shunt 63%
Interatrial septal aneurysm 43.3%

STROKE

0.59 events per 100 patient-years

IRR: 6.1 (95%CI 1.7-27.3)

0.09 events per 100 patient-years

TIA

1.05 events per 100 patient-years

IRR: 4.6 (95%CI 1.96-12.1)

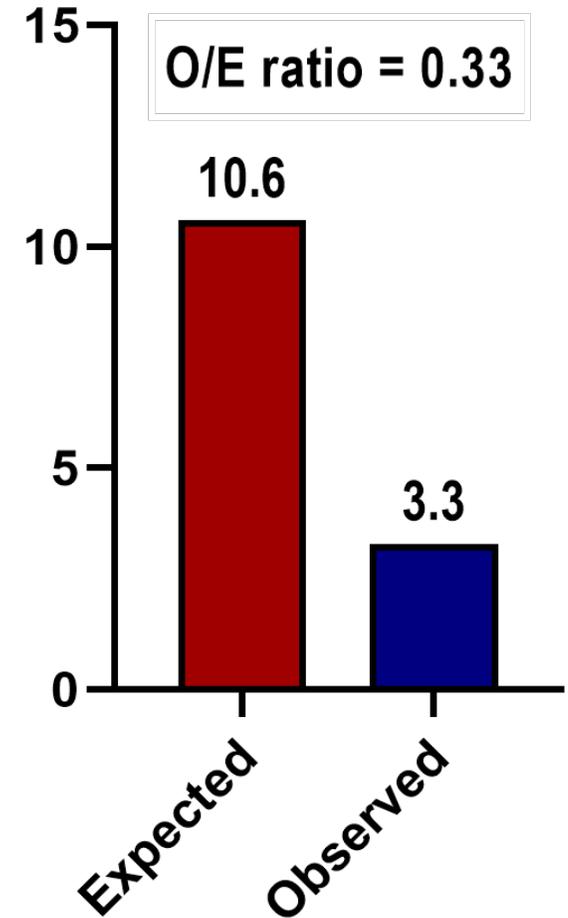
0.22 events per 100 patient-years

STROKE/TIA

1.64 events per 100 patient-years

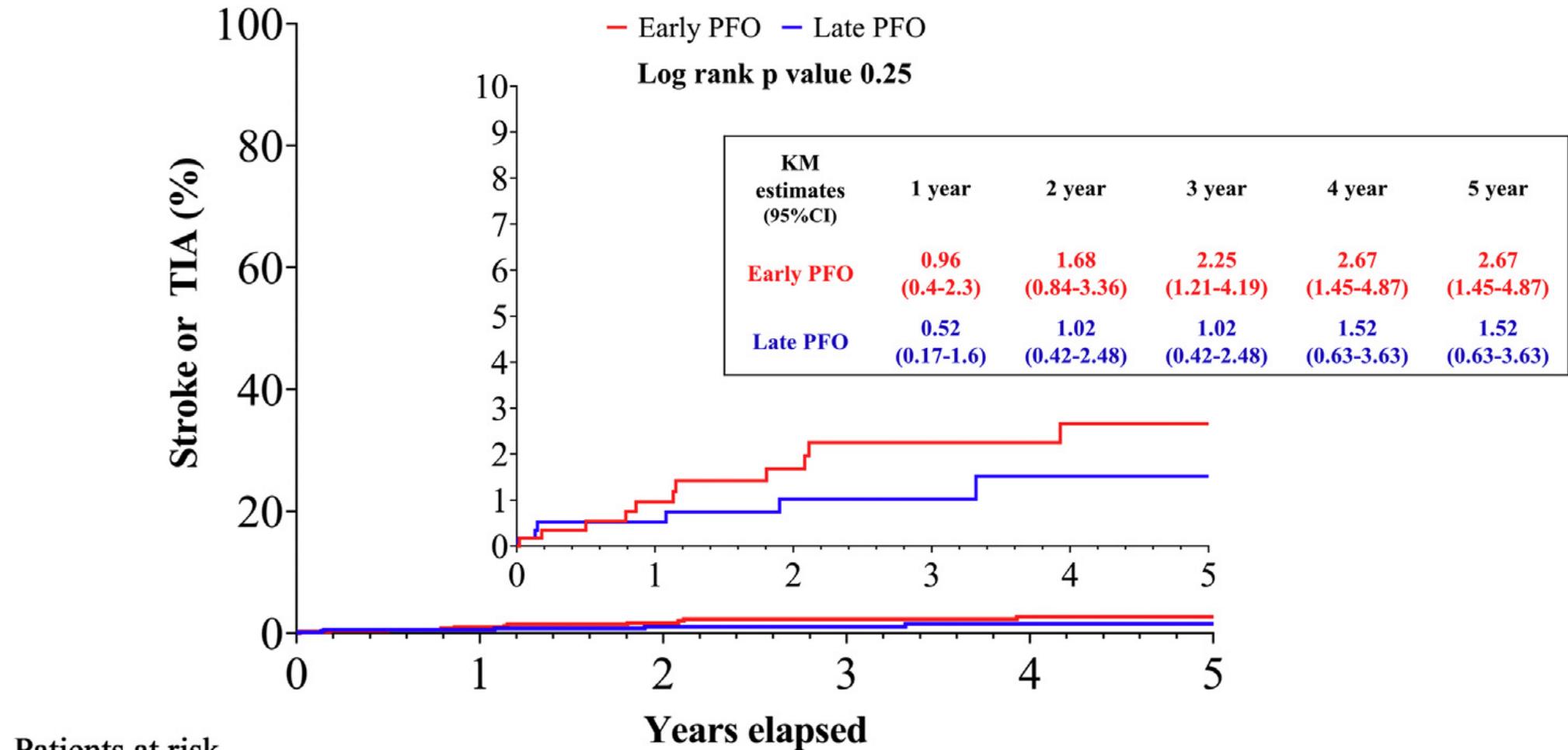
IRR: 4.7 (95%CI 2.36-9.80)

0.34 events per 100 patient-years



Peut-on fermer les « vieux » AVC de > 6 mois?

Older strokes



Patients at risk	0	1	2	3	4	5
Early PFO	590	449	354	273	233	209
Late PFO	589	462	347	225	172	158

Risque d'AC/FA post-fermeture?

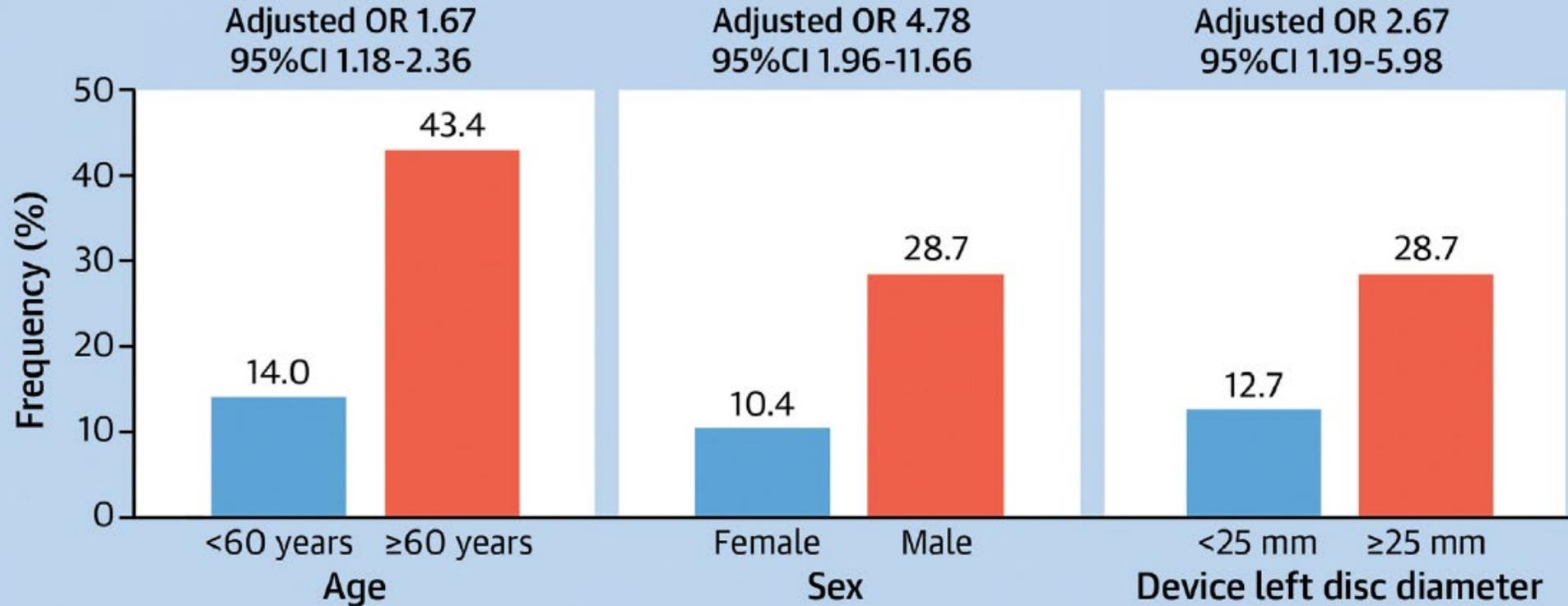
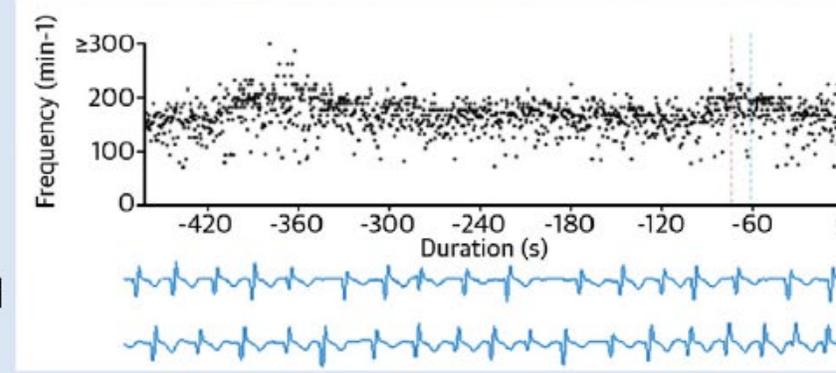
Supraventricular Arrhythmia Following Patent Foramen Ovale Percutaneous Closure

