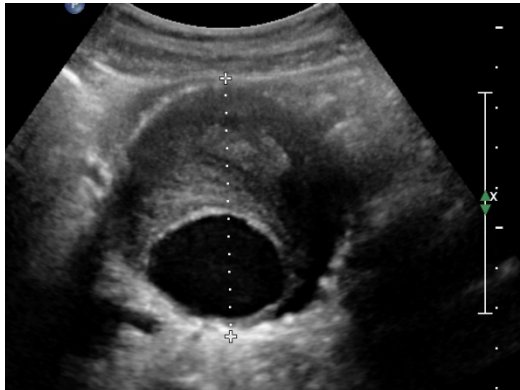


Surveillance par écho-doppler des traitements chirurgicaux et endovasculaires des anévrismes de l'aorte abdominale



SUIVI POST-OPÉRATOIRE

Chirurgie conventionnelle

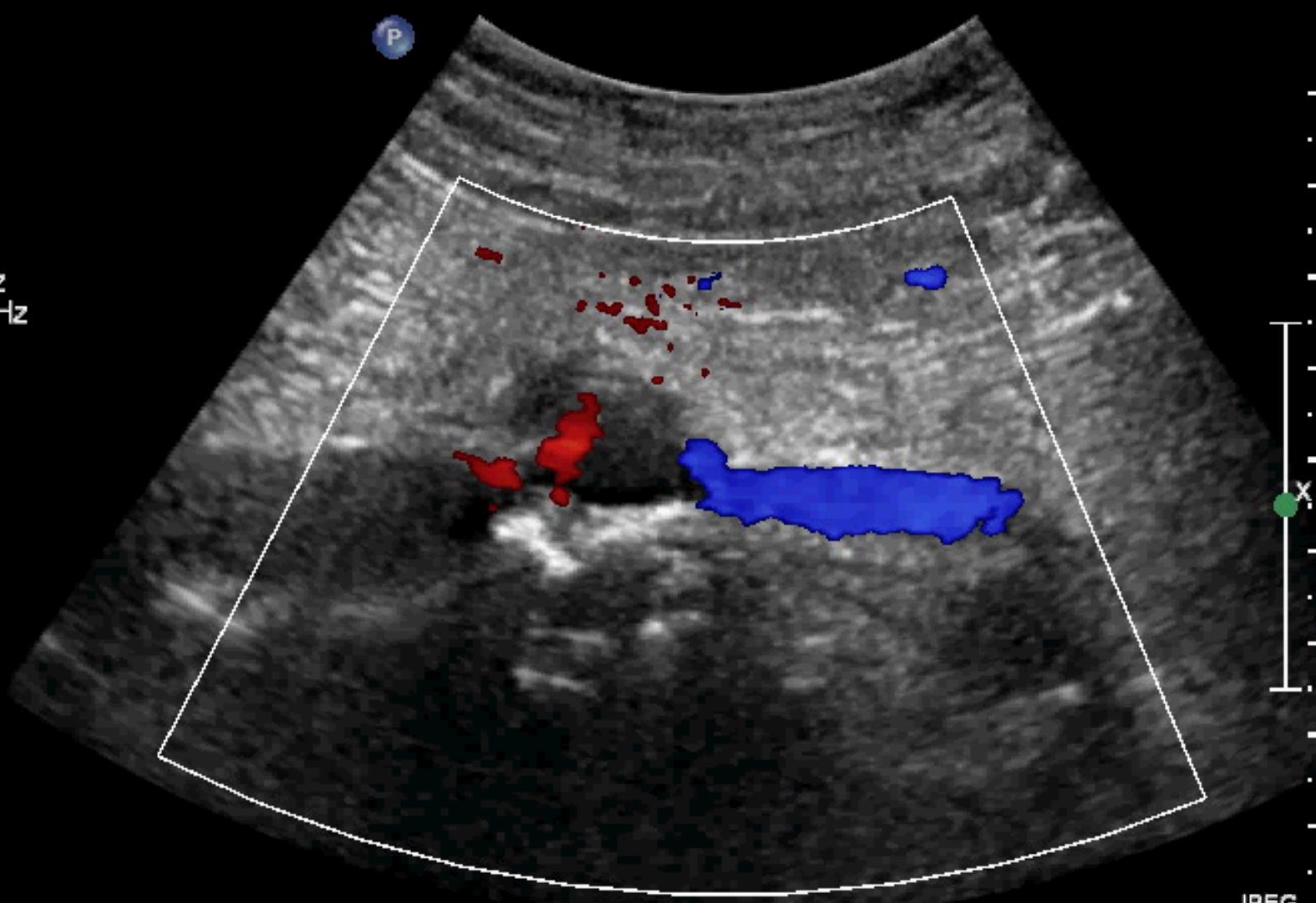
- Faux anévrismes anastomotiques
- Infection de prothèse
- Sténose ou occlusion de branche
- Autres localisations anévrismales

CI 11Hz
RP

2D
34%
C 55
P Moy
HGén

Coul
53%
1982Hz
FP 108Hz
Moy

C3 C4
+25.4



JPEG
9.0

*** bpm

CI 20Hz
RP

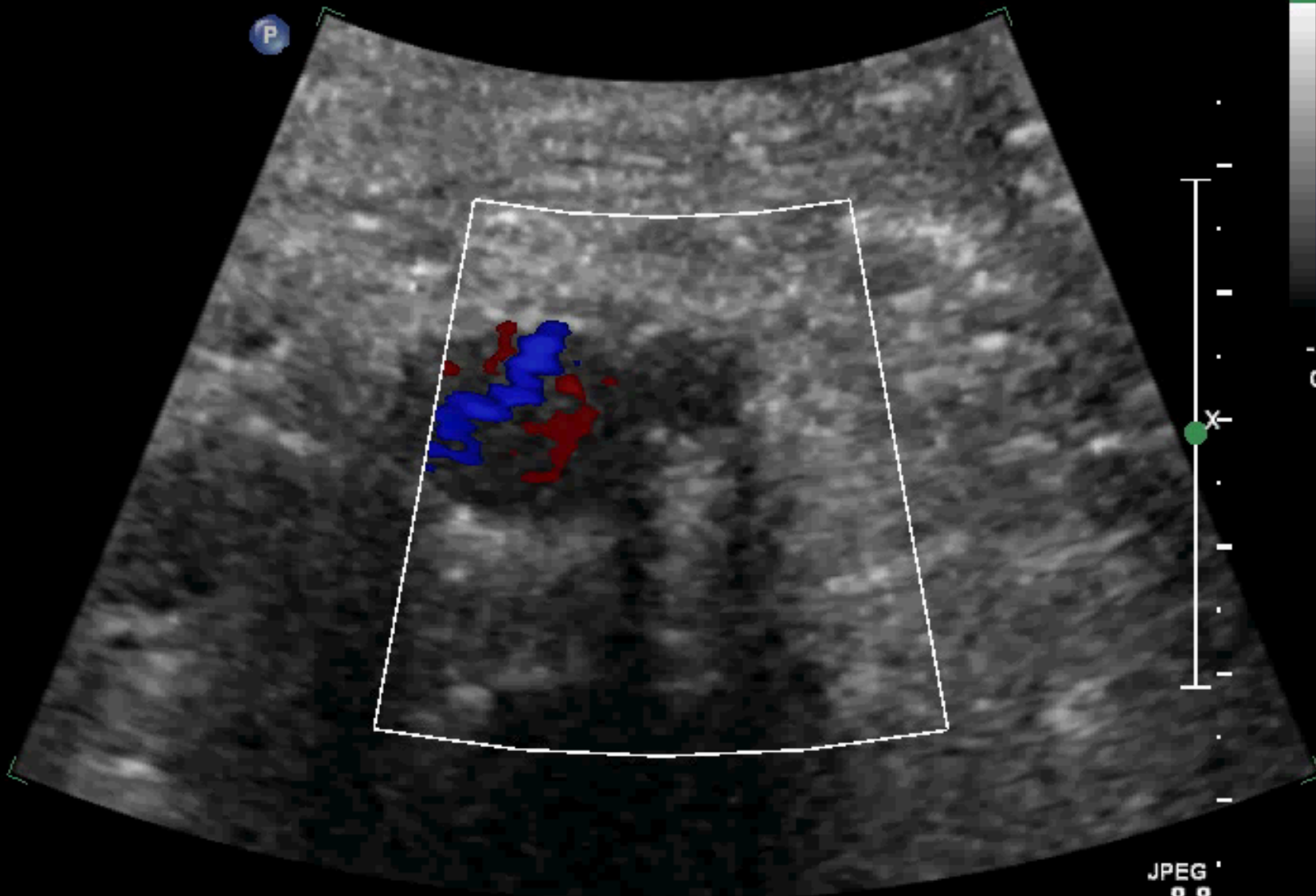
2D
36%
C 55
P Moy
HGén

Coul
53%
1982Hz
FP 108Hz
Moy

C3 C4
+25.4



-25.4
cm/s



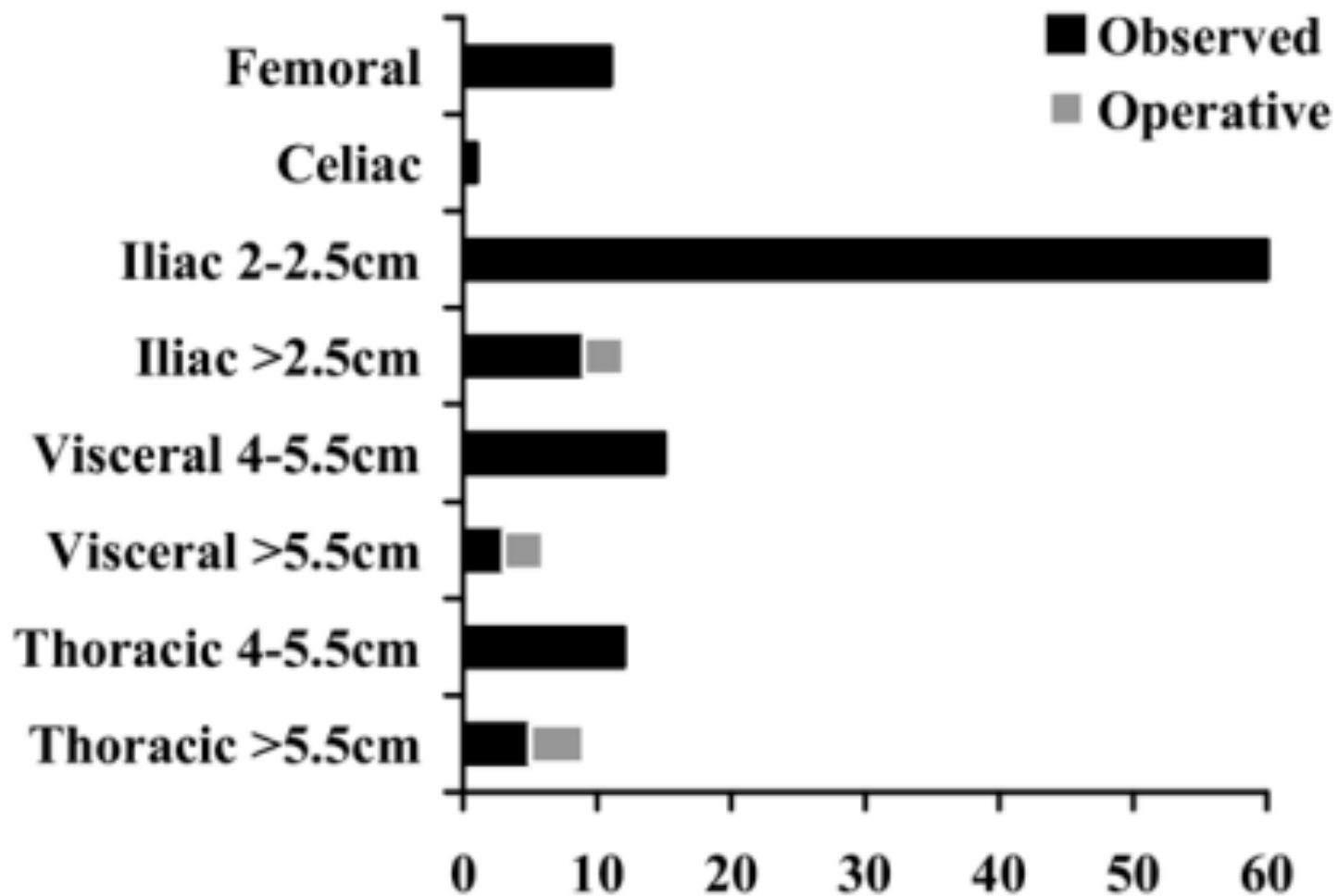
JPEG
8.8

*** bpm

SUIVI POST-OPÉRATOIRE

Chirurgie conventionnelle

- 157 patients suivis en moyenne 87 mois
- 7 faux anévrysmes anastomotiques 4% (4 opérés)
- 4 occlusions de branche 2,5%
- 2 infections de prothèse 1,3%
- **Autres anévrysmes : 68 patients (43%)**



