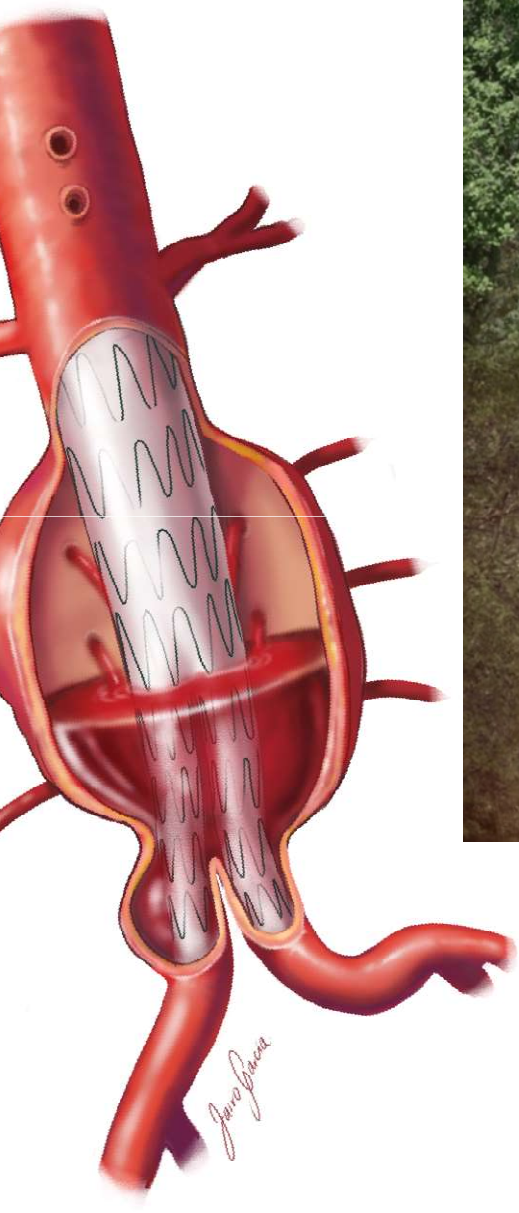




ARCHIV 2023 à Béziers



AAA au CHU de Dijon

Eric Steinmetz

CHU Dijon



AAA préoccupation des patients

- Pourquoi l'AAA se développe-t-il ?
- médicament pour le faire régresser ?
- médicament pour l'empêcher de grossir ?

> [Int Angiol.](#) 2017 Dec;36(6):526-530. doi: 10.23736/S0392-9590.17.03889-5. Epub 2017 A

Patients' opinions regarding research and management of abdominal aortic aneurysms

[Regent Lee](#) ¹, [Amy Jones](#) ², [Ismail Cassimjee](#) ², [Ashok Handa](#) ²

- Tests pour identifier les croissances rapides

AAA actualités – physiopath & prise en charge



European Society
of Cardiology

European Heart Journal (2023) 44, 2682–2697
<https://doi.org/10.1093/eurheartj/ehad386>

STATE OF THE ART REVIEW

Vascular biology and medicine

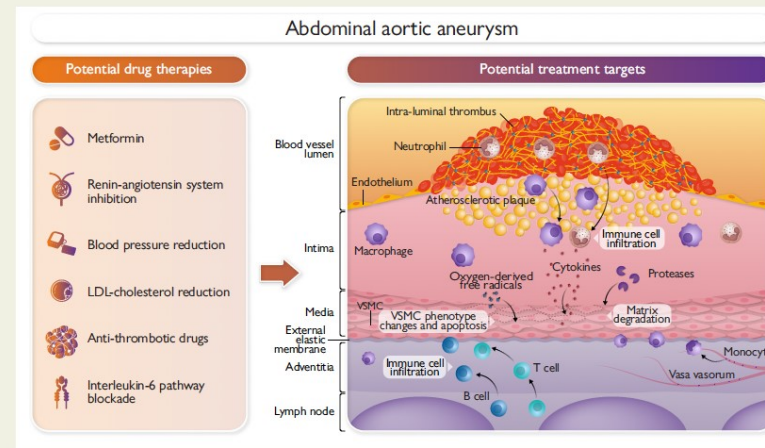
Pathogenesis and management of abdominal aortic aneurysm

Jonathan Golledge^{1,2,3,*}, Shivshankar Thanigaimani^{1,2}, Janet T. Powell⁴,
and Phil S. Tsao^{5,6,7}

¹Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, 1 James Cook Drive, Douglas, Townsville, QLD, Australia;
²Australian Institute of Tropical Health and Medicine, James Cook University, 1 James Cook Drive, Douglas, Townsville, QLD, Australia; ³Department of Vascular and Endovascular Surgery,
Townsville University Hospital, 100 Angus Smith Drive, Douglas, QLD, Australia; ⁴Department of Surgery & Cancer, Imperial College London, Fulham Palace Road, London, UK;
⁵Department of Cardiovascular Medicine, Stanford University, 450 Serra Mall, Stanford, CA, USA; ⁶VA Palo Alto Health Care System, 3801 Miranda Avenue, Palo Alto, CA, USA; and
⁷Stanford Cardiovascular Institute, Stanford University, 450 Serra Mall, Stanford, CA, USA

Received 11 January 2023; revised 16 May 2023; accepted 29 May 2023; online publish-ahead-of-print 30 June 2023

Graphical Abstract



Potential medical therapies to limit abdominal aortic aneurysm growth or rupture. VSMC, vascular smooth muscle cell; LDL, low density lipoprotein.

AAA actualités – physiopath & prise en charge

Abdominal aortic aneurysm

Potential drug therapies

-  Metformin
-  Renin-angiotensin system inhibition
-  Blood pressure reduction
-  LDL-cholesterol reduction
-  Anti-thrombotic drugs
-  Interleukin-6 pathway blockade

Potential treatment targets

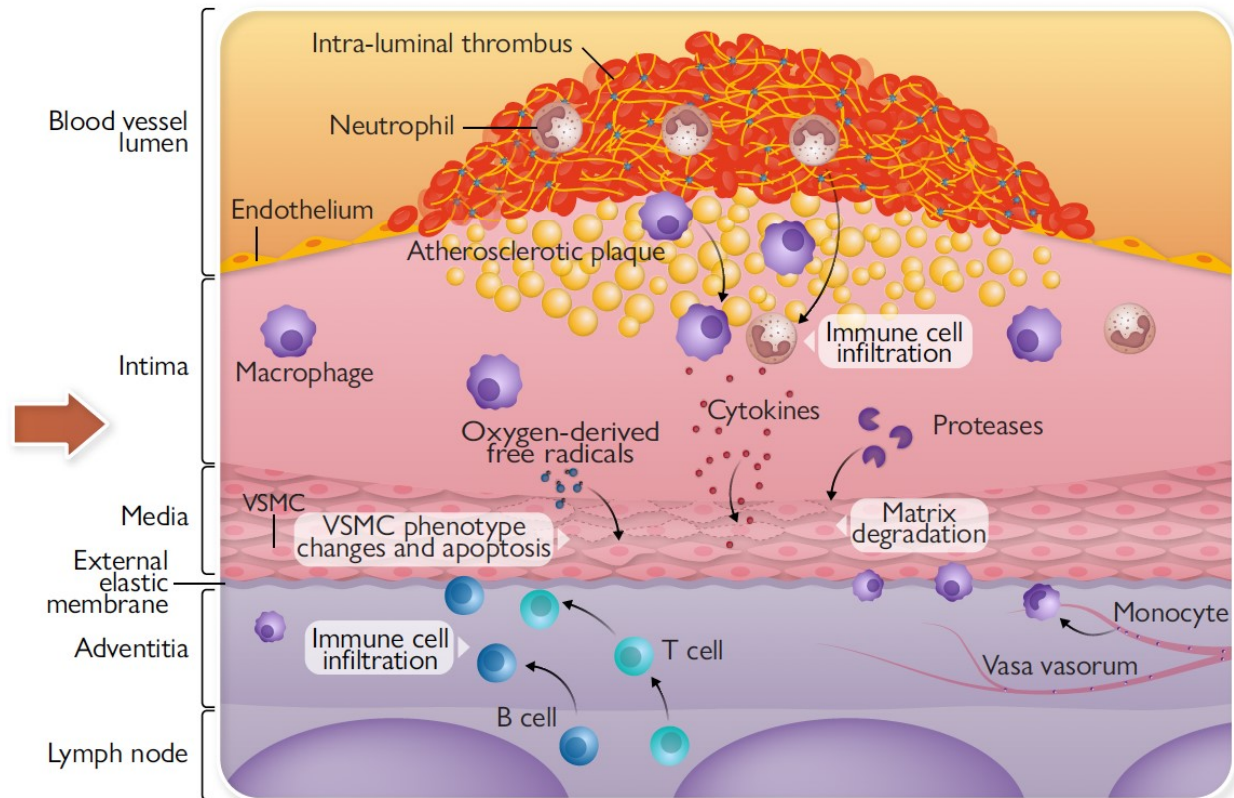


Table 1 Risk factors for abdominal aortic aneurysm diagnosis

Risk factor	Relative risk	95% CIs
Male sex ^a	5.93	4.26, 8.25
Hypertension	1.66	1.49, 1.85
Per 20 mmHg higher systolic blood pressure	1.14	1.06, 1.23
Per 20 mmHg higher diastolic blood pressure	1.28	1.12, 1.46
Current smoking	4.87	3.93, 6.02
Former smoking	2.10	1.76, 2.50
Per 10 pack years	1.78	1.54, 2.06
Family history of aortic aneurysm ^a	3.80	3.66, 3.95
Coronary heart disease ^a	2.29	1.75, 3.01
Peripheral artery disease ^a	2.50	2.12, 2.95
Diabetes	0.58	0.51, 0.66

^aOdds ratios or relative risk and 95% CIs based on data from previous systematic reviews and large population screening or case-control studies.^{19–27}

Table 3 Previous randomized placebo-controlled trials testing drugs to limit abdominal aortic aneurysm growth

Trial	Drug tested (daily dose)	Sample size	AAA growth (mm)		AAA events	
			Active	Placebo	Active	Placebo
Blood pressure lowering						
TEDY ⁸⁴	Telmisartan (40 mg)	210	1.7 (1.8)	1.8 (1.8)	11 (10.3%)	8 (7.8%)
AARDVARK ⁸⁵	Perindopril (10 mg)	227 ^e	1.8 (1.7)	1.7 (1.8)	10 (13.3%)	9 (11.4%)
AARDVARK ⁸⁵	Amlodipine (5 mg)	227 ^e	1.8 (1.7)	1.7 (1.8)	7 (9.6%)	9 (11.4%)
PAT ⁸⁶	Propranolol (240 mg)	552	2.2 (2.8)	2.6 (3.1)	57 (20.6%)	73 (26.5%)
Propranolol ⁸⁷	Propranolol (80 mg)	54	3.1 (2.5)	2.8 (2.4)	7 (23.3%)	5 (20.8%)
Antibiotics						
Azithromycin ⁸⁸	Azithromycin (variable ^a)	247	2.3 (1.8)	2.2 (1.9)	16 (13.1%)	13 (10.4%)
Roxithromycin 1 ⁸	Roxithromycin (300 mg for 28 days)	97	1.6 (1.5) ^b	2.8 (2.5)	5 (11.6%)	7 (14.3%)
Roxithromycin 2 ⁹	Roxithromycin (300 mg for 28 days annually)	84	1.6 (1.5)	2.5 (2.5)	12 (28.6%)	14 (40.5%)
Doxycycline 1 ⁹¹	Doxycycline (150 mg for 3 months)	32	1.5 (2.4)	3.1 (4.7)	2 (11.8%)	3 (20.0%)
PHAST ⁹²	Doxycycline (100 mg)	286	2.8 (2.1) ^c	2.1 (2.1)	21 (14.6%)	24 (16.9%)
N-TA ³ CT ⁹³	Doxycycline (200 mg)	261	3.6 (2.1) ^d	3.6 (2.8) ^d	13 (9.8%)	9 (7.0%)
Anti-platelet						
TicAAA ⁹⁴	Ticagrelor (180 mg)	136	2.3 (1.7, 2.9)	2.2 (1.6, 2.7)	4 (5.8%)	0
Mast cell inhibitor						
AORTA ⁹⁵	Pemirolast (20 mg)	326 ^f	2.6 (2.1, 3.1)	2.0 (1.6, 2.5)	5 (6.3%)	2 (2.4%)
	Pemirolast (50 mg)	326 ^f	2.3 (1.9, 2.8)	2.0 (1.6, 2.5)	2 (2.6%)	2 (2.4%)
	Pemirolast (80 mg)	326 ^f	2.7 (2.3, 3.2)	2.0 (1.6, 2.5)	6 (7.1%)	2 (2.4%)
Fibrate						
FAME-2 ⁹⁶	Fenofibrate (145 mg)	140	1.0 (3.7)	1.4 (3.7)	0	0

Metformine et AAA ?