Paul Guedeney, MD,^a Mikael Laredo, MD,^a Michel Zeito Thomas Wallet, MD,^a Benjamin Elegamandji, MD,^a Soni Candice Sabben, MD,^d Sandrine Deltour, MD, PhD,^e Mic Jean-Philippe Collet, MD, PhD,^a Stéphanie Rouanet, MS Gilles Montalescot, MD, PhD^a



Overall: 20.9%

- Intrahospital postprocedural: 4.4%
- External loop recorder-monitored patients: 9.9%
- Implantable loop recorder-monitored patients: 28.9%



Traitement antiplaquettaire après fermeture de FOP?



JOURNAL ARTICLE CORRECTED PROOF

Impact of the antiplatelet strategy following patent foramen ovale percutaneous closure [Get access >](#)

Paul Guedeney, Julio I Farjat-Pasos, Gabriel Asslo, Vincent Roule, Farzin Beygui, Alexis Hermida, Paul Gabrion, Laurent Leborgne, Christine Houde, Florent Huang, Benoit Lattuca, Florence Leclercq, Jules Mesnier, Jérémie Abtan, Stéphanie Rouanet, Nadjib Hammoudi, Jean-Philippe Collet, Michel Zeitouni, Johanne Silvain, Gilles Montalescot ✉, Josep Rodés-Cabau, for the AIR-FORCE Task Force

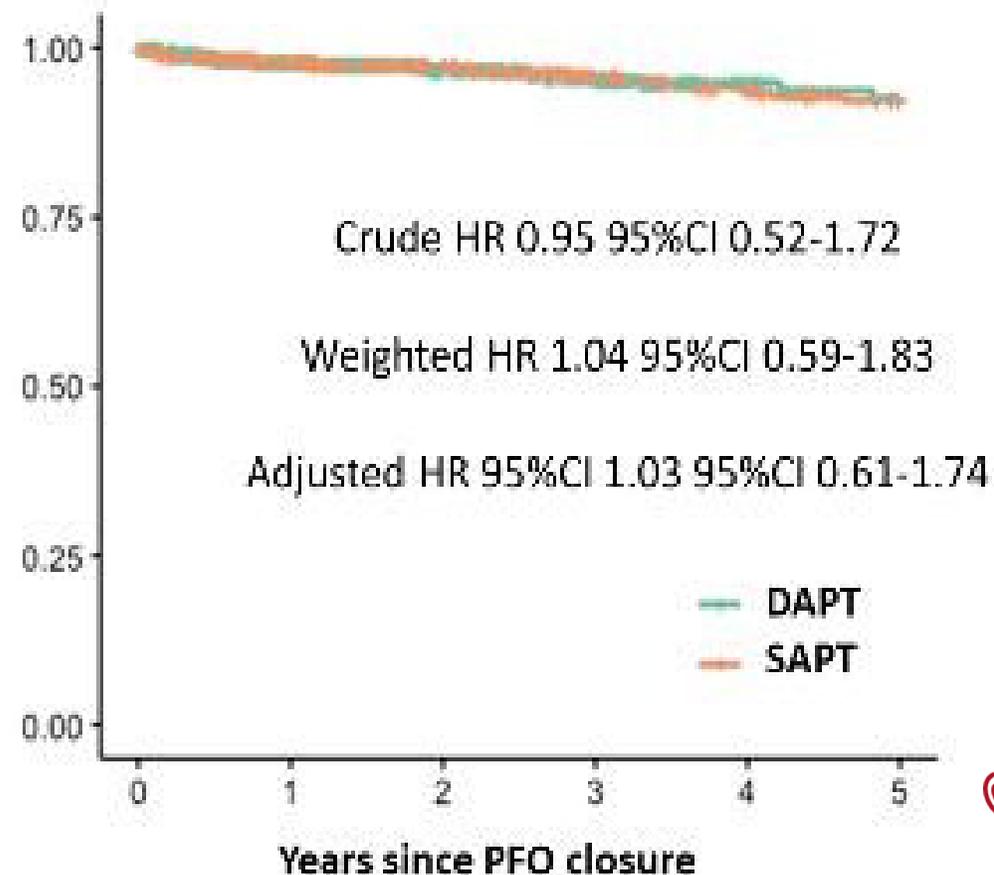
European Heart Journal - Cardiovascular Pharmacotherapy, pvad023, <https://doi.org/10.1093/ehjcvp/pvad023>

Published: 24 March 2023 **Article history** ▾

Antiplatelet therapy following PFO closure

- **Dual antiplatelet therapy at discharge**
 - 933 patients mostly from French centers
 - DAPT Duration: 3 months or less in 96.9% of the cases
- **Single antiplatelet therapy at discharge**
 - 599 patients mostly from Canadian center
 - ASA in 89.3% of the cases

Survival free of death, stroke, TIA, peripheral arterial embolism, MI, or BARC type ≥ 2 bleeding