SUIVI POST-OPÉRATOIRE

Chirurgie conventionnelle

We suggest noncontrast-enhanced CT imaging of the entire aorta at 5-year intervals after open repair or EVAR.

Level of recommendation 2 (Weak)

Quality of evidence C (Low)

○ **Recommandé :**

- Scanner non injecté à 5 ans

○ **En pratique :**

- Echo-doppler annuel

Journal of Vascular Surgery
January 2018

The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm

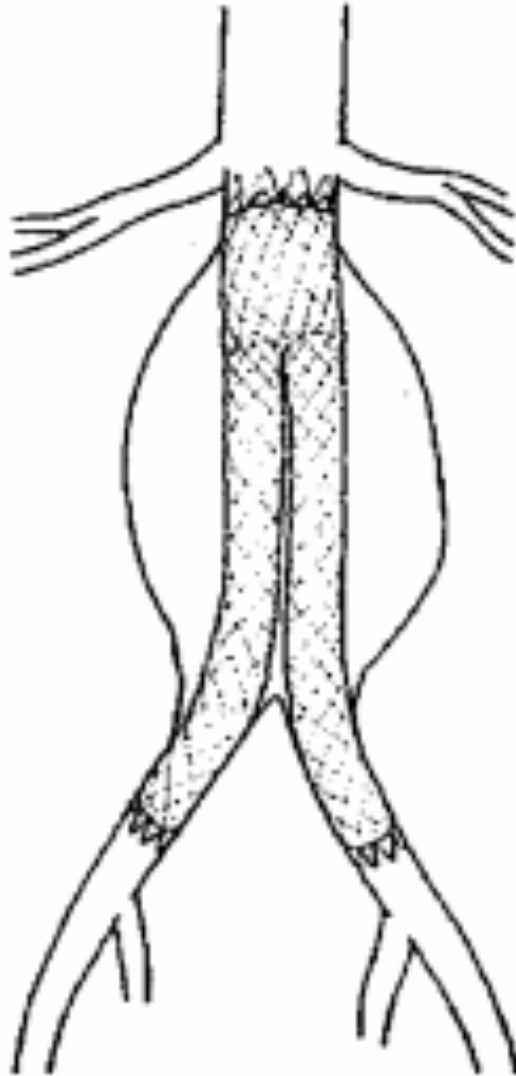


Elliot L. Chaikof, MD, PhD,^a Ronald L. Dalman, MD,^b Mark K. Eskandari, MD,^c Benjamin M. Jackson, MD,^d W. Anthony Lee, MD,^e M. Ashraf Mansour, MD,^f Tara M. Mastracci, MD,^g Matthew Mell, MD,^b M. Hassan Murad, MD, MPH,^h Louis L. Nguyen, MD, MBA, MPH,ⁱ Gustavo S. Oderich, MD,^j Madhukar S. Patel, MD, MBA, ScM,^{a,k} Marc L. Schermerhorn, MD, MPH,^g and Benjamin W. Starnes, MD,^l
Boston, Mass; Palo Alto, Calif; Chicago, Ill; Philadelphia, Pa; Boca Raton, Fla; Grand Rapids, Mich; London, United Kingdom; Rochester, Minn; and Seattle, Wash

SUIVI POST OPÉRATOIRE

Endoprothèses aortiques abdominales

- Croissance du sac anévrismal résiduel
- Endofuites
- Evolution anévrismale des collets
- Sténose ou thrombose



ENDOPROTHESE AORTOBILIAQUE

COMPLICATIONS

- 10-20% d'endofuites → II
- 5-10% de sténose ou occlusion
- 2% de migration
- 2% de conversion
- 2% de rupture

TRAITEMENT ENDOVASCULAIRE

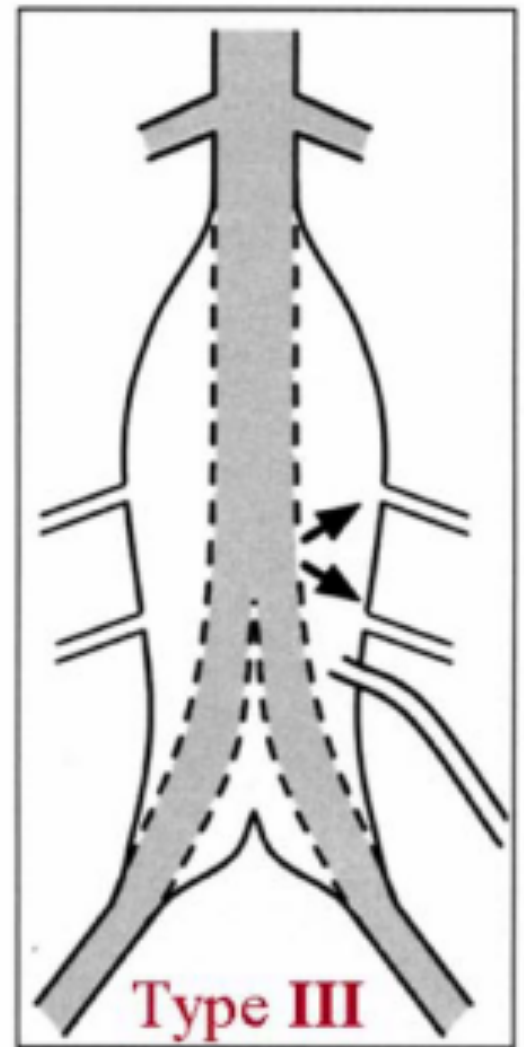
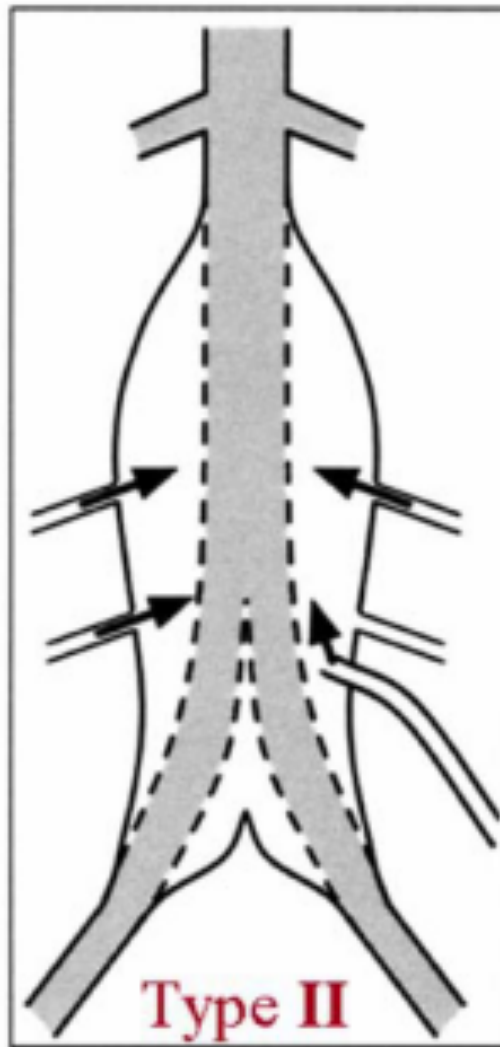
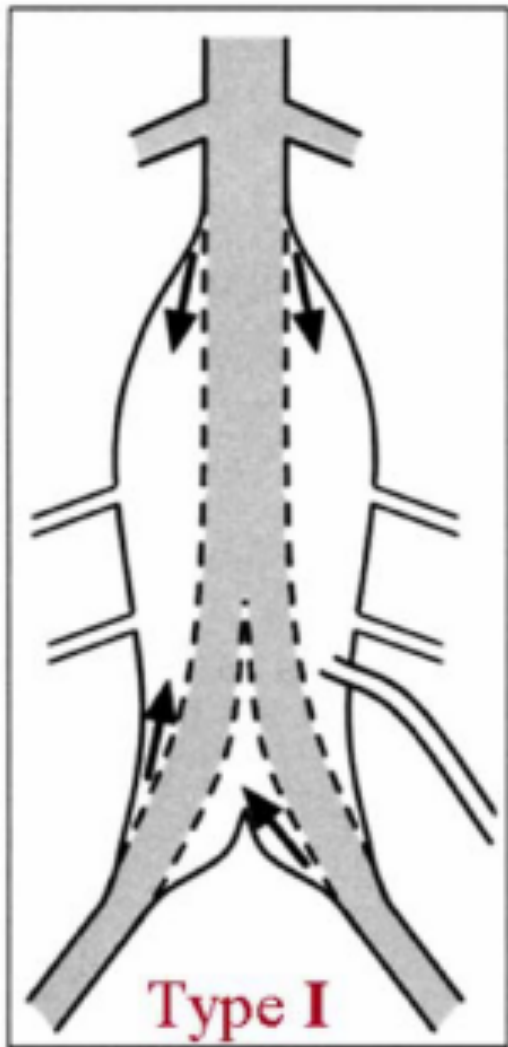
COMPLET

