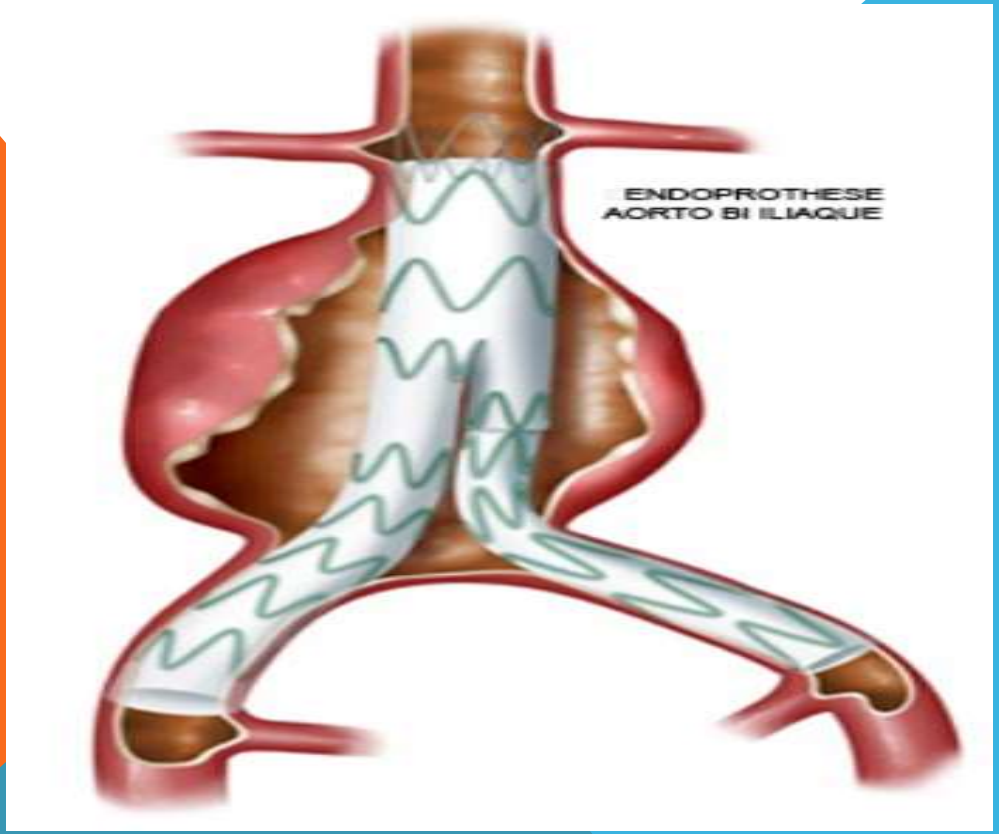
SURVEILLANCE ECHO-DOPPLER DES ENDOPROTHESES AORTIQUES



L. BITTON

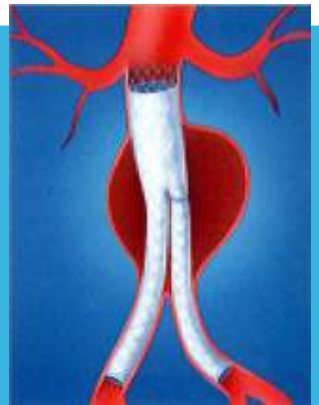
(R)EVOLUTION

N. VOLODOV
04/05/1985

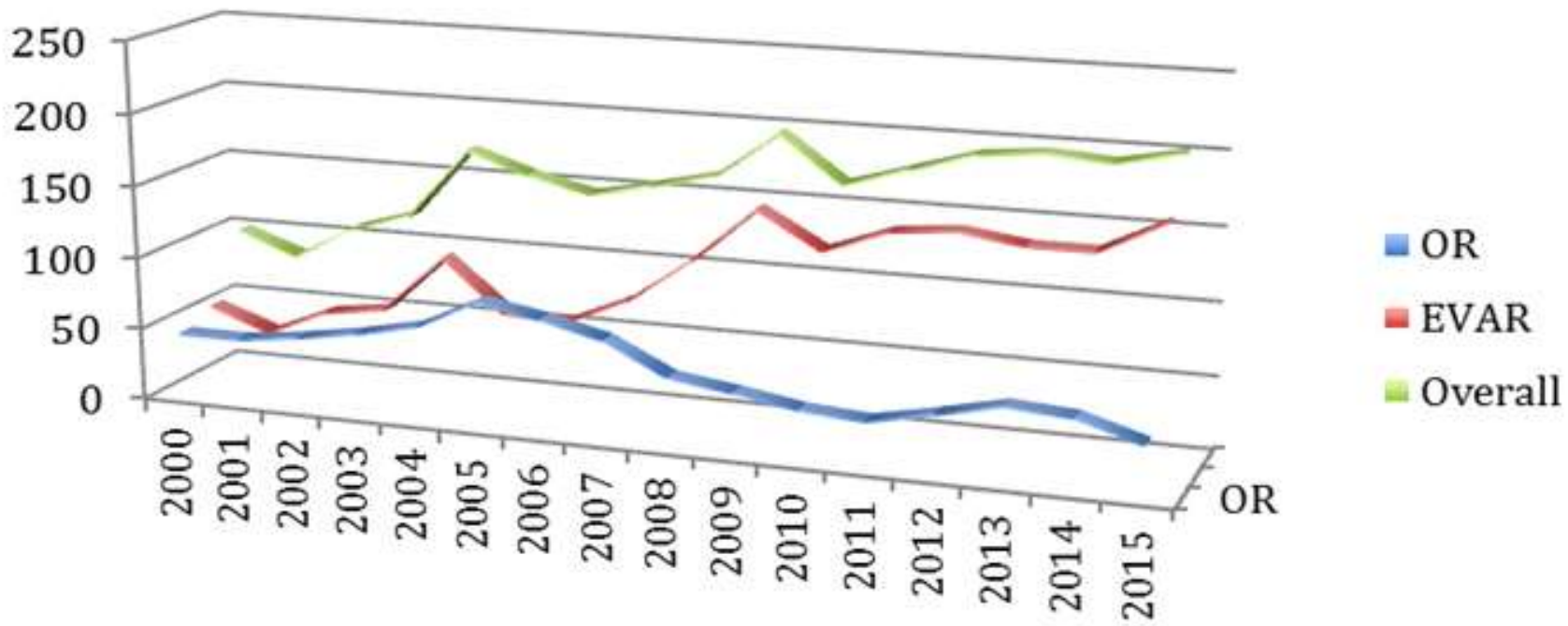
J. PARODI
07/09/1990

C. MIALHE
1991

A. HOLDEN
2008-NELLIX



EVOLUTION EVAR VS. OR
H. MONDOR 2000-2015



2000: EVAR 50%
2015: EVAR 82,5%

RCTS: EVAR 1 ; EVAR2; DREAM; OVER; ACE

NECESSITE DE SUVEILLANCE

Long-term ou … **eurysm repair.**

Mehta M[1], Sternbach …

⊕ **Author informa**

Abstract

PURPOSE: This stu … sm repair (EVAR).

METHODS: From 2(…) and 106 emergent (6%) infrarenal abdominal aortic an … mercially available stent grafts. Postoperative follow … aging, and computed tomography and magnetic resonance … and III endoleaks, unexplained endotension, limb o … upture underwent secondary interventions. Type … nslumbar embolization. Data were prospectively collec…

RESULTS: EVAR w… s, 339 patients (19.2%) required additional secondar…), type II (n = 136, 40.1%), and type III (n = 5, 1.5%) endoleak… 13.6%), stent graft iliac limb thrombosis or stenosis (n = 25, … re after EVAR (n = 29, 8.6%). The mean age was 74 (SD, 9.… cedures for AAA rupture, the nonrupture patients had a signi… managed by endovascular means (98.8% vs 44.8%, P… s for type I endoleaks and stent graft migration or limb thr…

CONCLUSIONS: Our long-term EVAR experience indicates that 18% of patients require additional secondary procedures, and most of these patients can be managed by endovascular means with an acceptable overall mortality of 2.9%. Most type I and II endoleaks can be successfully treated by transluminal embolization, and most patients with delayed aneurysm rupture after EVAR can be successfully managed by endovascular or open surgical repair.

20% de GESTES COMPLEMENTAIRES		
FUITES	I	15 %
	II	40 %
	III	1.5 %
	IV	2.5%
MIGRATION PROX		13.6 %
RUPTURE		8,6%
ST/THROMBOSE		7,4%

SUIVI EVAR: LES COMPLICATIONS

Endofuite:	15-30%
Sténoses/thromboses	7%
Rupture	1%
Infection	0,9%

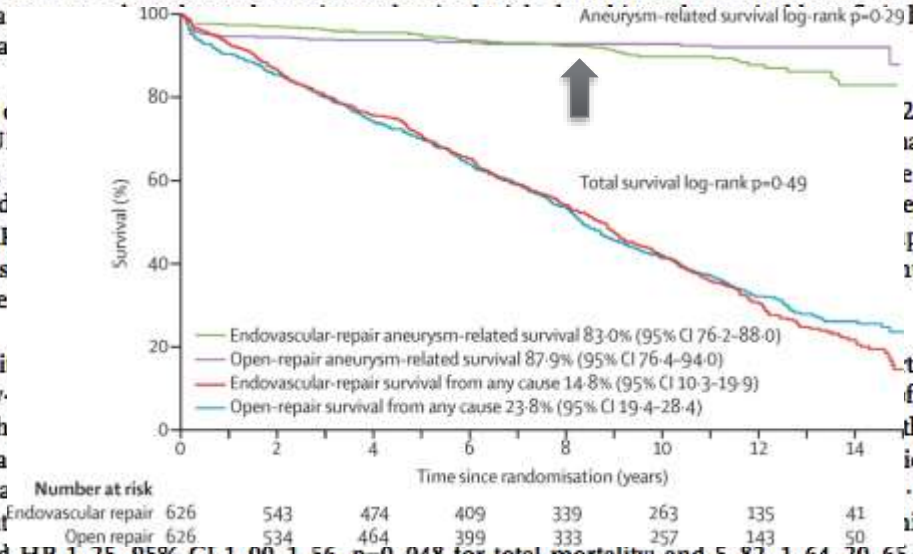
Endovascular versus open repair of abdominal aortic aneurysm in 15-years' follow-up of the UK endovascular aneurysm repair trial 1 (EVAR trial 1): a randomised controlled trial

*Rajesh Patel, Michael J Sweeting, Janet T Powell, Roger M Greenhalgh, for the EVAR trial investigators**

Summary

Background Short-term survival benefits of endovascular aneurysm repair (EVAR) versus open repair of intact abdominal aortic a… lost after a few years. We investiga…

Methods We used … 2 patients from 37 centres in the U… have aneurysms of at least 5·5 cm … e patients were randomly assigned … ed by centre to receive either EVAR … p assignments, no masking was us… til mid-2015 in the intention-to-tre…



Findings We recrui… tality outcome) were lost to follow… f follow-up, we recorded 9·3 death… the open-repair group (adjusted ha… ion, patients in the EVAR group ha… ·47, 0·23–0·93 for aneurysm-relat… ificantly lower mortality (adjusted HR 1·25, 95% CI 1·00–1·56, p=0·048 for total mortality; and 5·82, 1·64–20·65, p=0·0064 for aneurysm-related mortality). The increased aneurysm-related mortality in the EVAR group after 8 years was mainly attributable to secondary aneurysm sac rupture (13 deaths [7%] in EVAR *vs* two [1%] in open repair), with increased cancer mortality also observed in the EVAR group.

Interpretation EVAR has an early survival benefit but an inferior late survival compared with open repair, which needs to be addressed by lifelong surveillance of EVAR and re-intervention if necessary.

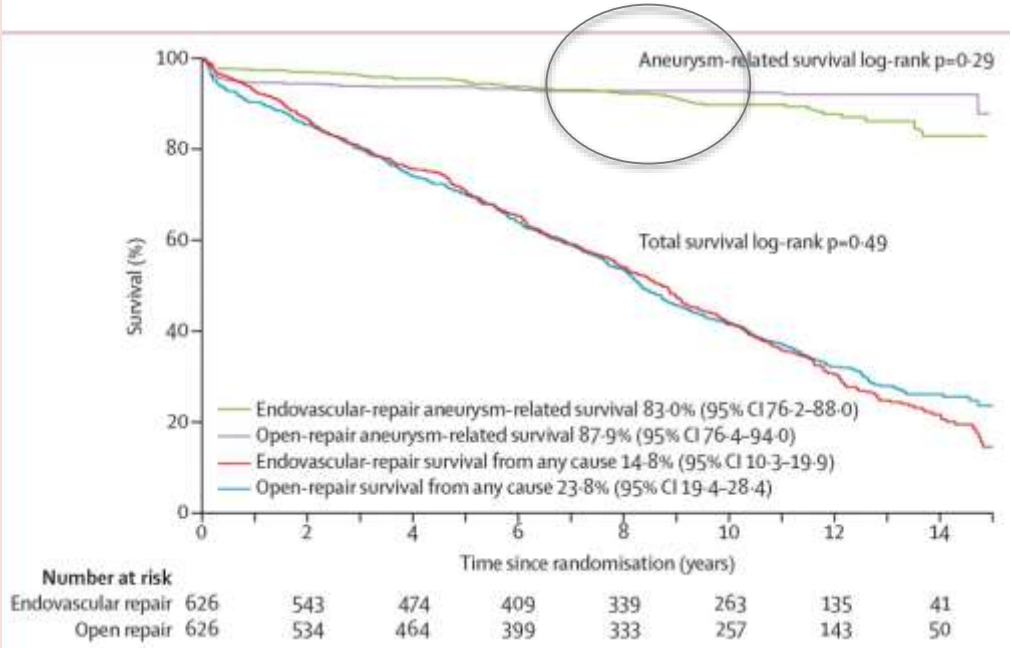
The Lancet 2016 388, 2366-2374DOI: (10.1016/S0140-6736(16)31135-7)

Lancet 2016

NÉCESSITE D'UN SUIVI LONG TERME

	Endovascular repair	Open repair
(Continued from previous column)		
>8 years	n=179	n=154
Aneurysm rupture before repair (primary)	0	1 (1%)
Aneurysm-related after repair	3 (2%)	0
Aneurysm rupture after repair (secondary)	13 (7%)	2 (1%)
Coronary heart disease	33 (18%)	35 (23%)
Stroke	10 (6%)	15 (10%)
Other vascular disease	4 (2%)	12 (8%)
Cancer		
Lung	13 (7%)	10 (6%)
Other	37 (21%)	21 (14%)
Respiratory	29 (16%)	30 (19%)
Renal	5 (3%)	4 (3%)
Other	31 (17%)	24 (16%)
Unknown	1 (1%)	0

Table 2: **Causes of death in patients, by time since randomisation in the intention-to-treat population**



…vascular versus open repair of abdominal aortic aneurysm … years' follow-up of the UK endovascular aneurysm repair trial 1 (EVAR trial 1): a randomised controlled trial

*Rajesh Patel, Michael J Sweeting, Janet T Powell, Roger M Greenhalgh, for the EVAR trial investigators**

www.thelancet.com Vol 388 November 12, 2016

SUIVI EVAR À VIE

Implications of all the evidence available

The loss of early EVAR survival benefit, followed by inferior late survival benefit and durability compared with open repair, needs to be addressed by lifelong surveillance of EVAR and prompt re-intervention if necessary. There is no time when it is safe to discontinue surveillance in patients who have had EVAR. Sac expansion needs to be tracked for all time periods and the underlying cause corrected. Novel ways to sense sac expansion would be useful to prompt early awareness of risk of secondary aortic sac rupture. Efforts should be made to understand the underlying aortic dilating disease process and to attempt to limit it. Device design might take into account the expected ongoing dilating process of the aorta. A possible increase in cancer deaths in the EVAR group in very late (>8 years) follow-up merits further consideration.

META-ANALYSE À 5 ANS
EVAR 1 .DREAM .OVER. ACE

Br J Surg. 2017 Feb;104(3):166-178. doi: 10.1002/bjs.10430.

Meta-analysis of individual-patient data from EVAR-1, DREAM, OVER and ACE trials comparing outcomes of endovascular or open repair for abdominal aortic aneurysm over 5 years.

Powell JT, Sweeting MJ, Ulug P, Blankensteijn JD, Lederle FA, Becquemin JP, Greenhalgh RM; EVAR-1, DREAM, OVER and ACE Trialists.

⊕ Collaborators (706)

Abstract

BACKGROUND: The erosion of the early mortality advantage of elective endovascular aneurysm repair (EVAR) compared with open repair of abdominal aortic aneurysm remains without a satisfactory explanation.

METHODS: An individual-patient data meta-analysis of four multicentre randomized trials of EVAR versus open repair was conducted to a prespecified analysis plan, reporting on mortality, aneurysm-related mortality and reintervention.

RESULTS: The analysis included 2783 patients, with 14 245 person-years of follow-up (median 5·5 years). Early (0-6 months after randomization) mortality was lower in the EVAR groups (46 of 1393 versus 73 of 1390 deaths; pooled hazard ratio 0·61, 95 per cent c.i. 0·42 to

Faible IPS :marqueur puissant du risque de mortalité

pair; pooled od rs. Beyond 3 years, aneurysm-related mortality was significantly higher in the EVAR groups (19 deaths versus 3 for open repair; pooled hazard ratio 5·16, 1·49 to 17·89; P = 0·010). Patients with moderate renal dysfunction or previous coronary artery disease had no early survival advantage under EVAR. Those with peripheral artery disease had lower mortality under open repair (39 deaths versus 62 for EVAR; P = 0·022) in the period from 6 months to 4 years after randomization.