Large registre national et international de FOP

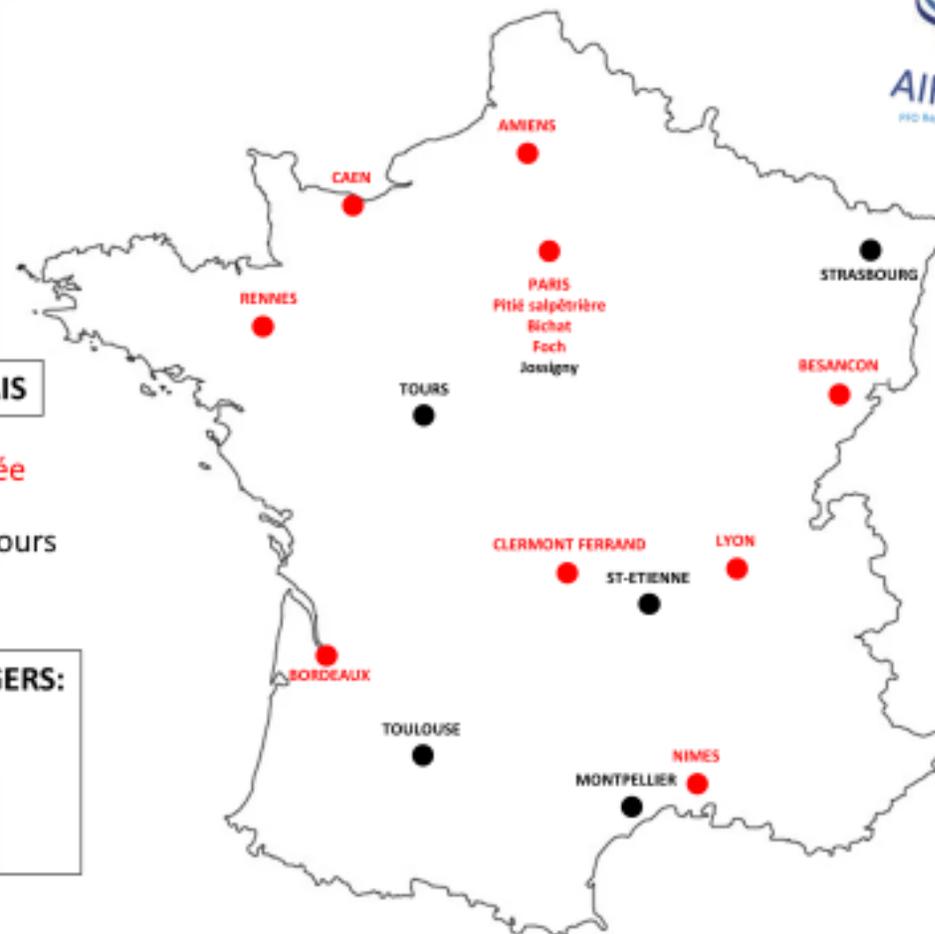


CENTRES FRANCAIS

- Convention signée
- Convention en cours De signature

CENTRES ETRANGERS:

- Québec
- Amsterdam
- Turin
- Bergame

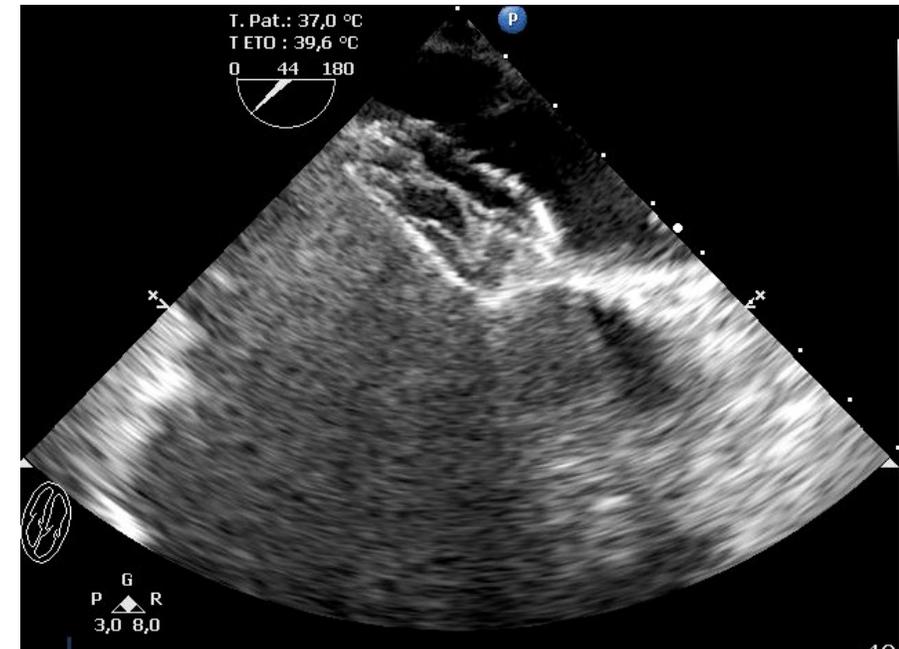
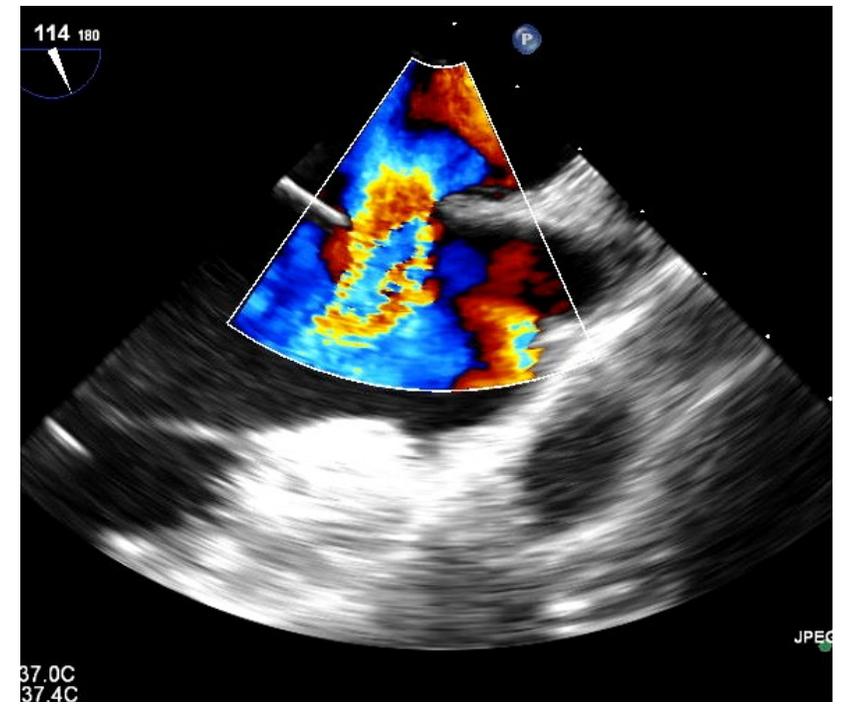
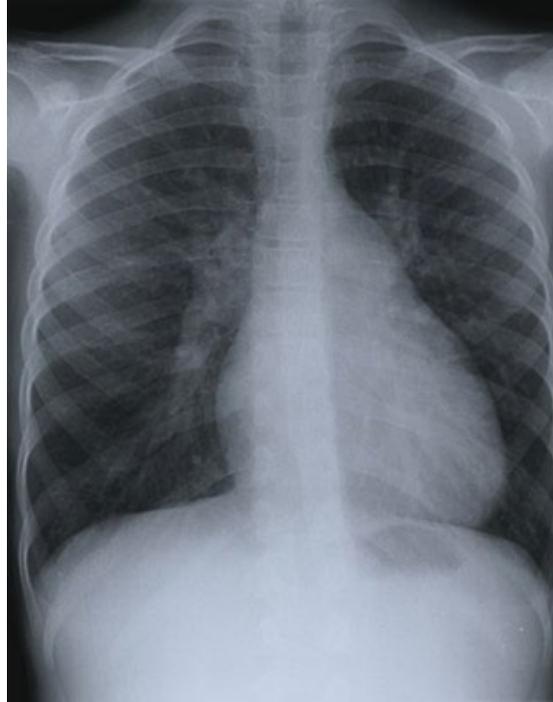
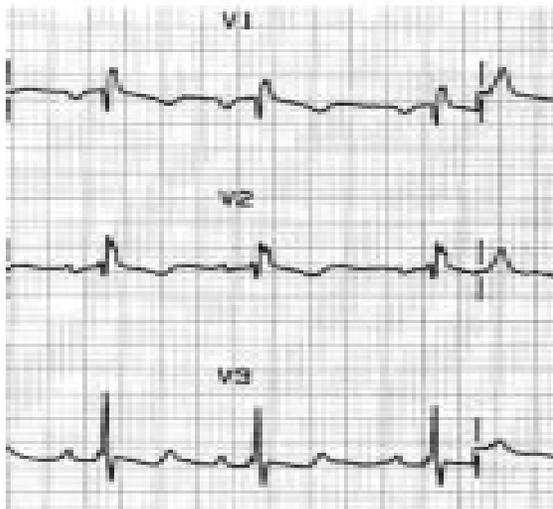


Indications de fermeture **percutanée** de CIA?