Combined incidence of abdominal aortic aneurysm (AAA) repair or mortality from AAA rupture (AAA events)

- 1000 pts suivis depuis 2002 pour petit AAA
- Suivi moyen 2,5 ans
- Objectif :
 - Mortalité liée à l'AAA
 - Traitement de l'AAA

Eur J Vasc Endovasc Surg (2019) 57, 94–101

Editor's Choice — Metformin Prescription is Associated with a Reduction in the Combined Incidence of Surgical Repair and Rupture Related Mortality in Patients with Abdominal Aortic Aneurysm

Jonathan Golledge^{a,b,c,*}, Dylan R. Morris^a, Jenna Pinchbeck^a, Sophie Rowbotham^{a,d,e}, Jason Jenkins^e, Michael Bourke^{a,f}, Bernard Bourke^f, Paul E. Norman^g, Rhonda Jones^{a,b}, Joseph V. Moxon^{a,c}

^a Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, Queensland, Australia

^b The Department of Vascular and Endovascular Surgery, The Townsville Hospital, Townsville, Queensland, Australia

^c The Australian Institute of Tropical Health and Medicine, James Cook University, Townsville, Queensland, Australia

^d School of Medicine, University of Queensland, Brisbane, Queensland, Australia

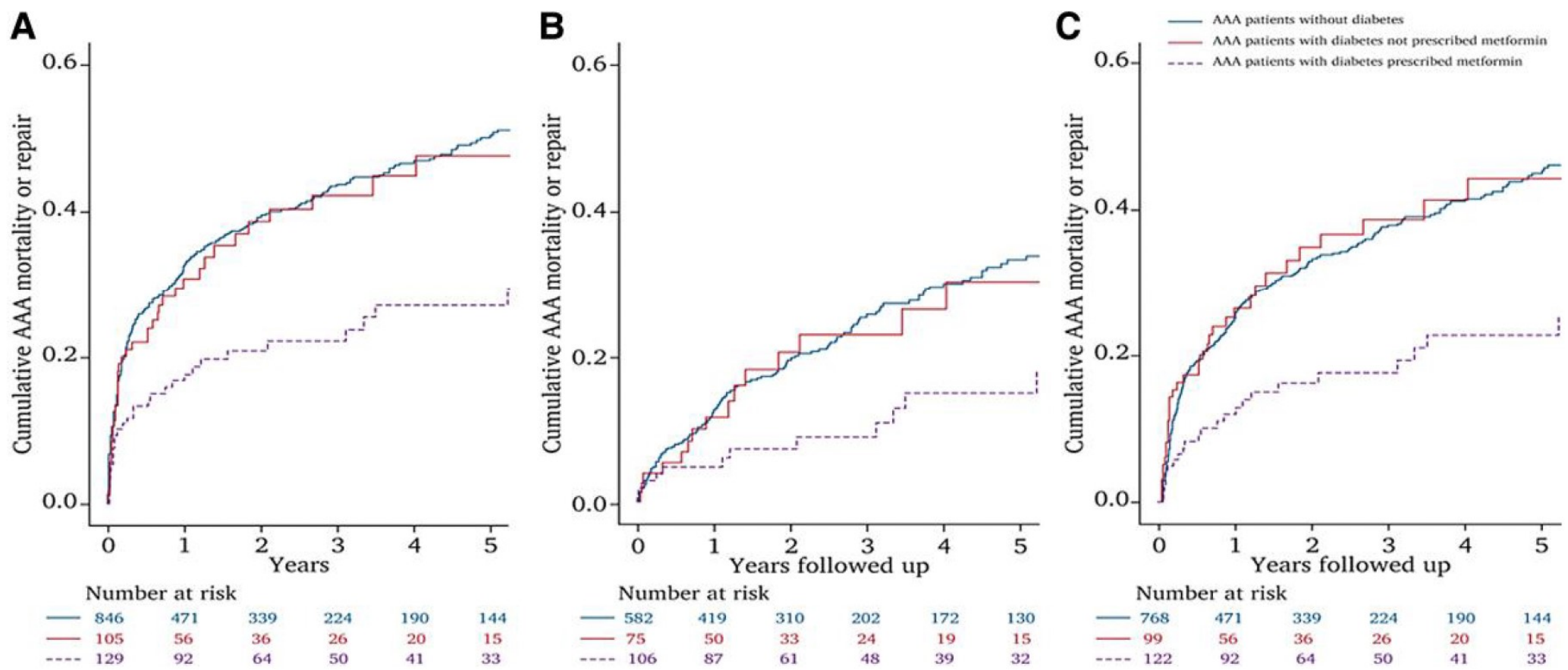
^e Royal Brisbane and Women's Hospital, Herston, Queensland, Australia

^f Gosford Vascular Clinic, Gosford, New South Wales, Australia

^g Medical School, University of Western Australia, Perth, Western Australia, Australia

Metformine et AAA ?

Combined incidence of abdominal aortic aneurysm (AAA) repair or mortality from AAA rupture (AAA events)



cumulative proportion of events over 5 years for the whole cohort

patients with initial AAA diameter ≤ 50 mm

patients with ≥ 6 month follow-up

Metformine et AAA ?

- Conclusion :

Metformine → - 40% AAA et RAAA chez le diabétique
intérêt chez un non-diabétique ?

Actualités AAA « state-of-the-art »

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VOL. 80, NO. 8, 2022

JACC FOCUS SEMINAR

JACC FOCUS SEMINAR: DISEASE OF THE AORTA

JACC FOCUS SEMINAR

Repair of Abdominal Aortic Aneurysms

JACC Focus Seminar, Part 1

Sara E. Hensley, MD, Gilbert R. Upchurch, Jr, MD

ABSTRACT

Abdominal aortic aneurysms (AAAs), defined by an aortic diameter >3 cm, affect >1 million people in the United States. Risk factors for AAA include male sex, family history of AAA, smoking, Caucasian ethnicity, and age. Patients with known AAA should undergo regular surveillance via ultrasonography. Medical management, including smoking cessation and blood pressure management, is recommended for asymptomatic patients who do not meet the threshold for intervention. Repair options include endovascular aortic repair and open surgical repair, with good outcomes in long-term follow-up. Men with AAA >5.5 cm and women with AAA >5.0 cm in general should undergo elective repair. Medical management, including smoking cessation and blood pressure management, is recommended for asymptomatic patients who do not meet the threshold for intervention. (J Am Coll Cardiol 2022;80:821-831) © 2022 Published by Elsevier on behalf of the American College of Cardiology Foundation.

Abdominal aortic aneurysms (AAAs) affect >1 million people in the United States and are defined by an aortic diameter >3 cm or a $>50\%$ increase in diameter compared with the normal proximal aorta.¹ Previous studies of western populations in the late 1990s described 4%-8% prevalence of AAAs in men aged 65-80 years.² More recent studies have shown a decrease in AAA prevalence and AAA-related mortality in the United States and parts of Europe in the 21st century in parallel with decreased smoking rates and increased use of statins and antihypertensive medications.³ AAAs are more common in older men, smokers, and patients with a family history of AAA.

Similar to that of other degenerative diseases, the natural history of AAAs includes further weakening of the arterial wall and consequent inability to withstand intraluminal blood pressure, resulting in progressive dilatation and eventual rupture.⁴ Rupture is associated with 50%-80% mortality,⁴ but mortality after elective repair is only 1.8%-4.2%.⁵ Progression of AAA can be mitigated by modifying risk factors,

including smoking and hypertension. Elective AAA repair is associated with improved perioperative mortality compared with emergent intervention. Repair options include open surgical repair (OSR) and endovascular aortic repair (EVAR). Outcomes of AAA repair have improved since the advent of EVAR, a less invasive surgical technique.⁶⁻⁷ Despite advances in operative techniques, patients who undergo AAA repair remain at a long-term survival disadvantage compared with the general population, with cardiovascular comorbidities and cancer accounting for 30%-49% and 29% of deaths, respectively, at 5 years.⁸

STRUCTURE AND FUNCTION OF THE ABDOMINAL AORTA

The aorta is a large elastic artery characterized by the ability to expand and recoil in sequence with the heart to distribute blood to the body.⁹ The abdominal aorta (AA) gives rise to the arteries supplying the abdominal viscera, lumbar spine, and lower extremities, and it is commonly divided into suprarenal and

From the Department of Surgery, University of Florida College of Medicine, Gainesville, Florida, USA.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

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<https://doi.org/10.1016/j.jacc.2022.04.066>

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AAA – rythme de surveillance - seuil

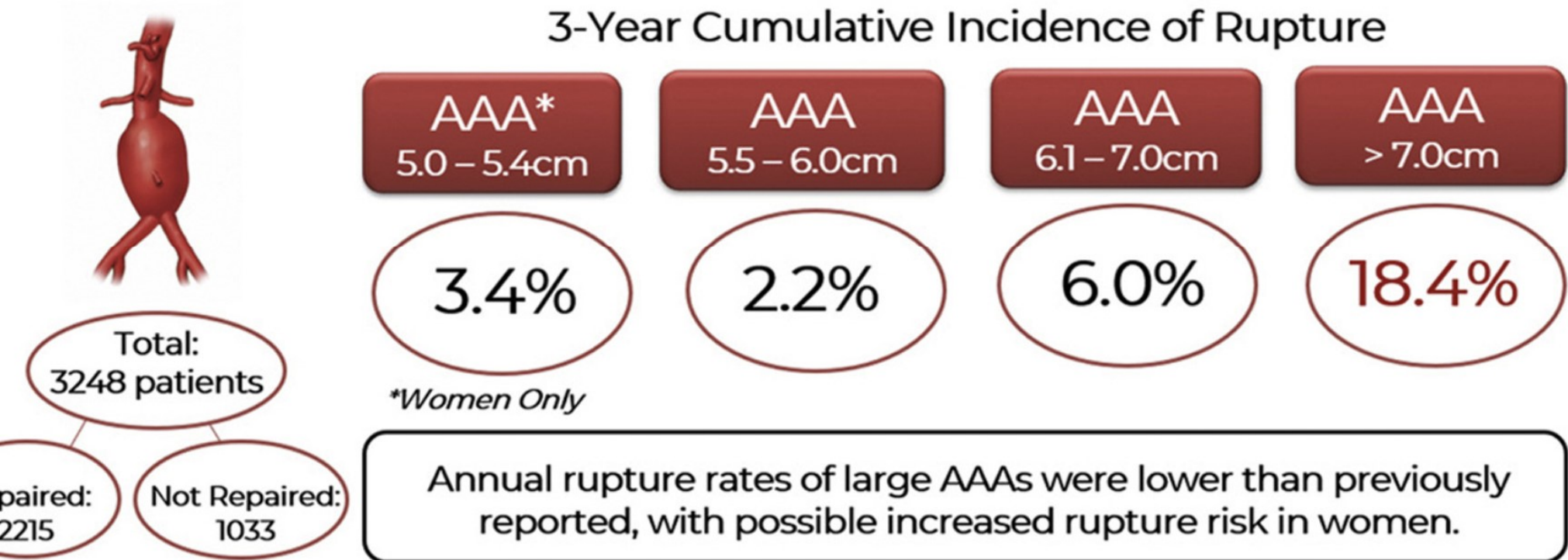
TABLE 1 Surveillance Recommendations for Abdominal Aortic Aneurysms Based on Aortic Diameter

	Location	Aorta <3 cm	Small	Medium	Large
Society for Vascular Surgery (SVS Guidelines, 2017) ³⁰	United States	10 y	3-3.9 cm; 3 y	4-4.9 cm; 1 y	5-5.4 cm; 6 m
National Health Services (NHS AAA Screening Program, 2017)	United Kingdom	No follow-up	3-4.4 cm; 1 y	4.5-5.4 cm; 3 mo	4.5-5.4 cm; 3 mo
European SVS (ESVS Guidelines, 2019)	33+ countries in Europe	5-10 y	3-3.9 cm; 3 y	4-4.9 cm; 1 y	5-5.4 cm; 3-6 m

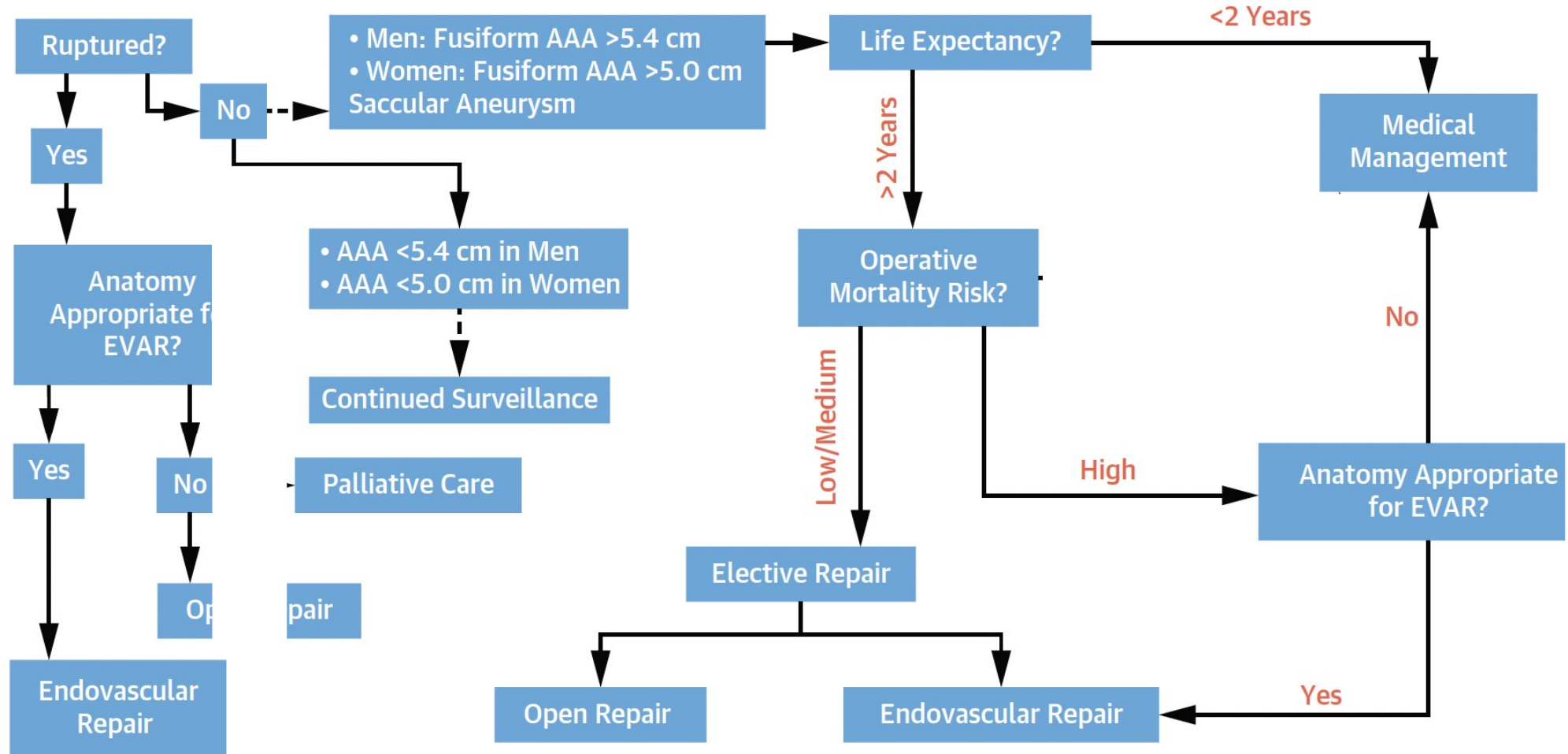
Values are definition; surveillance interval unless otherwise indicated. Although there is variability in specific time interval recommendations for abdominal aortic aneurysms, surveillance, aortas with diameter >3 cm should be imaged regularly to monitor for disease progression.

Natural History of Large Abdominal Aortic Aneurysms (AAA) in Patients Without Timely Repair

► Multicenter retrospective cohort study  3248 patients with large, unrepaired AAAs



CENTRAL ILLUSTRATION Management of Patients With Abdominal Aortic Aneurysms

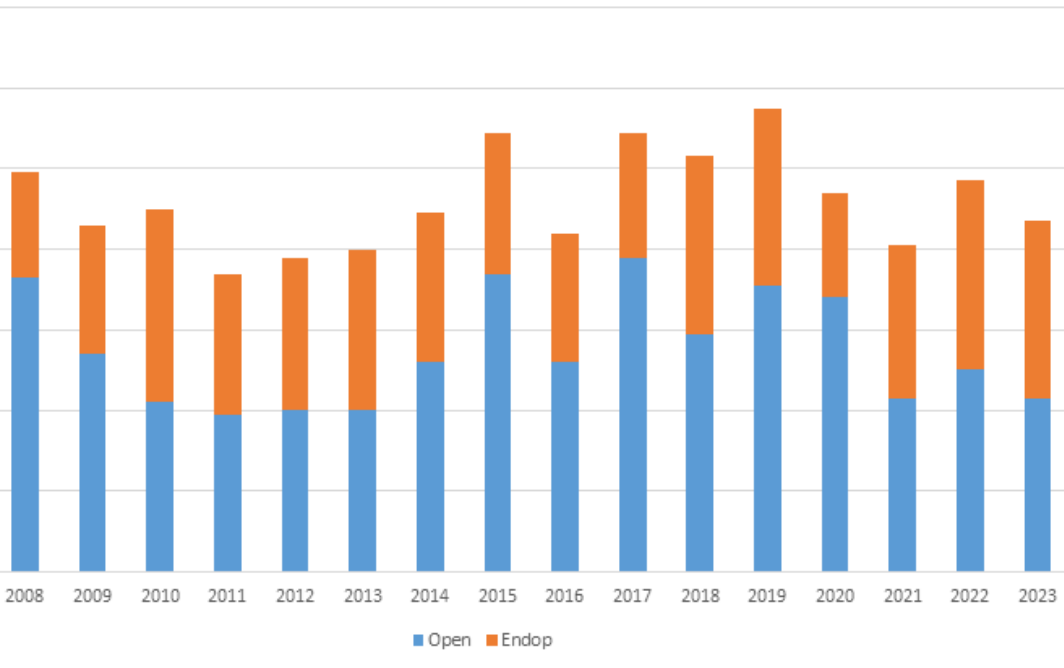


Hensley SE, et al. J Am Coll Cardiol. 2022;80(8):821-831.