=

PROCEDURE

+

SURVEILLANCE



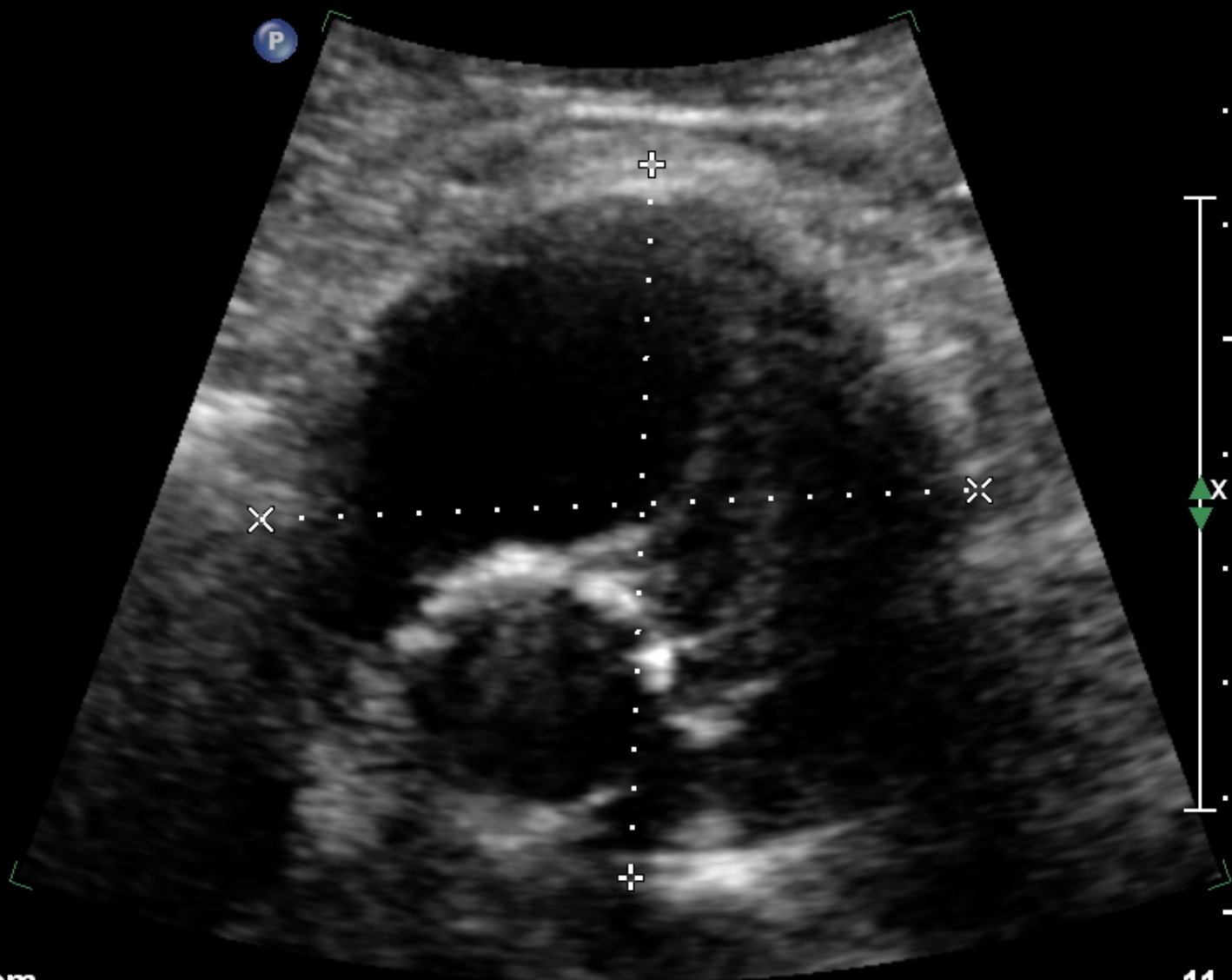
ETAPE I : SAC ANÉVRISMAL

- Mesure du diamètre maximal du sac
→ ÉLÉMENT CAPITAL DU SUIVI
- Pulsatilité
- Thrombus

CI 54Hz
RV

2D
36%
C 48
P Bas
HGén

C2



+ Dist 6.24 cm

x Dist 6.28 cm

26221220121210

C5-2/ARFS

AGC C2

CI 30Hz
10cm

2D
42%
C 55
P Moy
HRés

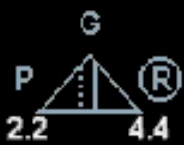


- 0

- 5



JPEG - 10
*** bpm



CI 38Hz
10cm

AGC

C2

2D
47%
C 55
P Moy
HRés

A0

P

- 0

X- 5



JPEG - 10
*** bpm

CI 28Hz

RV

Z 1.4

2D

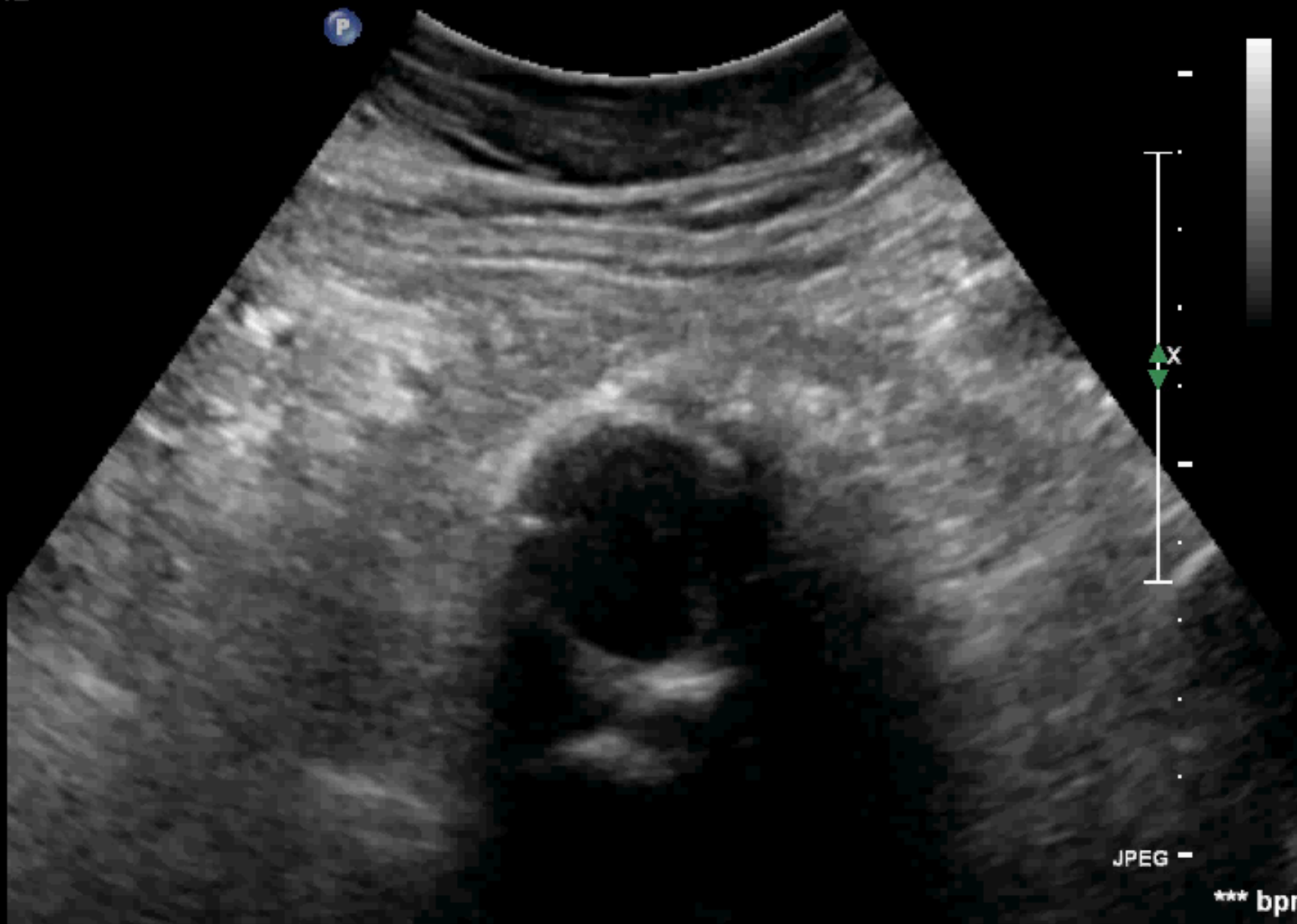
40%

C 55

P Bas

HGen

C3



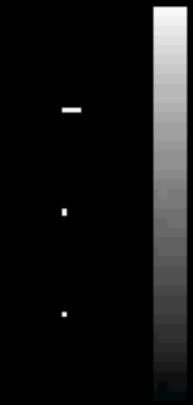
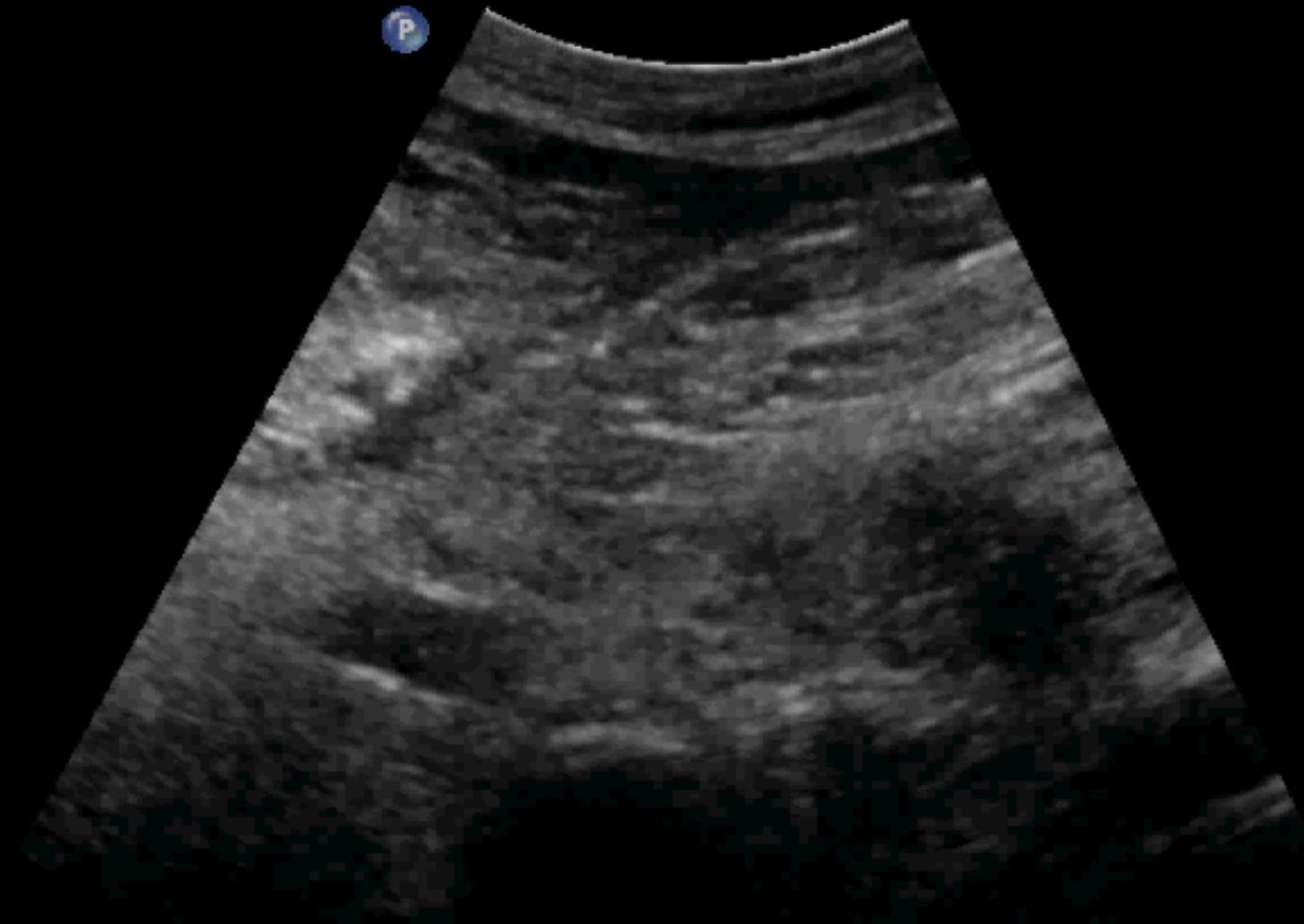
JPEG