80% des CIA sont diagnostiquées à l'âge adulte

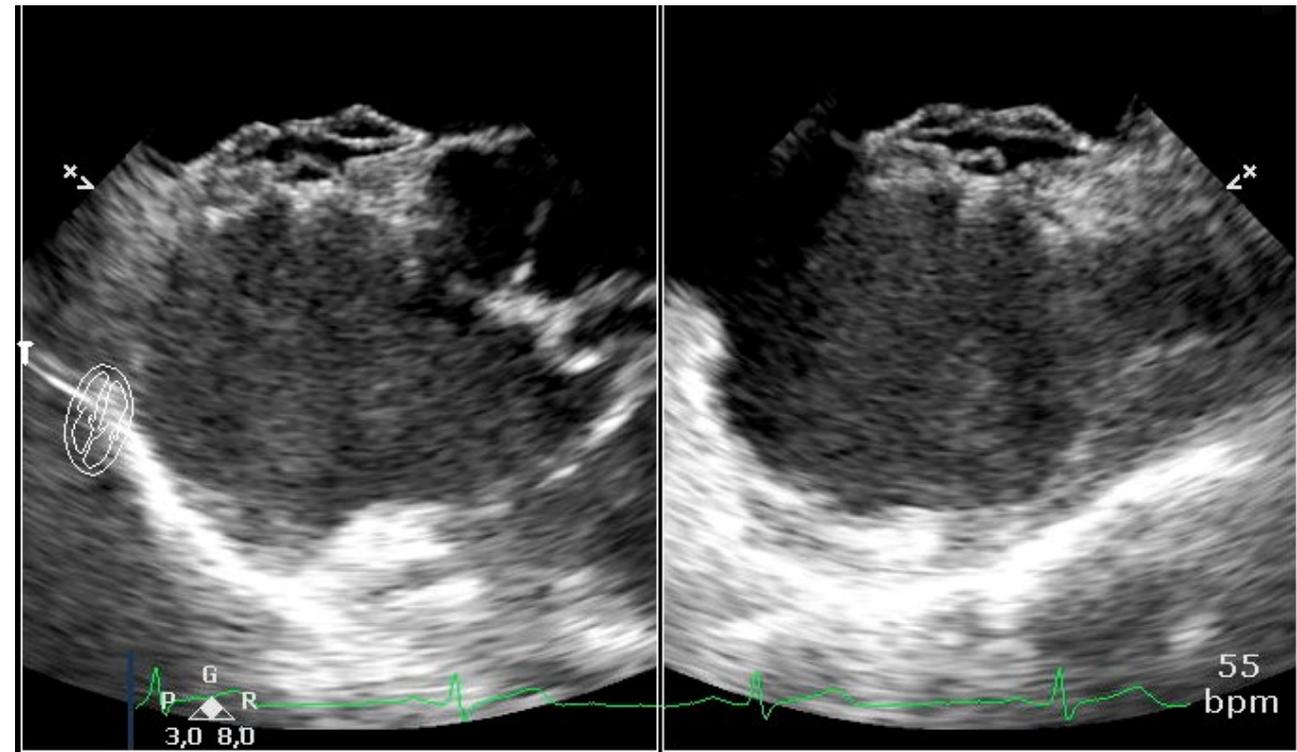
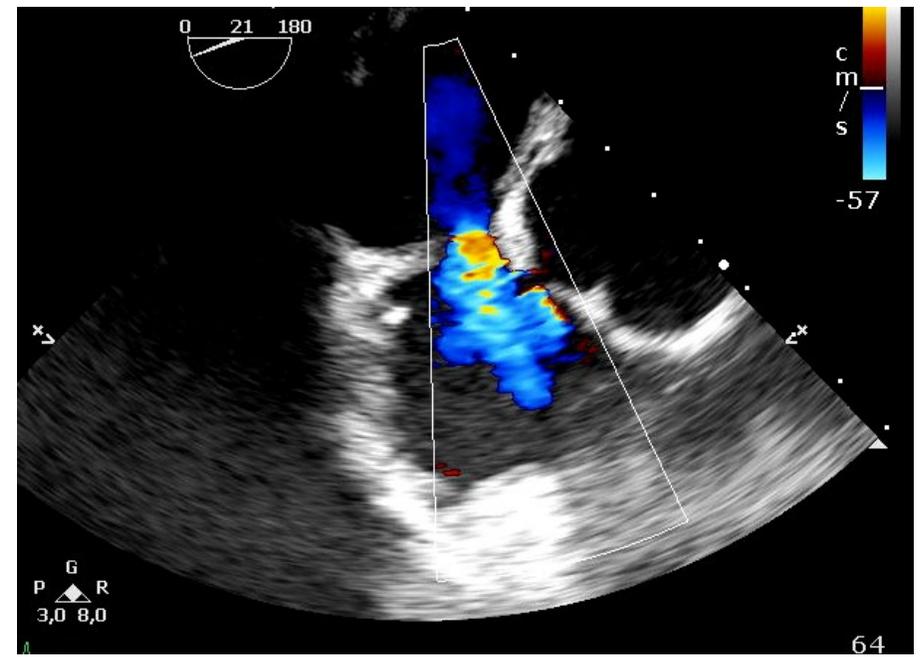
Cas#1: Mme Tin... 19 ans

- 2 grossesses
- NYHA IIb pendant 2ème grossesse
- Palpitations et dyspnée d'effort; BB2
- Echo: VD dilaté, PAPs 20mmHg, CIA OS de 16mm sans berge aortique, Qp/Qs: 1,7
- Scanner: pas de RVPA

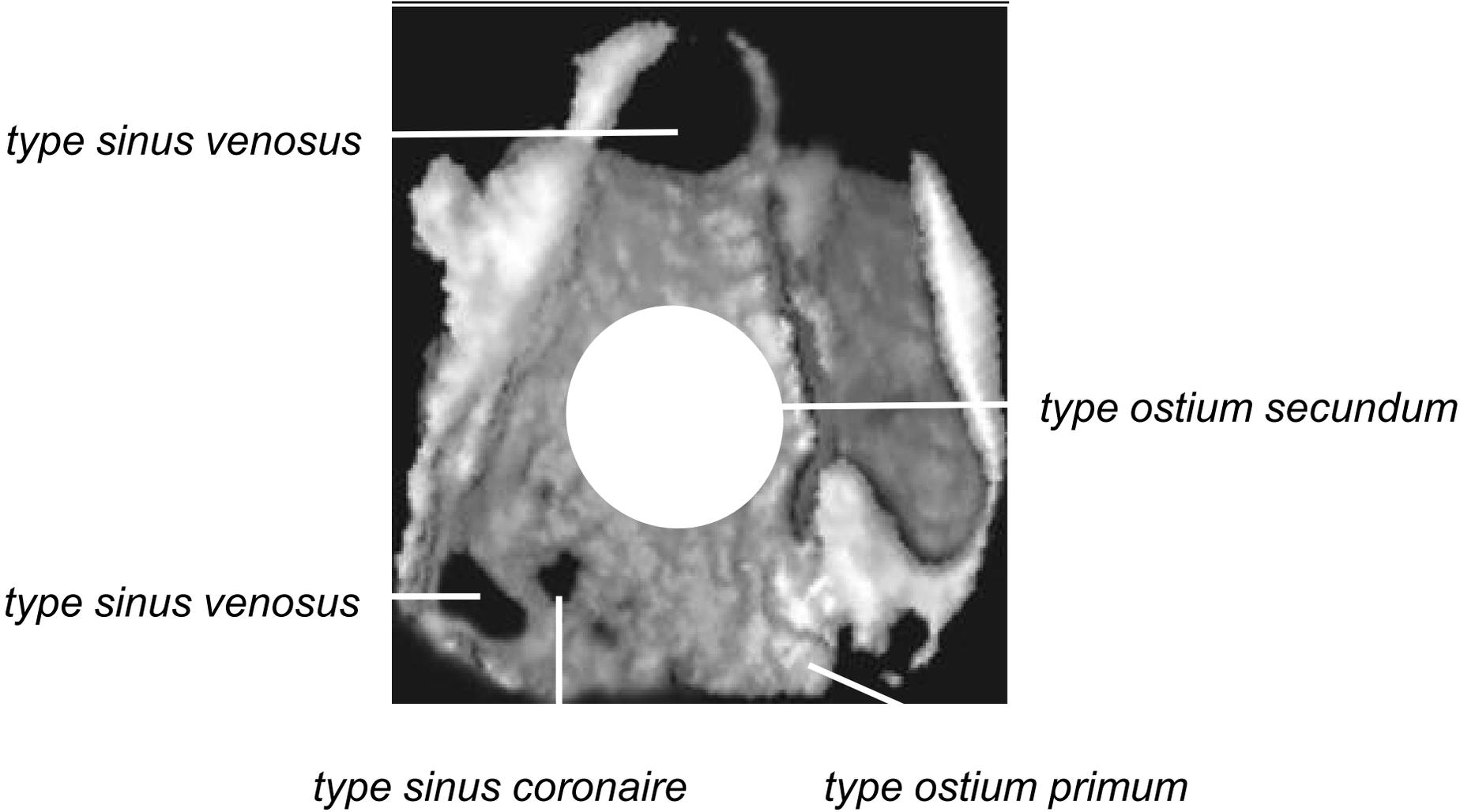


Cas#2: Mr Ngu... 50 ans

- AVCi
- Découverte CIA OS avec Qp/Qs: 1,1, VD dilaté, sans RVPa, pas de berge aortique mais berges de 10mm sup, 16mm post et 25mm inf.
- ECG RS, BBDI, PR NI



TYPES ANATOMIQUES



Indications

CONTRE-INDICATIONS

- Ostium primum, sinus venosus
- OS trop large (>40)
- Pas de berge inférieure
- Pas de berge sur >1/3 trou
- HTAP fixée

NON CONTRE-INDICATIONS

- Sujet âgé
- HTAP avec résistances <5 UW et Qp/Qs > 1.5 (vasodilatateurs)
- Risque d'embolie paradoxale

INDICATIONS

- Surcharge volumétrique cavités droites
- Qp/Qs > 1.5
- Embolie paradoxale
- Pas de maladie coronaire/valvulaire associée
- Pas de berge sur >1/3 trou

Test d'occlusion 15minutes?