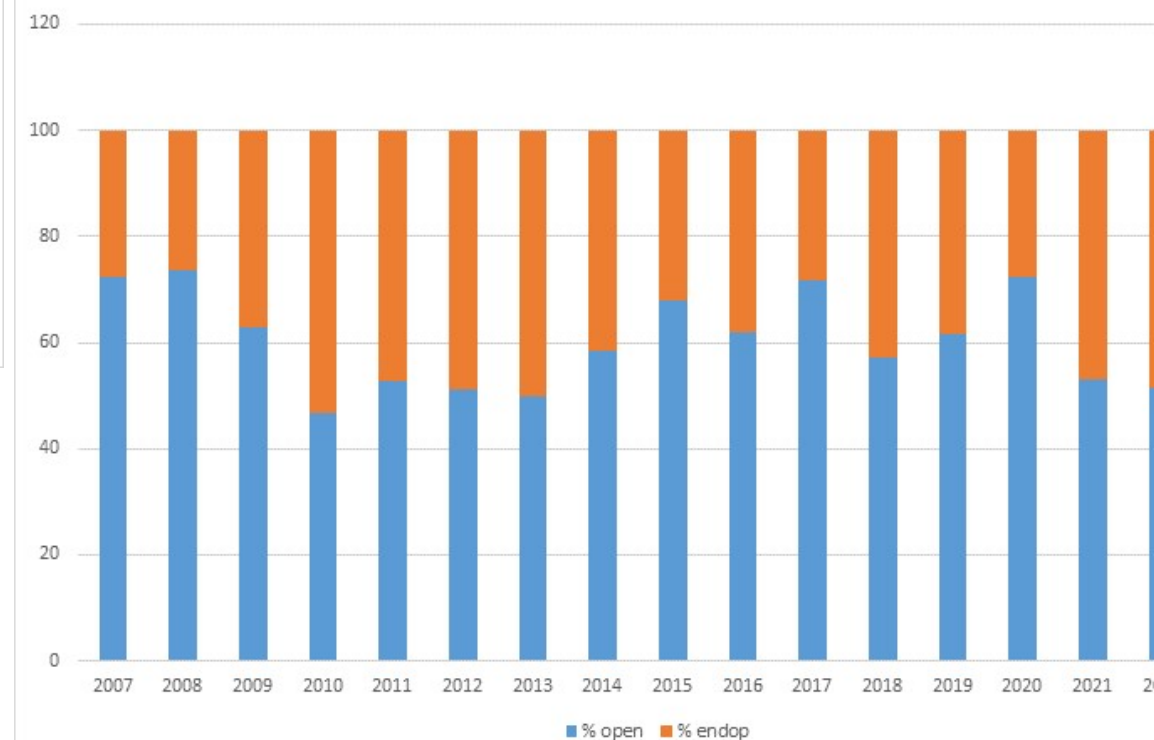
An algorithm for managing patients with abdominal aortic aneurysms including both open and endovascular repair options. AAA = abdominal aortic aneurysm; EVAR = endovascular aortic repair.

Activité AAA open vs endo 2007 à 2023

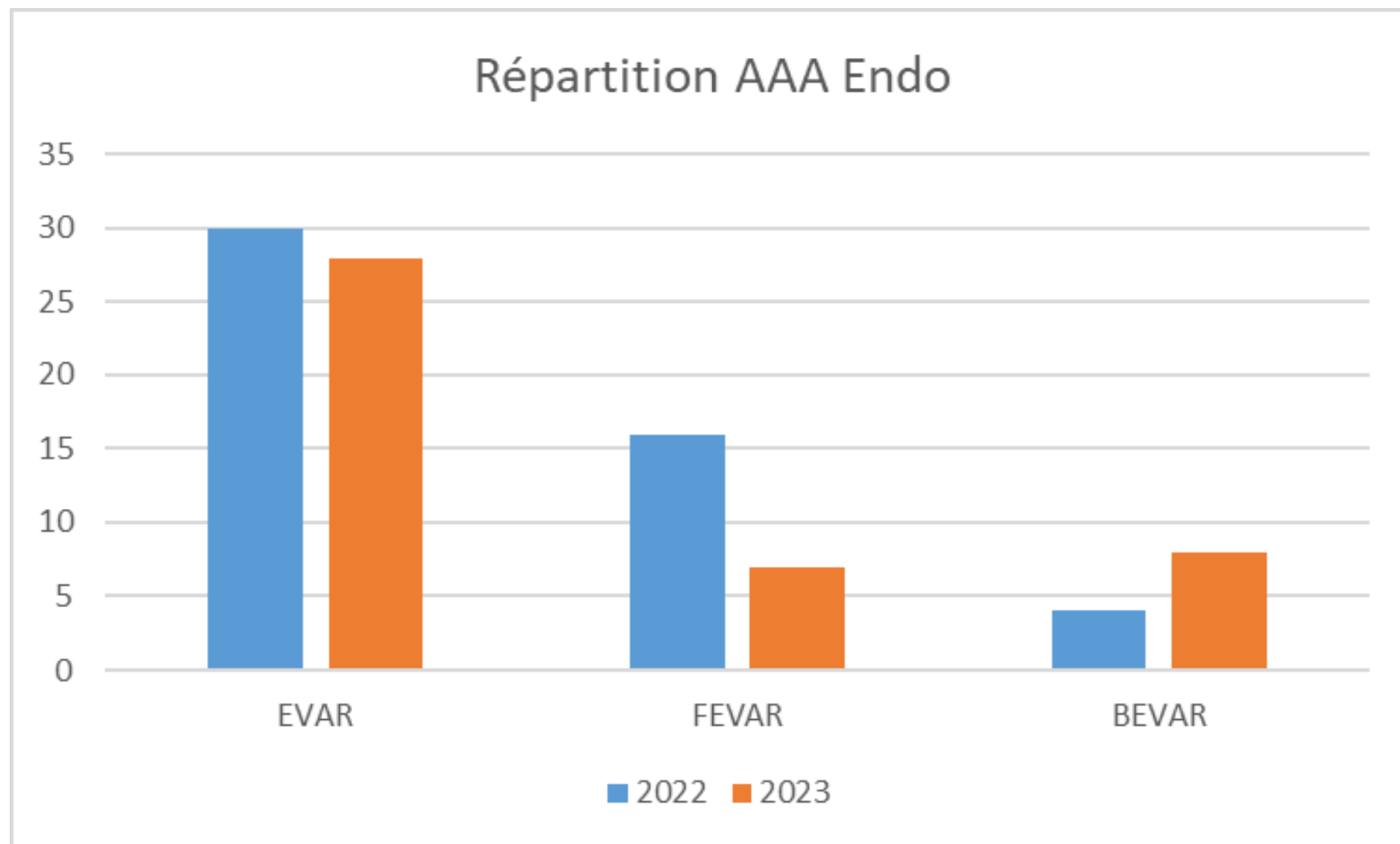
Evolution Chirurgie AAA (en Nb)



Evolution Chirurgie AAA (en %)



Activité EVAR/FEVAR/BEVAR 2022 - 2023



Eric Steinmetz

2 cas

cliniques



Cas clinique 1

- **Mr S. 78 ans (bonne forme)**

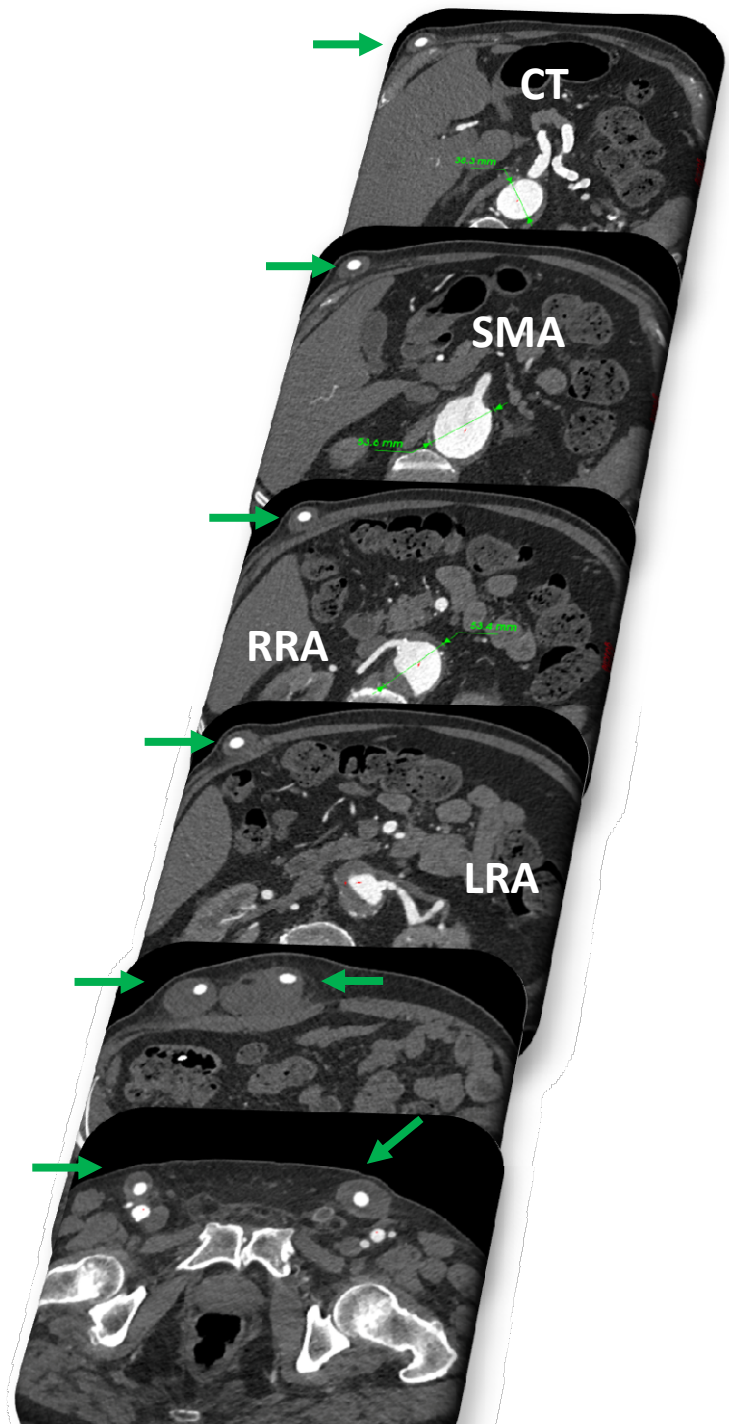
- HTA, diabète type2, ACFA, tabac sevré, BMI 30, SAS appareillé, R Ao,
- 2012 : EVAR
- 2013 : occlusion jambage gauche : pontage croisé
- 2014 : occlusion jambage droit et EVAR : pontage axillo-bifémoral
- ...
- Fin 2022 : cs Dr JLP → Allo Stein
 - Sérome péri-prothétique axillo-bifémoral de 7 cm
 - ATA IV de 62 mm

Cas clinique 1

- **Mr S. 78 ans (bonne forme)**

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 - ATA IV de 62 mm





Cas clinique 1 : on fait quoi ?



Cas clinique 1 : on ne s'énerve pas

- Mr S. 78 ans
 - Janv 2013 : akinésie septo apicale mais coro normale
 - Mars 2023 : ...je vais refaire un angioscanner pour étudier l'évolutivité...
 - Avril 2023 : EFR sub normales
 - Mai 2023 :« quand est-ce que vous m'opérez ? »...
 - Juin 2023 : ...nous avons commandé le matériel...
 - Sept 2023 : ...le patient a rappelé pour savoir quand il sera opéré....
 -6 oct 2023 : D-day !

Cas clinique 1 : on ne s'énerve pas

- **Mr S. 78 ans**

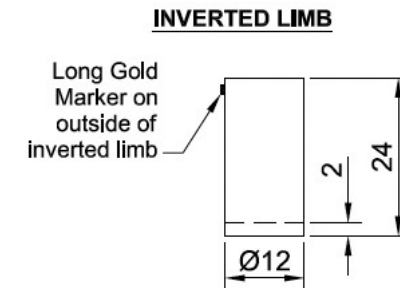
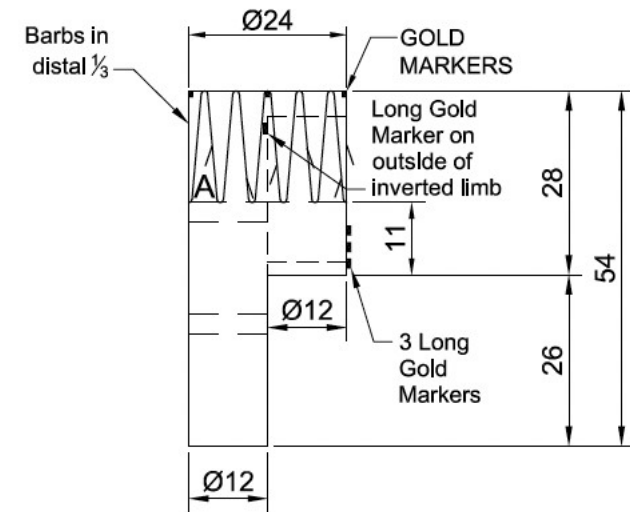
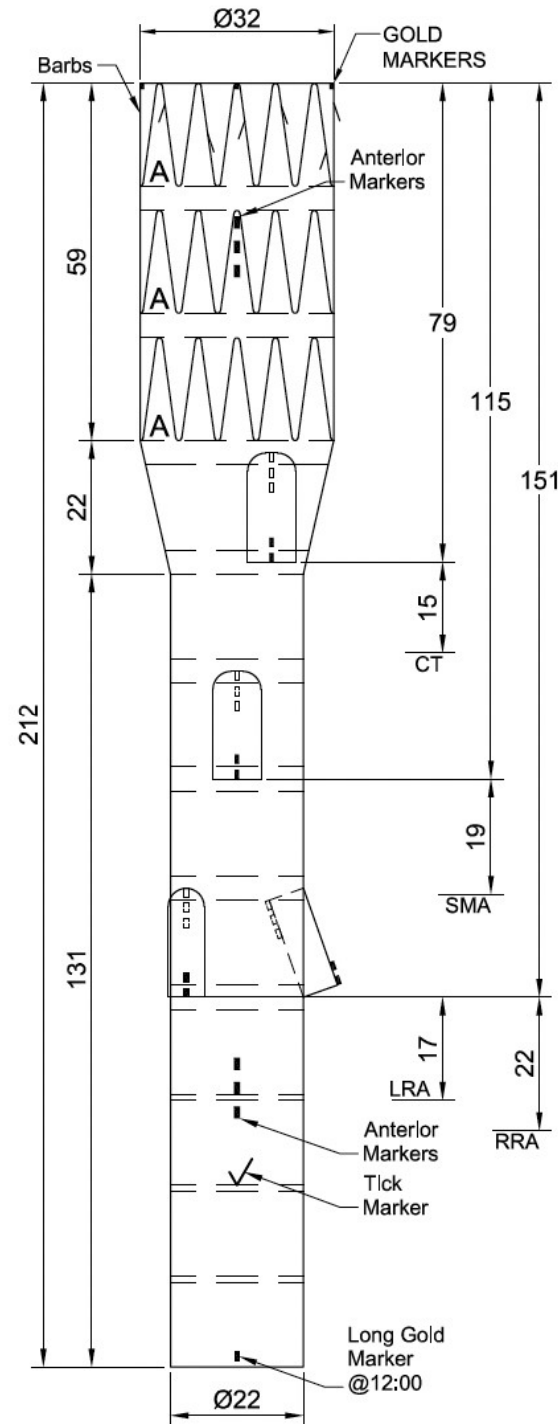
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-6 oct 2023 : D-day !