*** bpm

CI 41Hz
RV

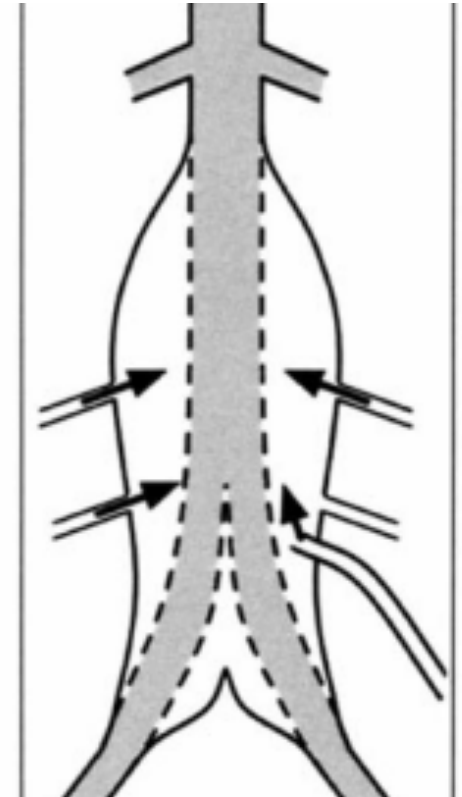
C2

2D
33%
C 48
P Bas
HGén



ETAPE 2 : ENDOFUITES

- Type : directe (I, III) ou indirecte (II)
- Porte d'entrée et de sortie
- Vitesse maximale
- Spectre
- Mode B, couleur, puissance, pulsé
- +/- Contraste (Sonovue®/ Bracco)

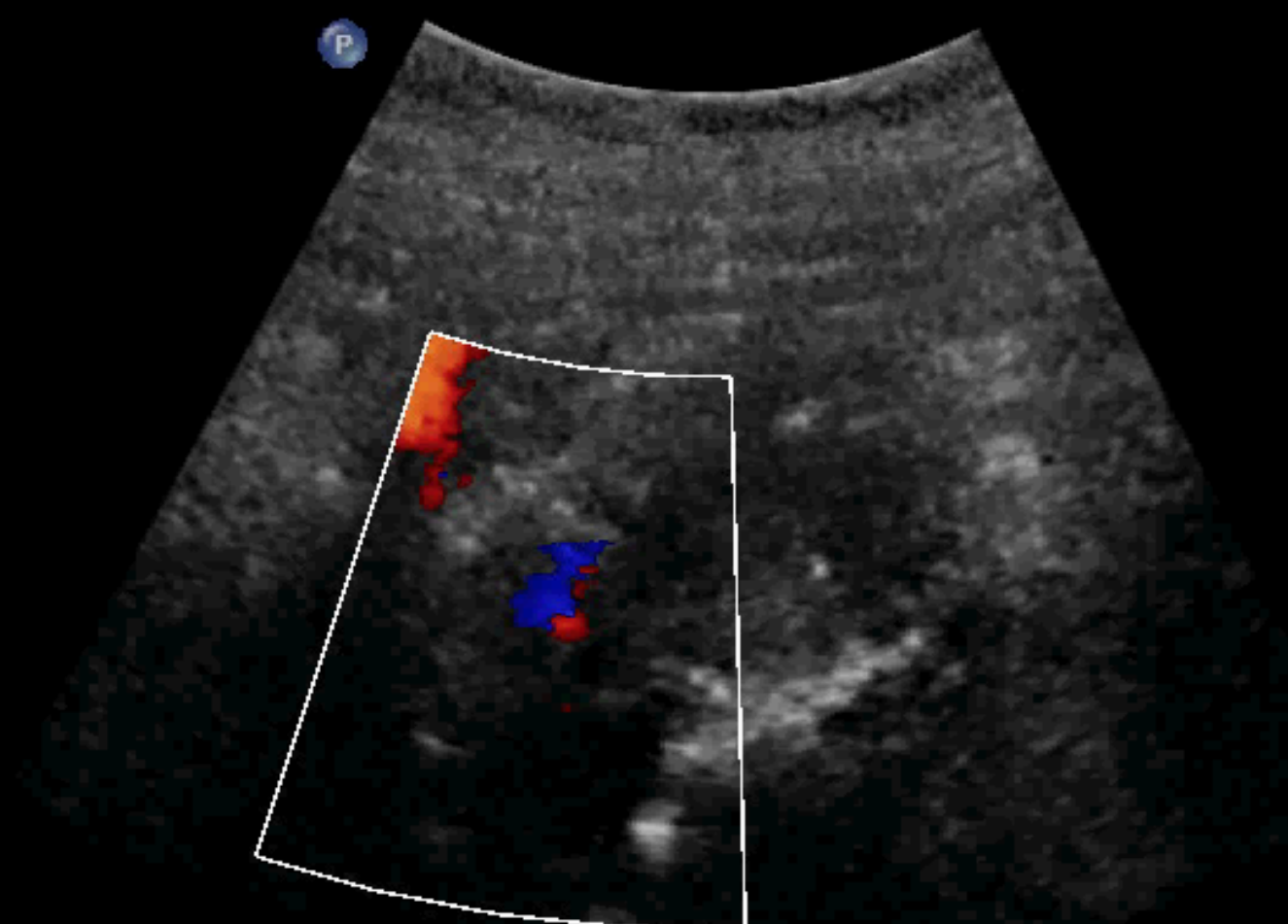


CI 23Hz
RP

2D
29%
C 55
P Moy
HGén

Coul
57%
3600Hz
FP 198Hz
Moy

C2 C4
+46.