CONCLUSION: The early survival advantage in the EVAR group, and its subsequent erosion, were confirmed. Over 5 years, patients of marginal fitness had no early survival advantage from EVAR compared with open repair. Aneurysm-related mortality and patients with low ankle : brachial pressure index contributed to the erosion of the early survival advantage for the EVAR group. Trial registration numbers:

EVAR-1 trial Endovascular aneurysm repair
DREAM trial DutchRandomized endovascular Aneurism Management
OVER trial Open Surgery Versus Endovascular Repair of Abdominal Aortic Aneurysm
ACE trial Elective Abdominal Aortic Aneurism - Open Versus Endovascular Repair

afssaps

Agence française de sécurité sanitaire des produits de santé

ANNEXE I : CALENDRIER DE SUIVI DES PATIENTS AYANT UNE ENDOPROTHESE 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 6ème et 12ème 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-Doppler vasculaire	Si scanner et IRM impossibles	Si scanner et IRM impossibles (avec radiographie de l'abdomen sous 3 incidences)

BESOIN DE REDÉFINIR LES MODALITÉS DE SURVEILLANCE

Exposition trop importante aux radiations[1]

L'injection répétée de produit de contraste

Coût[2,3]

Le faible taux de complication avec les nouvelles endoprothèses[4]

1 Brenner DJ. N Engl J Med 2007;357:2277-84
2 Prinssen M. Ann Vasc Surg 2004; 18:421-27
3 Gray C. Eur J Vasc Endovasc Surg 2012;44:145-50
4 Sternbergh WC. J Vasc Surg 2008;48: 278_85

SURVEILLANCE PAR ED SEUL

Duplex ultrasound imaging alone is sufficient for midterm endovascular aneurysm repair surveillance: A cost analysis study and prospective comparison with computed tomography scan

Brian R. Beeman, MD, Lynne M. Doctor, BA, Kevin Doerr, RVT, Sandy McAfee-Bennett, RVT, Matthew J. Dougherty, MD, and **Keith D. Calligaro, MD,** *Philadelphia, Pa*

Objective: **Early in our experience with endovascular aortic aneurysm repair (EVAR) we performed both serial computed tomography scans and duplex ultrasound (DU) imaging in our post-EVAR surveillance regimen. Later we conducted a prospective study with DU imaging as the sole surveillance study and determined cost savings and outcome using this strategy.**

Methods: **From September 21, 1998, to May 30, 2008, 250 patients underwent EVAR at our hospital. Before July 1, 2004, EVAR patients underwent CT and DU imaging performed every 6 months during the first year and then annually if no problems were identified (group 1). We compared aneurysm sac size, presence of endoleak, and graft patency between the two scanning modalities. After July 1, 2004, patients underwent surveillance using DU imaging as the sole surveillance study unless a problem was detected (group 2). CT and DU imaging charges for each regimen were compared using our 2008 health system pricing and Medicare reimbursements. All DU examinations were performed in our accredited noninvasive vascular laboratory by experienced technologists. Statistical analysis was performed using Pearson correlation coefficient.**

Results: **DU and CT scans were equivalent in determining aneurysm sac diameter after EVAR ($P < .001$). DU and CT were each as likely to falsely suggest an endoleak when none existed and were as likely to miss an endoleak. Using DU imaging alone would have reduced cost of EVAR surveillance by 29% ($534,356) in group 1. Cost savings of $1595 per patient per year were realized in group 2 by eliminating CT scan surveillance. None of the group 2 patients sustained an adverse event such as rupture, graft migration, or limb occlusion as a result of having DU imaging performed as the sole follow-up modality.**

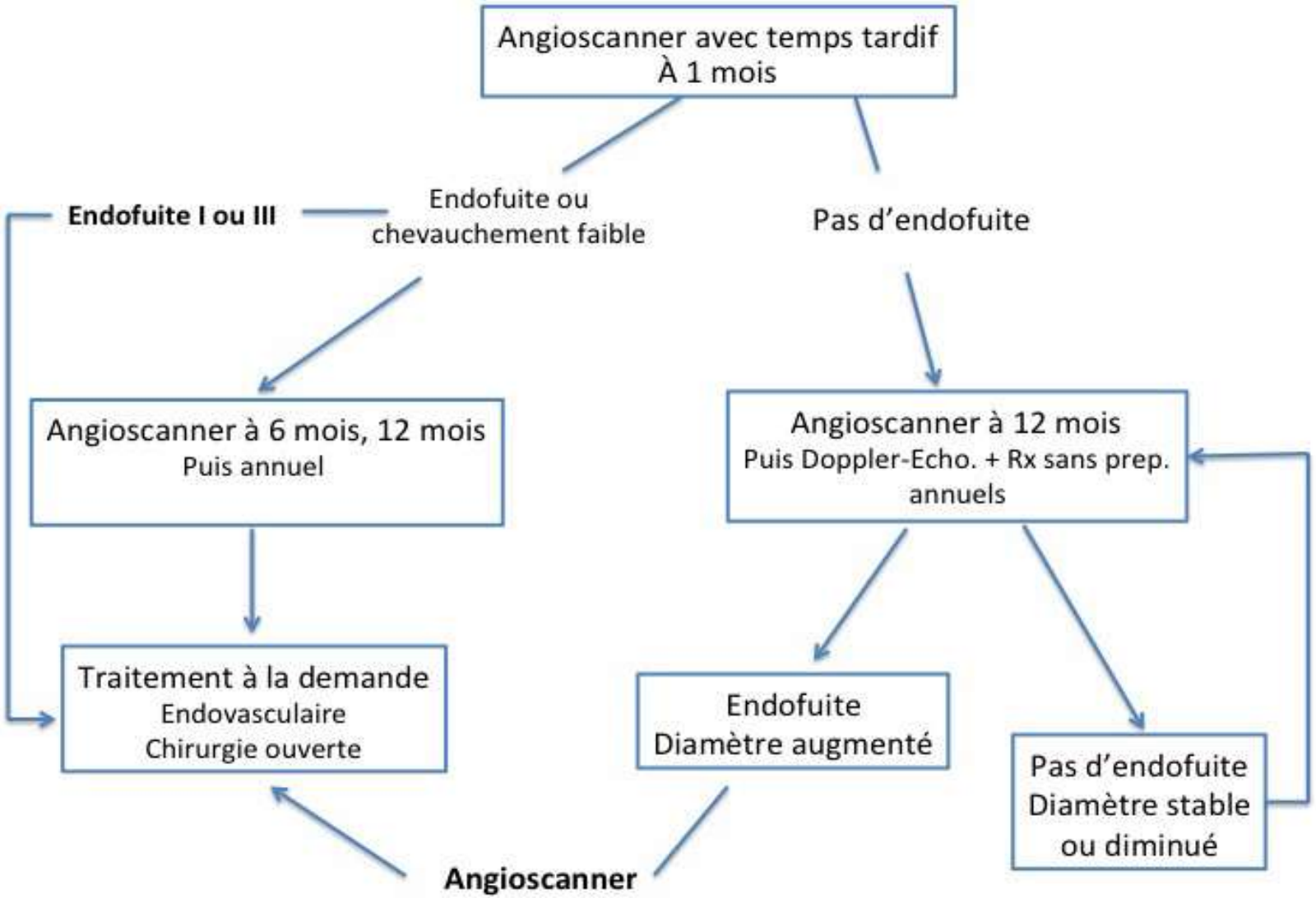
Conclusion: **Surveillance of EVAR patients can be performed accurately, safely, and cost-effectively with DU as the sole imaging study. (J Vasc Surg 2009;50:1019-24.)**

DEUX CONCEPTS NOUVEAUX

- ✓ Adaptation du suivi en fonction de l'évolution

- ✓ Suivi par écho-doppler

PROTOCOLE DE SURVEILLANCE



ECHO-DOPPLER

Avantages :
- pas d'irradiation
- pas d'iode
- peu coûteux
- accessible
- hémodynamique
- Pulsatilité
- IPS

Limites :
- opérateur dépendant
- morphologie patient (gaz+++)
- migration
- fracture
- Infection
- fistule.

Amélioration par l'examen avec contraste (origine de la fuite +++)

PROTOCOLE DE LA SURVEILLANCE ED

- TYPE D'ENDOPROTHESE(aorto-bi-iliaques, aorto-mono-iliaque, Standards : à fixation supra: Endurant, Cook; infra: Gore, AFX, Nellix...,Complexes: branchées et fenêtrées)
- DIAMETRE (sac, collet, jambages, iliaques)
- PERMEABILITE (prothèse, a viscérales, iliaques)
- COMPLICATIONS (augmentation de volume, endofuites I à V, migration, rupture, thrombose, torsion, plicature)
- EVOLUTION de la maladie anévrismale (hypogastrique, zones d'implantation)

ENDOPROTHESES

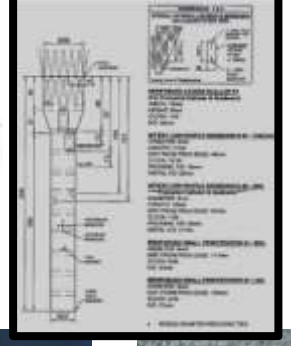
Present:

- Endurant I and II (Medtronic)
- C3 (Gore),
- Zenith LP (Cook)
- PowerLink (Endologix)
- AFX (Endologix)
- Nellix (Endologix)
- Anaconda (Vascutek)
- Ovation (Trivascular)

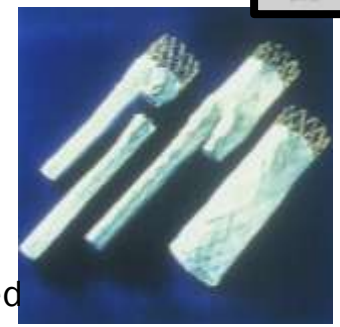
- Fenestrated and branched grafts (COOK, Anaconda, Ventana, Jotec)

Other:

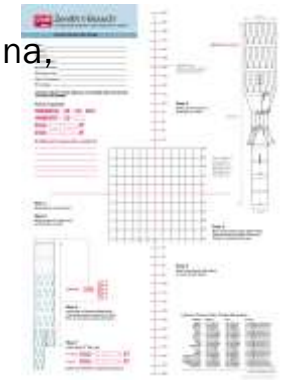
- Incraft EVAR (Cordis);
- E-vita abdominal (Jotec),
- Treovance (Bolton)
- CARDIATIS (multilayer)
- Kissing stent-graft