Cas clinique 1 : on ne s'énerve pas

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- **....6 oct 2023 : D-day !**

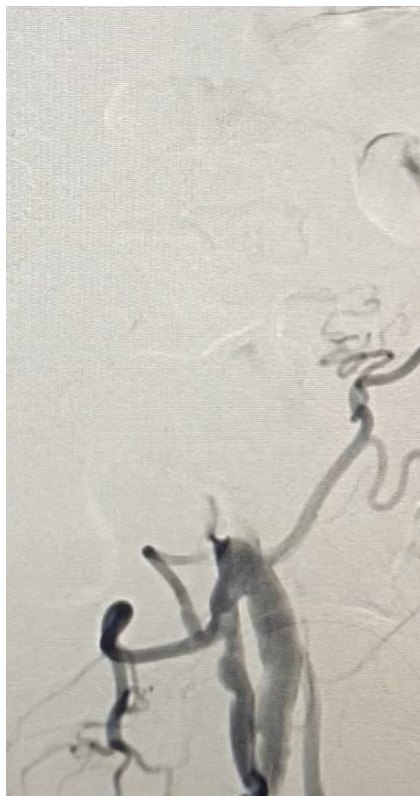
Cas clinique 1

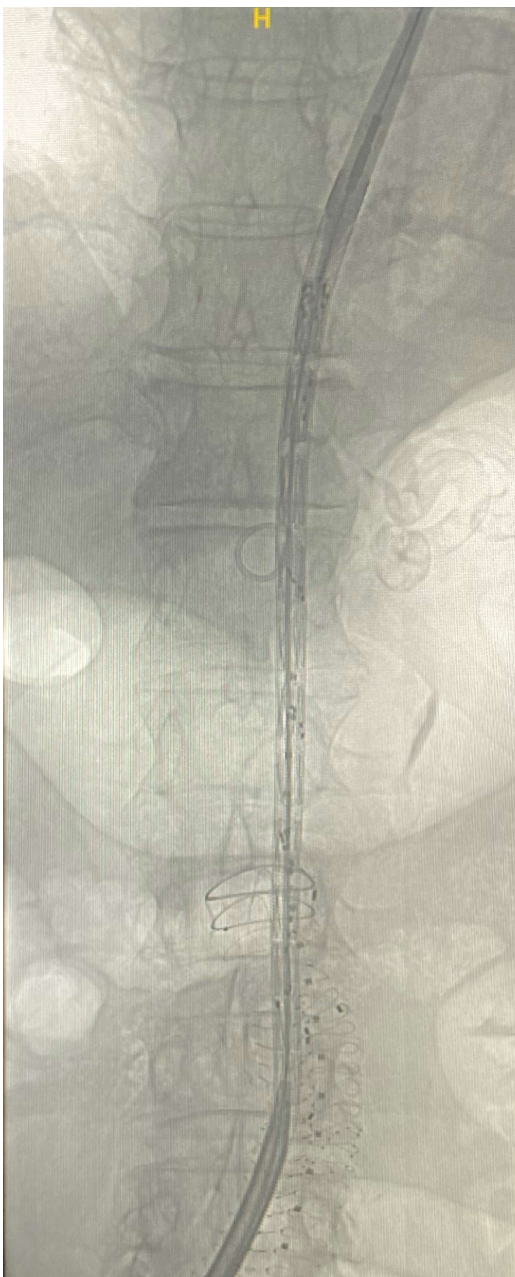


Cas clinique 1

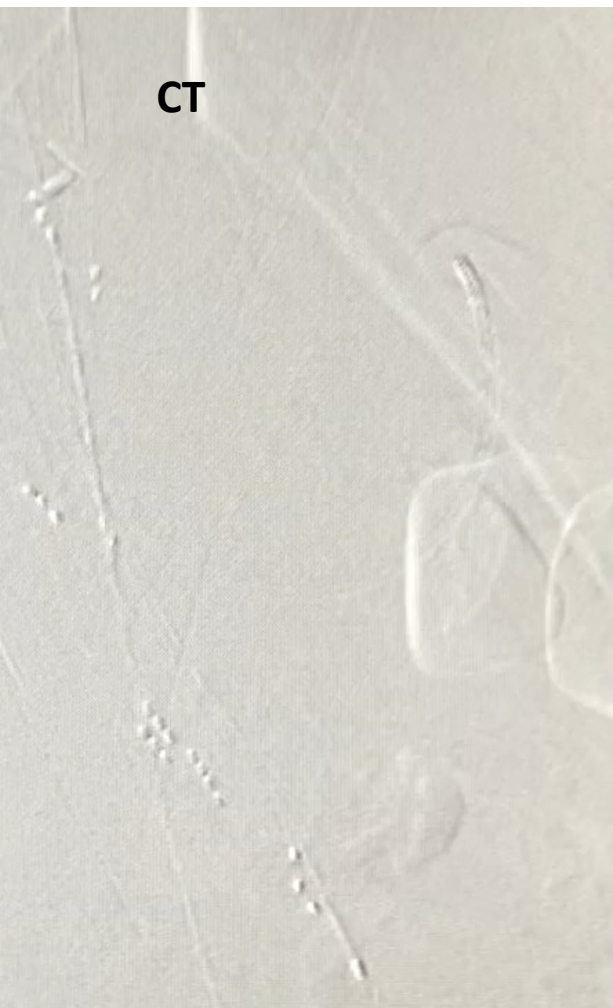
- Abord open des 2 scarpas
 - Axillo-bif de décharge, à retirer à la fin
- Axillaire droite dans le champ



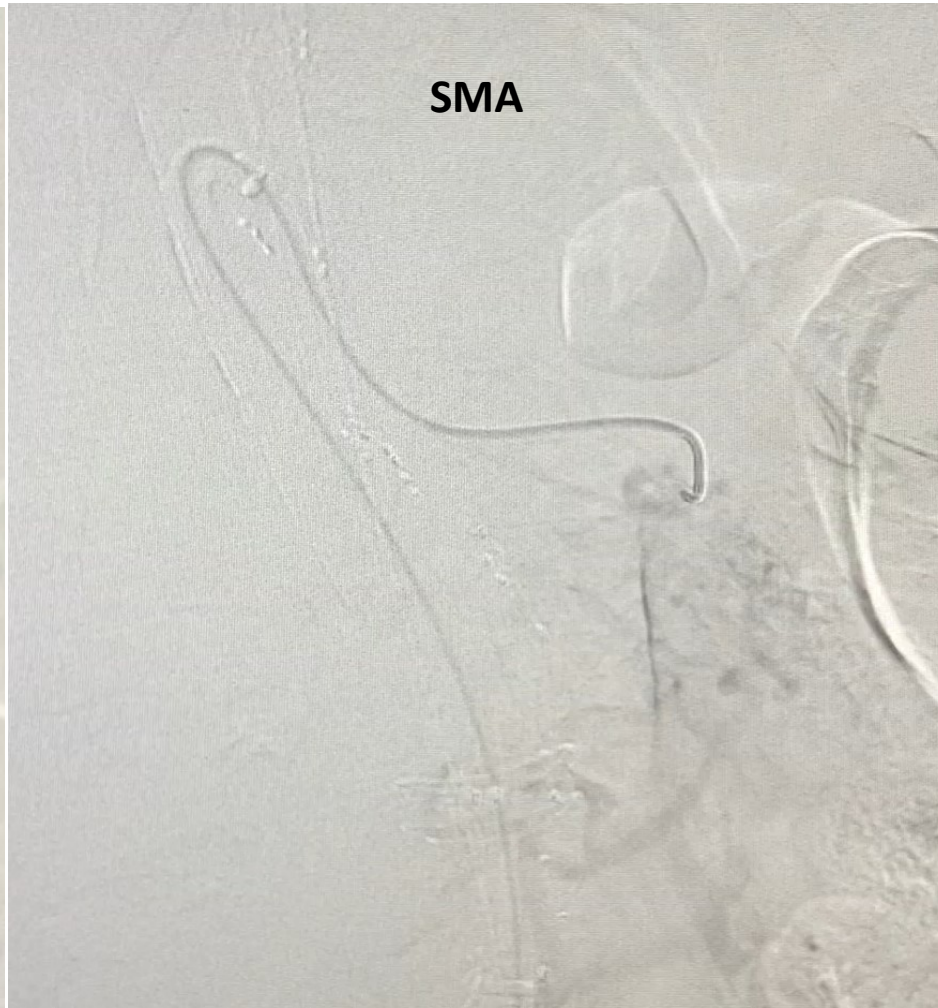




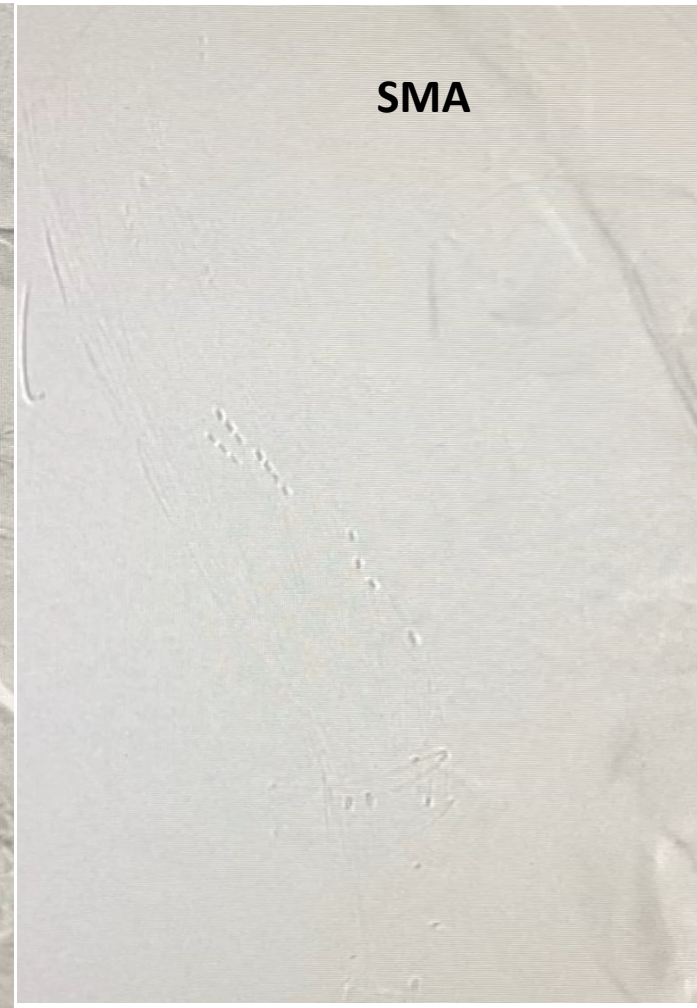
CT

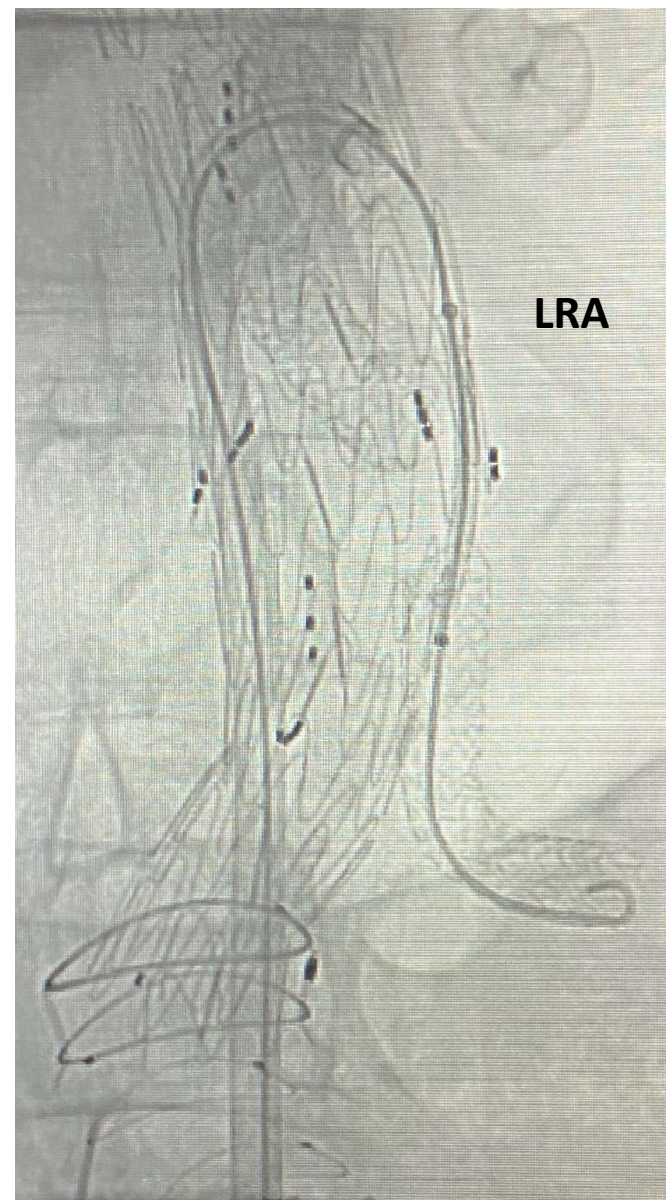
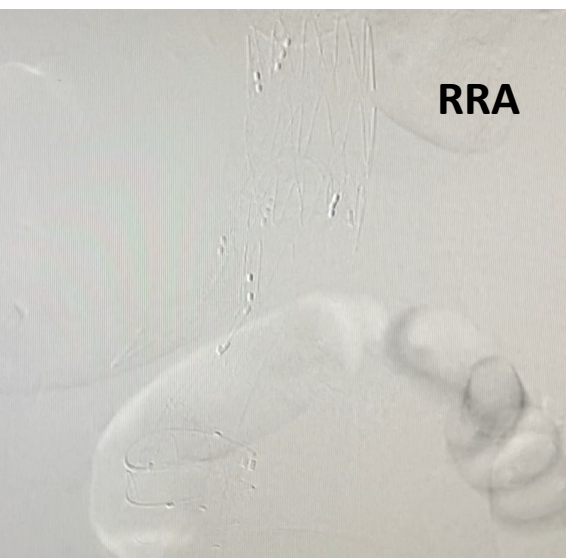
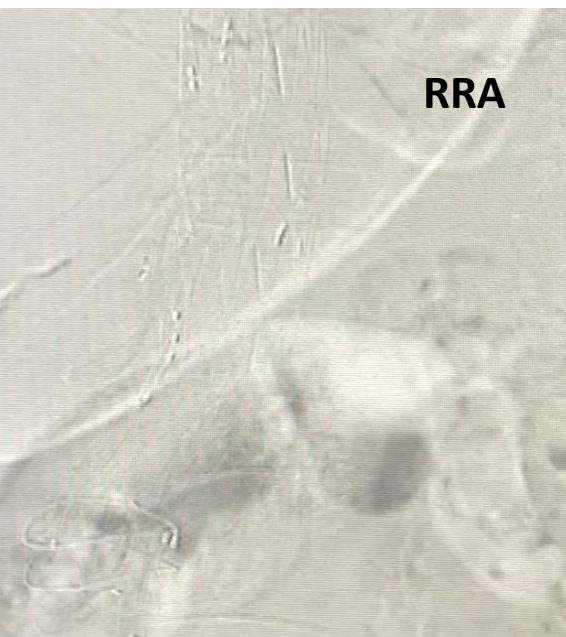