-PTDVG +20mmHg ou +50%

-PAS -20%

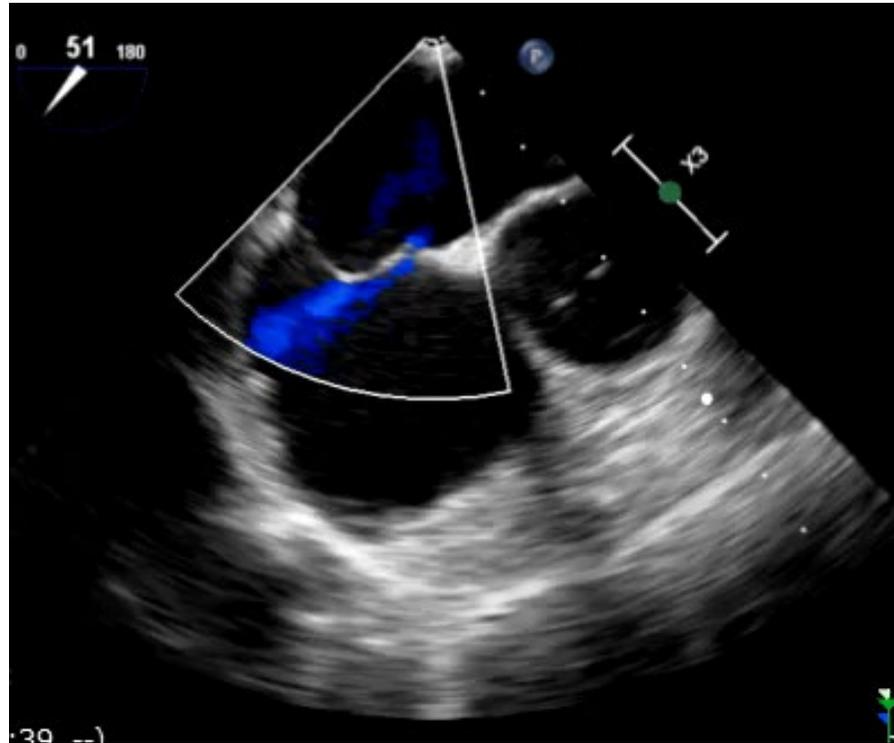
-OAP

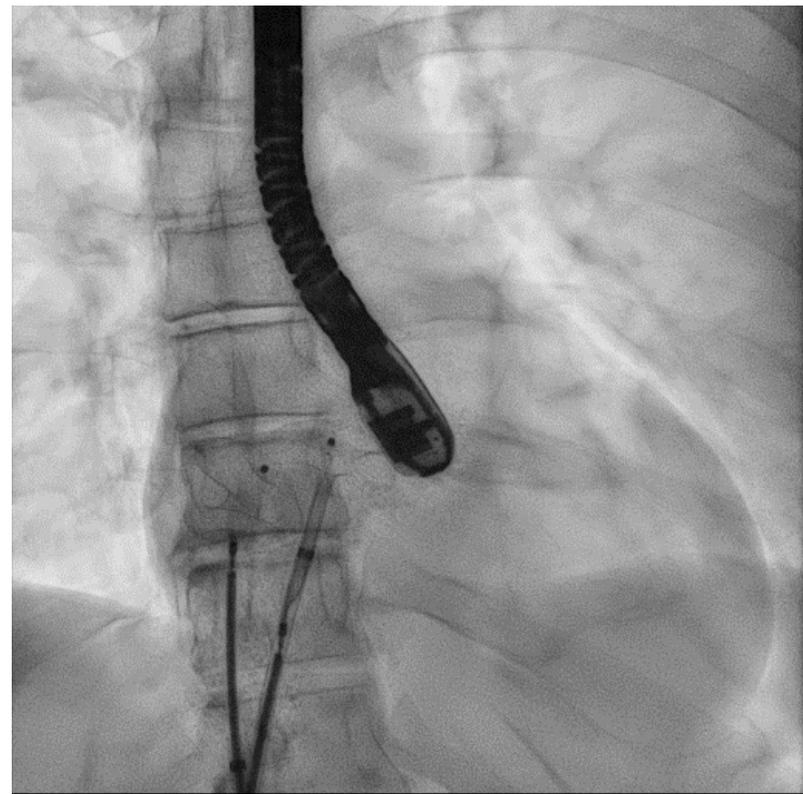
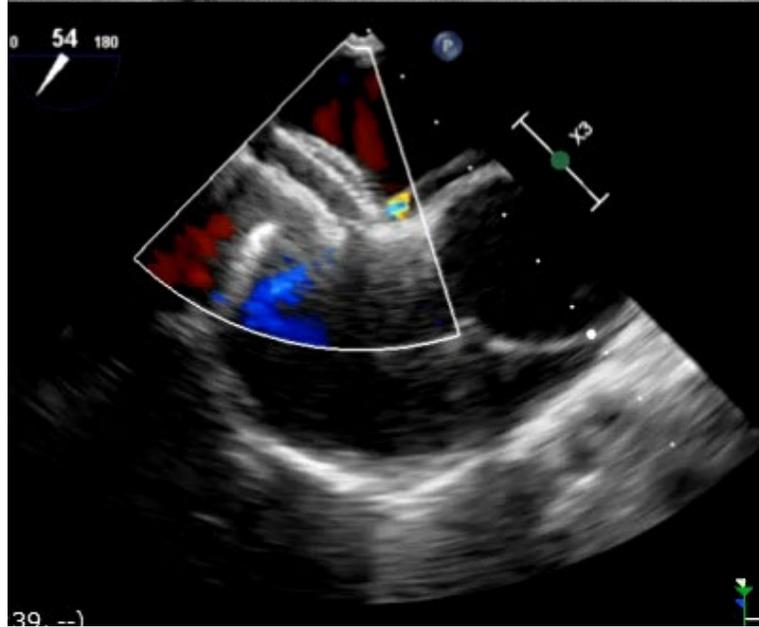
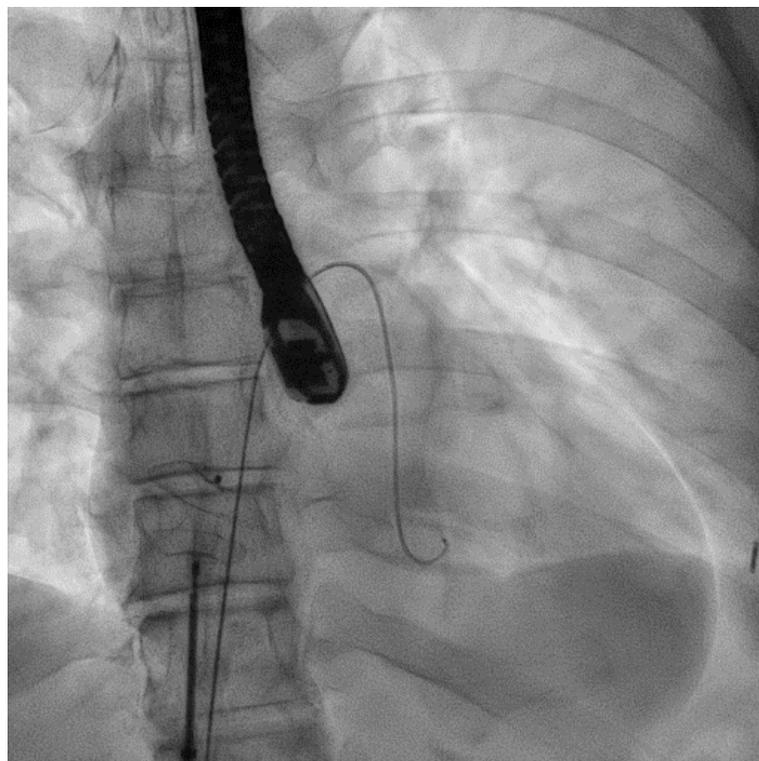
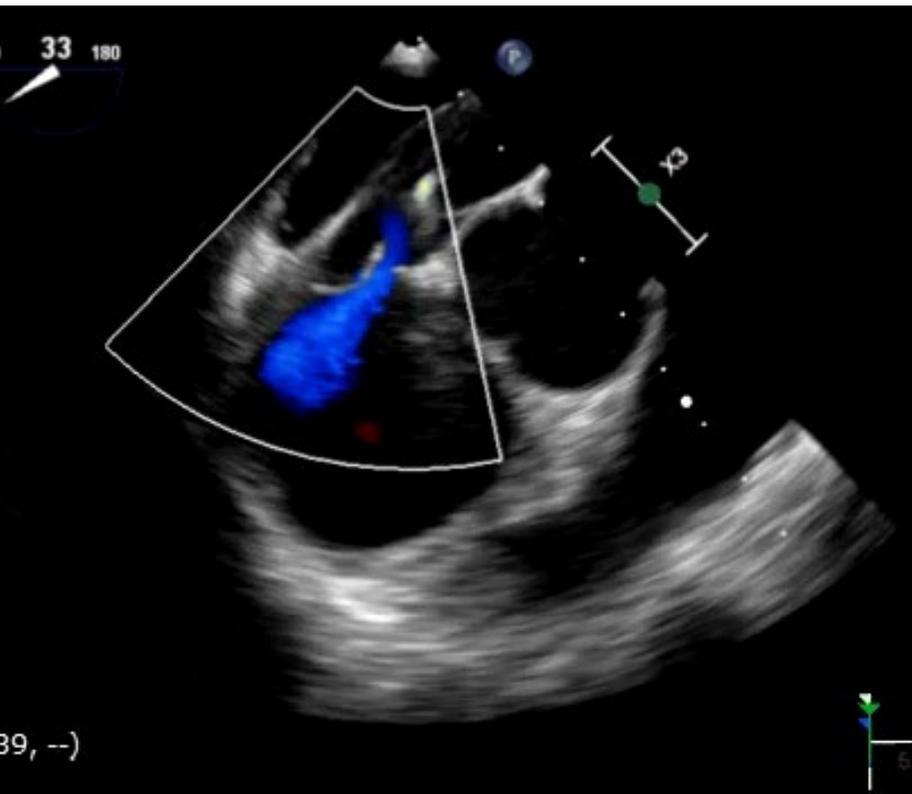
-HTAP