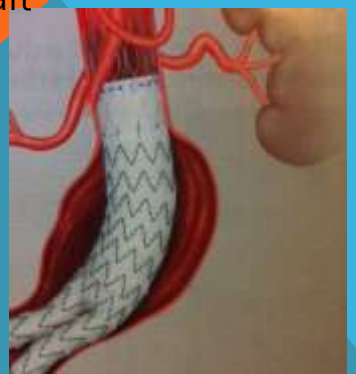


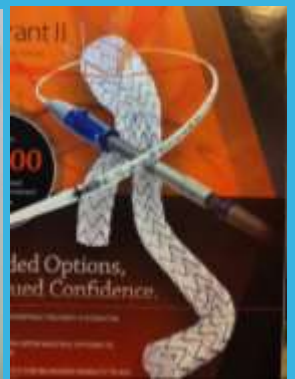






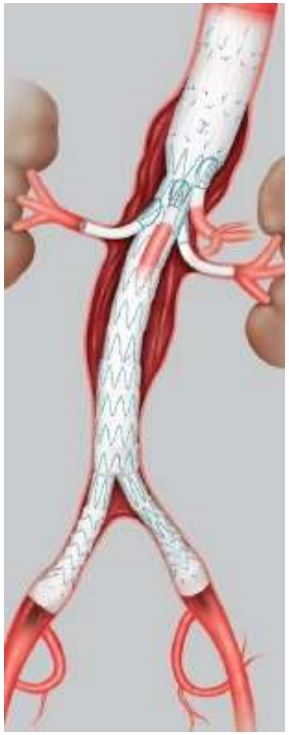



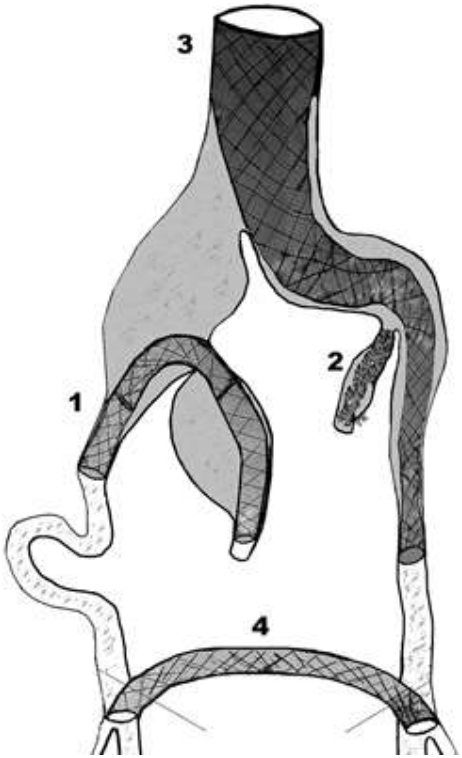
DIFFERENTS MONTAGES

Aorto-iliaque
+/- Exclusion contro-lat
Pontage croisé

Aorto-bi-iliaque

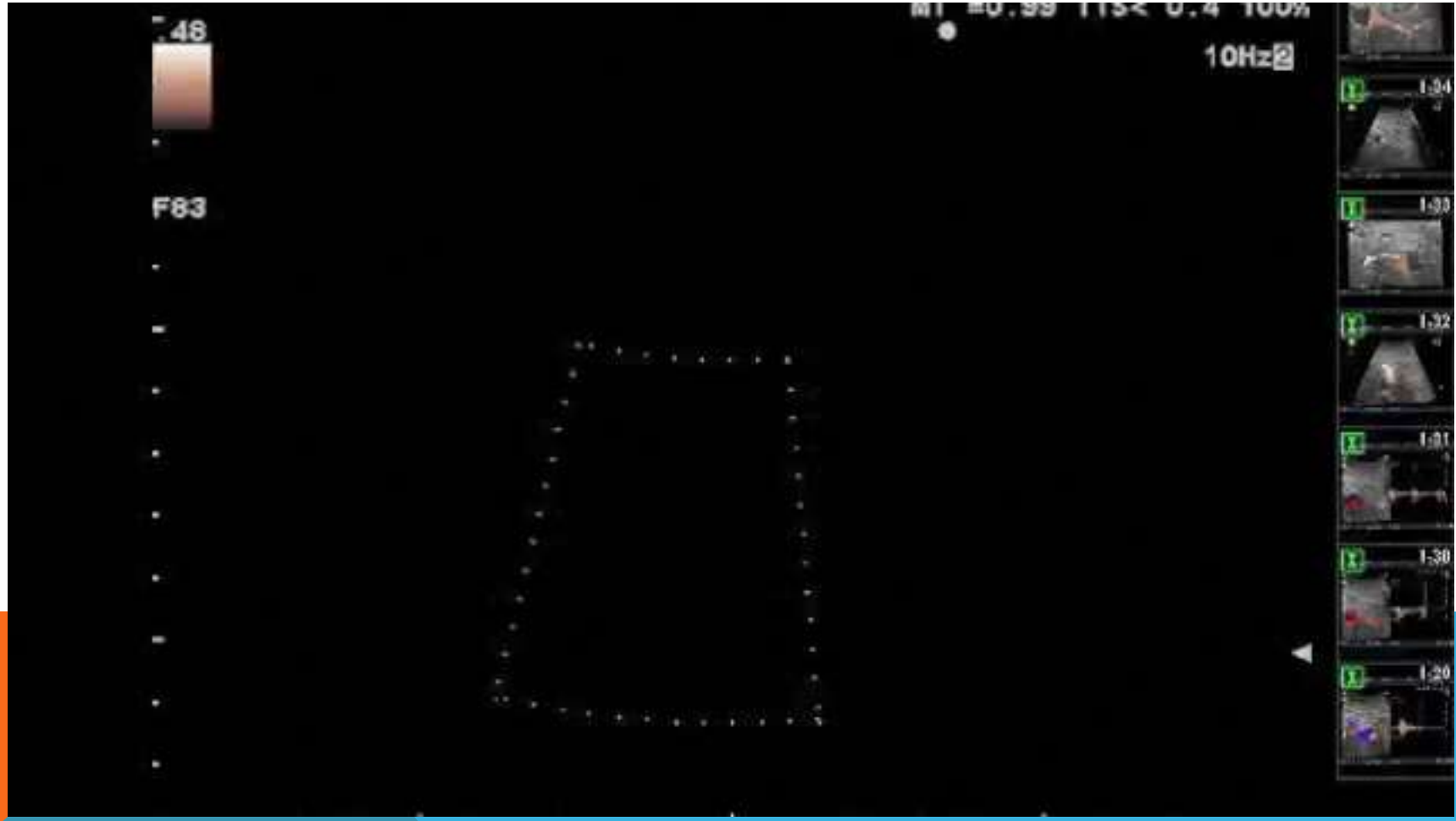


Aorto-iliaque
Stent A.Visc

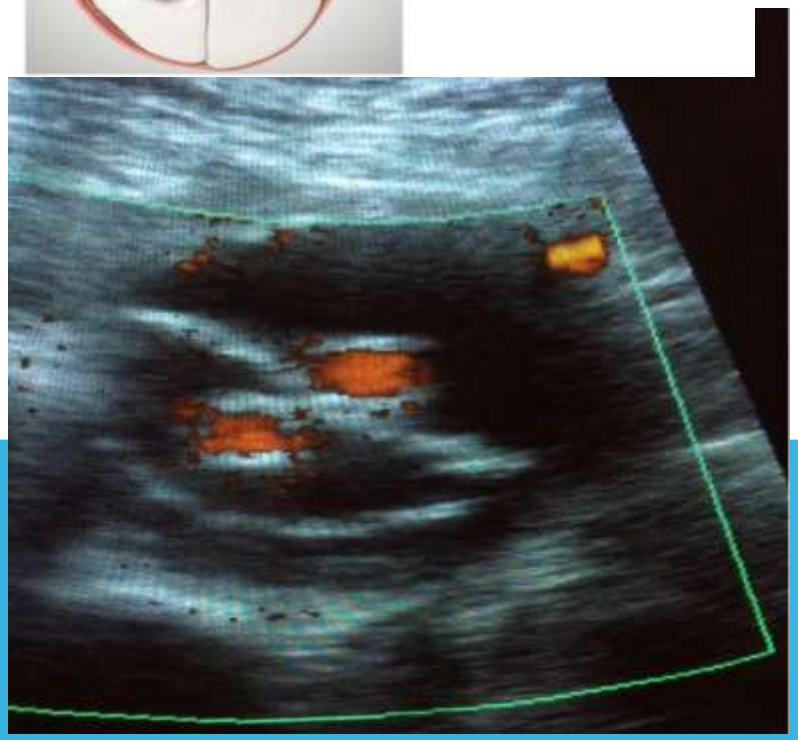


Aorto-iliaque
Exclusion contro-lat
Embol HyG
Endo pro HYD
Pontage croisé

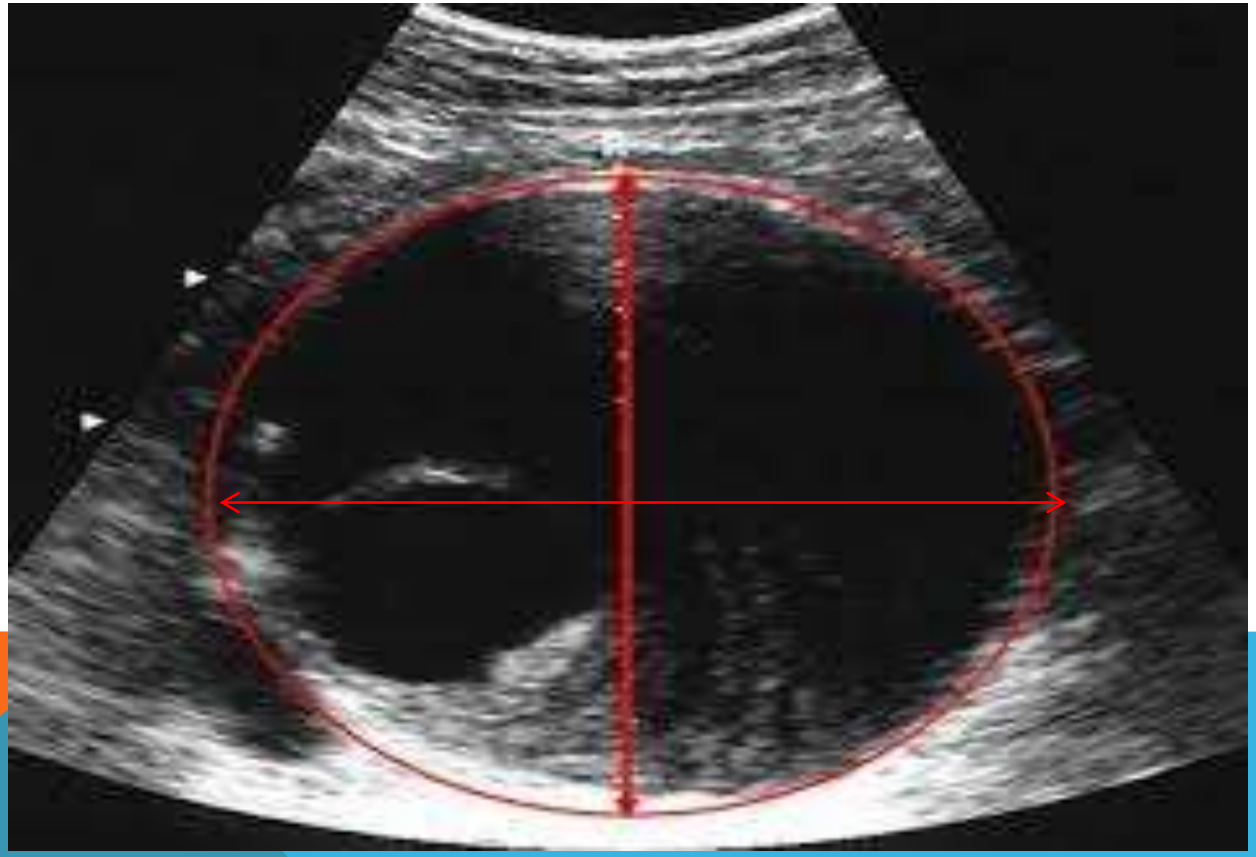
EPA AORTO-BI NORMALE



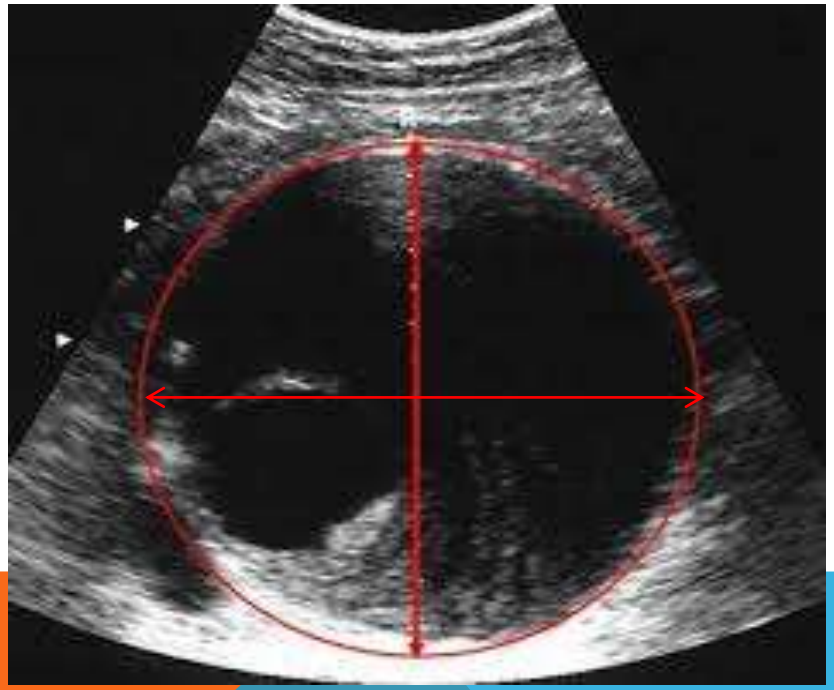
NELLIX

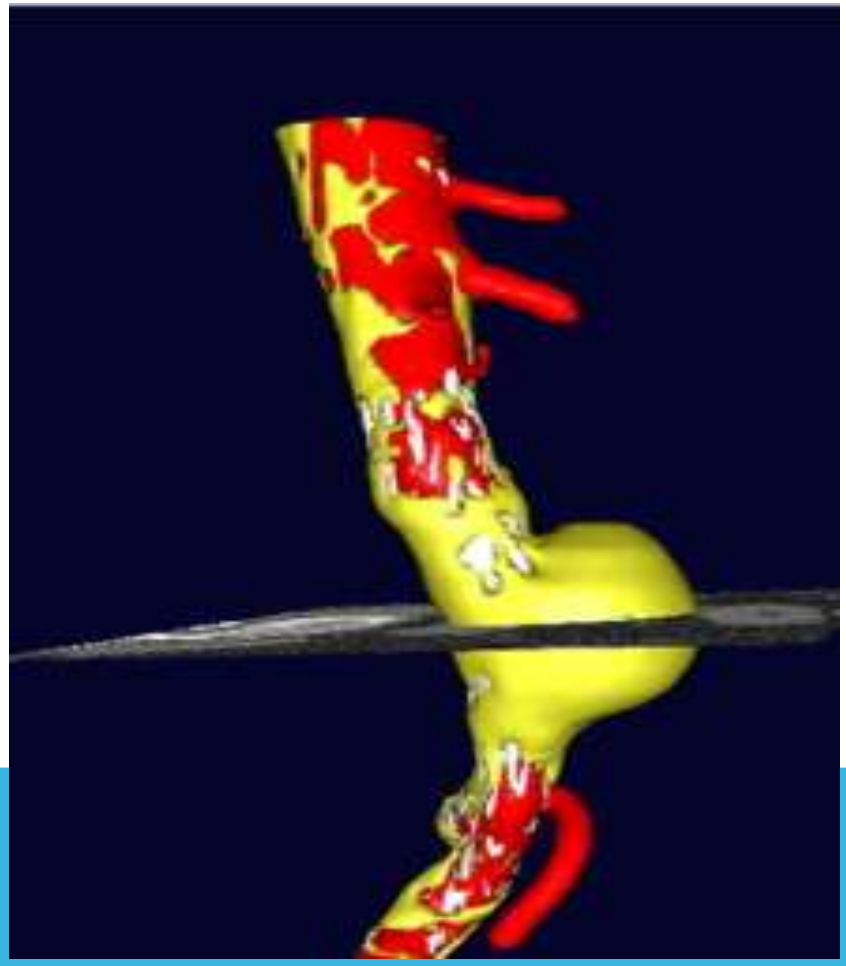


LA TAILLE DU SAC ANEVRISMAL: CRITÈRE MAJEUR

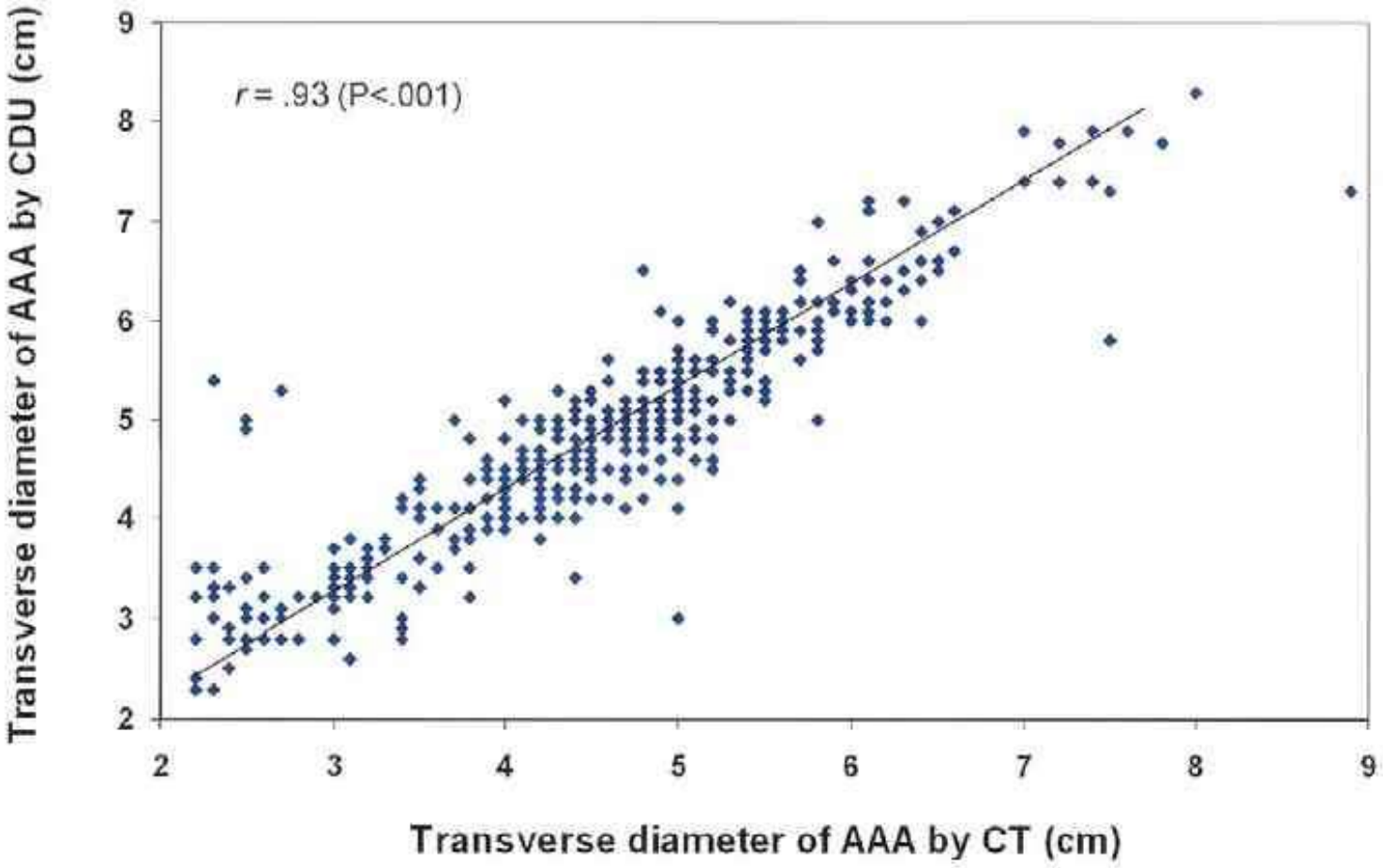


L'IMPORTANT C'EST LE DIAMÈTRE
Ø AP EXT MAX- Ø TRANS EXT MAX





Ø ED VERSUS TDM



. sensibilité et spécificité proches de 100%

- variabilité intra- et inter-observateur
  - < 2 mm dans 70 à 86 % des cas
  - < 4 mm dans 94 à 99 % des cas.
- variabilité par rapport à TDM :pulsatilité

ANALYSE VOLUMETRIQUE

Follow-up of aortic stent grafts: comparison of the volumetric analysis of the aneurysm sac by ultrasound and CT.

Arsicot M[1], Lathelize H[2], Martinez R[2], Marchand E[2], Picquet J[3], Enon B[3].

Author information

1 Département de Chirurgie Vasculaire, CHRU Trousseau, Tours, France. Electronic address: matthieu.arsicot@gmail.com.
2 Département de Chirurgie Vasculaire, CHRU Trousseau, Tours, France.
3 Département de Chirurgie Vasculaire, CHRU Larrey, Angers, France.

Abstract

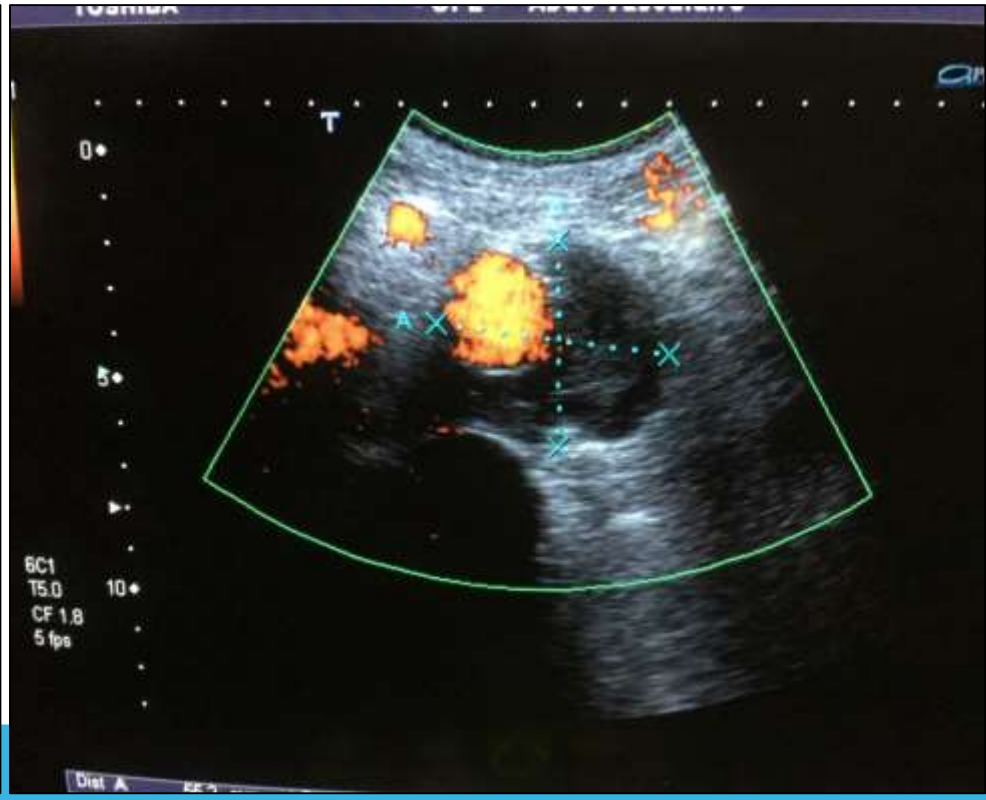
BACKGROUND: The long-term follow-up of patients with endovascular aneurysm repair (EVAR) and a normal surgical risk was defined by the French National Authority for Health (Haute Autorité de Santé) in 2009. The monitoring of the volume of the aneurysm sac theoretically avoids the bias related to the measurement of its diameter alone. The objective of this study was to evaluate how reliable and reproducible the volumetric measurement of the aneurysm sac by ultrasound was compared with computerized tomography angiography (CTA).

METHODS: We carried out a retrospective diagnosis study of 75 consecutive patients treated with EVAR in our institution who were monitored with 3-dimensional ultrasonography (3DU) and CTA between January 2010 and December 2012. The measurement of the volume (cm(3)) of the aneurysm sac with a Toshiba Aplio XG ultrasound system equipped with a 3-MHz 3-dimensional probe was compared with the volume obtained by CTA. Interoperator reproducibility was studied in the last 45 enrolled patients; 2 different blinded operators made 2 volumetric measurements on the same patients, on the same day. An analysis of a 48-patient subgroup in which at least two 3DU were performed during follow-up was also carried out to determine the threshold value of the increase in the volume of the aneurysm sac, making it possible to suspect the presence of an endoleak.

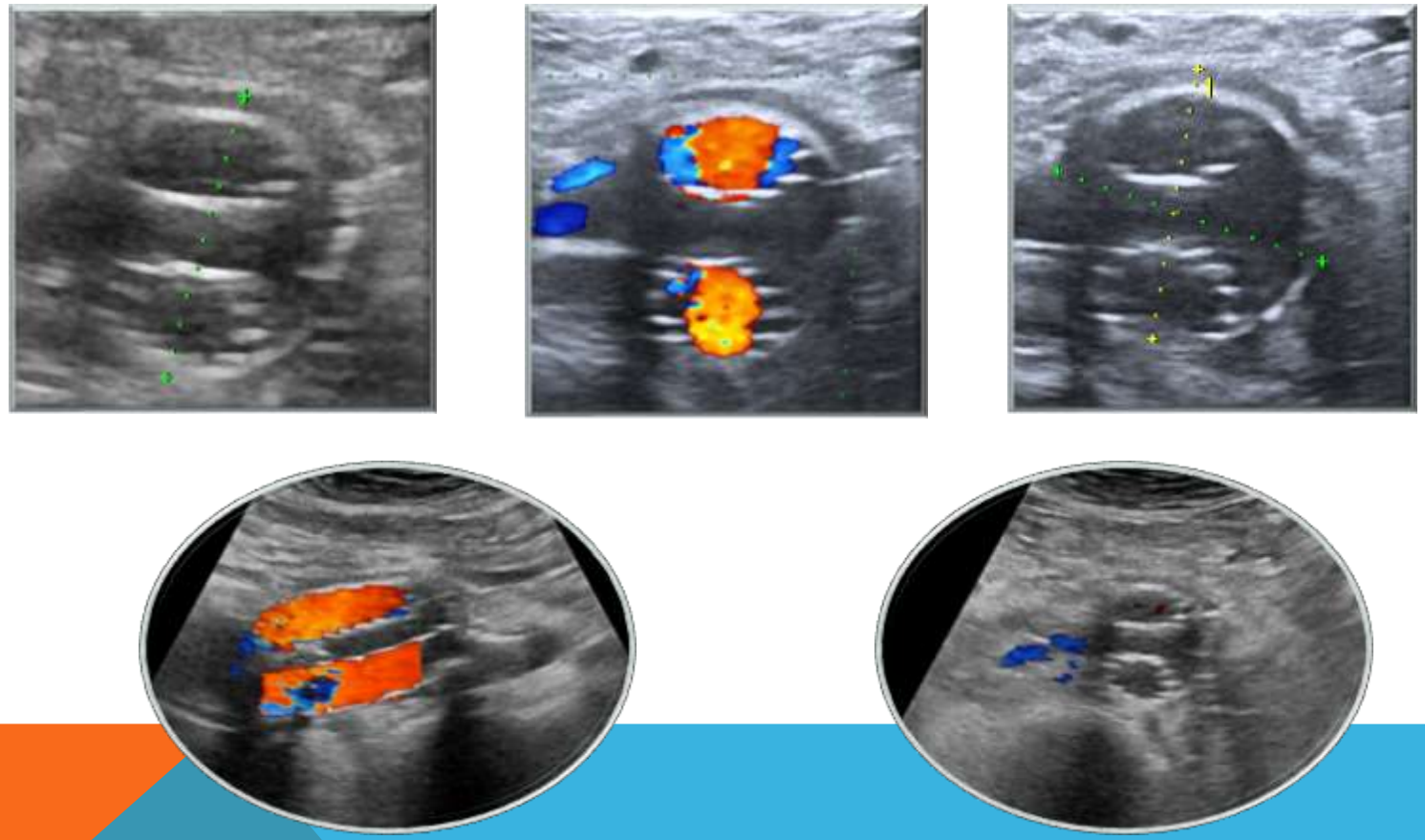
RESULTS: A total of 116 pairs of examinations were compared (the patients who had the longest postoperative follow-up had 4 pairs of compared examinations). The correlation between volumetric ultrasound and CTA measurements was excellent ($r = 0.931$; $P < 0.0001$) in the 116 pairs of examinations, and so was the reproducibility of volumetric echography ($r = 0.949$; $P < 0.0001$) in 45 patients. The subgroup study highlighted the fact that a 6.5-cm(3) increase of the aneurysm sac made it possible to suspect the presence of an endoleak in comparison with CTA as the gold standard (sensitivity and specificity were 85.7% and 85.3%, respectively). The area under the curve was 0.854 (95% confidence interval, 0.793-0.915). In the 116 examinations, a good correlation between volume and diameter was calculated with CTA ($r = 0.733$; $P < 0.0001$) and between ultrasound volumetric and CTA diameter ($r = 0.660$; $P < 0.0001$).