SMA

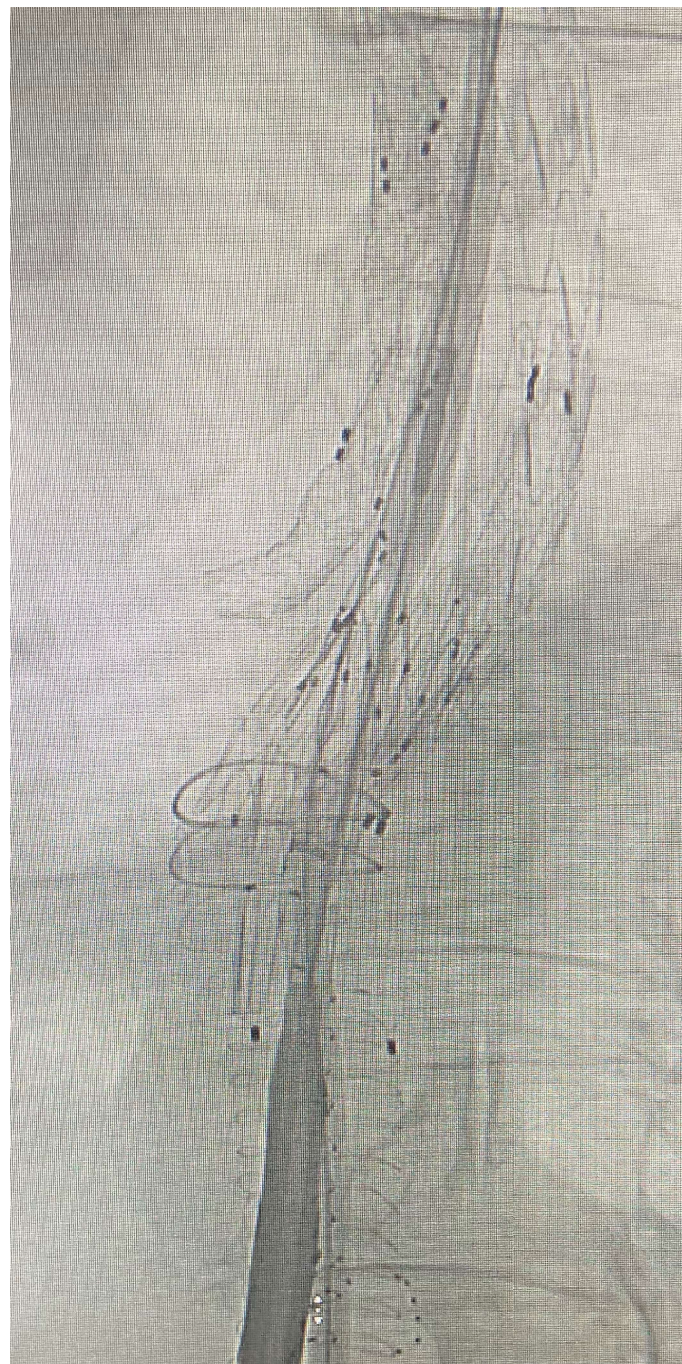


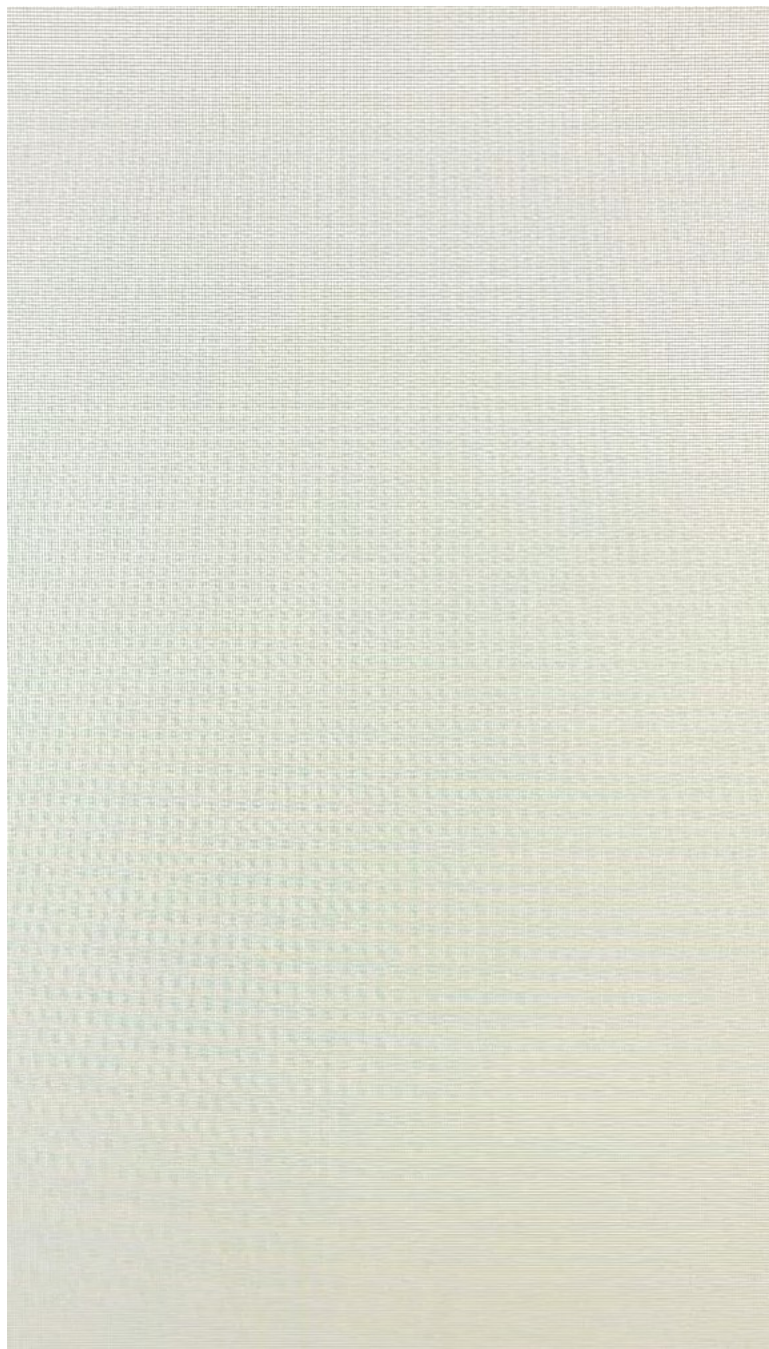
SMA

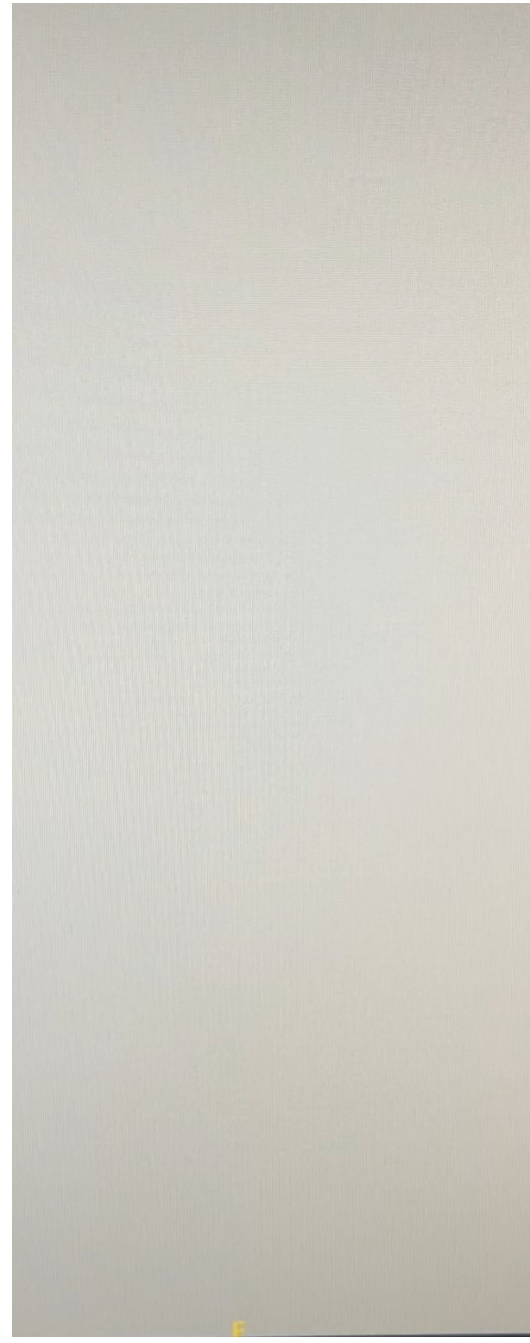
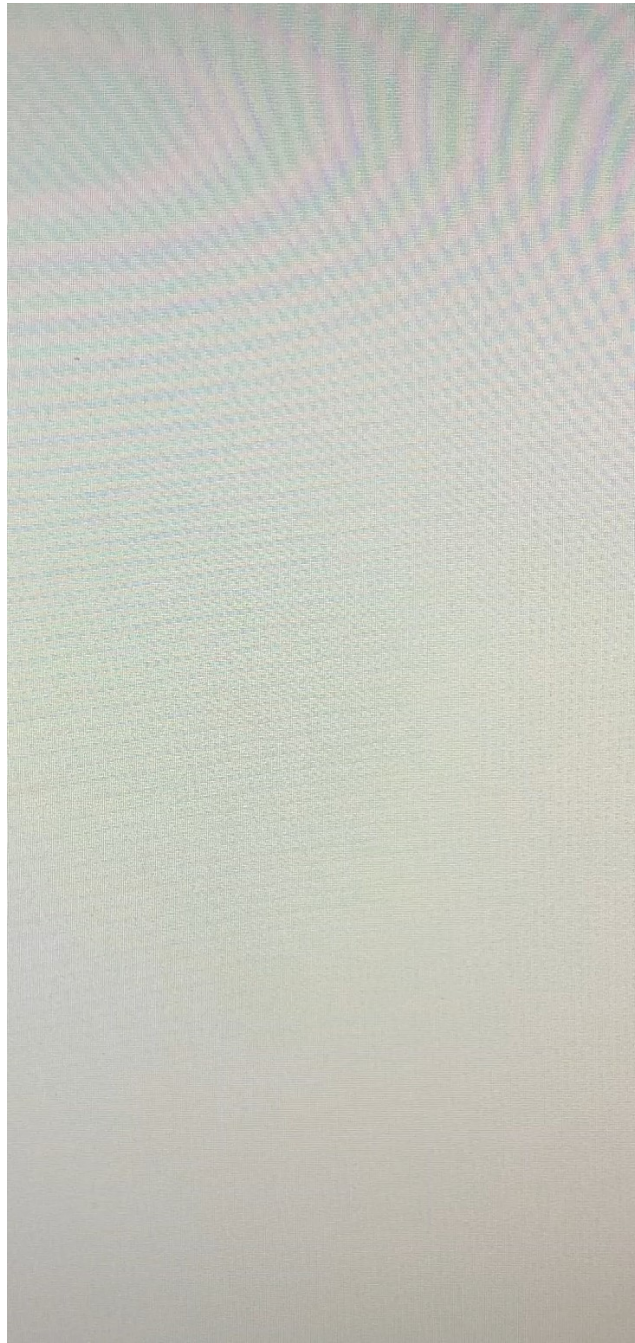
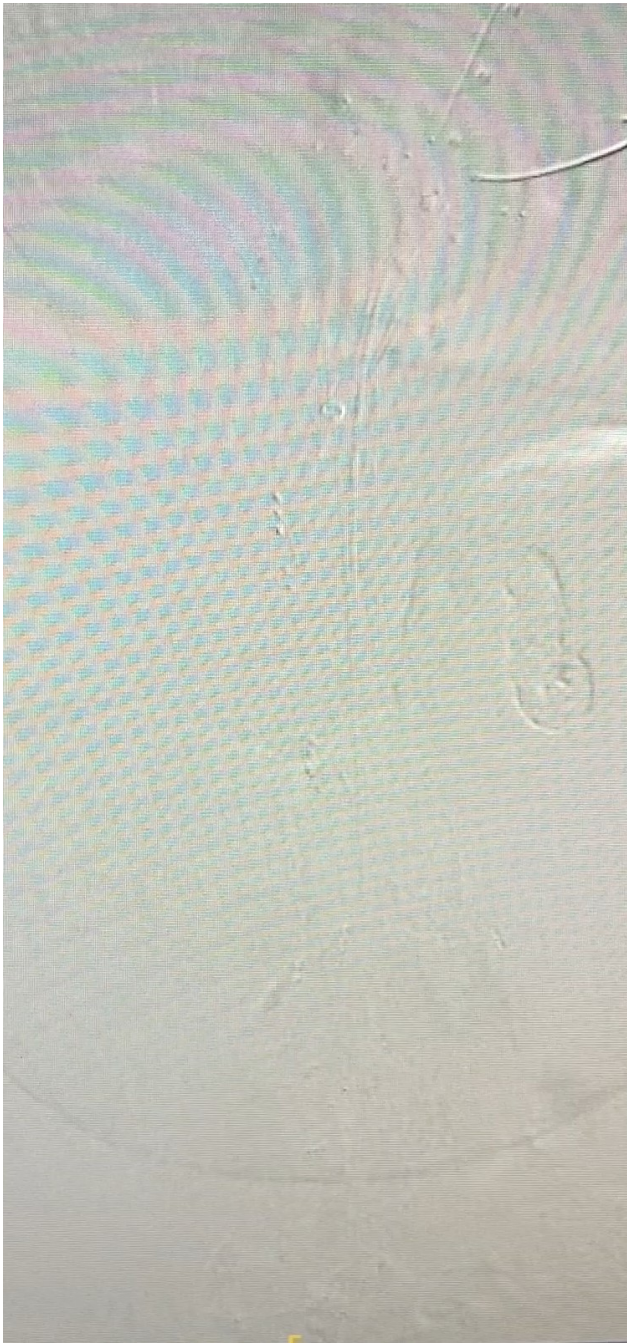












Cas clinique 1 : et là, on fait quoi ?