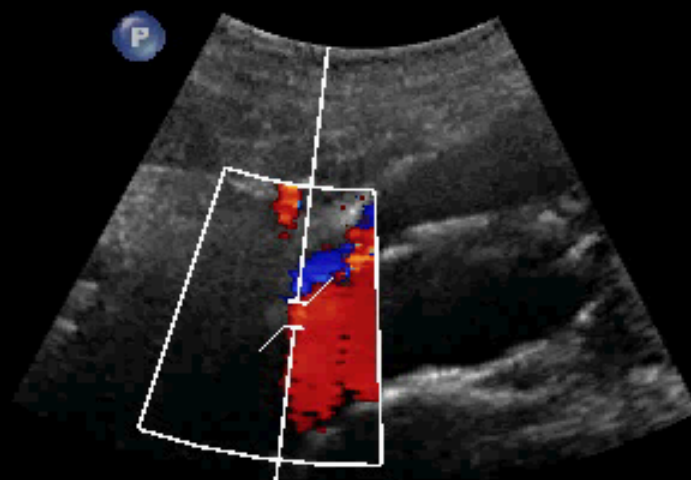
29461620121031

C5-1/OPTIMAL Aorta

CI 23Hz 38°
RP

2D
29%
C 55
P Moy
HGén

Coul
57%
3600Hz
FP 198Hz
Moy



DP
64%
FP 150Hz
VE4.0mm
E3
2.3MHz
4.3cm

C2 C4
+46.2



-
-100
-
-cm/s
-
-100
-
-200

JPEG

6.6s

*** bpm

CI 14Hz
D1

2D
83%
C 40
P Moy
GénC

C2



JPEG
9.0

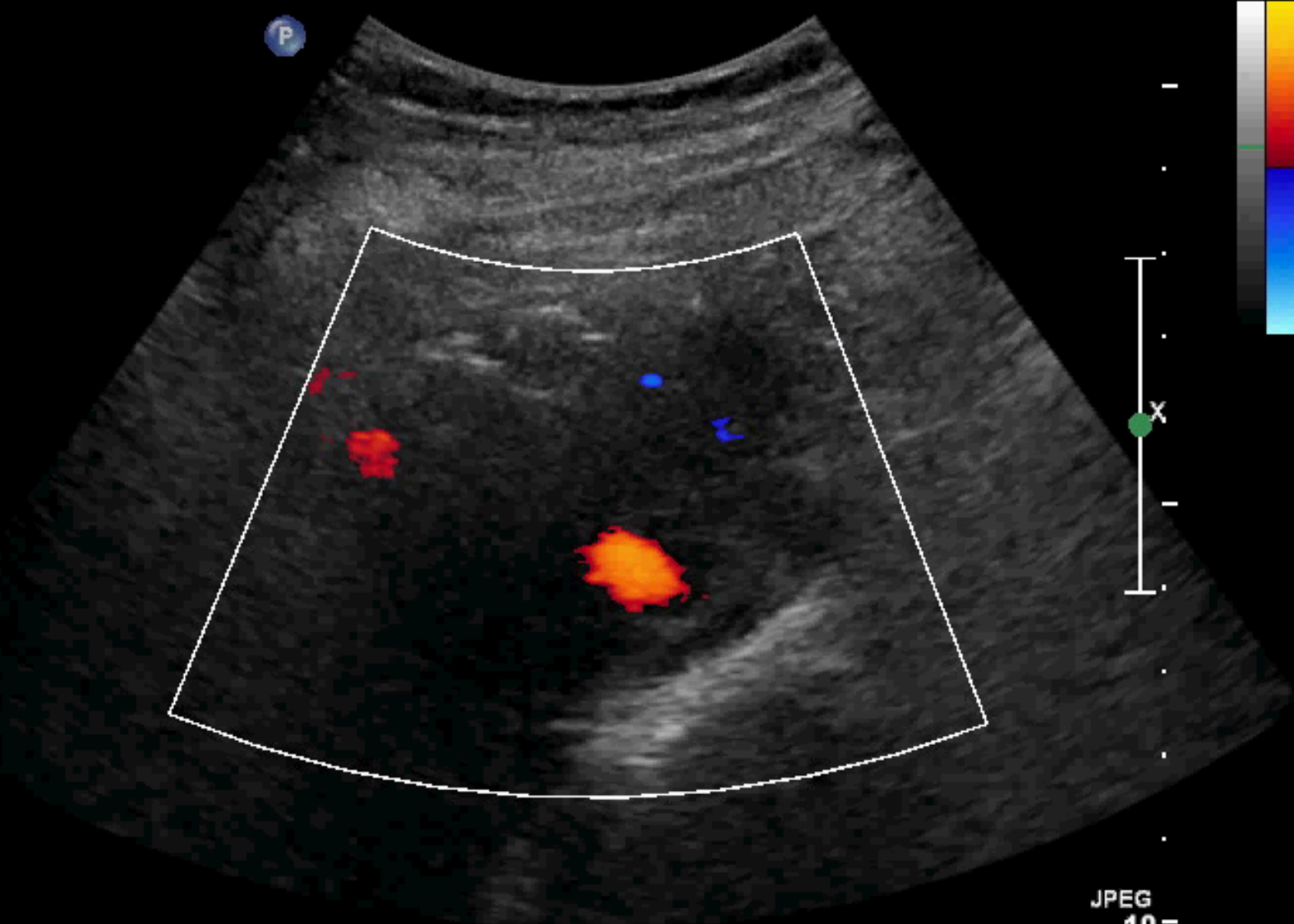
*** bpm

CI 10Hz
RP

2D
28%
C 55
P Moy
Gén

CPA
58%
1000Hz
FP 60Hz
Moy

C2 C6



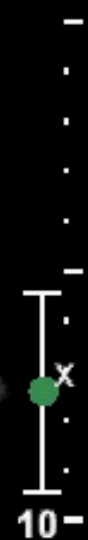
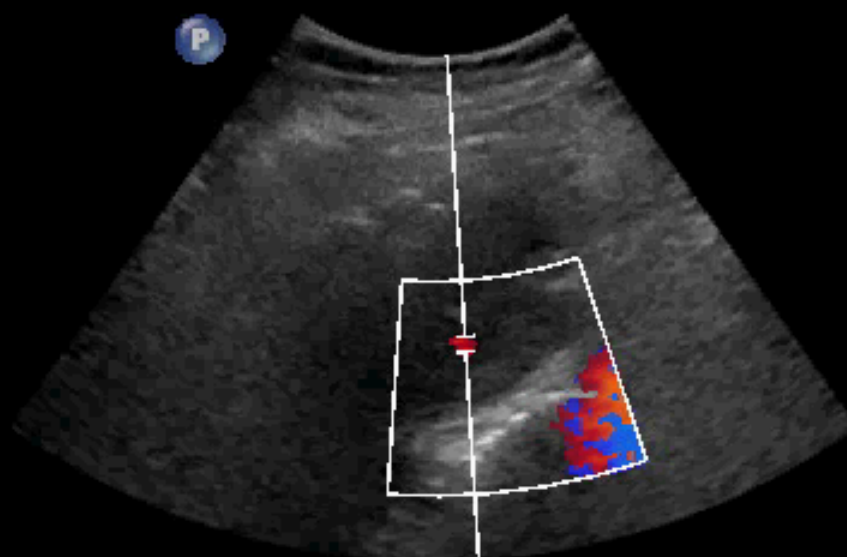
C2 C6