CONCLUSIONS: Volumetric echography is comparable with CTA for the evaluation of the aneurysm sac after EVAR, reproducible and inexpensive. When a significant increase of the volume of the sac is detected by ultrasound, the examination can be supplemented by an injection of ultrasound contrast agent or by CTA to visualize an endoleak.

Ø TRANSVERS MAX # VOLUMES



RETRACTION DU SAC: BON PRONOSTIC



Significant sac retraction after endovascular aneurysm repair is a robust indicator of durable treatment
Rabih Houbballah, Marek Majewski, Jean-Pierre Becquemin
J Vasc Surg. 2010

AUGMENTATION DU DIAMETRE

> 5 mm en 6 mois, > 10 mm en 1 an

1an : 3%, 3 ans: 17%, 5 ans: 41%

Fact :

- Age> 80 ans
- Anévrisme volumineux
- Collet : > 28 mm Ø, angle > 60°
- IP > 20 mm Ø
- Endofuite
- Anticoagulant

(Schanzer, circulation 2011)

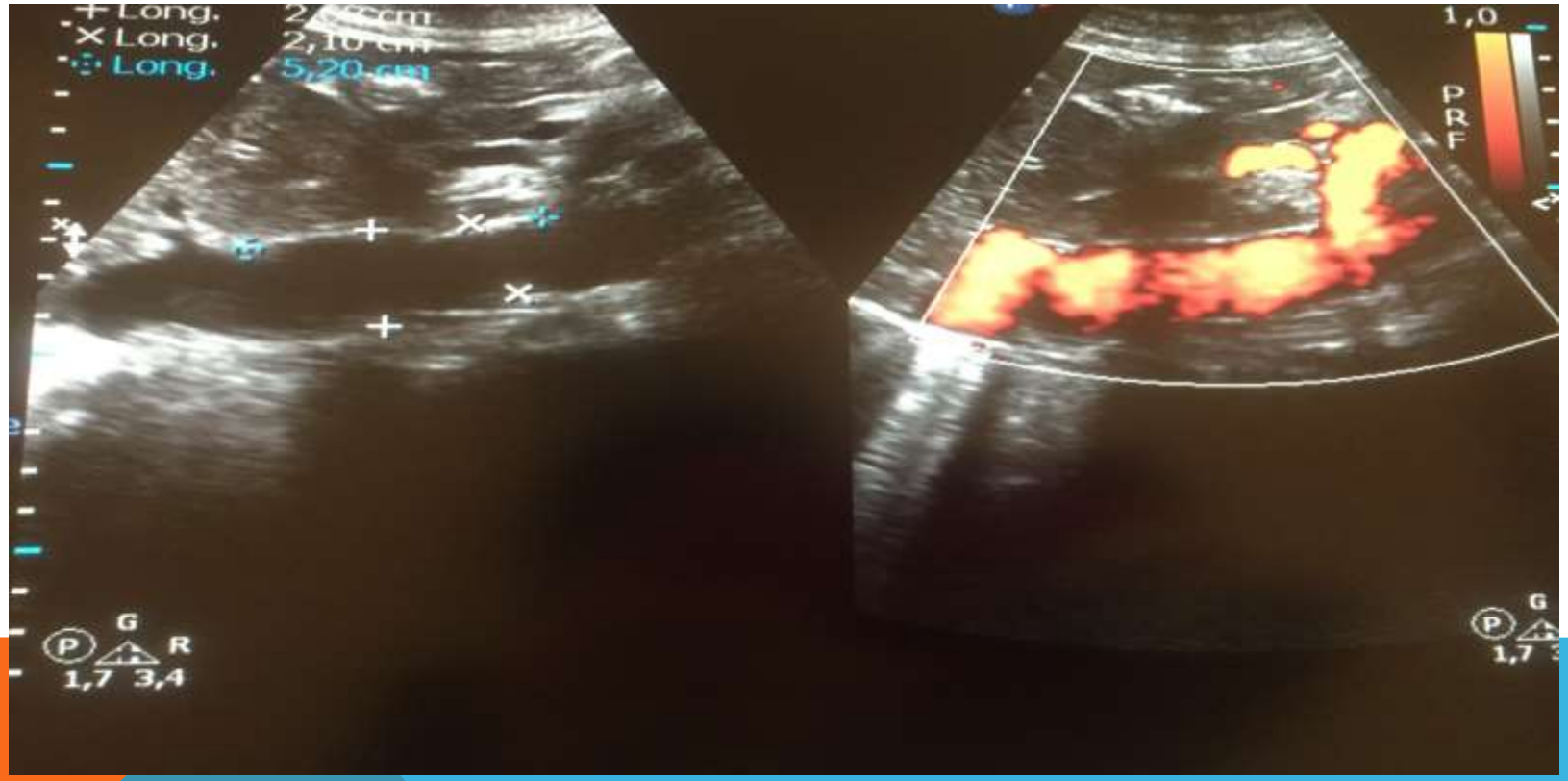
COLLET

- Longueur > 15 mm
- Diamètre < 28 mm
- Angle < 60°
- Calcification / Thrombus
- Etanchéité (migration)

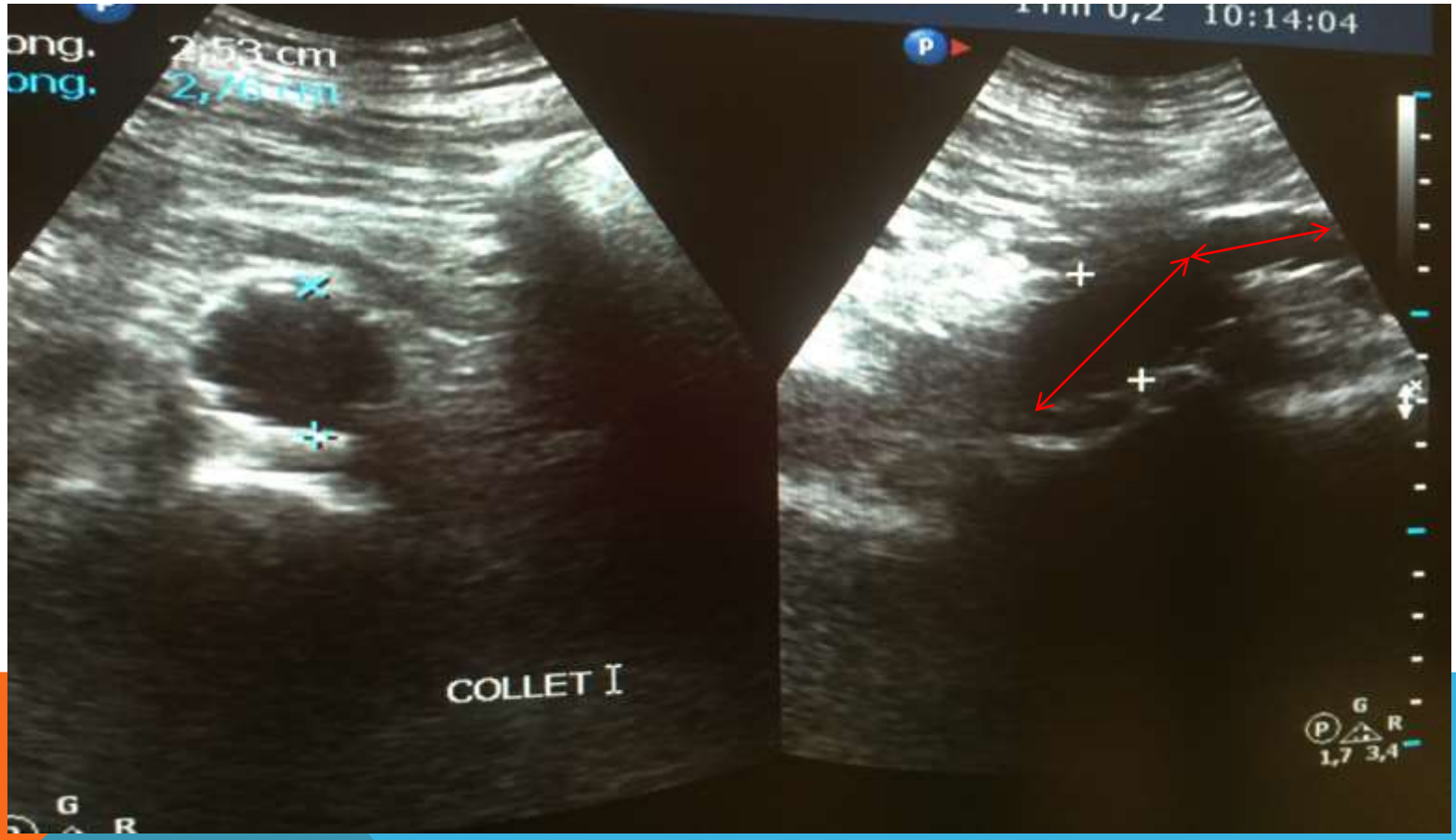
Limitation :