Cas clinique 1

- **Mr S. 78 ans**
 -6 oct 2023 : D-day !
 - Conversion xipho-pubienne
 - Axe donneur = iliaque commune droite
 - Dagobert → ARD + AMS
 - ARG est battante
 - TC : inch allah...
 - Chantal (IBODE) : y a comme une odeur de m... ~~«Ta gueule, Chantal»~~
- Avis digestif → laparostomie, 2nd look @ 48h**
- Reprise dans la nuit pour occlusion du Dagobert**
- Décès à J1 en défaillance multiviscérale**

Cas clinique 1

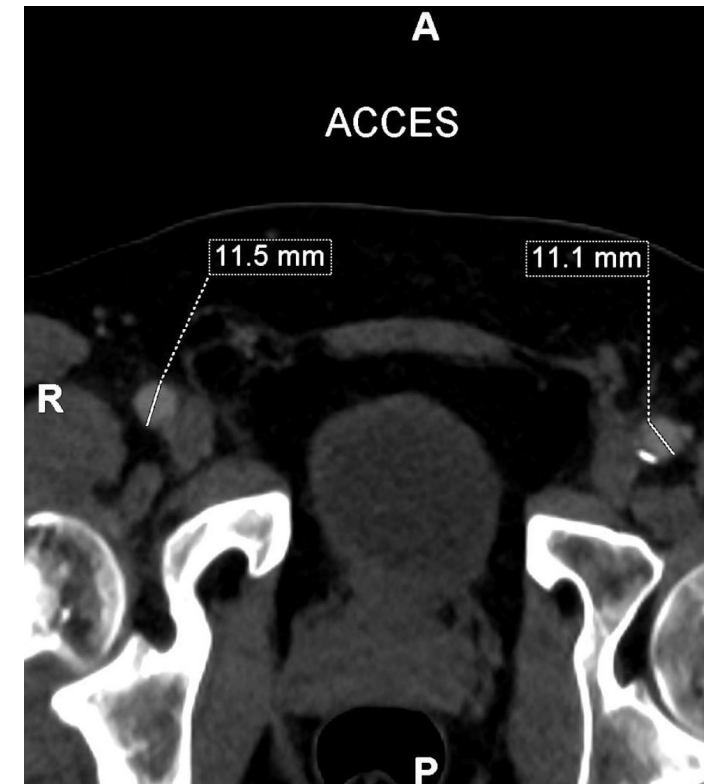
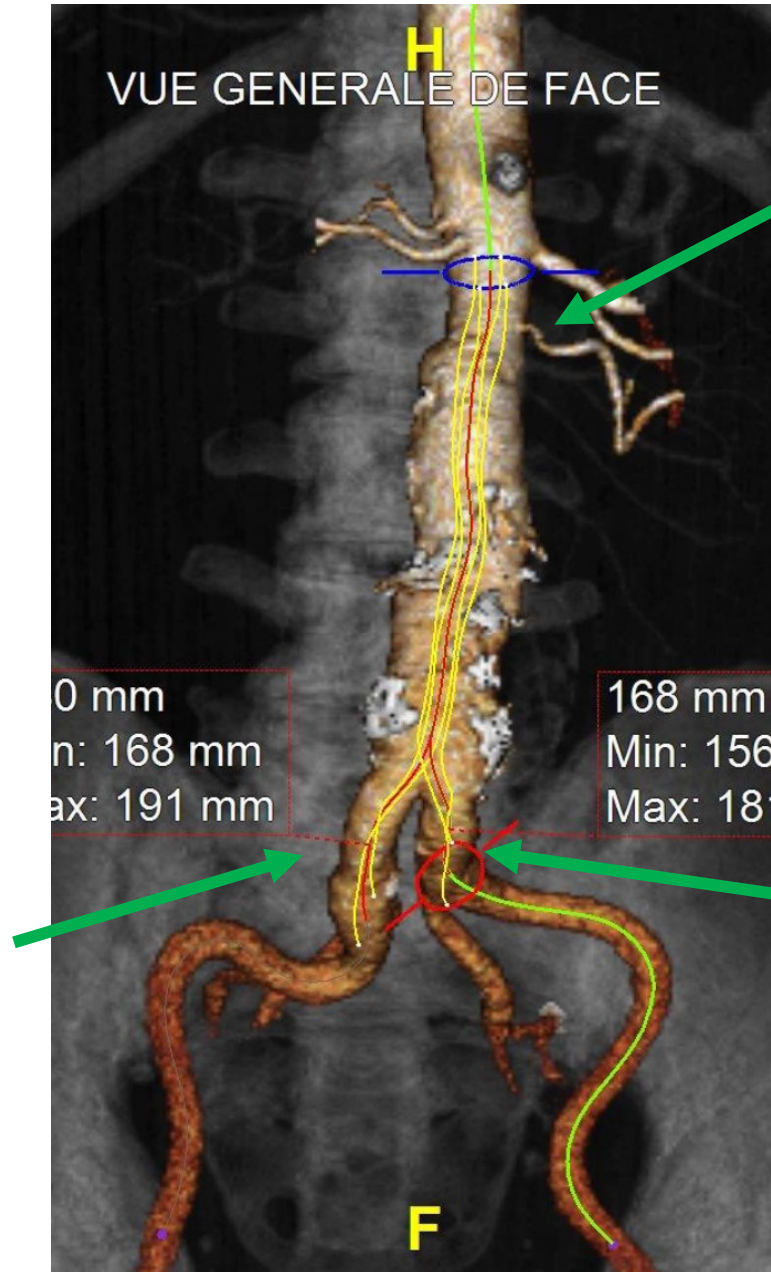
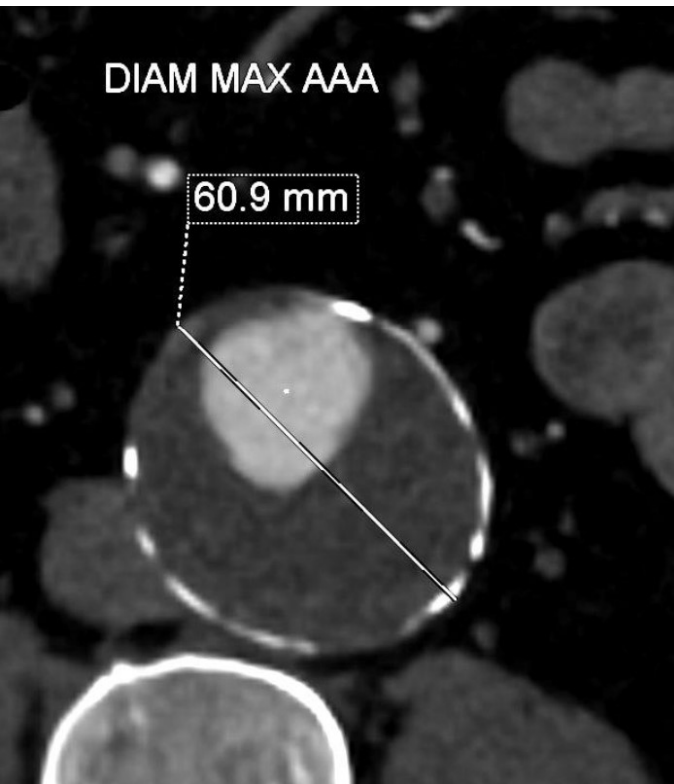
- Mr S. 78 ans
- Qu'aurait-on dû faire ? Ou ne pas faire ?



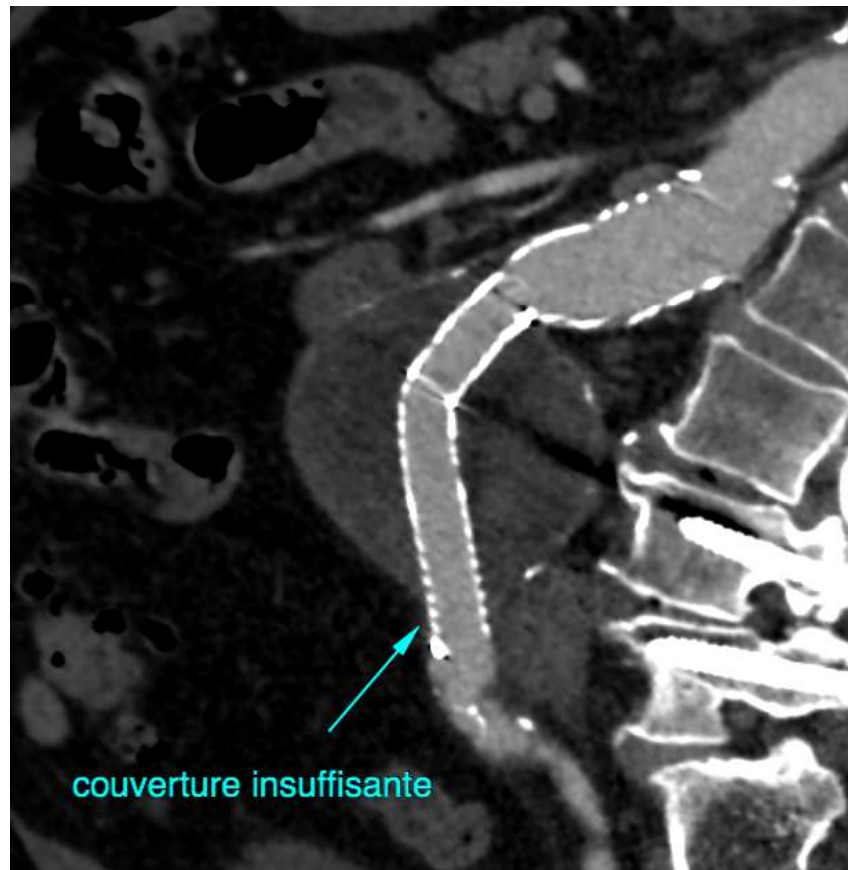
Cas clinique 2

- **Mr J. 61 ans**
 - HTA, FEVG 50%, HCT, tabac sevré, BMI 30
 - **2021 : découverte AAA 51 mm et AA Ascendante 53 mm**
 - Coro normale
 - Remodelage de la racine aortique (Yacoub) en 2021
 - Suites simples
 - **2022 : AAA 52 mm → surveillance**
 - **2023 : AAA 57 mm → opération**

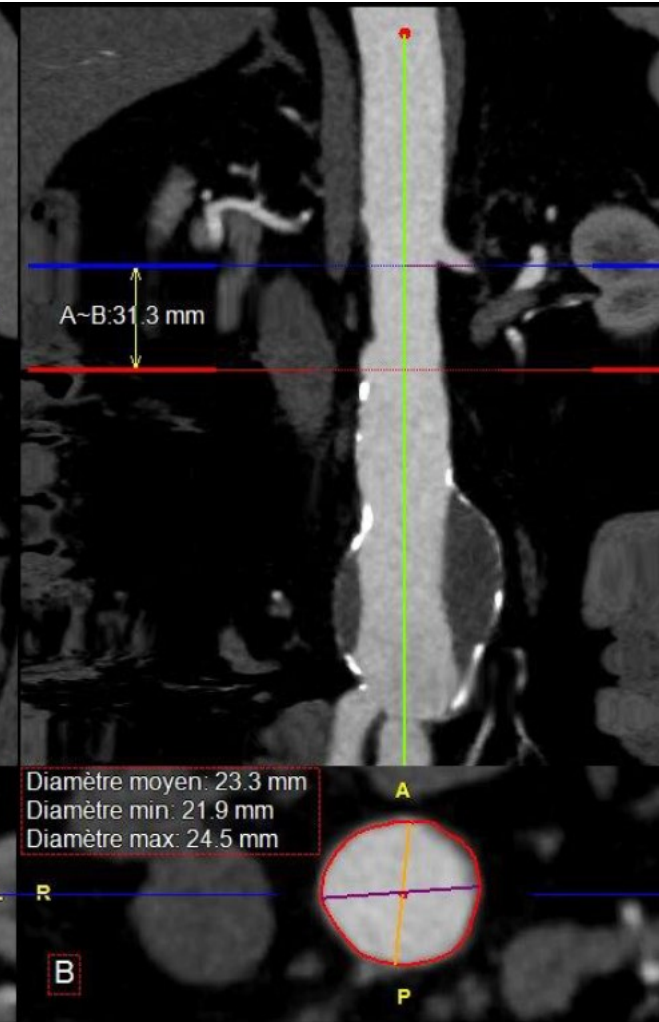
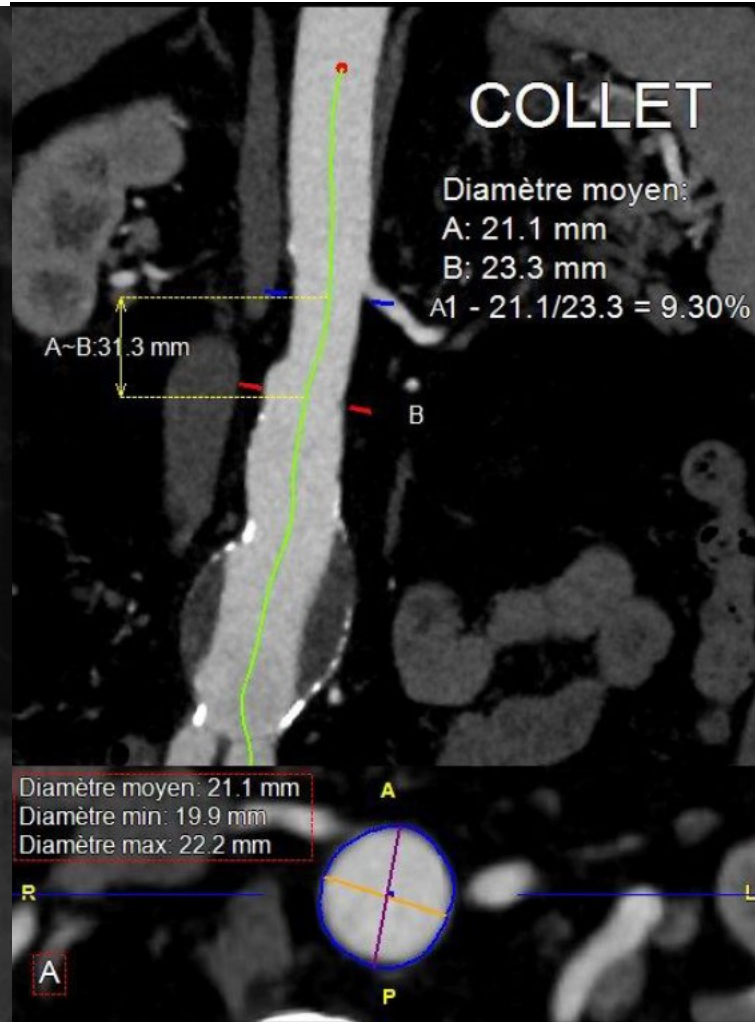
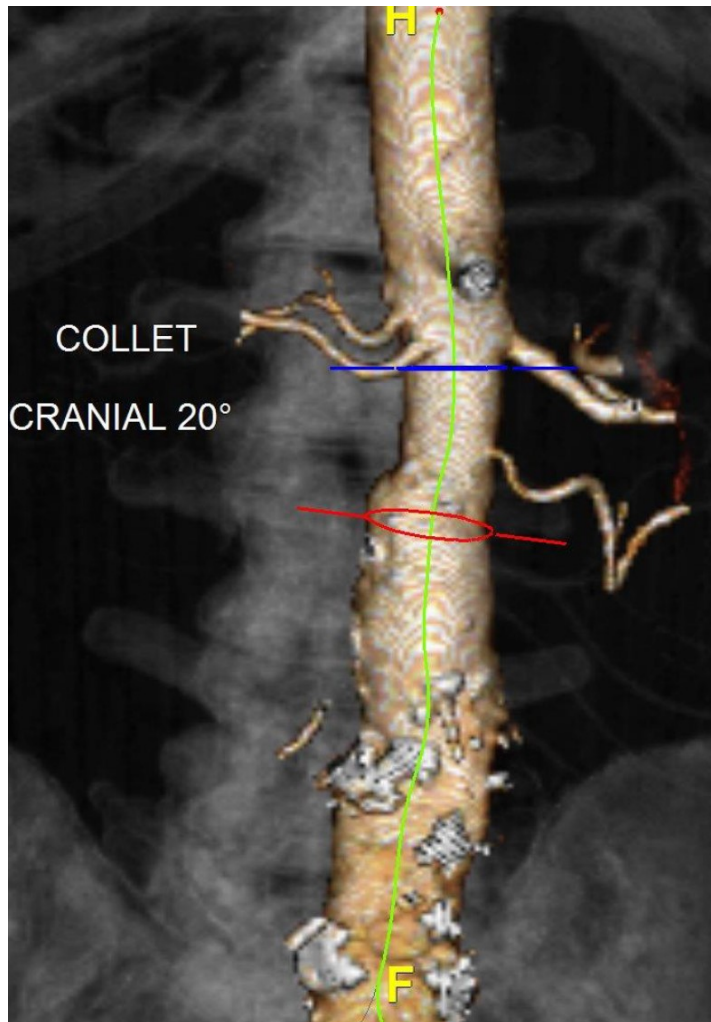
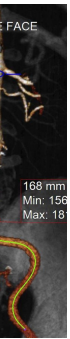
Cas clinique 2