CI 6Hz
RP

2D
48%
C 55
P Moy
Gén

CPA
64%
1000Hz
FP 60Hz
Moy

DP
40%
FP 50Hz
VE3.0mm
E3
2.3MHz
5.8cm



-60
-40
-20
-cm/s
-20
-40
-60 bpm

JPEG

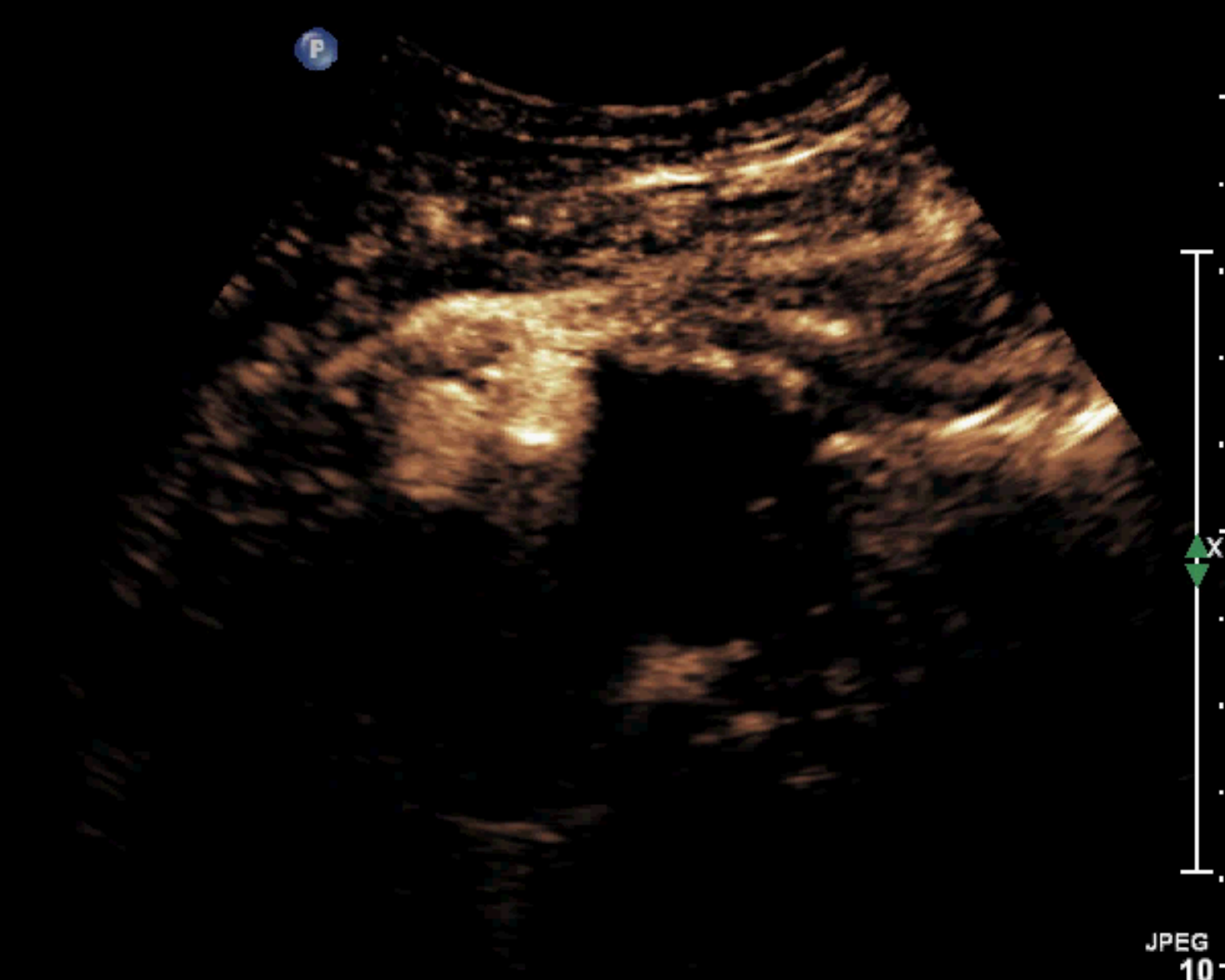
6.6s



CI 20Hz
D1

C2

2D
76%
C 40
P Arrêt
GénC

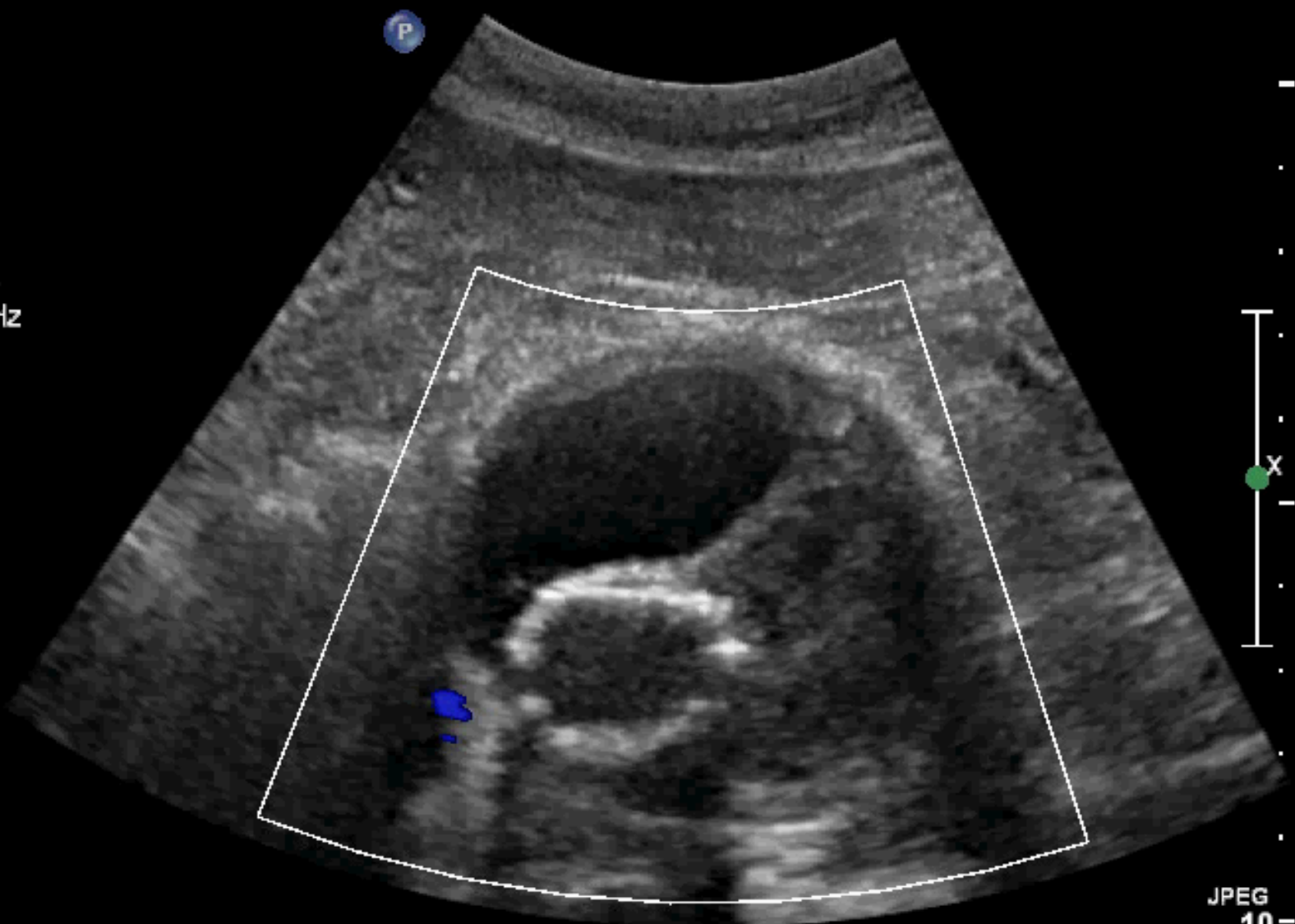


CI 8Hz
RP

2D
34%
C 55
P Moy
HGén

Coul
53%
3600Hz
FP 198Hz
Moy

C2 C4
+46.2



JPEG
10-

*** bpm

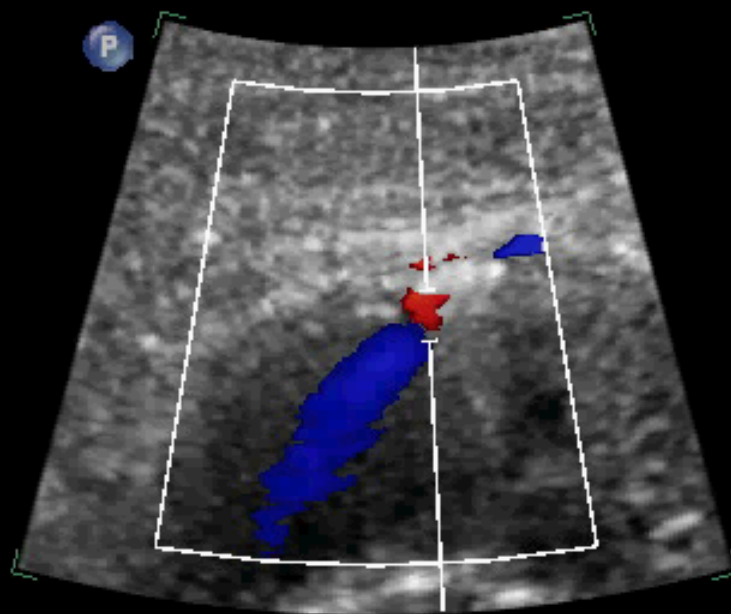
57111220101108

C5-1/OPTIMAL Aorta

CI 29Hz
RP

2D
34%
C 55
P Moy
HGén

Coul
53%
3600Hz
FP 198Hz
Moy



DP
52%
FP 130Hz
VE4.0mm
E3
2.3MHz
3.9cm



-80
-cm/s
-80
-160
*** bpm

JPEG

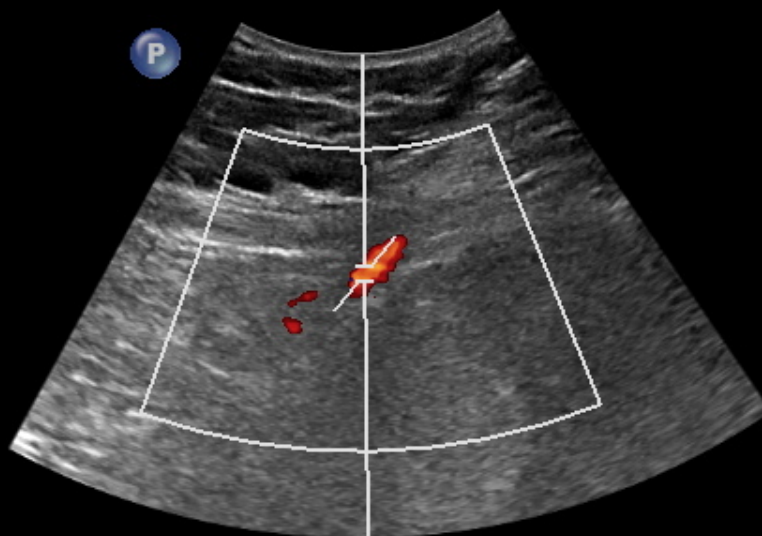
6.6s

CI 12Hz 40°
RP

2D
35%
C 55
P Moy
Gén

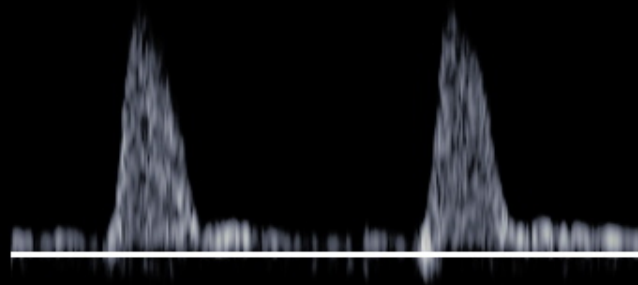
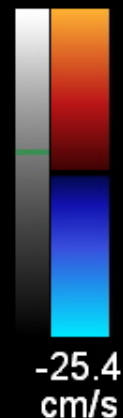
Coul
55%
1816Hz
FP 99Hz
Moy

AMI



DP
40%
FP 50Hz
VE3.0mm
E3
2.3MHz
4.1cm

C2 C4
+25.4

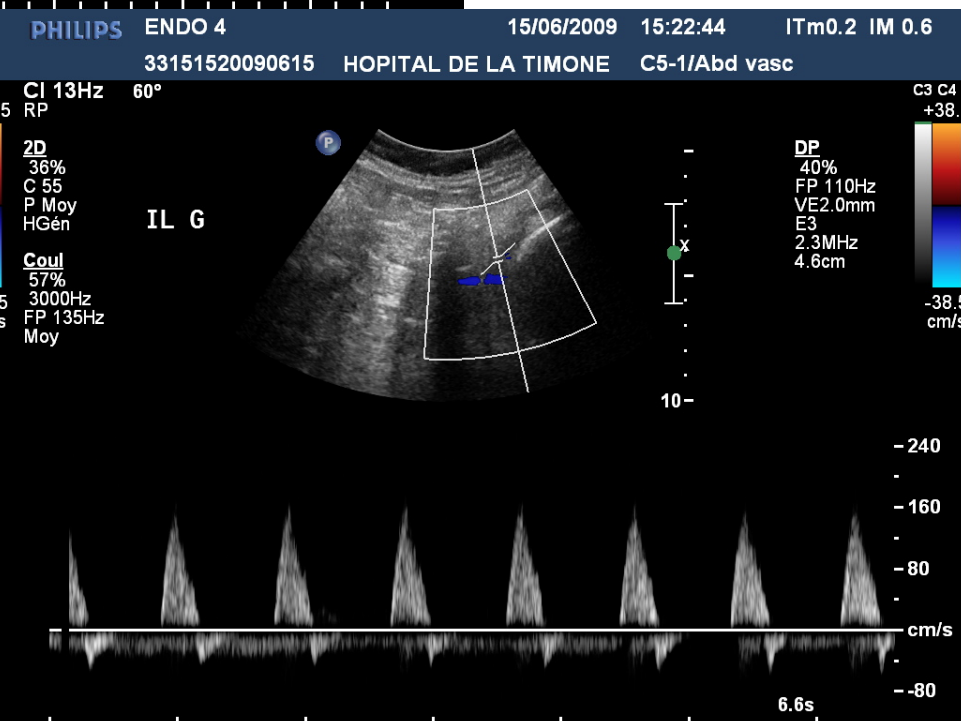
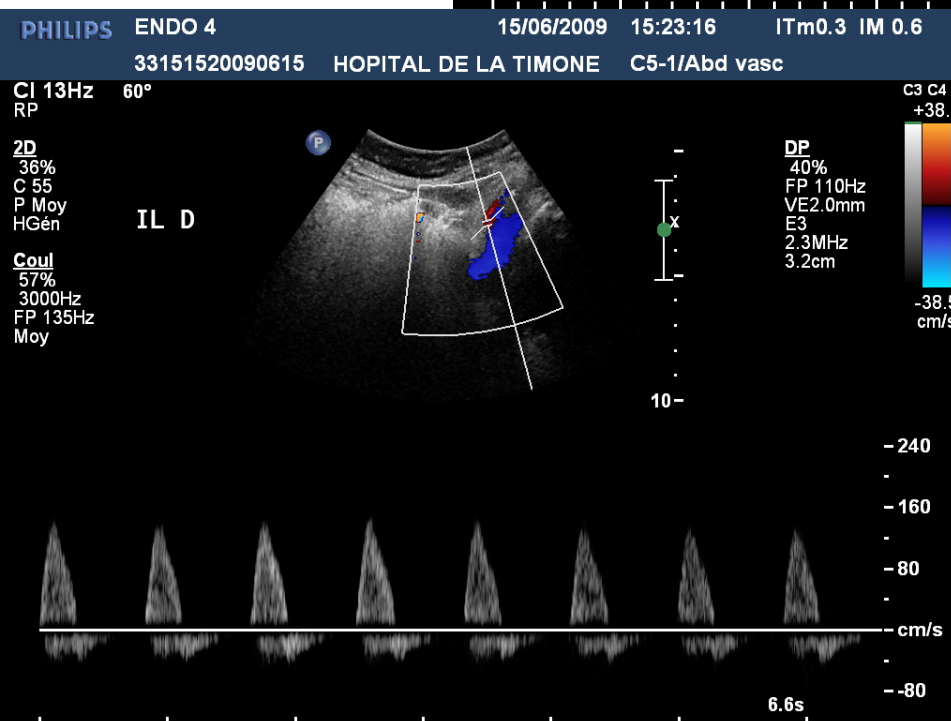
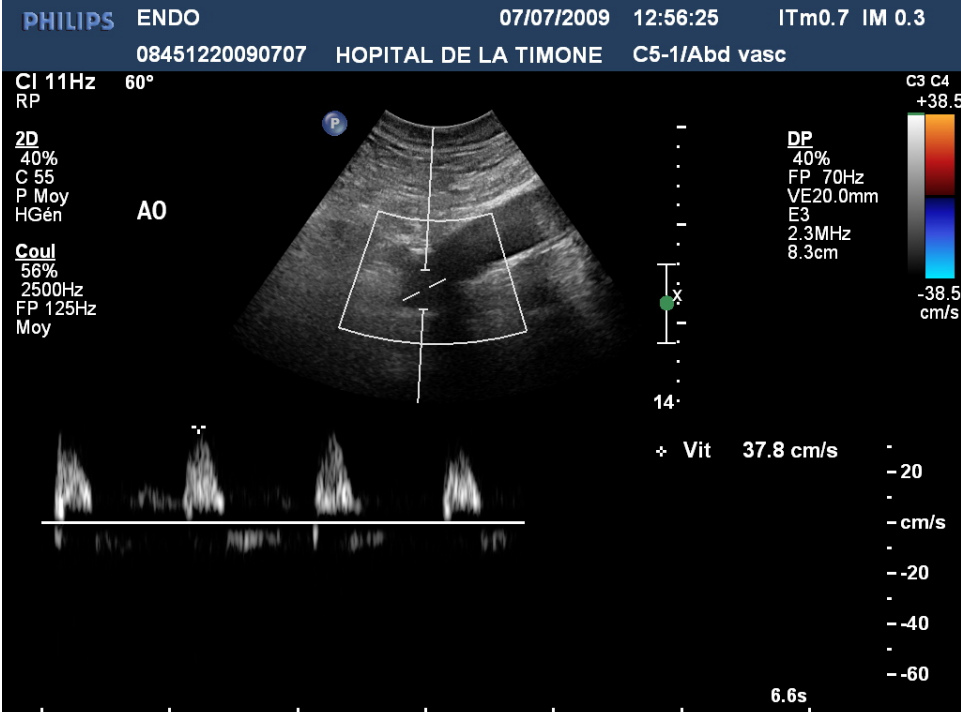