- Migration
- ASP/TDM

COLLET : LONGUEUR / DIAMETRE



COLLET: ANGULATION/ETANCHEITE



PERMEABILITE

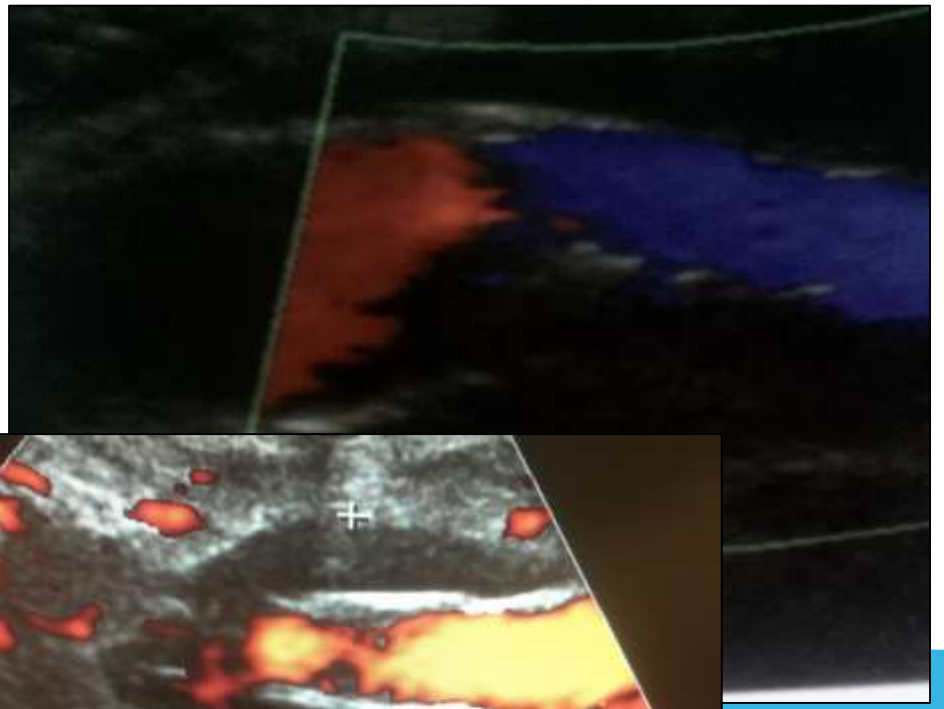
ENDOPROTHESE : corps, jambages

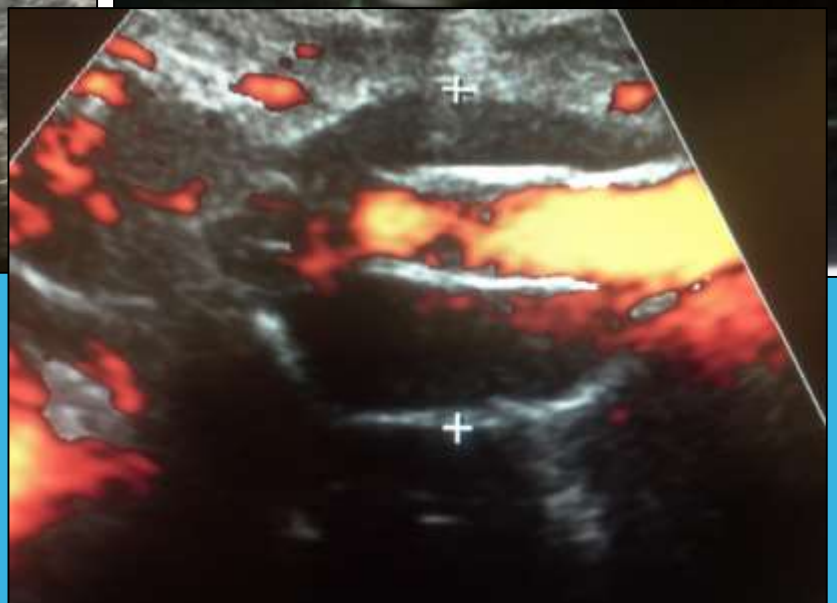
ARTERES VISCERALES : fenêtres, branches

Axes d'aval : iliaques

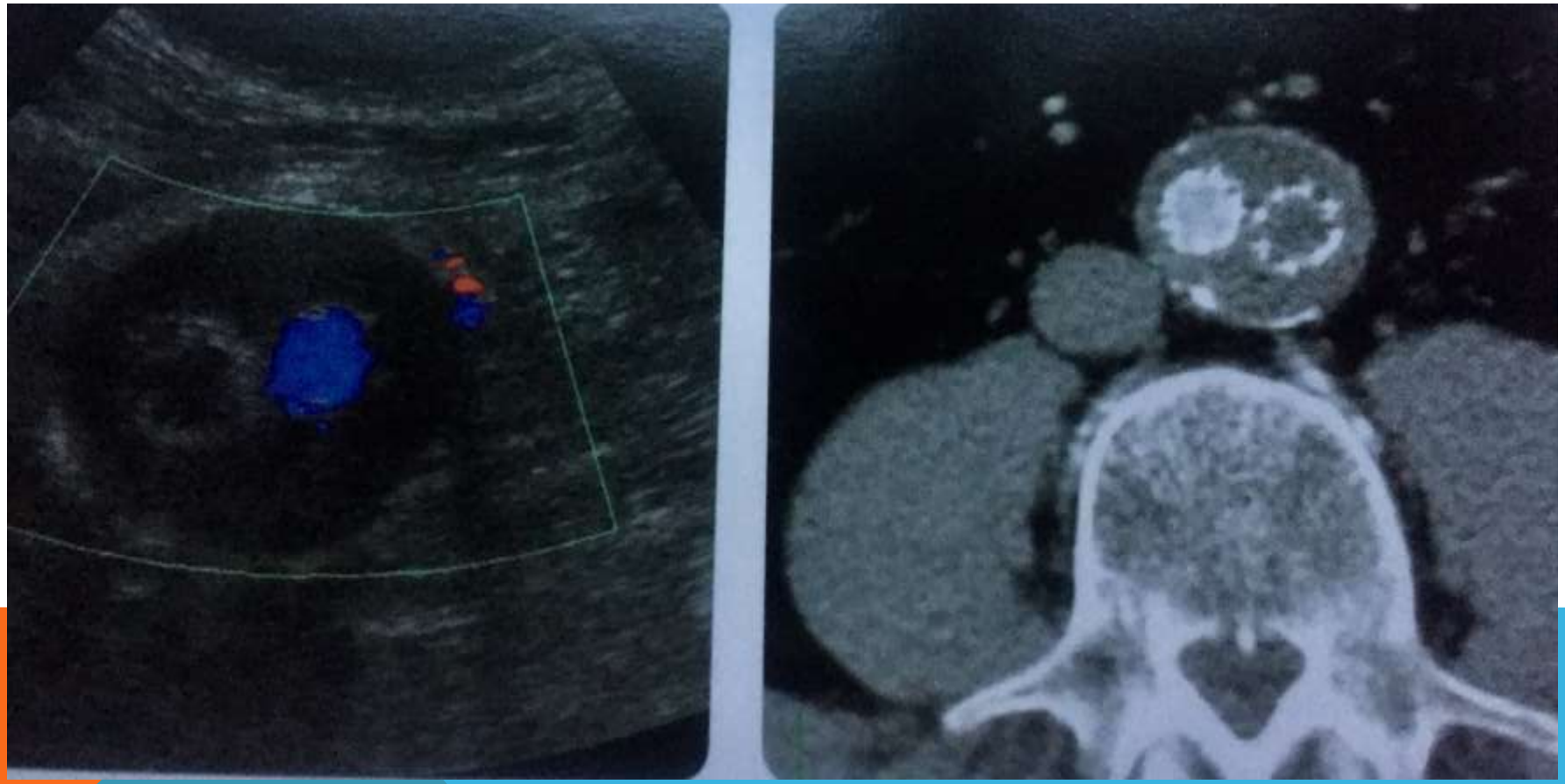
- Plicature
- Sténose
- Occlusion

PERMÉABILITÉ DES JAMBAGES : STENOSE; THROMBOSE; PLICATURE

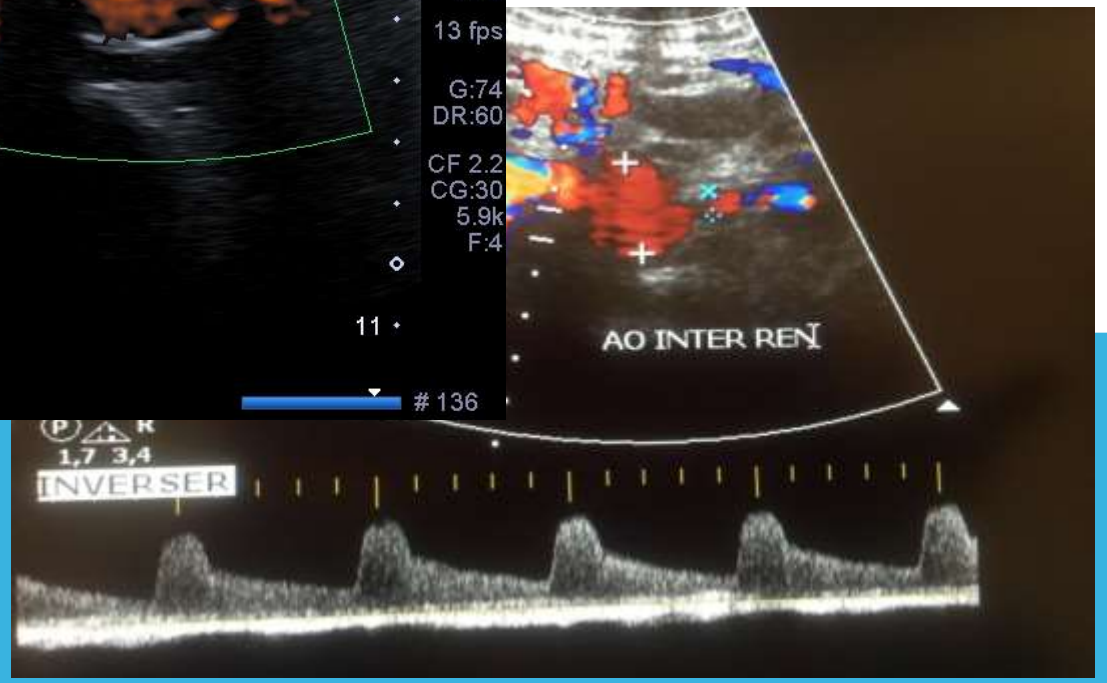




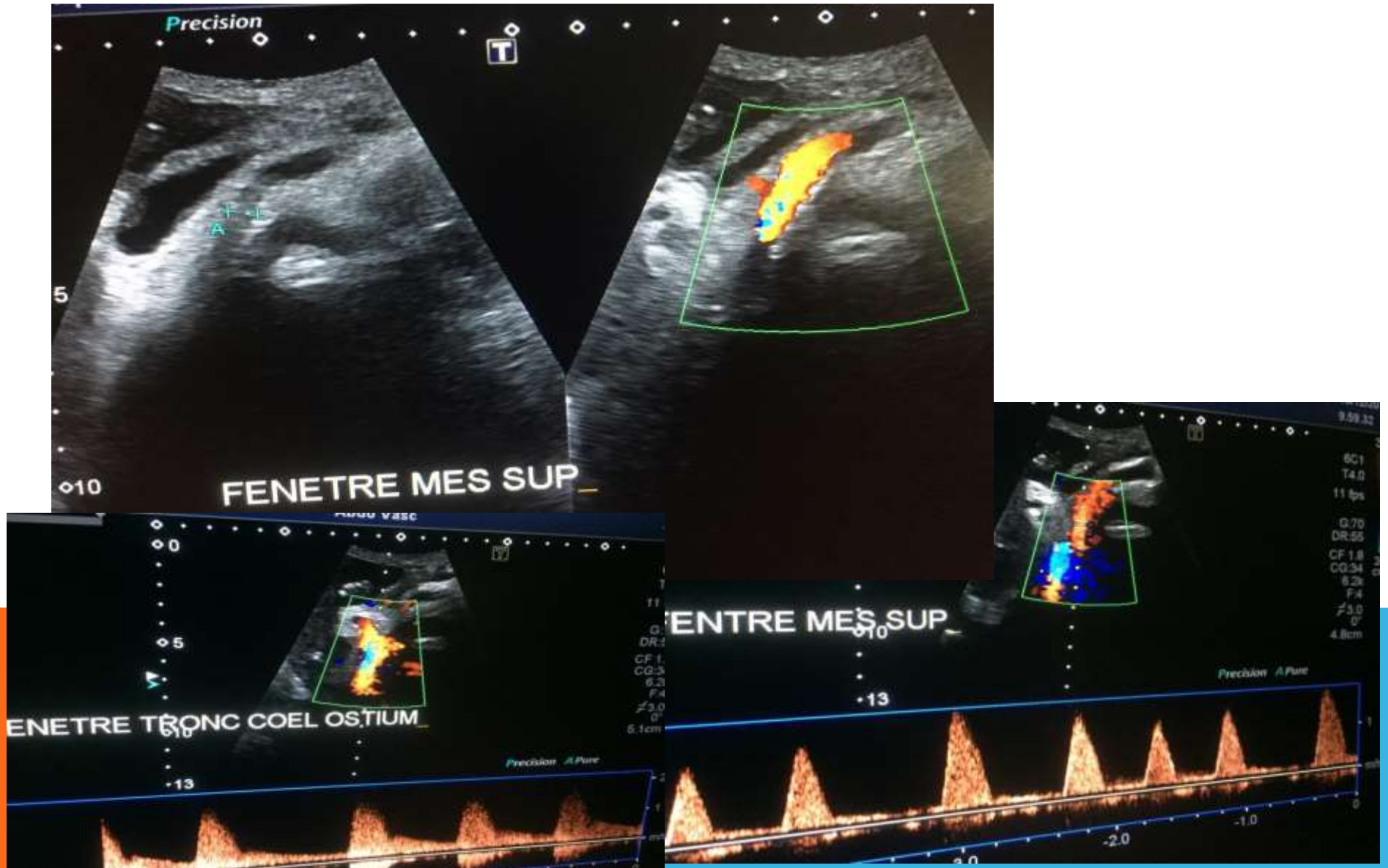
PERMEABILITE /THROMBOSE



PERMEABILITE FENETRES RENALES



PERMEABILITE FENETRE MS/TC



FUITES

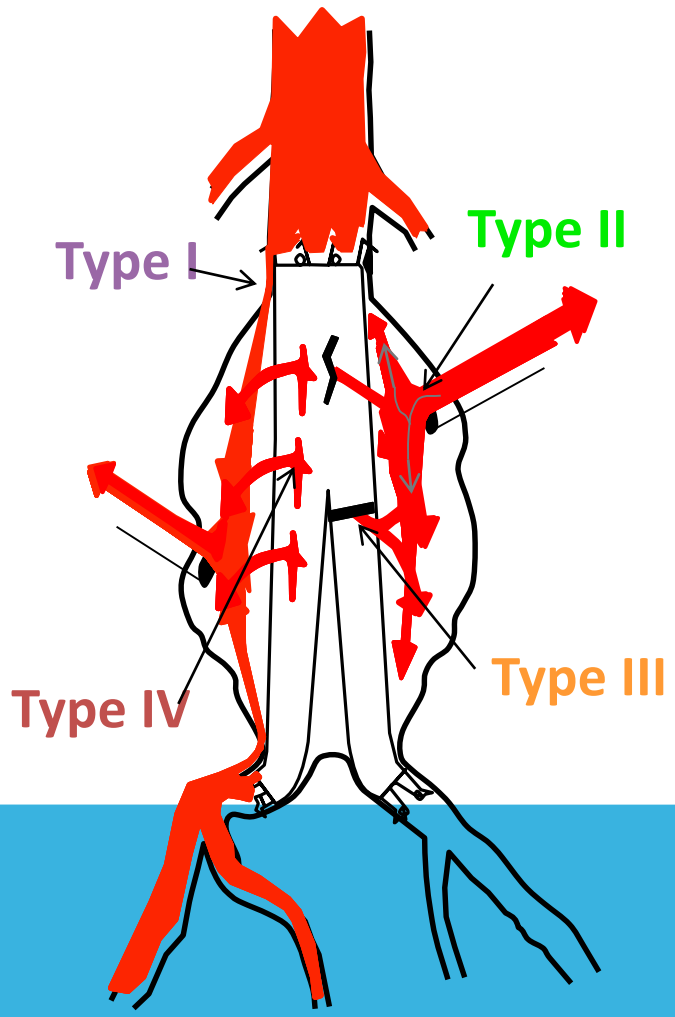
Type I
fuite au niveau des zones d'attache de l'endoprothèse à la paroi

Type II
fuite par reflux des collatérales aortiques

Type III
fuite par déconnection des jambages

Type IV
fuite par porosité de la prothèse

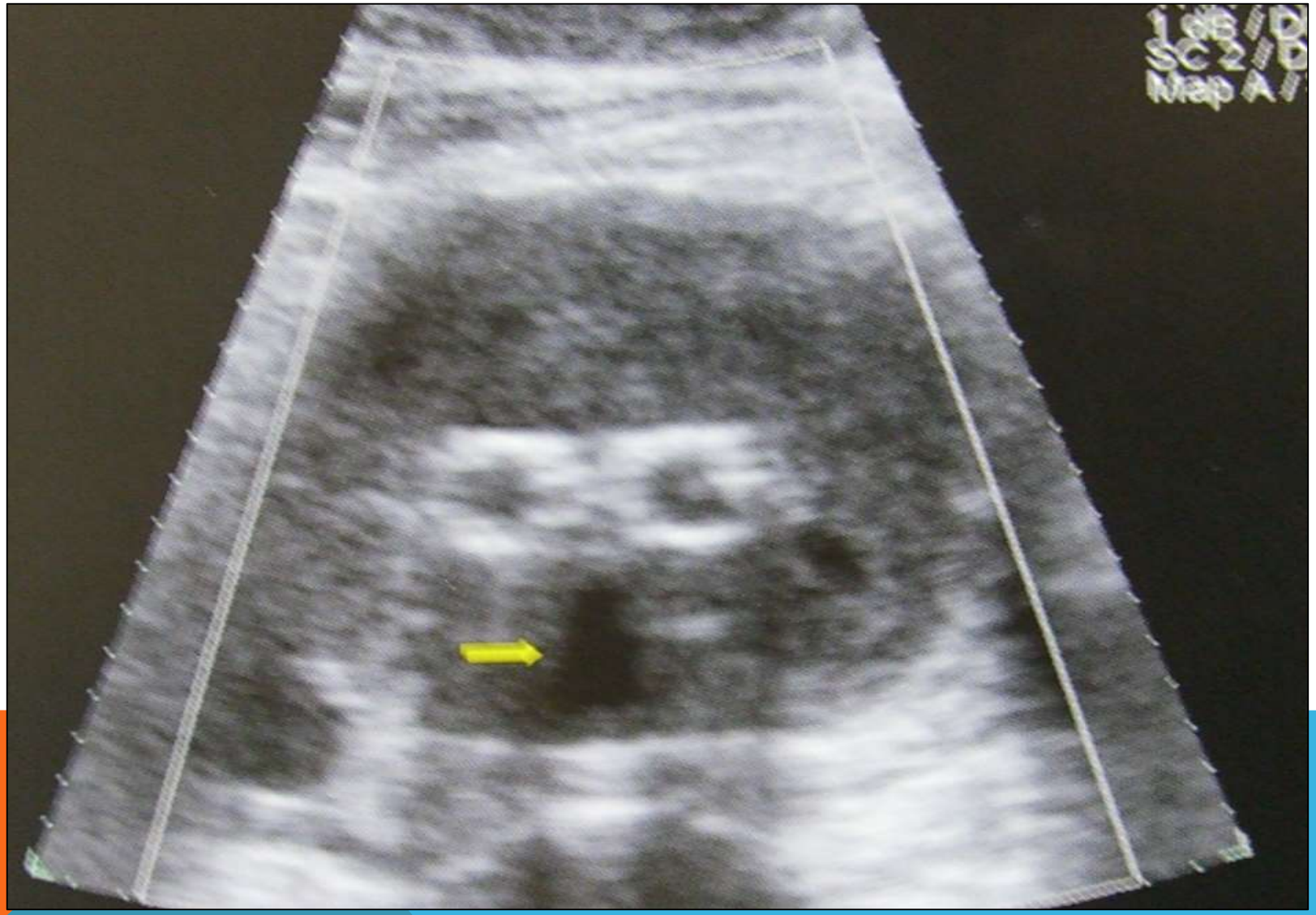
Type V
Endotension



White et.al., Endoleak Classification, Journal of Endovascular Surgery, 1998;5:305-309

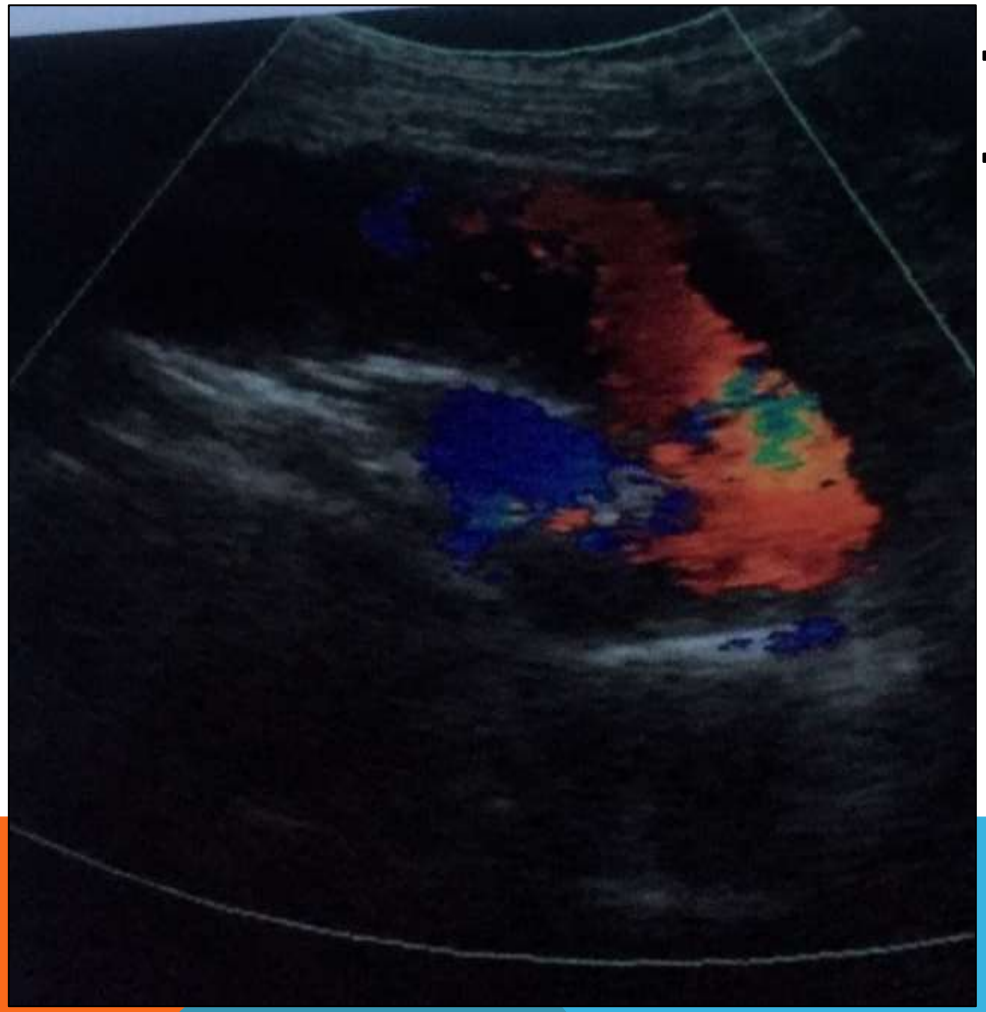
HYPOECHOGENICITE
PULSATILITE

HYPOECHOGENICITÉ: NIDUS



PULSATILITE

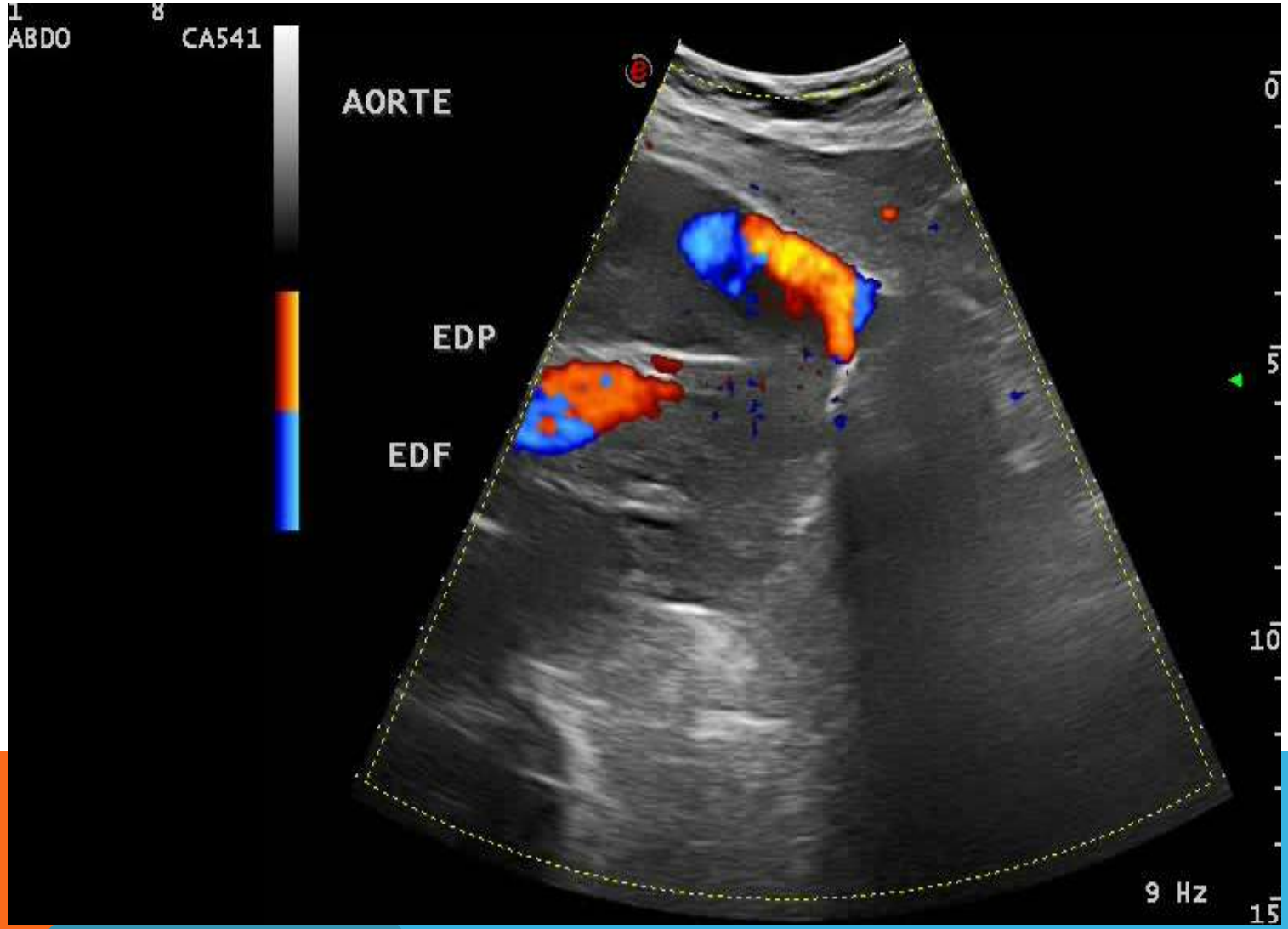
ENDOFUITE TYPE I: EVAR 6%, 10,5%



. Précoce: sizing

. Tardive:
  migration:
  collet court/
  angulation/
  évolutivité
  anévrismale/
  modification de
  forme