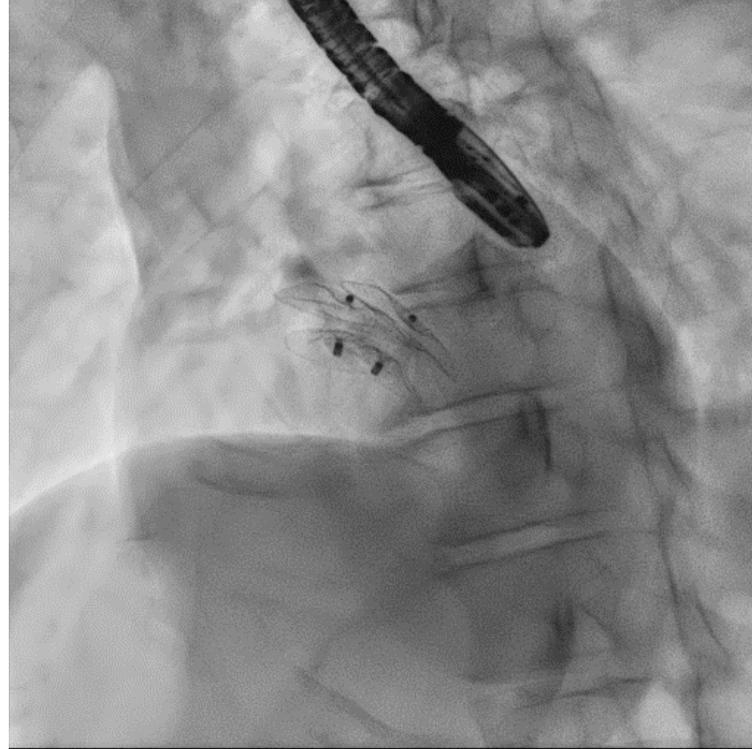
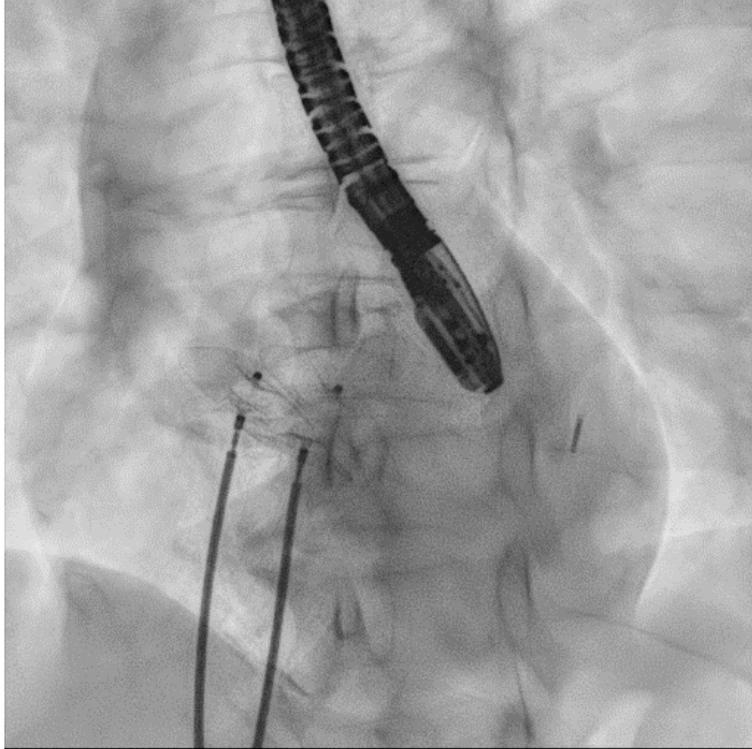
Traitement de la FA?

Scanner ou IRM?