-80
-40
-cm/s
-40

6.6s

ETAPE 3 : ENDOPROTHÈSE

- Diamètre des collets
- Perméabilité : sténose, thrombose
 - IPS



CI 19Hz
RP

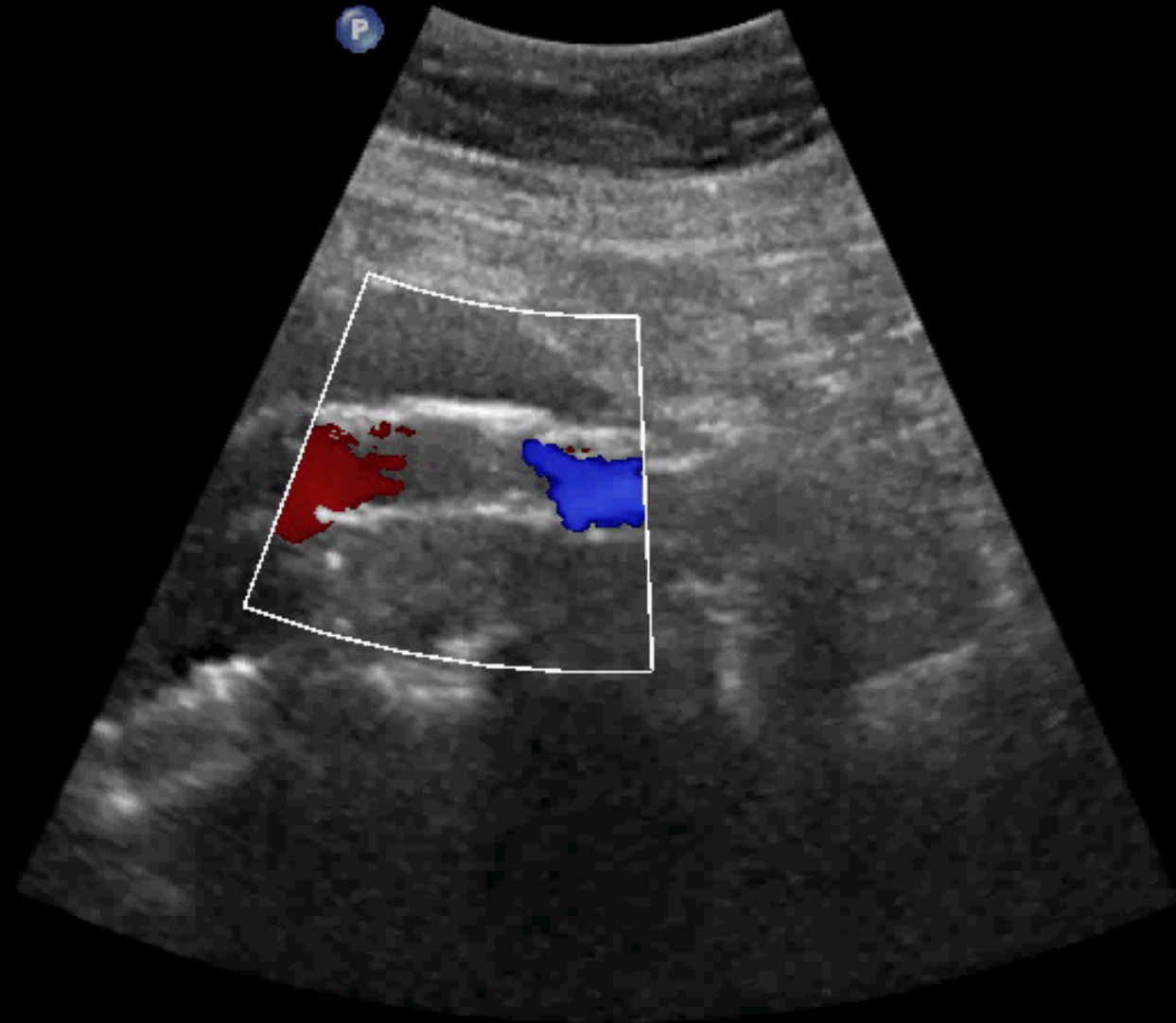
2D
41%
C 55
P Moy
HGén

Coul
57%
3300Hz
FP 181Hz
Moy

C2 C4
+46.2



-46.2
cm/s



JPEG
11

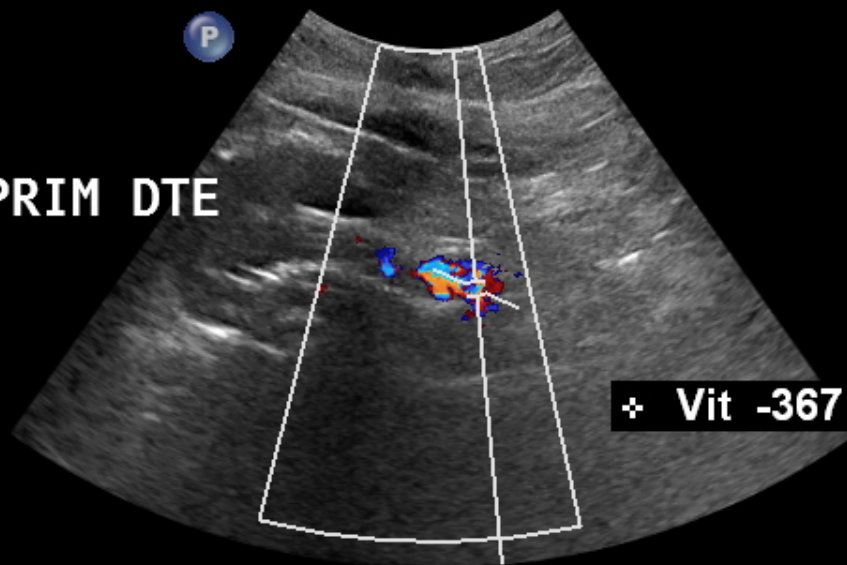
*** bpm

CI 10Hz 60°
RP

2D
39%
C 55
P Moy
Gén

Coul
52%
1440Hz
FP 93Hz
Moy

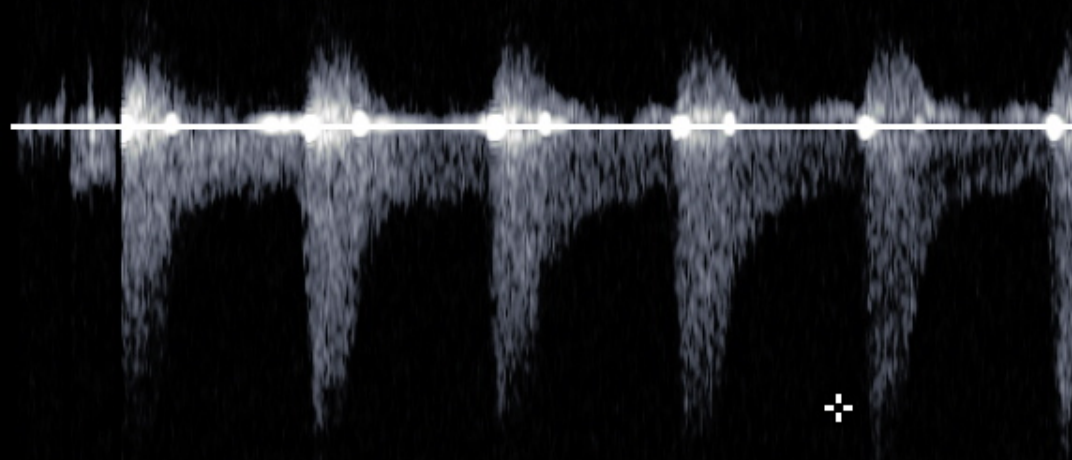
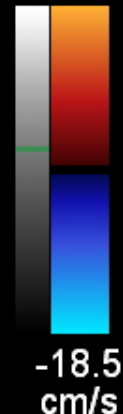
ILI PRIM DTE