ENDOFUITE DE TYPE I A



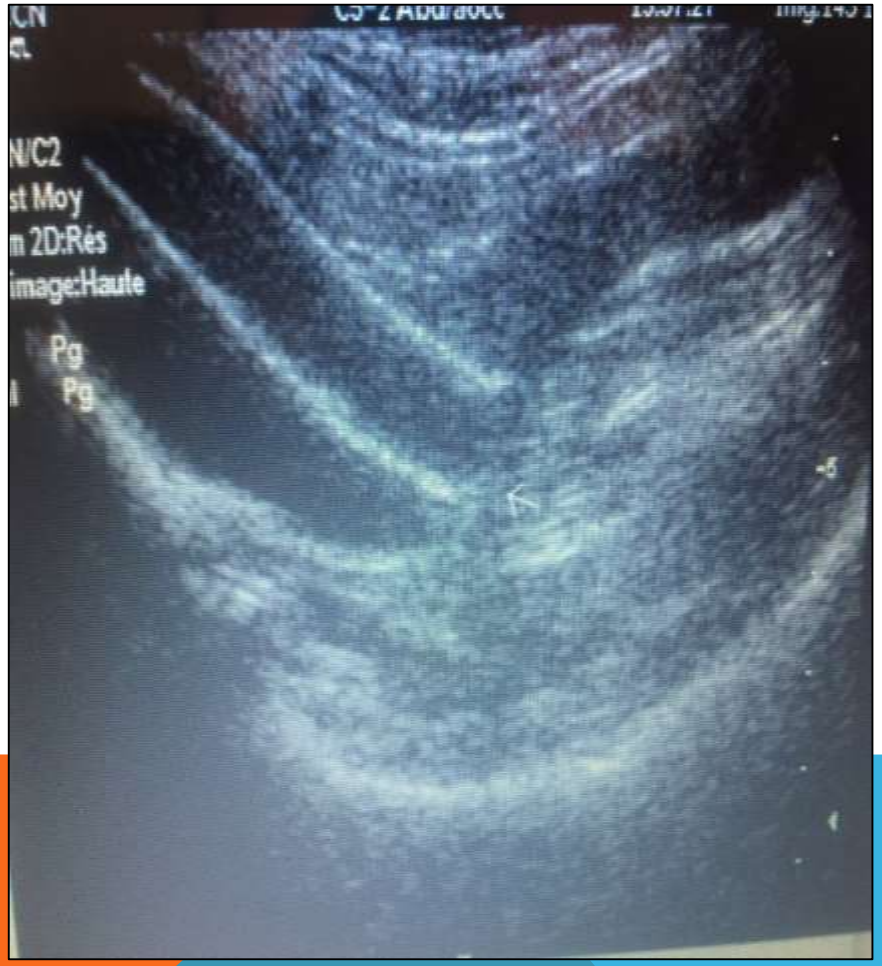
REINJECTION DU SAC TYPE I A

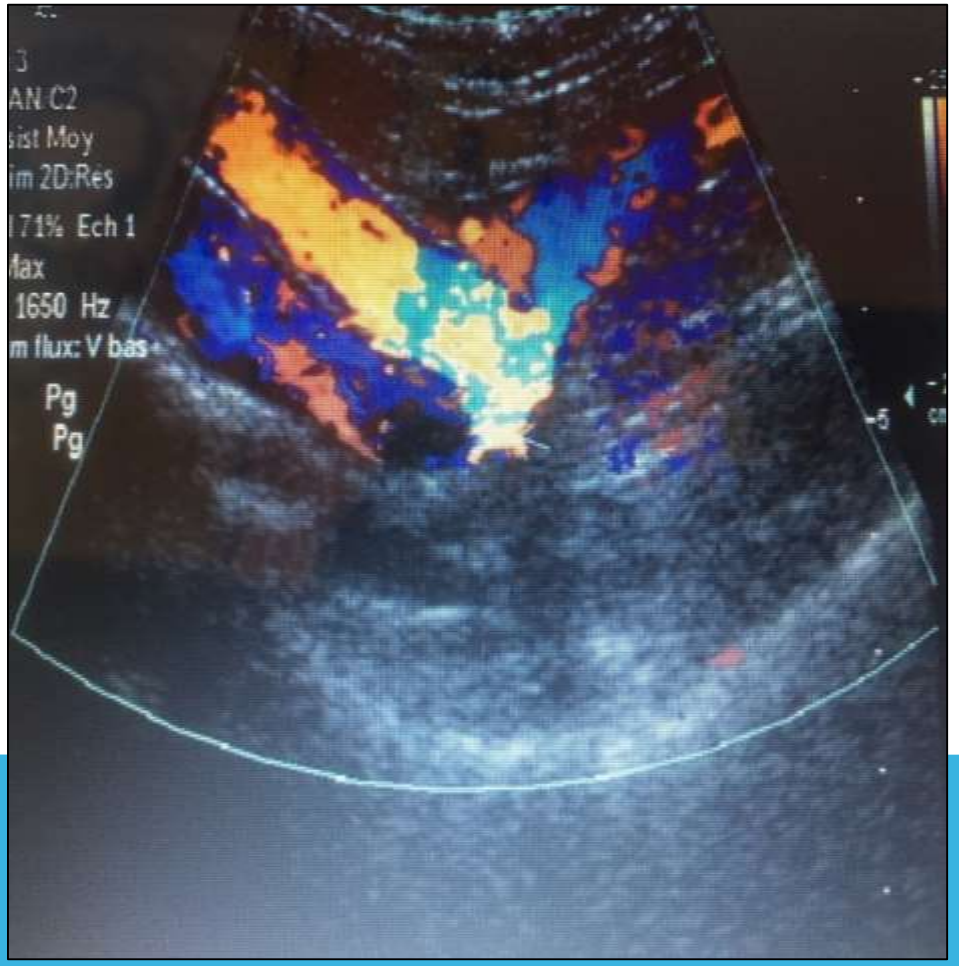
a

b

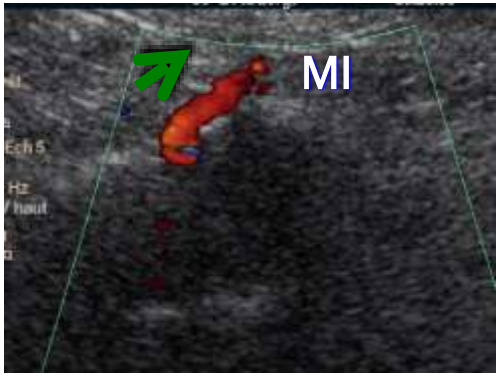
FUITE TYPE IA

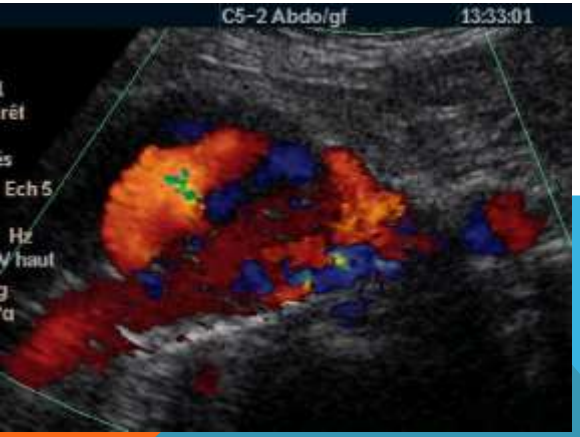
ENDOFUITE TYPE I B

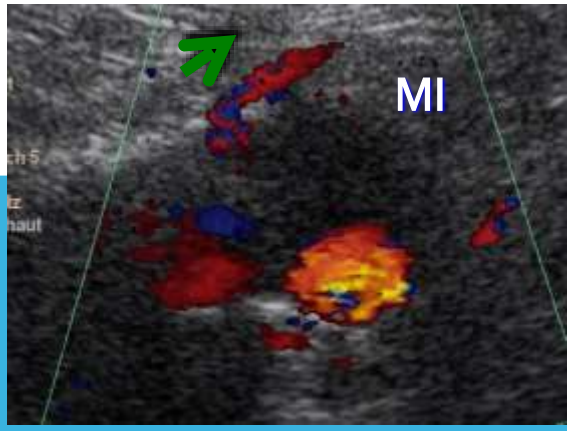




ENDOFUITE TYPE I B

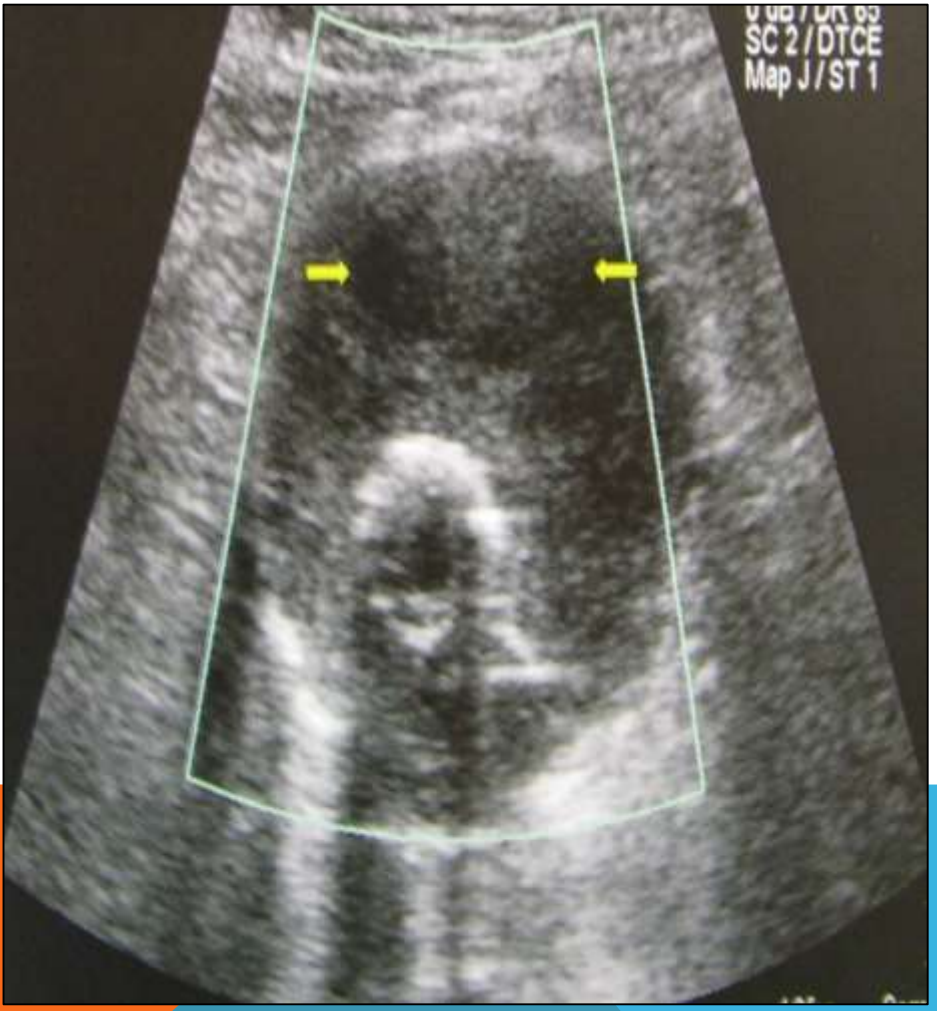


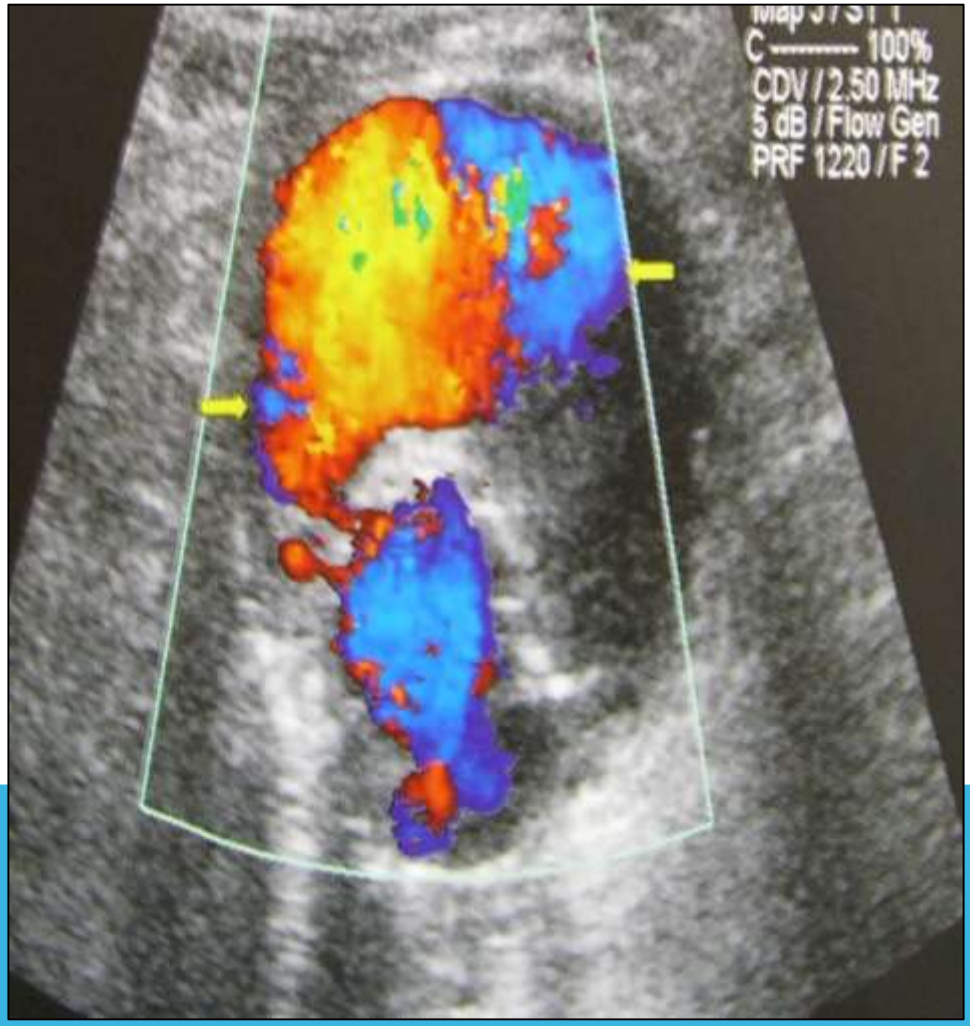




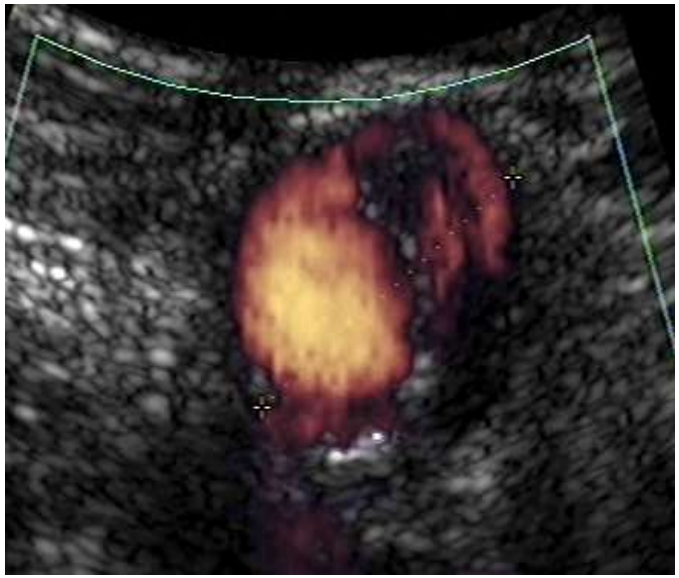
FUITE DU COLLET INF
RÉINJECTION ORTHOGRADE MI

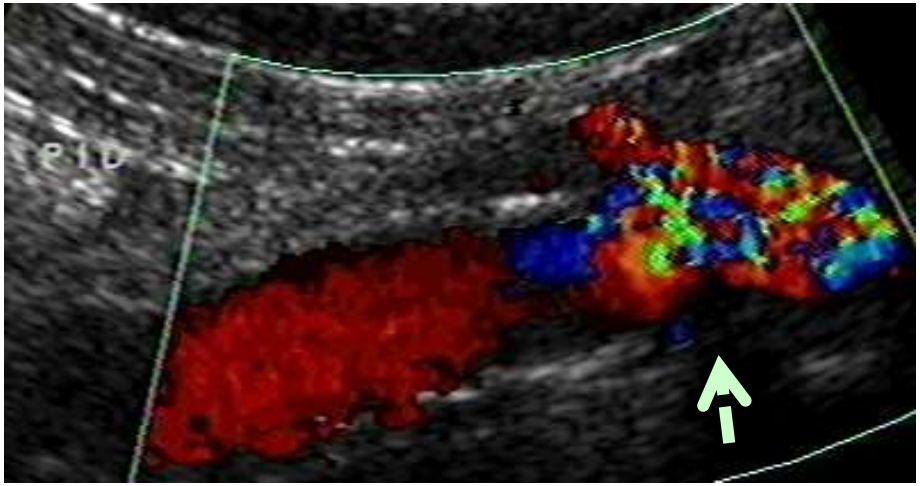
FUITE DE TYPE III

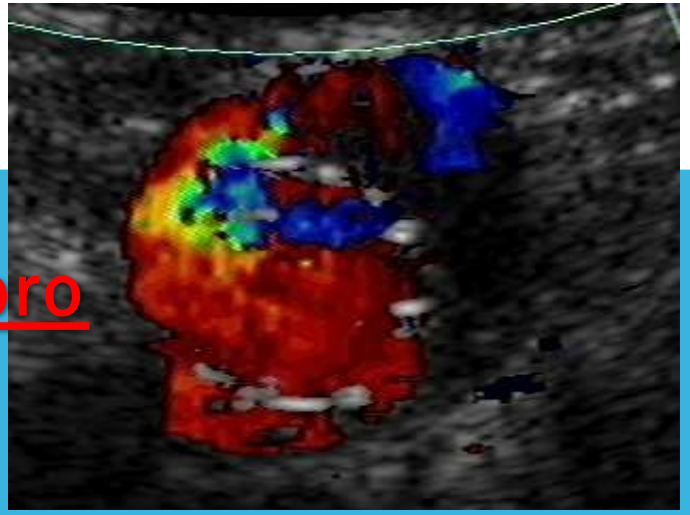




FUITE TYPE III

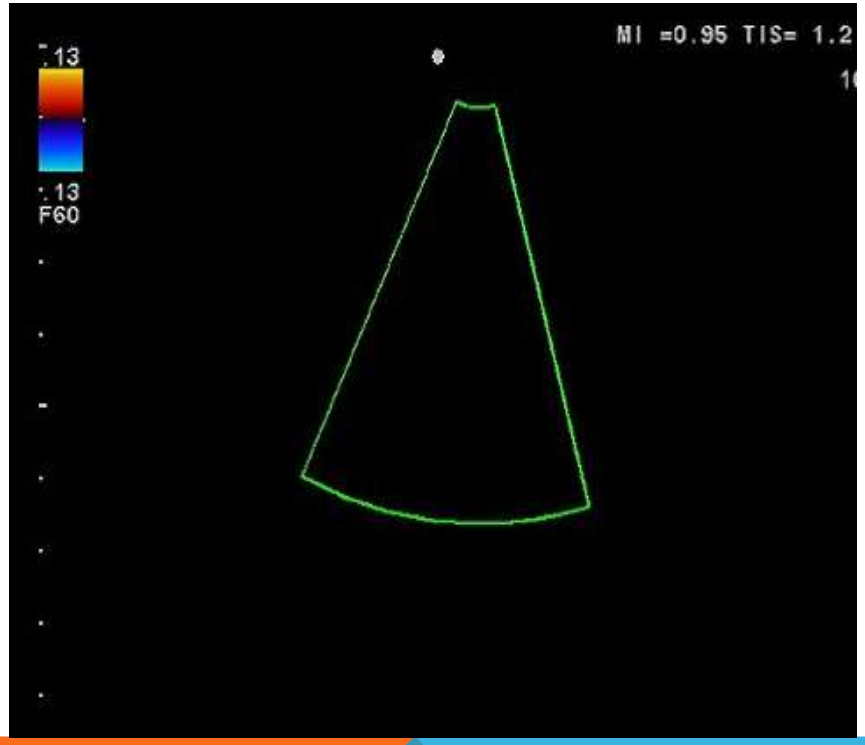






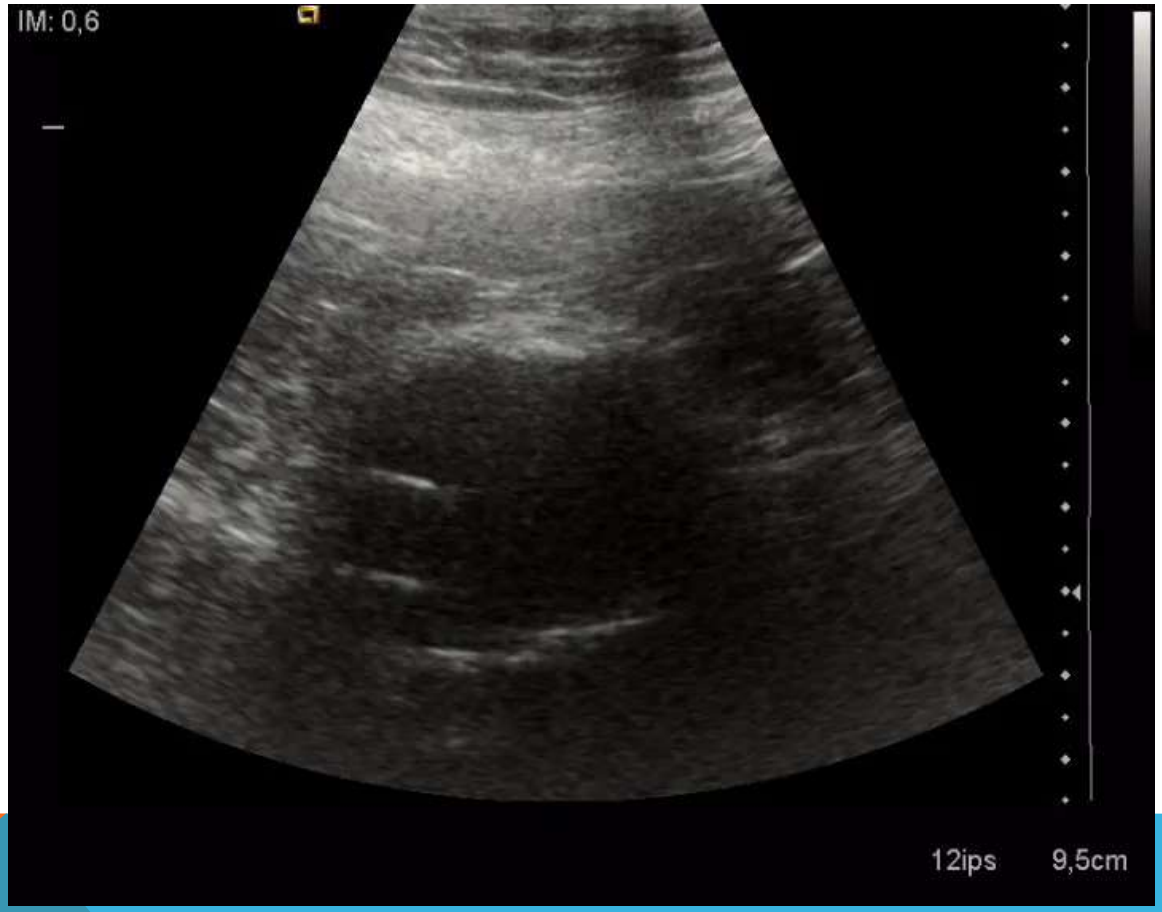
Désunion entre 2 endopro

FUITE INTERMEDIAIRE JAMBAGE TYPE III



Coup de boutoir dans le sac
Pas de sortie

MIGRATION /FUITE III REINJECTION MI



Fuite collet inf de l'extension iliaque
Réinjection du sac
Sortie MI

Systematic review and meta-analysis of duplex ultrasonography, contrast-enhanced ultrasonography or computed tomography for surveillance after endovascular aneurysm repair

A. Karthikesalingam[1], W. Al-Jundi[2], D. Jackson[3], J. R. Boyle[4], J. D. Beard[2], P. J. E. Holt[1] and M. M. Thompson[1]

[1]Department of Outcomes Research, St George's Vascular Institute, St George's Hospital, London, [2]Sheffield Vascular Institute, Northern General Hospital, Sheffield, and [3]Medical Research Council Biostatistics Unit, Institute of Public Health, University of Cambridge, and [4]Department of Vascular Surgery, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Correspondence to: Mr A. Karthikesalingam, St George's Vascular Institute, Room 4.007, St George's Healthcare NHS Trust, Blackshaw Road, London SW17 0QT, UK (e-mail: akarthik@sgul.ac.uk)

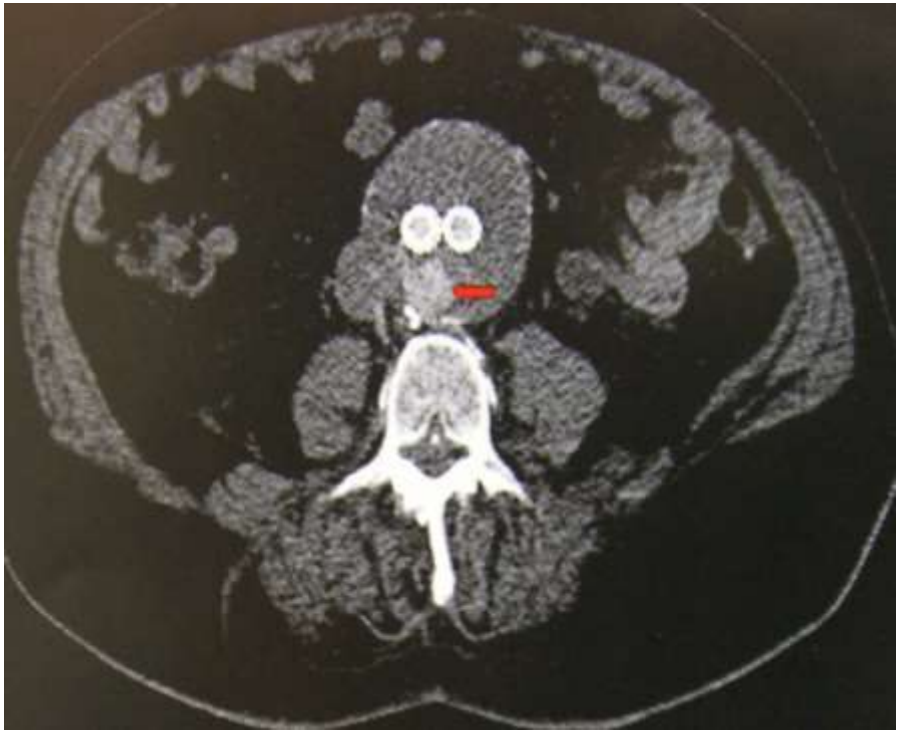