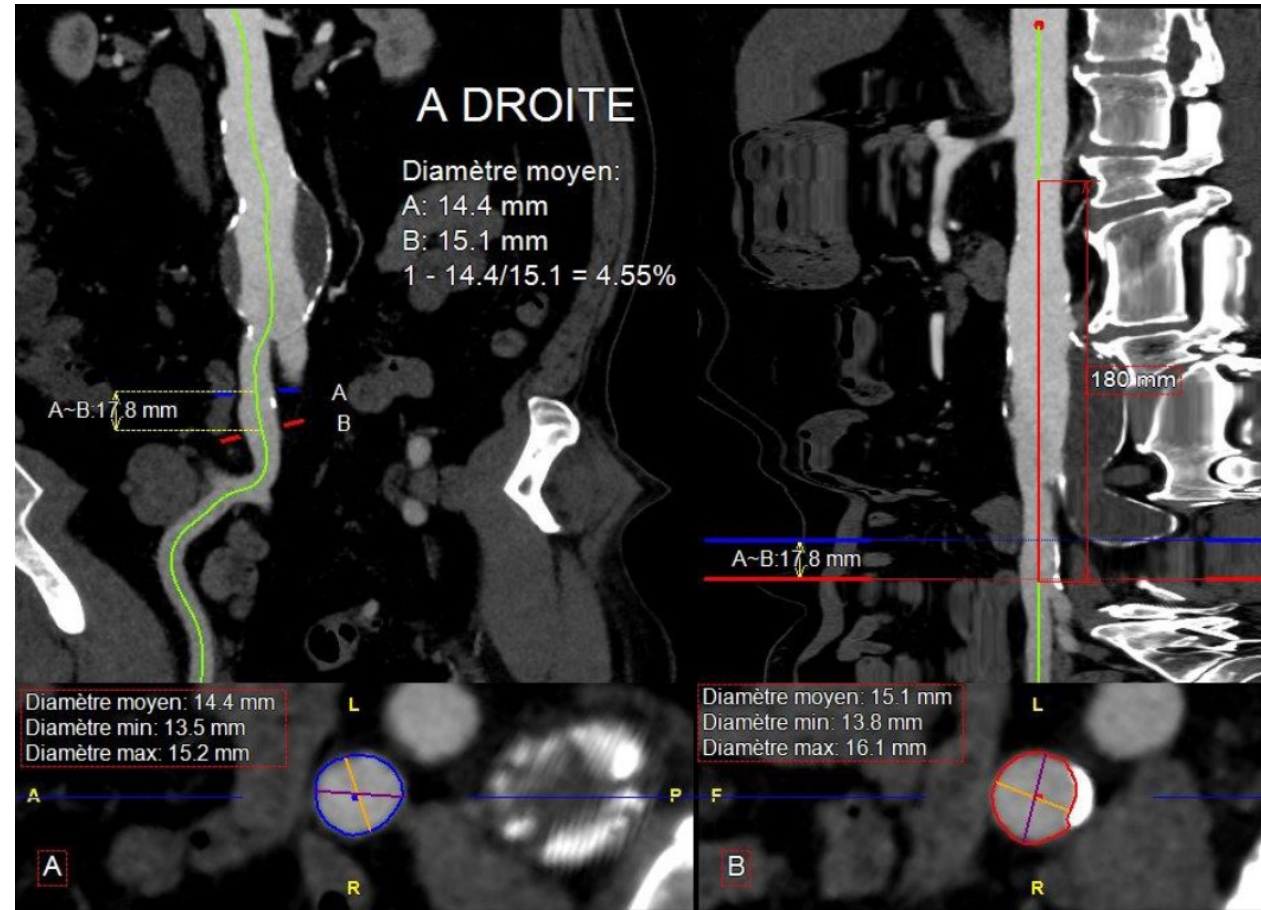
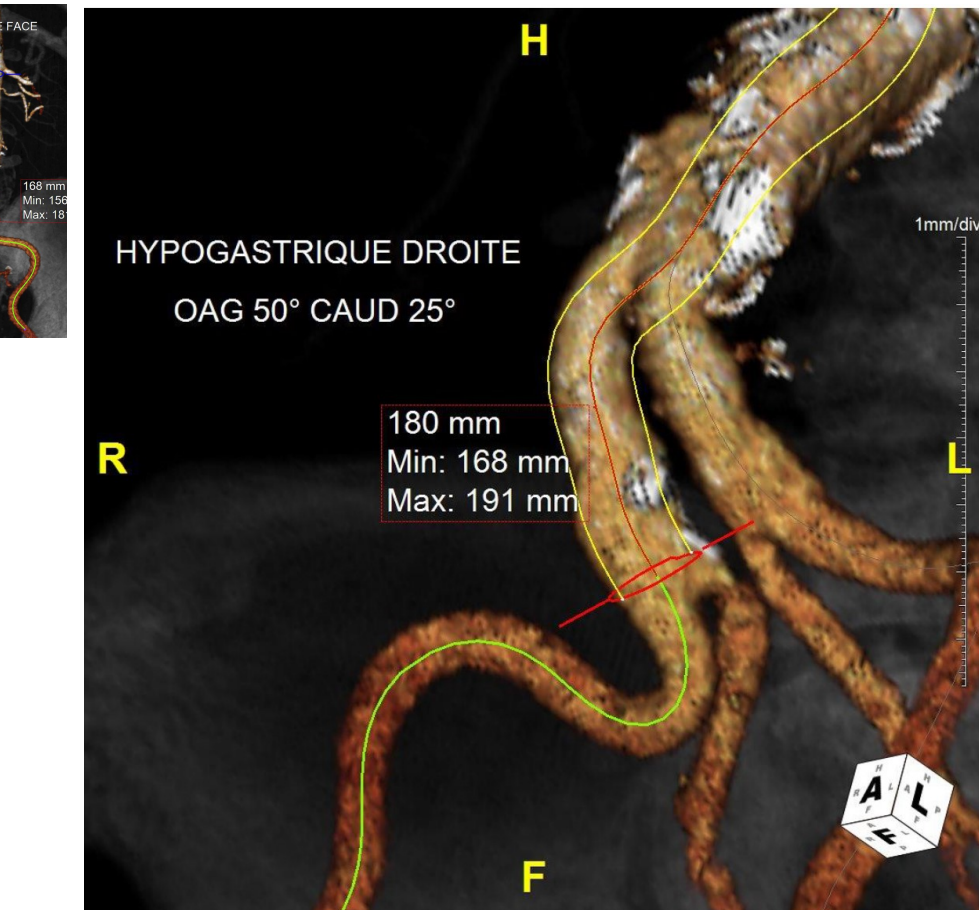
FT1b rétraction d'un jambage dans le sac



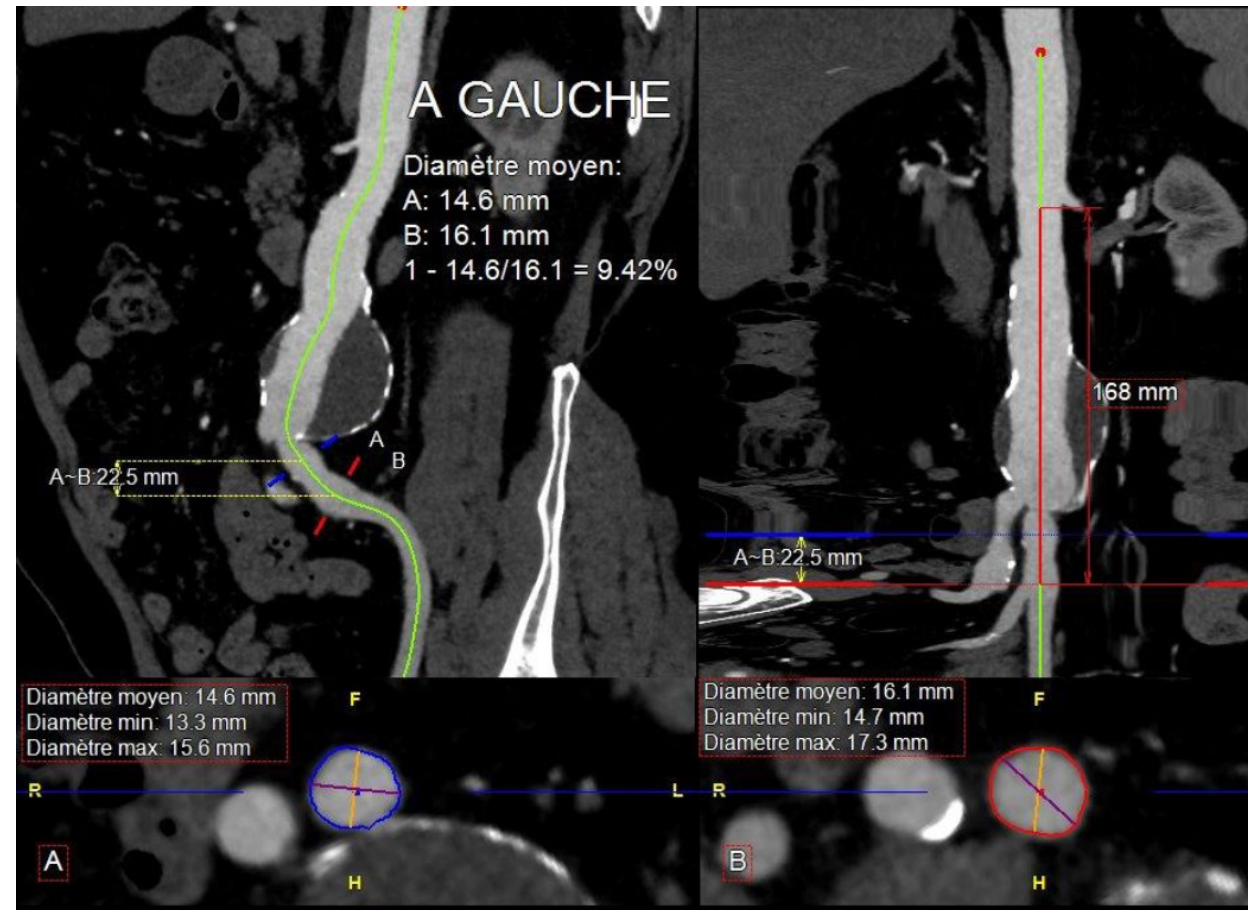
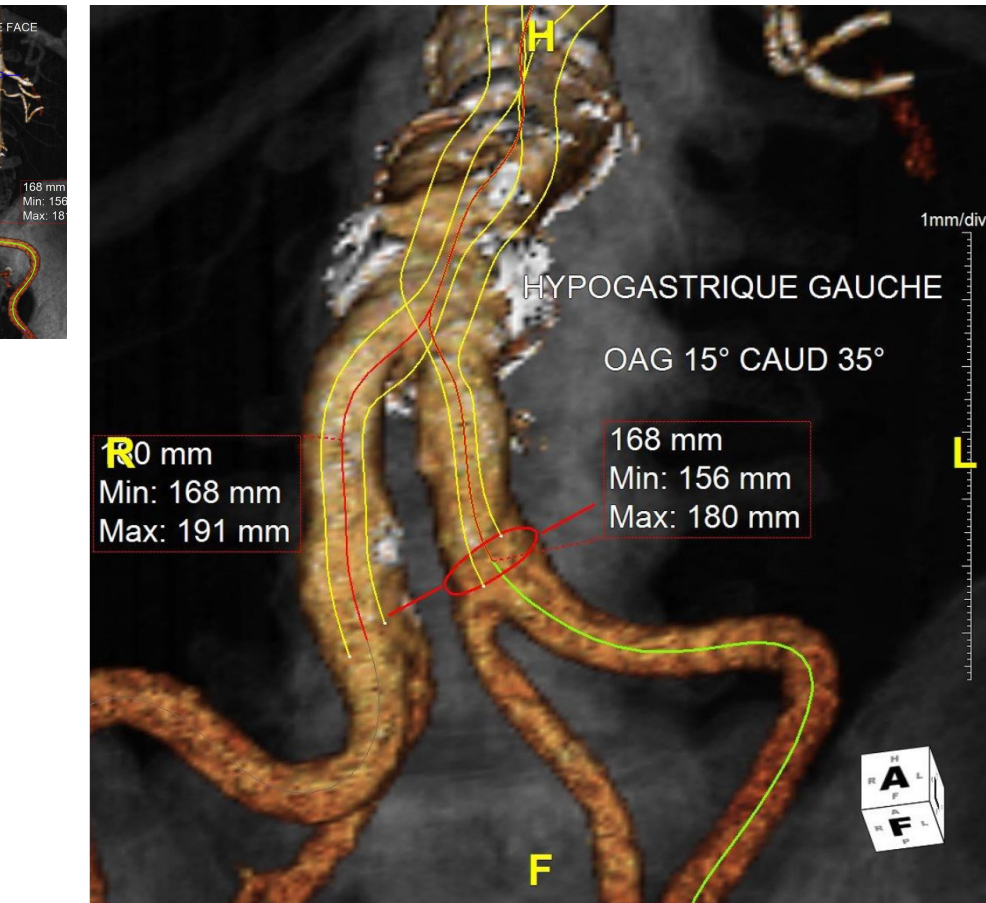
Cas clinique 2 - collet proximal : diamètre longueur, forme, angulation, DFG



Cas clinique 2 - collet iliaque droit : diamètre, longueur, forme, angulation



Cas clinique 2 - collet iliaque gauche : diamètre, longueur, forme, angulation



Cas clinique 2 : open ou endo chez le jeune ?