Comment former **2 trous distants?**



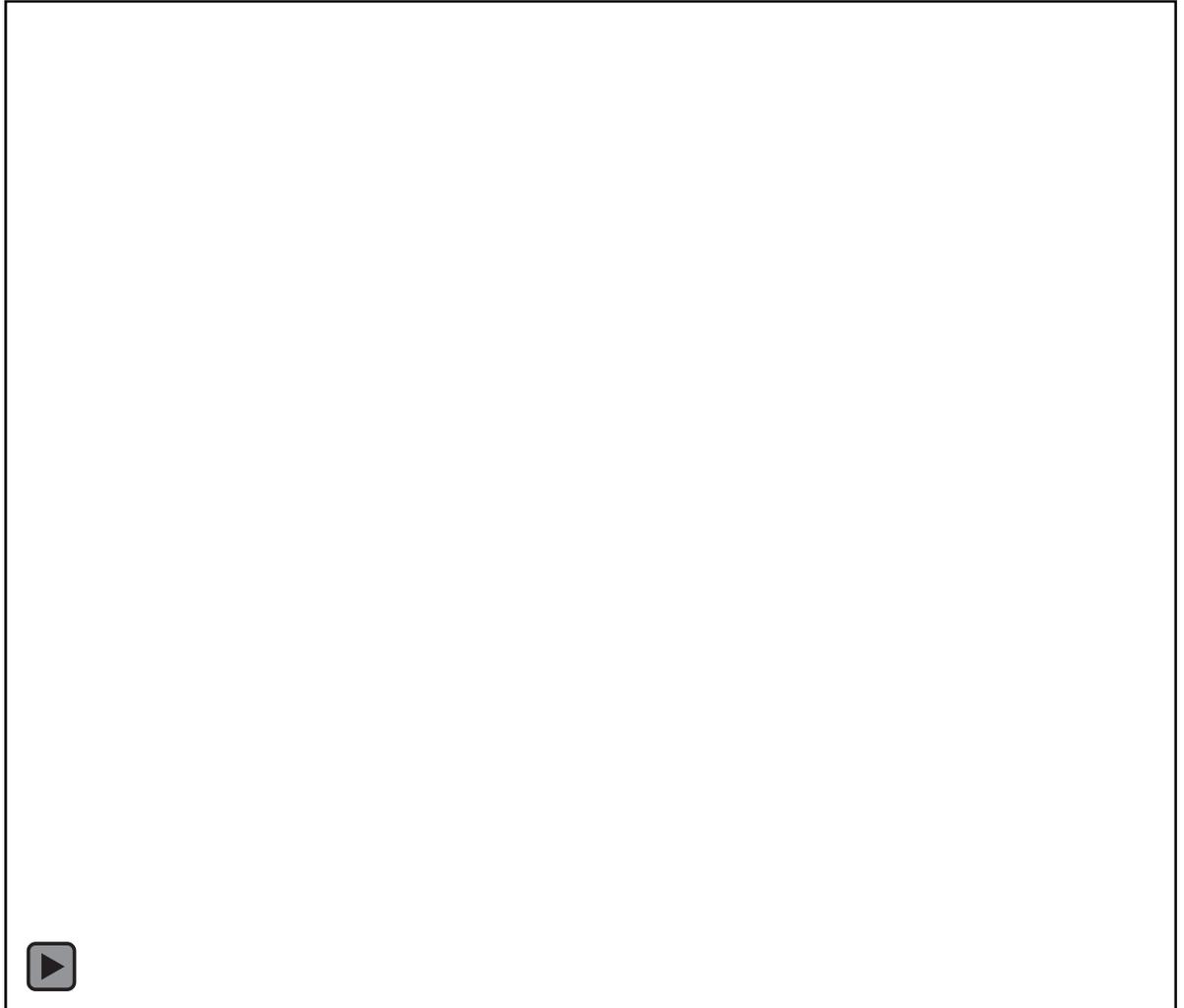




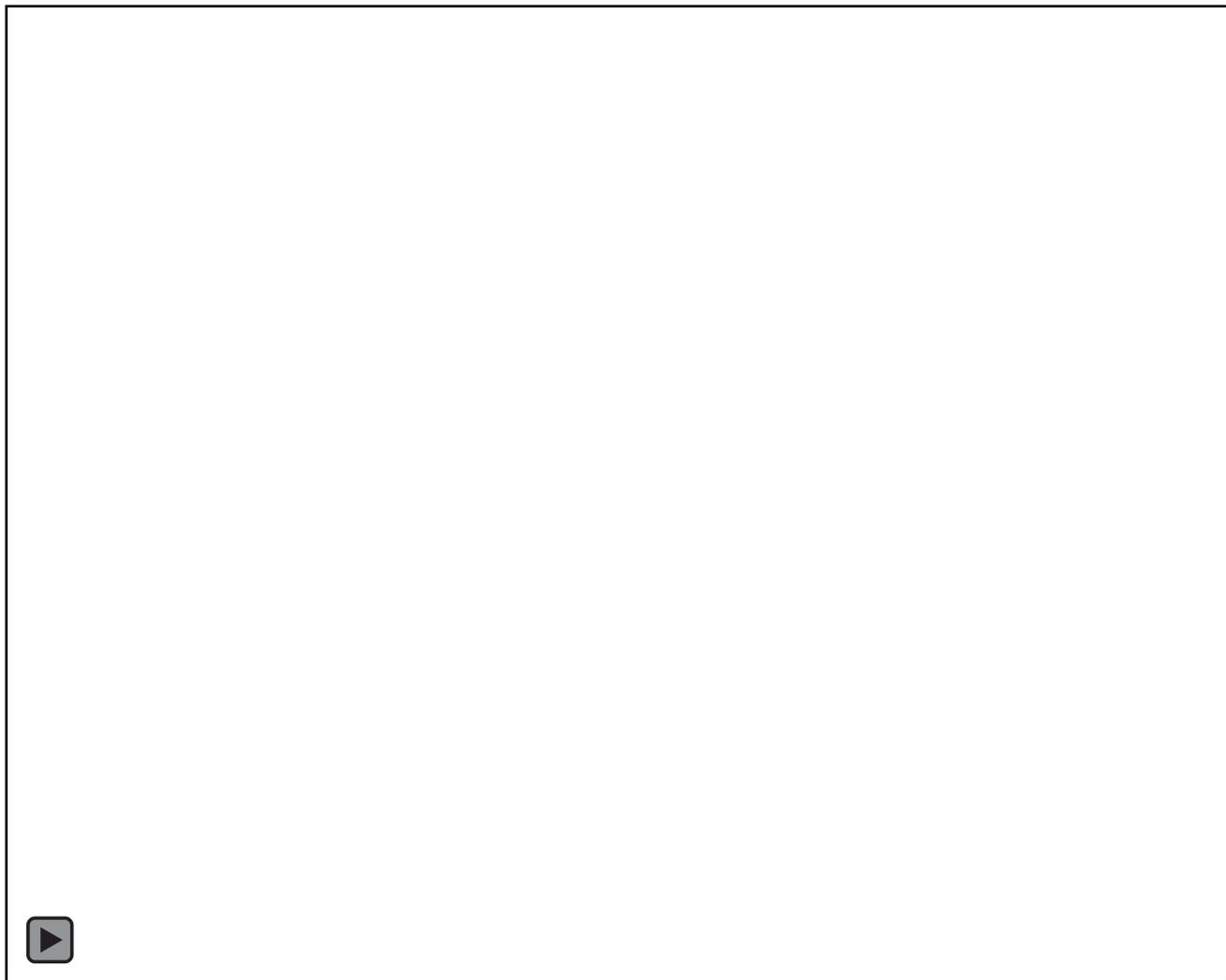
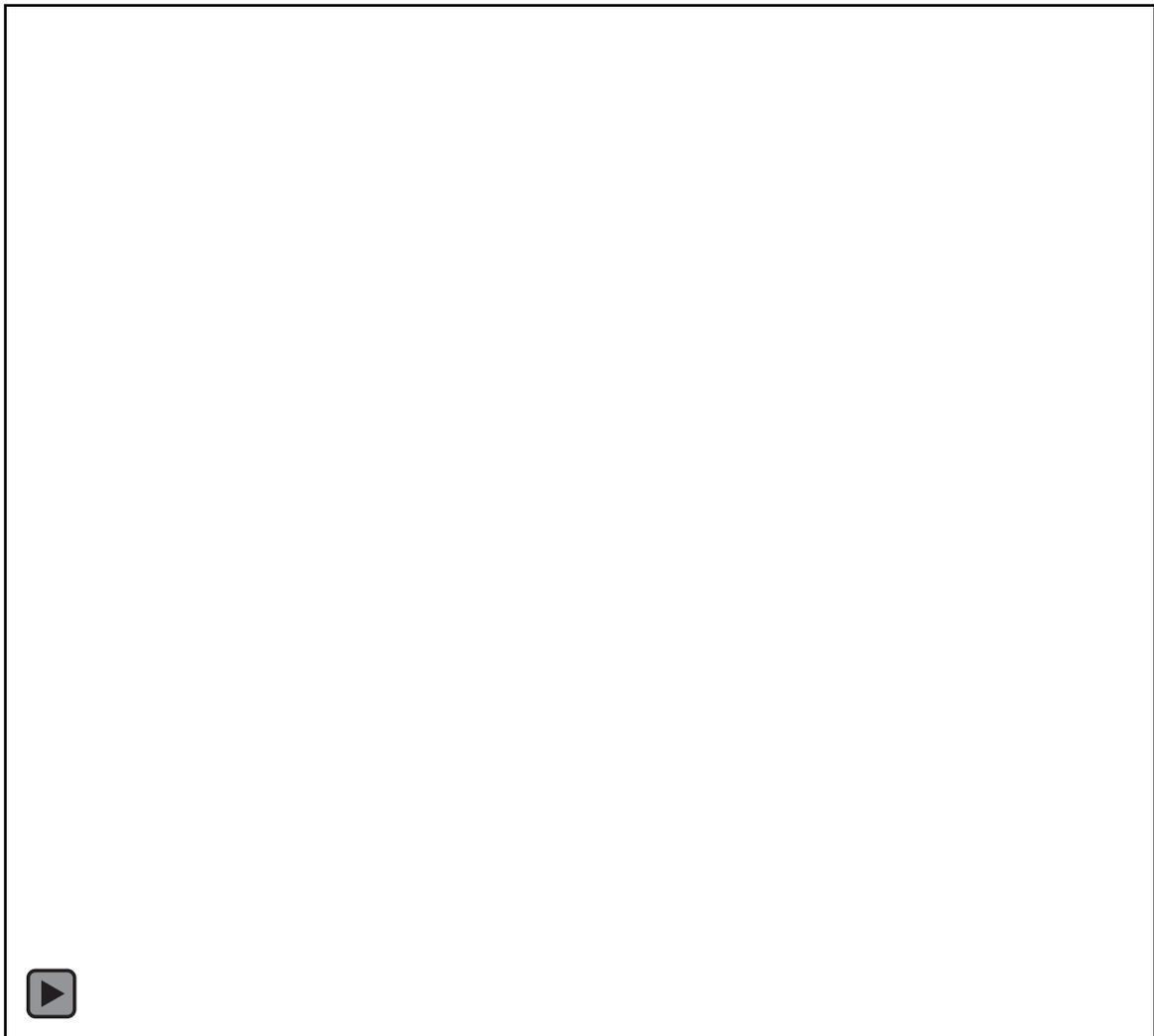
CIA multiperforées?