✦ Vit -367 cm/s

DP
64%
FP 80Hz
VE3.0mm
E3
2.3MHz
5.1cm

C2 C4
+18.5



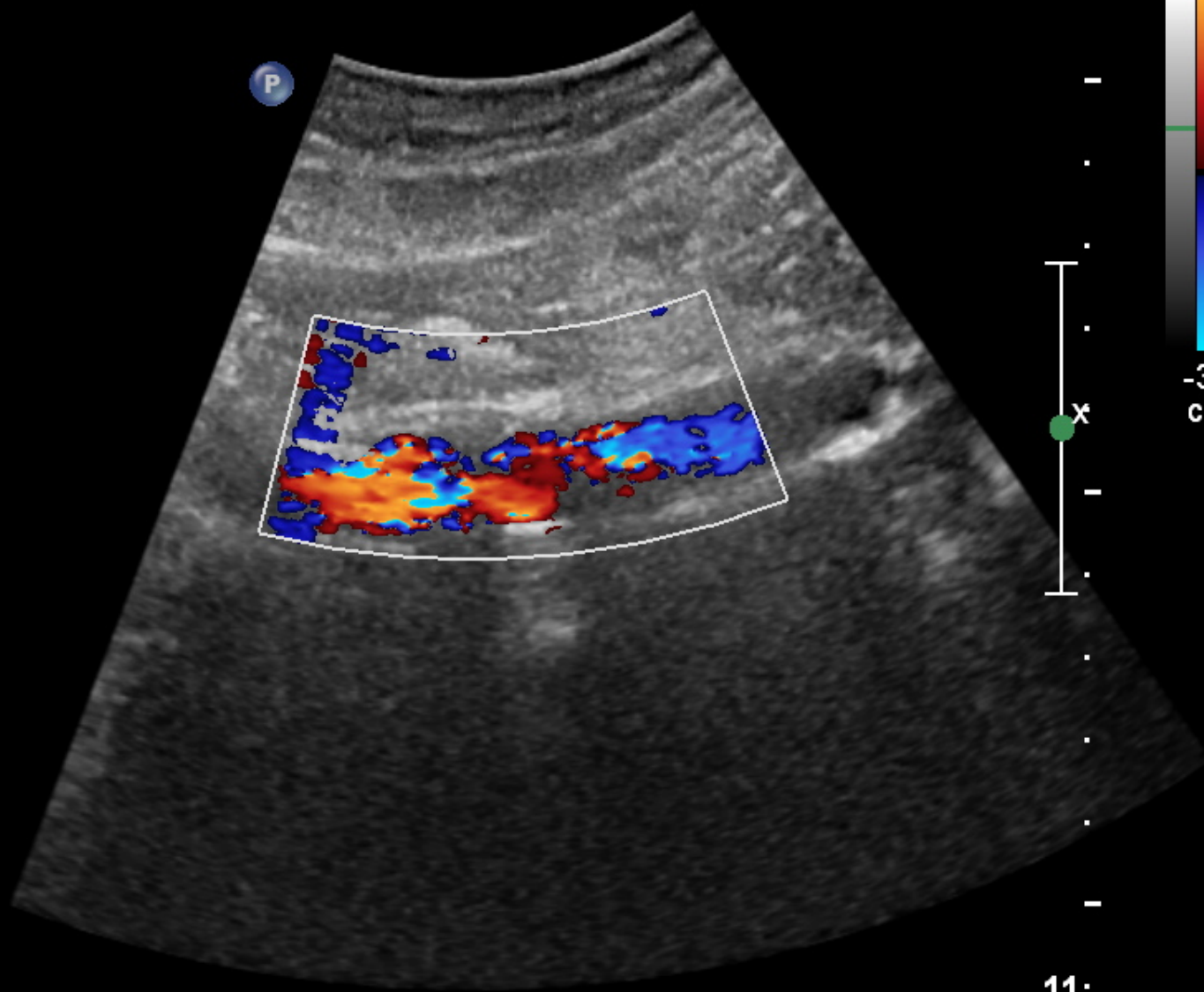
-1.0
-m/s
-1.0
-2.0
-3.0
-4.0
-5.0

6.6s

CI 14Hz
RP

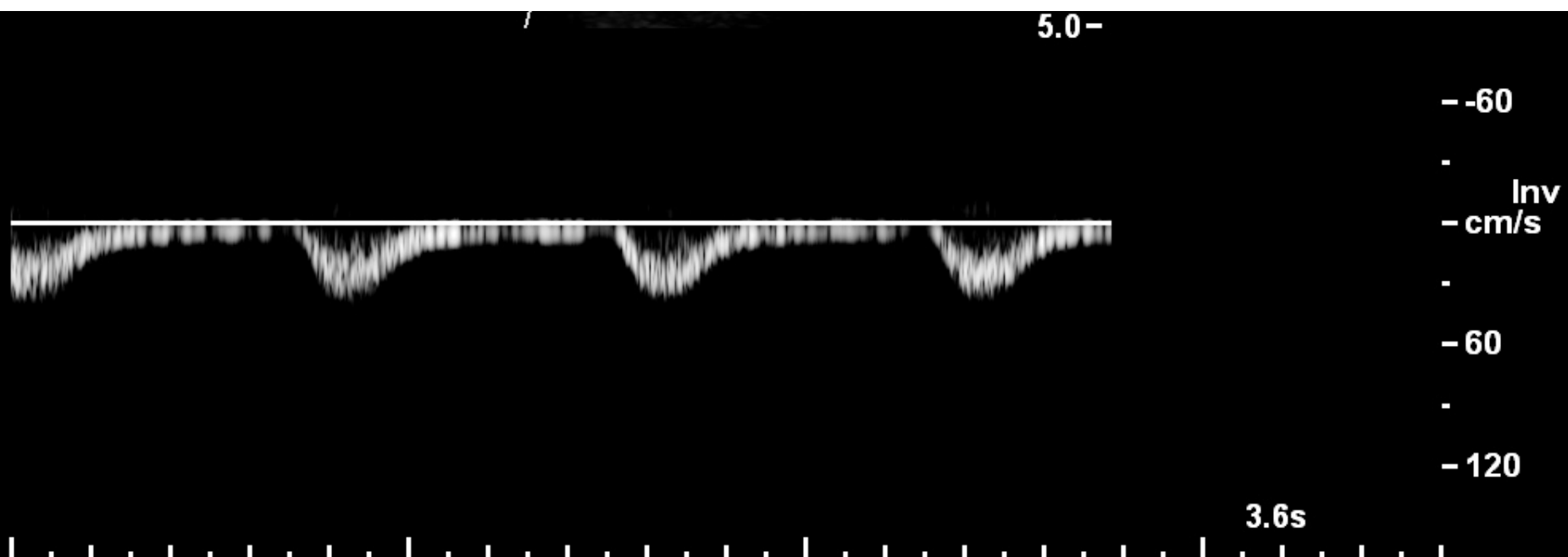
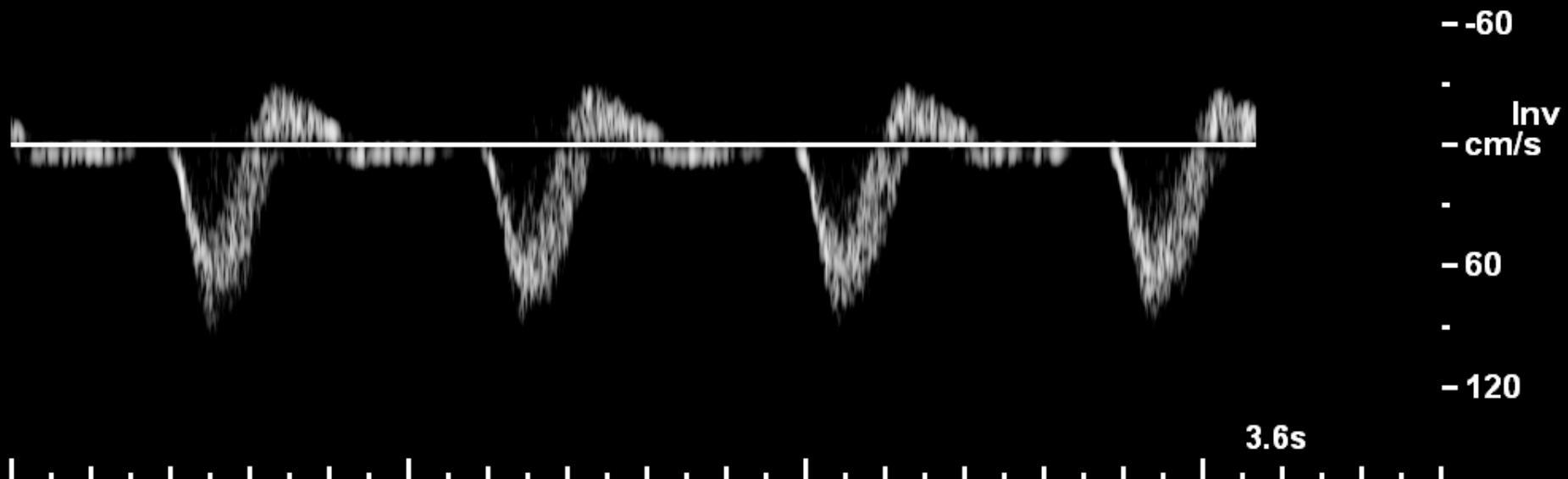
2D
41%
C 55
P Moy
HGén

Coul
62%
3000Hz
FP 165Hz
Moy



C2 C4
+38.5

-38.5
cm/s



ECHO DE CONTRASTE

- Suspicion d'endofuite :
 - Augmentation du diamètre du sac $\geq 5\text{mm}$
 - Plages anéchogènes ou hypoéchogènes dans le thrombus
 - Pulsatilité du sac anévrismal
- Référence si contre-indication au scanner ou IRM
- En complément d'un scanner

ECHO – META ANALYSE

Mirza et al., Eur J Vasc Endovasc Surg 2010

- Echo-doppler standard :
 - 21 études, 2601 patients
 - Sensibilité **77%** (95% CI 64-86%)
 - Spécificité **94%** (95% CI 88-97%)

- Echo-doppler de contraste :
 - 7 études, 288 patients
 - Sensibilité **98%** (95% CI 90-99%)
 - Spécificité **88%** (95% CI 78-94%)

Modalités de surveillance

Calendrier de suivi des patients ayant une endoprothèse aortique - 2009

	En dehors du contrôle angiographique réalisé en fin de procédure, En post-opératoire immédiat ou dans les 30 jours qui suivent l'implantation	En l'absence d'endofuite, de détérioration de la prothèse ou d'évolutivité de l'anévrisme, Aux 6^{ème} et 12^{ème} mois post-opératoires, puis annuellement
Radiographie de l'abdomen sans préparation sous 3 incidences (face, profil, trois-quarts)	Indispensable	/
Examen tomodensitométrique après injection de produit de contraste	Indispensable (avec acquisitions précoce et tardive), sauf si impossible	Indispensable (avec acquisitions précoce et tardive), sauf si impossible
Imagerie par Résonance Magnétique	Si scanner impossible	Si scanner impossible (avec radiographie de l'abdomen sous 3 incidences)
Echographie-Döppler vasculaire	Si scanner et IRM impossibles	Si scanner et IRM impossibles (avec radiographie de l'abdomen sous 3 incidences)

SVS 2018

We recommend baseline imaging in the first month after EVAR with contrast-enhanced CT and color duplex ultrasound imaging. In the absence of an endoleak or sac enlargement, imaging should be repeated in 12 months using contrast-enhanced CT or color duplex ultrasound imaging.

Level of recommendation 1 (Strong)

Quality of evidence B (Moderate)

If a type II endoleak is observed 1 month after EVAR, we suggest postoperative surveillance with contrast-enhanced CT and color duplex ultrasound imaging at 6 months.

Level of recommendation 2 (Weak)

Quality of evidence B (Moderate)

If neither endoleak nor AAA enlargement is observed 1 year after EVAR, we suggest color duplex ultrasound when feasible, or CT imaging if ultrasound is not possible, for annual surveillance.

Level of recommendation 2 (Weak)

Quality of evidence C (Low)

If a type II endoleak is associated with an aneurysm sac that is shrinking or stable in size, we suggest color duplex ultrasound for continued surveillance at 6-month intervals for 24 months and then annually thereafter.

Level of recommendation 2 (Weak)

Quality of evidence C (Low)

If a new endoleak is detected, we suggest evaluation for a type I or type III endoleak.

Level of recommendation 2 (Weak)

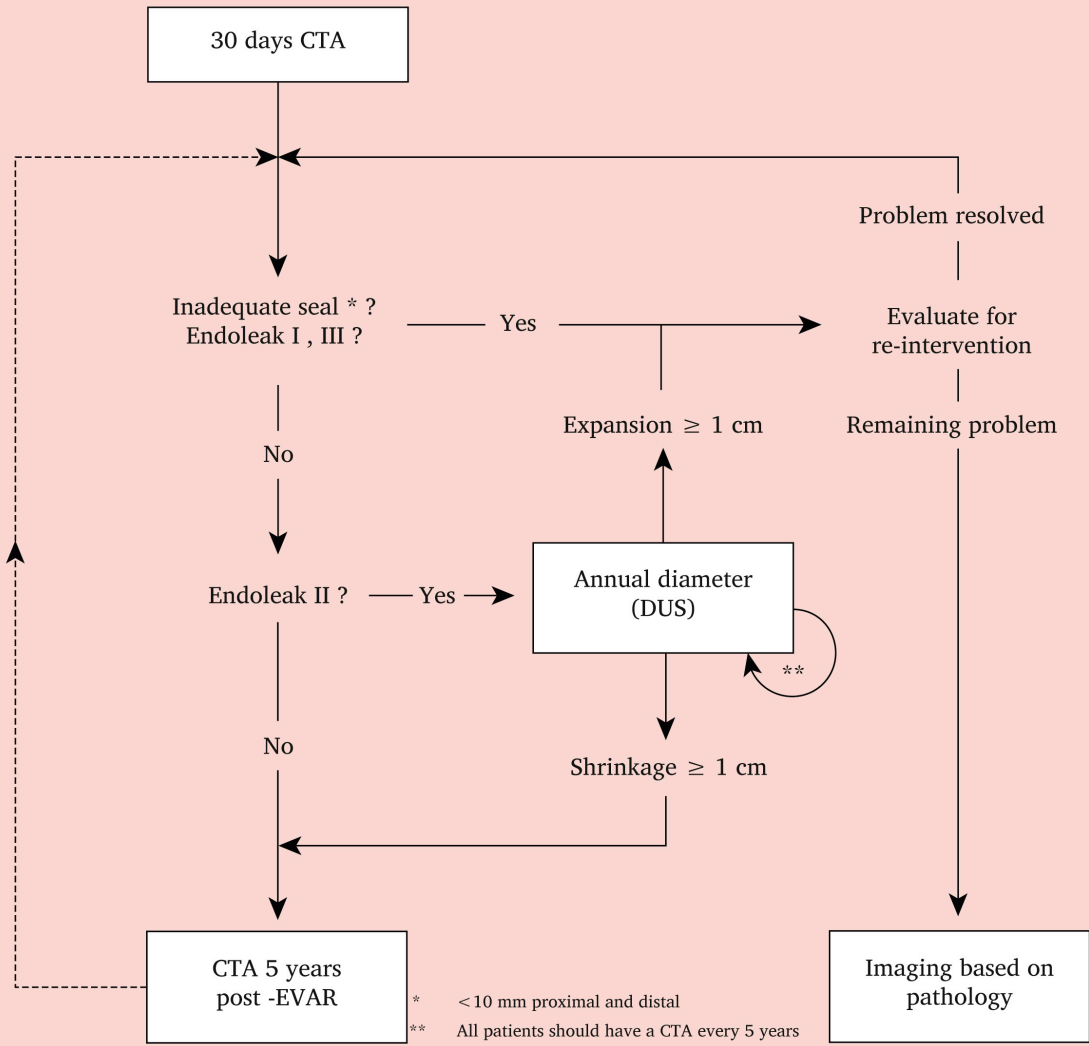
Quality of evidence C (Low)

We suggest noncontrast-enhanced CT imaging of the entire aorta at 5-year intervals after open repair or EVAR.

Level of recommendation 2 (Weak)

Quality of evidence C (Low)

ESVS 2019



CONCLUSIONS

- Suivi d'une chirurgie conventionnelle :
 - Pas de consensus
 - Anastomoses et autres localisations anévrismales
- Suivi d'un traitement endovasculaire :
 - Place grandissante de l'écho
 - Mesure du diam max du sac anévrismal résiduel
 - Calendrier précis

MERCI