Background: Previous analyses suggested that duplex ultrasonography (DUS) detected endoleaks after endovascular aneurysm repair (EVAR) with insufficient sensitivity; they did not specifically examine types 1 and 3 endoleak, which, if untreated, may lead to aneurysm-related death. In light of changes to clinical practice, the diagnostic accuracy of DUS and contrast-enhanced ultrasonography (CEUS) for types 1 and 3 endoleak required focused reappraisal.

Methods: Studies comparing DUS or CEUS with computed tomography (CT) for endoleak detection were identified. CT was taken as the standard in bivariable meta-analysis.

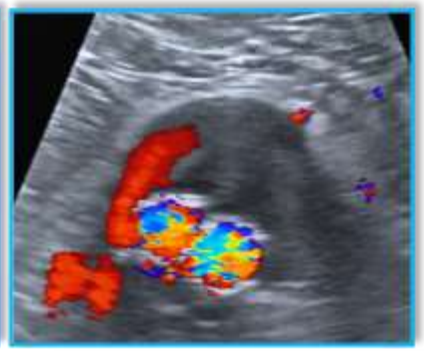
Results: Twenty-five studies (3975 paired scans) compared DUS with CT for all endoleaks. The pooled sensitivity was 0·74 (95 per cent confidence interval 0·62 to 0·83) and the pooled specificity was 0·94 (0·90 to 0·97). Thirteen studies (2650 paired scans) reported detection of types 1 and 3 endoleak by DUS; the pooled sensitivity of DUS was 0·83 (0·40 to 0·97) and the pooled specificity was 1·00 (0·97 to 1·00). Eleven studies (961 paired scans) compared CEUS with CT for all endoleaks. The pooled sensitivity of CEUS was 0·96 (0·85 to 0·99) and the pooled specificity was 0·85 (0·76 to 0·92). Eight studies (887 paired scans) reported detection of types 1 and 3 endoleak by CEUS. The pooled sensitivity of CEUS was 0·99 (0·25 to 1·00) and the pooled specificity was 1·00 (0·98 to 1·00).

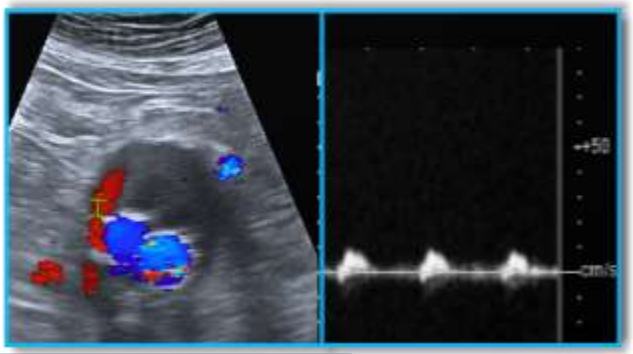
Conclusion: Both CEUS and DUS were specific for detection of types 1 and 3 endoleak. Estimates of their sensitivity were uncertain but there was no evidence of a clinically important difference. DUS detects types 1 and 3 endoleak with sufficient accuracy for surveillance after EVAR.