Cas délicat!

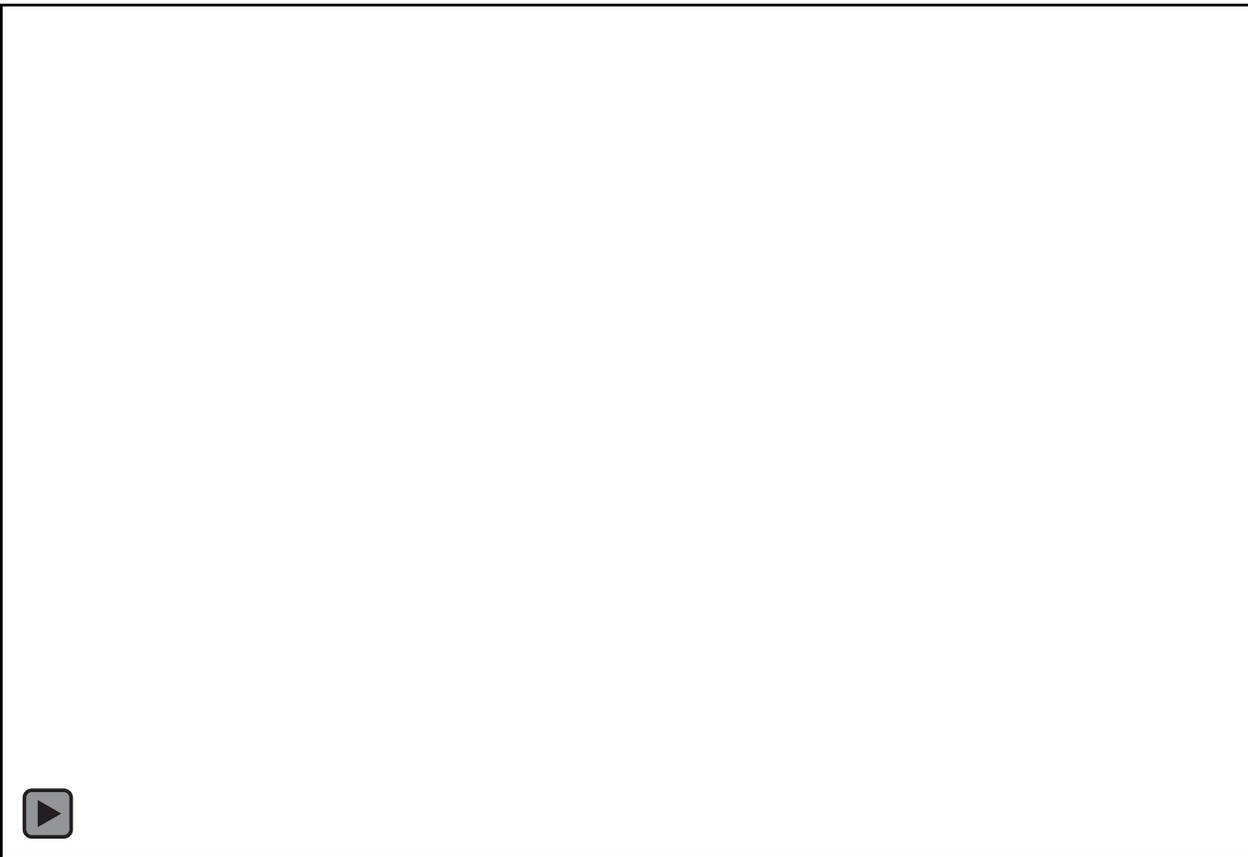
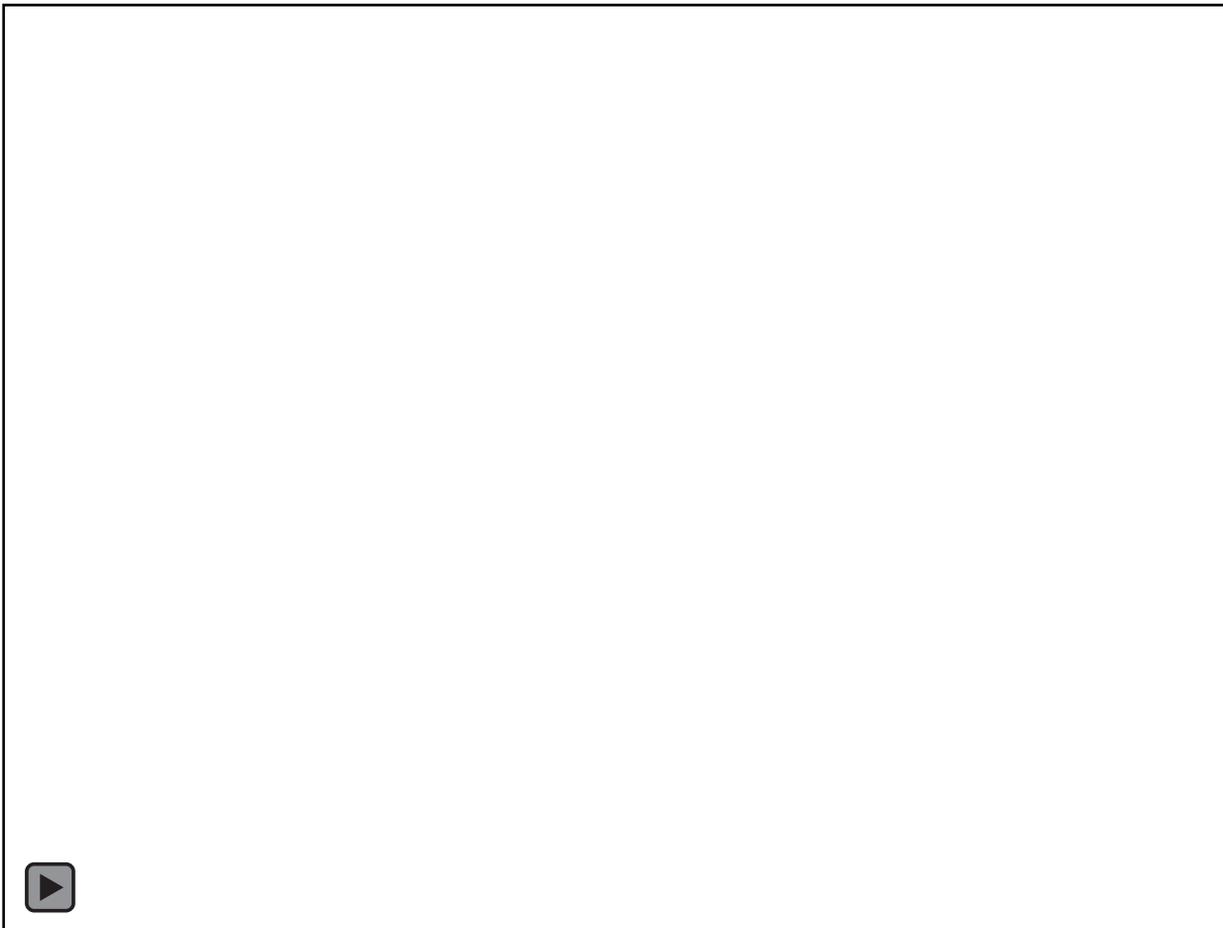
- Homme 55 ans (Cre...),
pécheur
- PFO / AVC
- Chirurgie discutée
localement
- Décision de fermeture
percutanée à la Pitié











Final result



Conclusions