FUITE DE TYPE II NIDUS



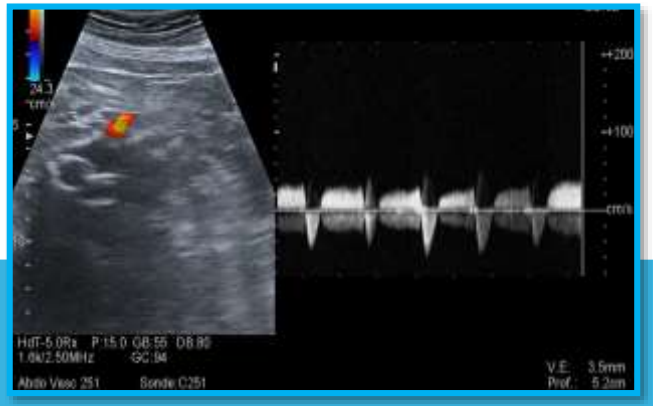
ENDOFUITE TYPE II



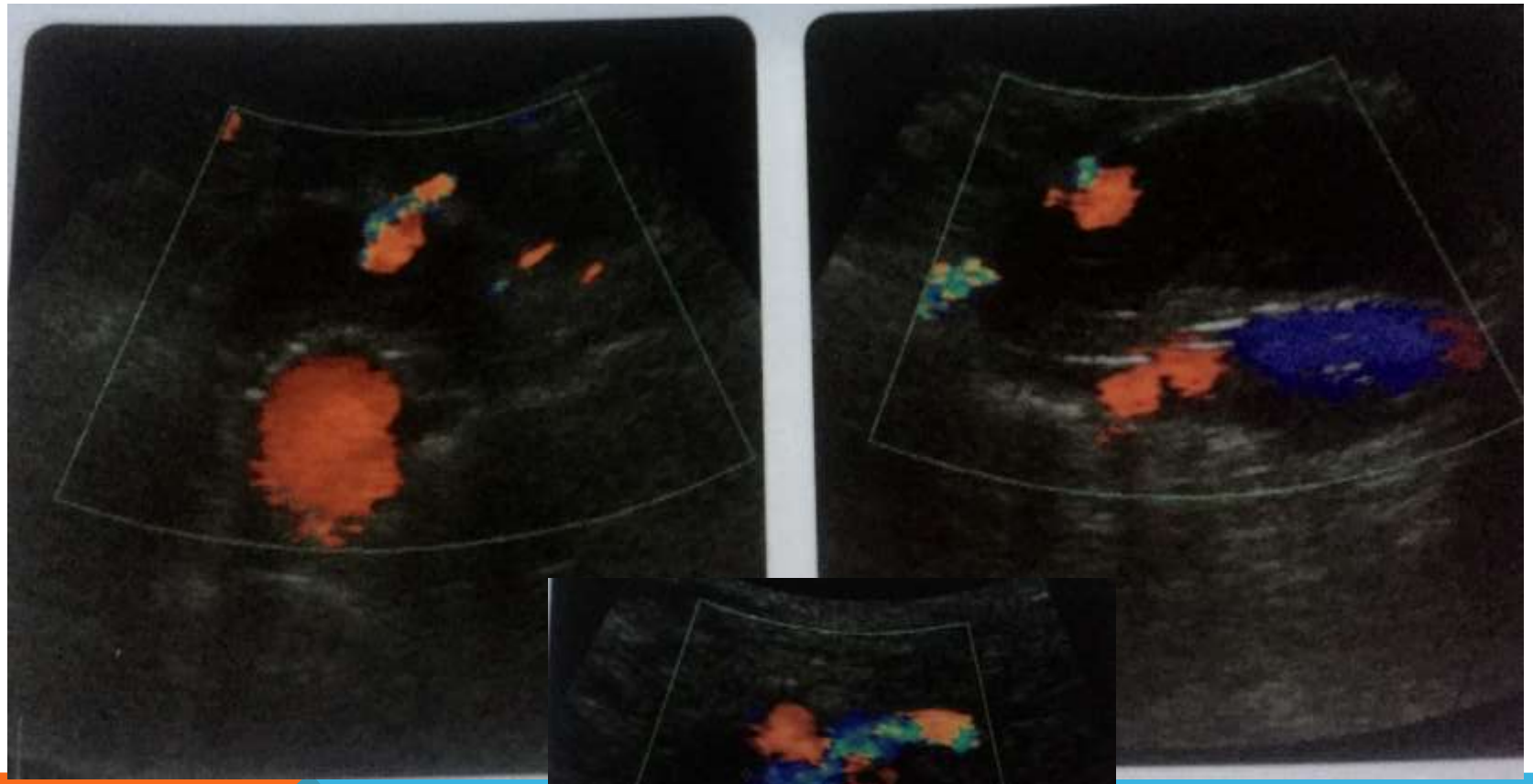


NIDUS

REINJECTION A.LOMBAIRE SORTIE MI

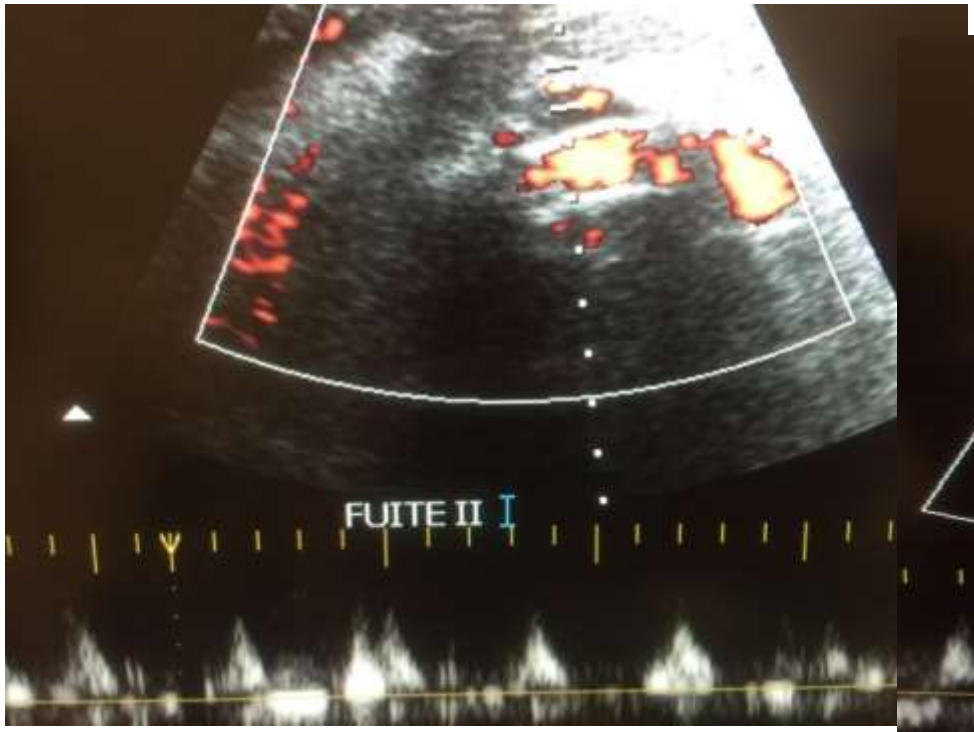


ENDOFUITE TYPE II- AMI

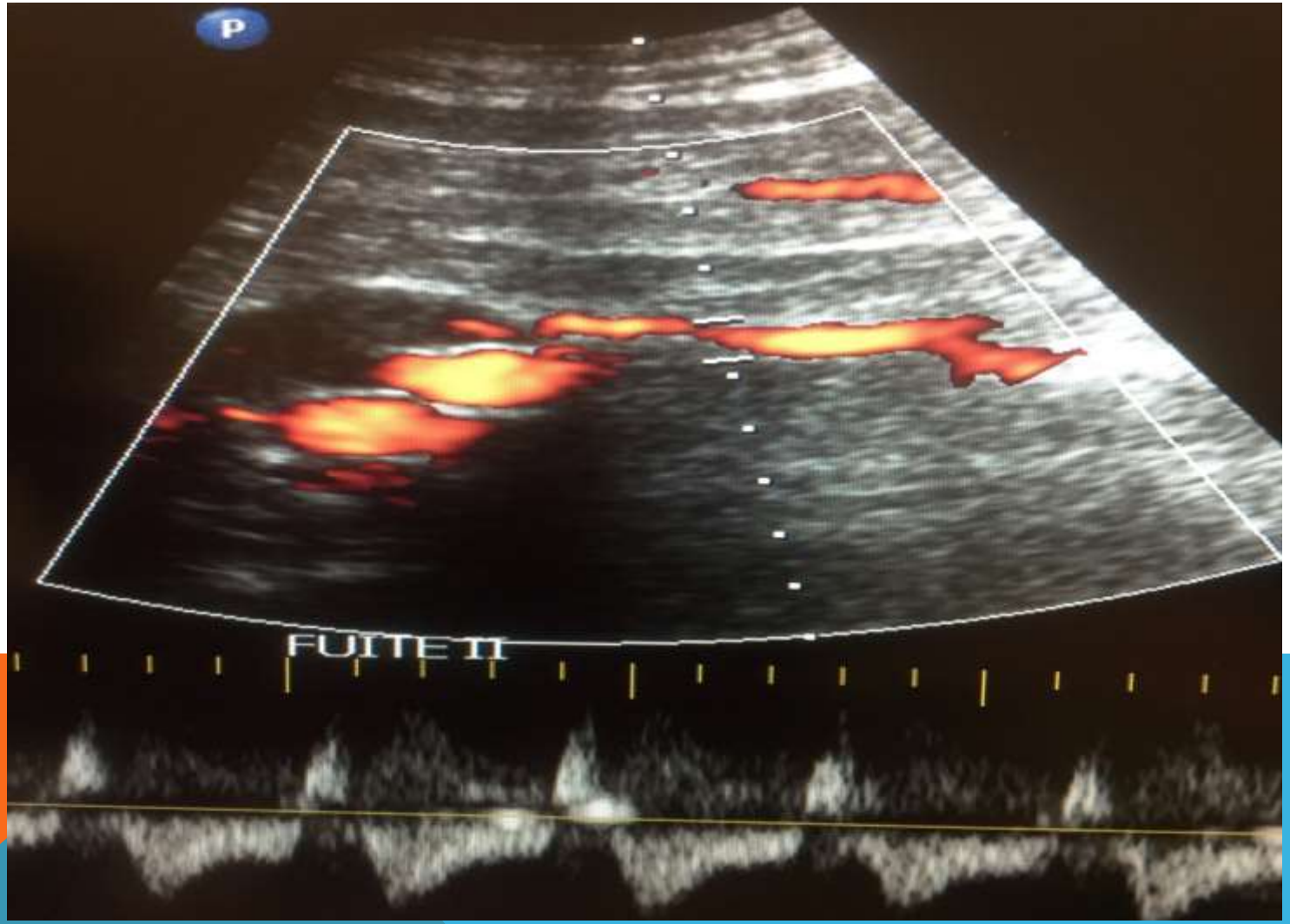


FUITE II: MI

FUITE TYPE II-AMI

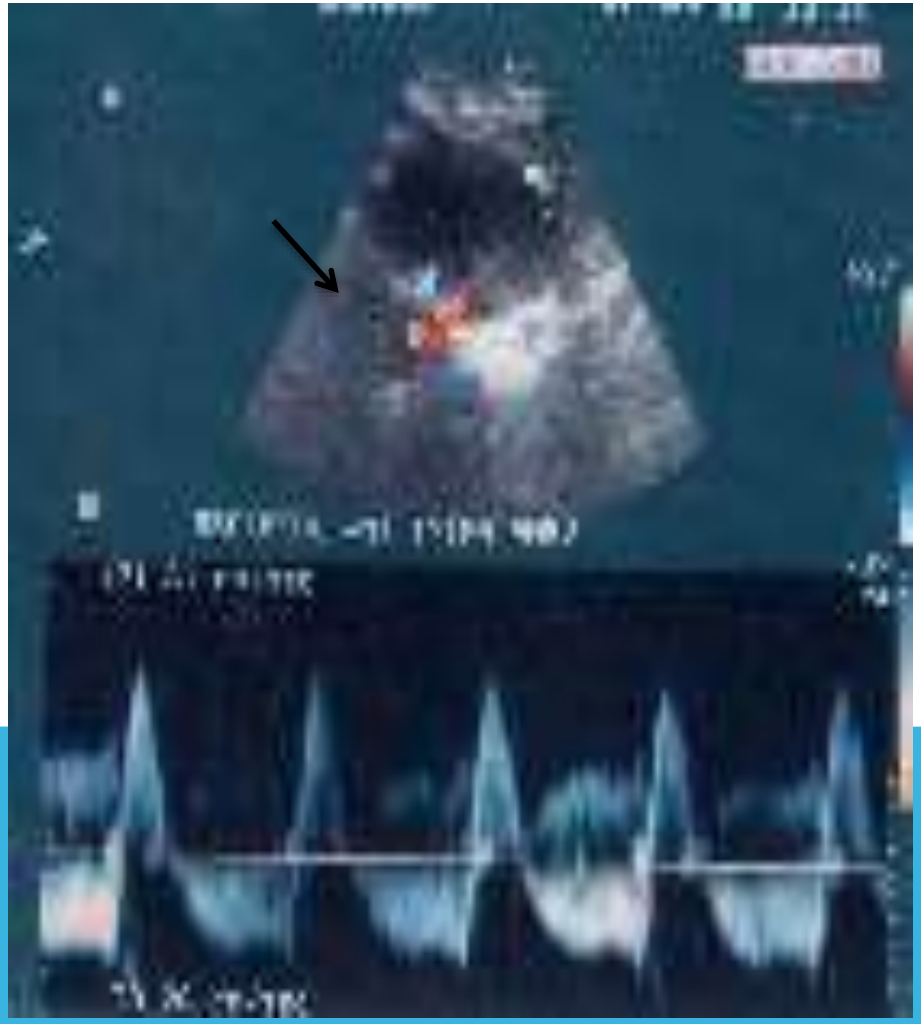


FUITE TYPE II-AMI

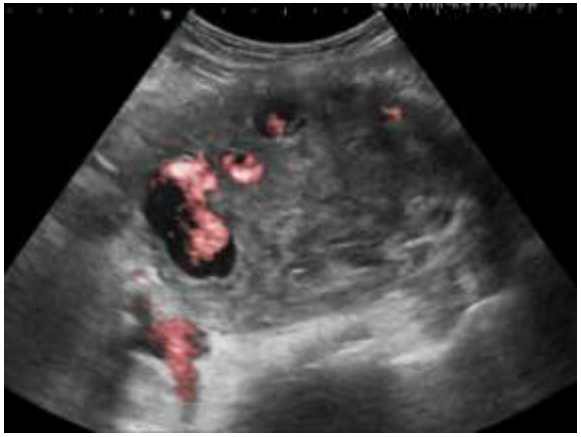


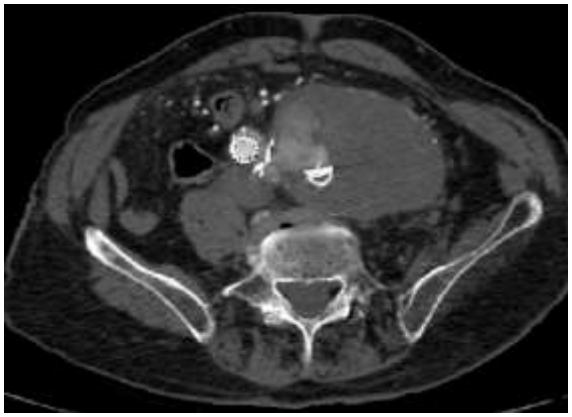
FUITE LOMBAIRE TYPE II

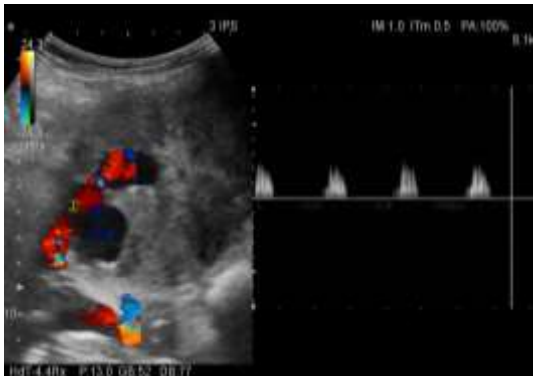
FUITE TYPE II: IL



EVOLUTIVITÉ À 7 ANS
ANEVRISME AORTO ILLIAQUE G 90 MM
REINJECTION DU SAC TYPE II HYPOGASTRIQUE







ENDOFUITE II : FACTEURS PREDICTIFSDE L'EVOLUTION DES ENDOFUITES II

Vitesse doppler dans la fuite (100cm/s):

Predictif de persistance de la fuite ?

ARKO FR .J Vasc Surg 2003

Taille du nidus > 15 mm

TIMARAN CH.J Vasc Surg 2004

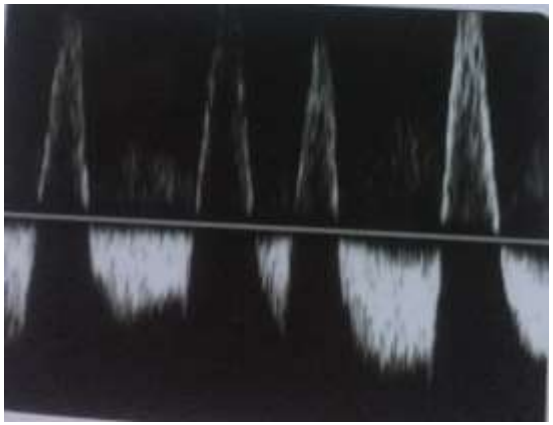
Nombre /diamètres des collatérales /flux biphasique:

corrélation avec croissance

Vitesse non predictif de croissance

BEEMAN B.J Vasc Surg 2010

FLUX INTRASACCULAIRE



Endofuite type 2 nbre = 38 / 278 patients

Nbre	14	12	12 (31.6%)
Fuite type 2	Résolutive	Active	Active
Diamètre Sac	< ou =	< ou =	>
Vitesse	42 cm/s	47 cm/s	43 cm/s
Flux monoph	5 (35.7%)	1 (8.3%)	1 (8.3%)
Flux biphasic	7 (50%)	5 (41.7%)	2 (16.7%)
Flux bidirect	2 (14.3%)	5 (41.7%)	9 (75%)
Type 2 multipl	0%	17%	75%

Beeman JVS 2010

ENDOFUITE: ECHO-DOPPLER /SCANNER

AUTEURS	ANNEE	SENSIBILITE	SPECIFICITE	VPP	VPN
Heilberger et coll	1997	95	95	84	99
Berdejo et coll	1998	80	91	84	99
Kronzon et coll	1998	_	94	0	98
Sato et coll	1998	97	74	66	98
Thompson et coll	1998	100	100	100	100
Fletcher et coll	2000	100	100	100	100
Wolf et coll	2000	81	85	94	88
Zannett et coll	2000	92	98	79	99
D'audiffret et coll	2001	92	98	79	99
Mc Lafferty et coll	2002	100	99	88	100
Mac Williams et coll	2002	12	53	94	88
Raman et coll	2003	43	96	54	94
Schmieder et coll	2009	90	81	99	94
Manning et coll	2009	45	67	45	94
Pineda et coll	2015	77	99		
COMBINES	95	97	77	98	93

CDU OR ECDU VERSUS CT; DETECTION OF ENDOLEAK

Author	Year	Patients	CT	CDU	ECDU
Heilberger	1997	102	CT	95/95	97/NR
McWilliam	2002	51	CT-biphasic	12/94	50/74
Giannoni	2003	26	CTA	63/93	100/65
Bendick	2003	20	CTA-triple phase	NR	100/100
Napoli	2004	30	CTA-biphasic	↓NR	100/NR
Cantisani	2011	108	CTA-triple phase	58/93	96/100

ED : ÉTUDES COMPARATIVES AVEC TDM

Table I. Published Series Evaluating Color Duplex Ultrasonography for the Detection of Endoleak

Authors	Year Published	Dates of EVAR	N	Paired Studies	Mean F/U	CDU Sensitivity	CDU Specificit
Sato et al[7]	1998	December 1995-January 1997	79	100	NR	97%	74%
Wolf et al[8]	2000	October 1996-May 1999	76	166	9 mo	81%	95%
d'Audiffret et al[9]	2001	January 1995-March 2000	89	122	18 mo	96%	94%
Pages et al[11]	2001	November 1996-September 1999	40	109	12 mo	48%	93%
Parent et al[10]	2002	February 1996-July 2000	83	NR	21 mo	100%	NR
Raman et al[12]	2003	February 1996-November 2002	281	494	35 mo	43%	96%
Elkouri et al[13]	2004	June 1996-November 2001	107	252	9 mo (median)	25%	89%
AbuRahma et al[14]	2005	February 2000-February 2004	178	367	16 mo	68%	99%
AbuRahma et al[15]	2006	NR	232	NR	25 mo	72%	NR
Sandford et al[16]	2006	March 1994-October 2005	310	244	NR	64%	91%
Schmieder et al[17]	2009	July 1996-March 2007	236	472	17 mo	64%	84%
Jordan et al[18]	In press	October 1999-June 2009	455	561	30 mo	35%	95%

Note: EVAR = endovascular aneurysm repair; N = number of patients; F/U = follow-up; CDU = color duplex ultrasonog

ED CONTRASTE

AAA évolutif en l'absence de fuite decelée
Contre indication aux produits iodés

ECHOGRAPHIE AVEC CONTRASTE

Table 3. Published Series Evaluating Contrast-Enhanced Ultrasonography for the Detection of Endoleak

Authors	Year Published	Dates of EVAR	N	Paired Studies	Mean F/U	Contrast	CEUS Sensitivity	CEUS Specificity
Heilberger et al[22]	1997	August 1994-October 1996	113	NR	7 mo	Levovist	97%	NR
McWilliams et al	2002	March 1999-May 2000	53	96	11 mo	Levovist	50%	94%
Bendick et al[23]	2003	January 2001-December 2001	20	20	5 mo	Optison	100%	100%
Giannoni et al[24]	2003	NR	28	81	30 mo	Levovist	100%	65%
Henao et al[25]	2006	July 2004-May 2005	20	NR	9 mo	Optison	100%	100%
Dill-Macky et al[26]	2007	April 2003-June 2004	20	23	NR	Definity	75%	88%
Iezzi et al[27]	2009	NR	84	84	9 mo	Sonovue	98%	82%

Note: EVAR = endovascular aneurysm repair; N = number of patients; F/U = follow-up; CEUS = contrast-enhanced ultrasonography; NR = not recorded; mo = months.

- Napoli (2004) : 10 patients avec croissance sac après EVAR sans endofuite retrouvée au TDM et à l'ED mais retrouvée à l'écho contraste
- Millen (JVS 2013) : 33 patients avec cas discordants ou non résolus par ED et TDM résolus par echo contraste avec 30% de reprises.

CONCLUSION

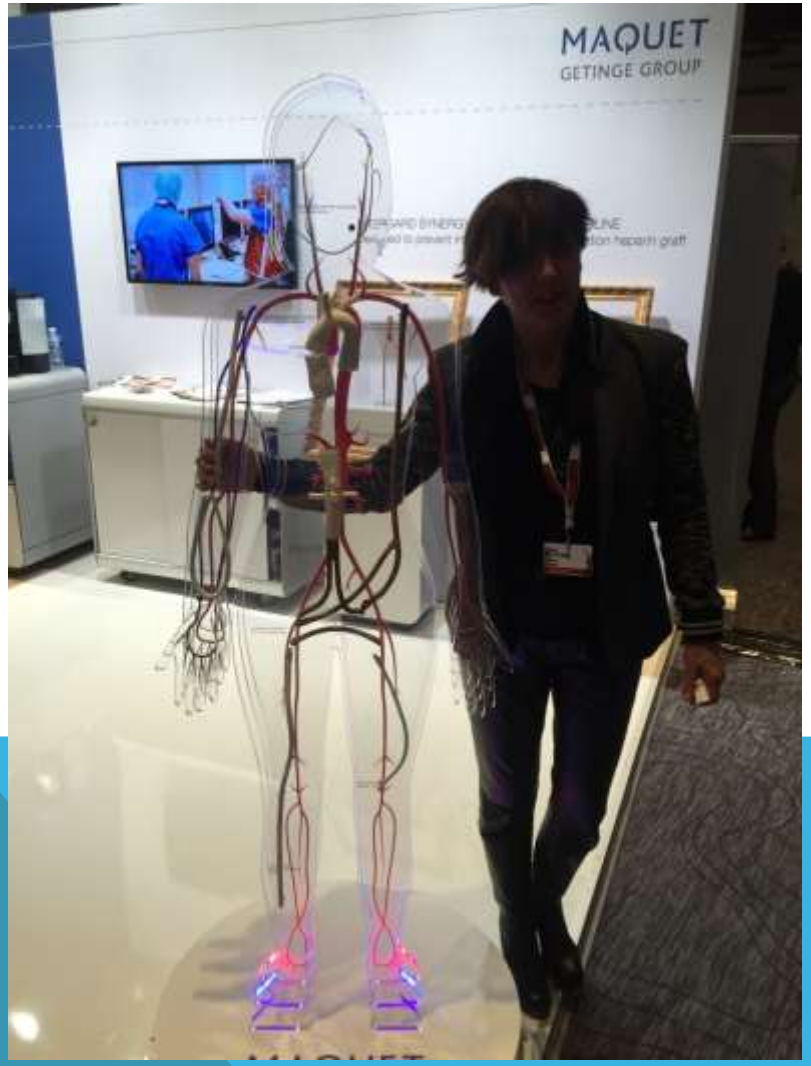
La surveillance régulière et au long cours fait partie intégrante des EVAR

L' ED du fait de ses avantages peut être proposé seul en l'absence de complications, après TDM normal

En cas d'examen techniquement difficile, de complication ou d'évolution du sac : TDM/IRM

ED CONTRASTE en cas d' insuffisance rénale, en l'absence de cause retrouvée à l'augmentation du sac, si discordance ED/TDM

VIVE L'ENDOVASCULAIRE



VIVE L'ENDOVASCULAIRE