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Sage

atic Review With Meta-Analysis
ovascular Versus Open Repair of
inal Aortic Aneurysm Repair
Young

ontopodis, PhD¹, Aikaterini Gavalaki, MD², Nikolaos Galanakis, PhD³,
ntzas, MD¹, Christos Ioannou, PhD¹, George Geroulakos, PhD⁴,
s, PhD⁴, and George A. Antoniou, PhD^{5,6}

was to investigate which treatment method for abdominal aortic aneurysm (AAA),
er outcomes in young patients. **Materials and Methods:** A systematic review was
udies or randomized controlled trials (RCTs) that compared endovascular and open
s. MEDLINE, EMBASE, and CENTRAL were searched up to March 2022 using the

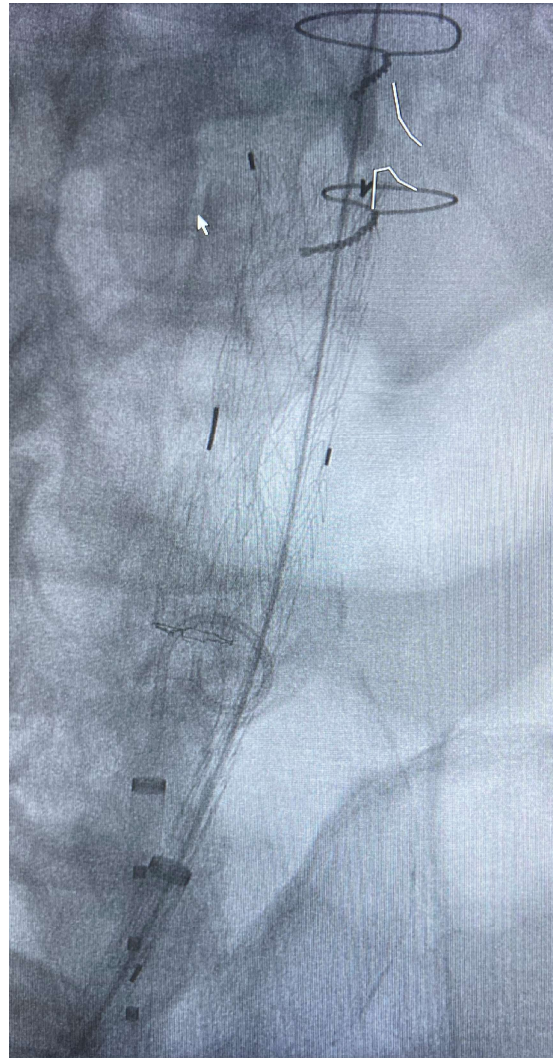
OVID interface. The risk of bias was assessed with the Newcastle-Ottawa scale (NOS), with a maximum score of 9, or
version 2 of the Cochrane risk of bias tool. The certainty of evidence was assessed with the GRADE framework. Primary
outcomes were perioperative, overall, and aneurysm-related mortality. Secondary outcomes were reintervention, hospital
length of stay, and perioperative complications. Effect measures in syntheses were the odds ratio (OR), risk difference
(RD), mean difference (MD), or hazard ratio (HR) and were calculated with the Mantel-Haenszel or inverse variance
statistical method and random-effects models. **Results:** Fifteen observational studies and 1 RCT were included, reporting
a total of 48 976 young patients. Definitions of young ranged from 60 to 70 years. The median score on the NOS was
8 (range: 4–9), and the RCT was judged to be high risk of bias. The perioperative mortality was lower after EVAR (RD:
–0.01, 95% CI: –0.02 to –0.00), but the overall and aneurysm-related mortality was not significantly different between
EVAR and open repair (HR: 1.38, 95% CI: 0.81 to 2.33; HR: 4.68, 95% CI: 0.71 to 31.04, respectively), as was the hazard
of reintervention (HR: 1.50, 95% CI: 0.88 to 2.56). The hospital length of stay was shorter after EVAR (MD: –4.44 days,
95% CI: –4.79 to –4.09), and the odds of cardiac (OR: 0.22, 95% CI: 0.13 to 0.35), respiratory (OR: 0.17, 95% CI: 0.11
to 0.26), and bleeding complications were lower after EVAR (OR: 0.26, 95% CI: 0.11 to 0.64). The level of evidence was
low or very low. **Conclusion:** Patient preferences and perspectives should be considered during shared decision-making
process considering the available evidence. EVAR may be considered in young and fit patients with a suitable anatomy.

Protocol registration: PROSPERO, CRD42022325051

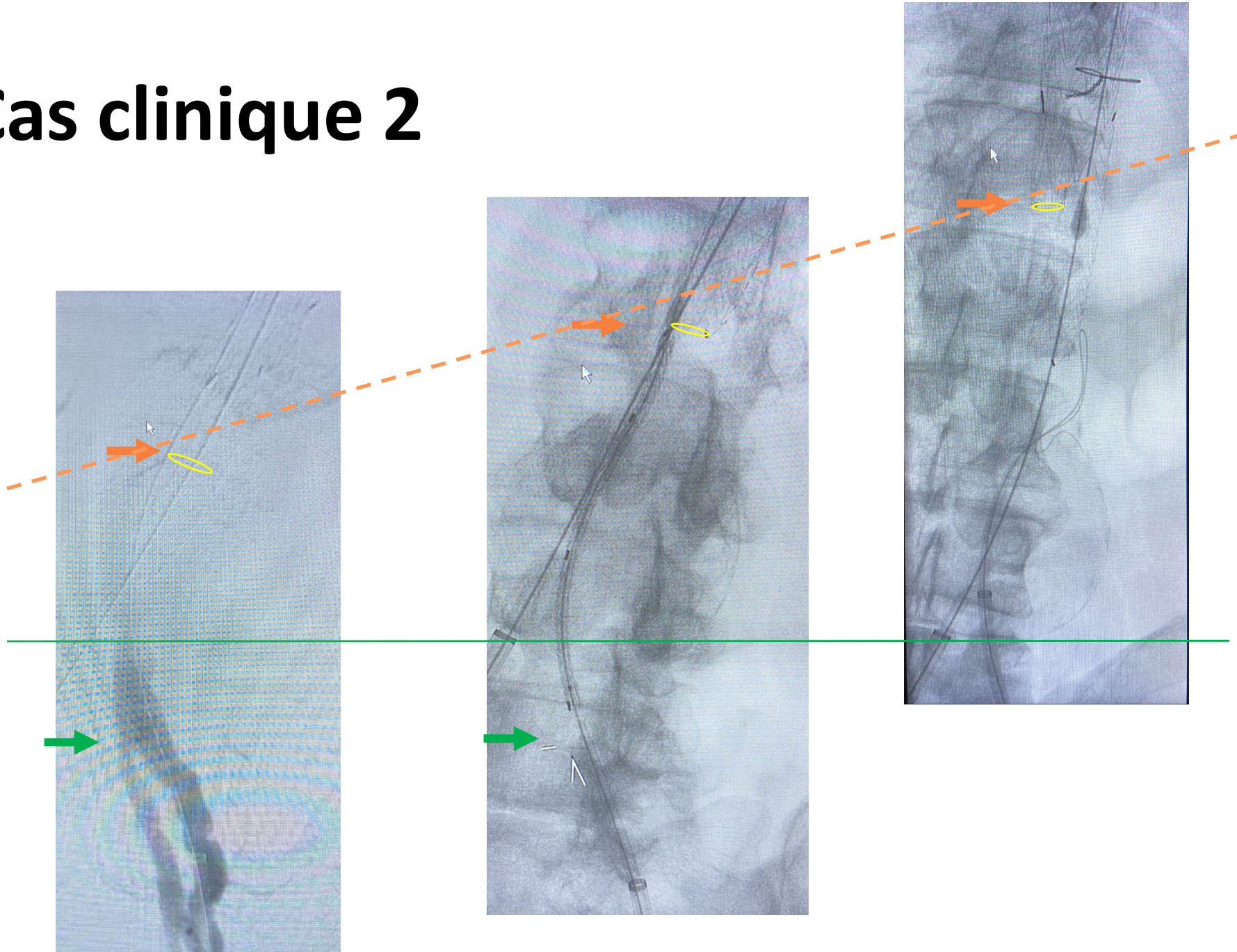
Cas clinique 2

- **Ponction sous écho, 2 Proglide / côté (→ Manta®, Teleflex)**
- **Intro 16 Fr à Dt, 12 Fr à Gche**
- **50 UI/Kg Héparine, Hémochron® (1 +/- 1x/h)**
- **Guide Advantage 035 de 180 cm, sonde Ber2 035 de 65 cm**
- **Pigtail® marquée**
- **Montée du corps d'EVAR avant injection**
- **injections PDC pur 15/15 ou manuelles de 5cc**
- **Collimation obsessionnelle & reco ALARA**

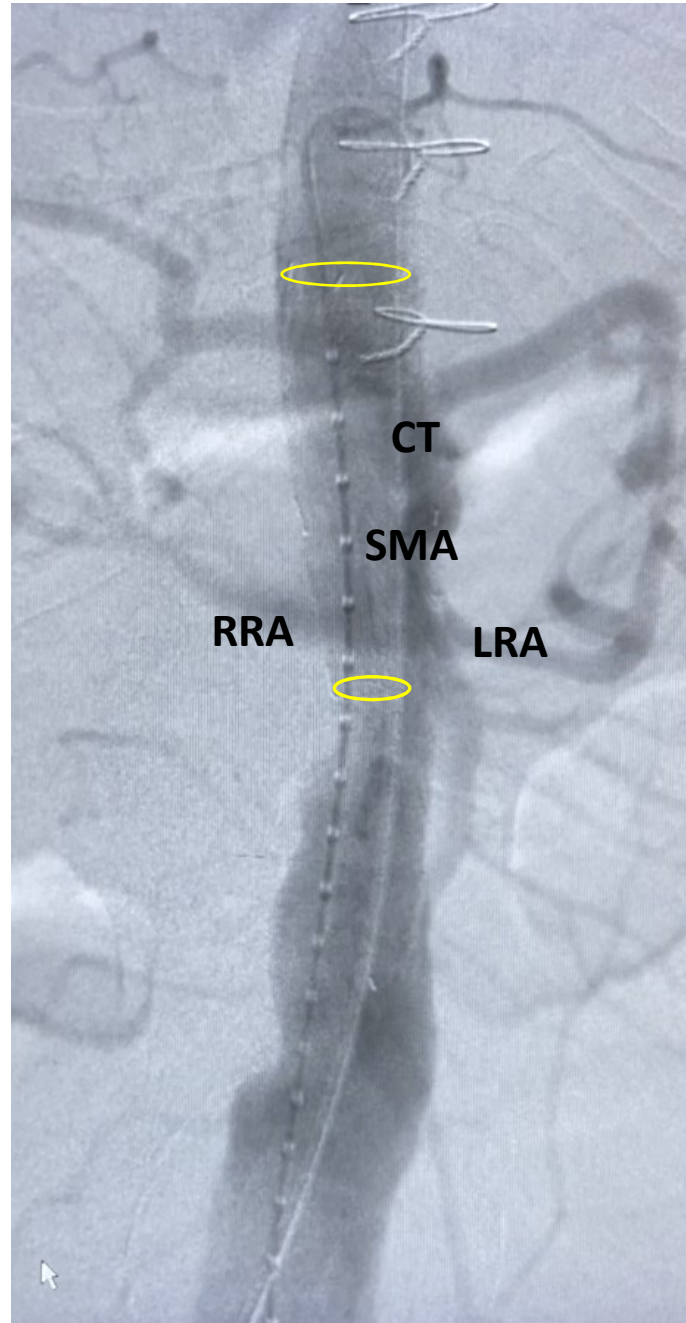
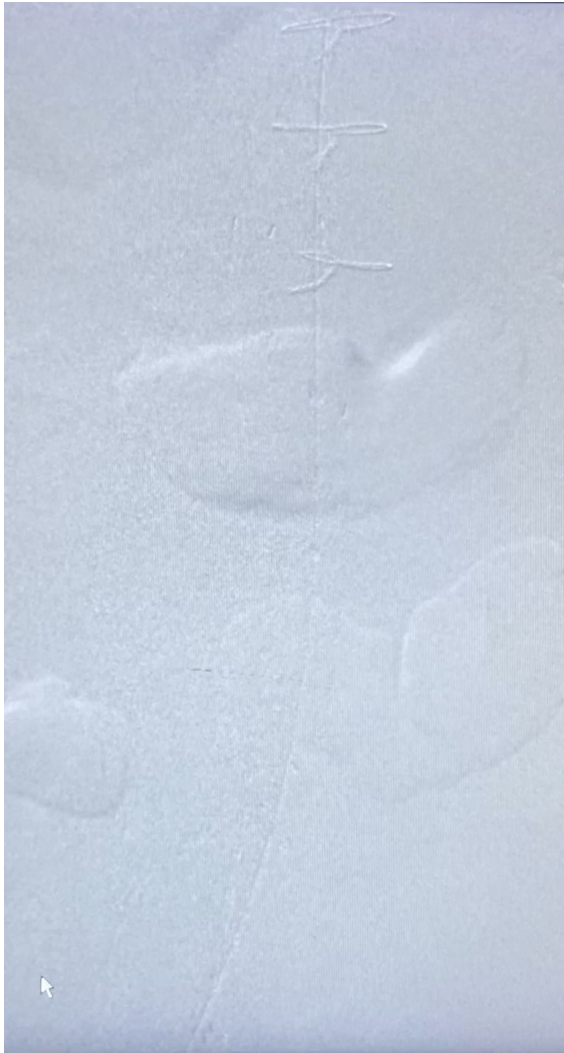
Cas clinique 2



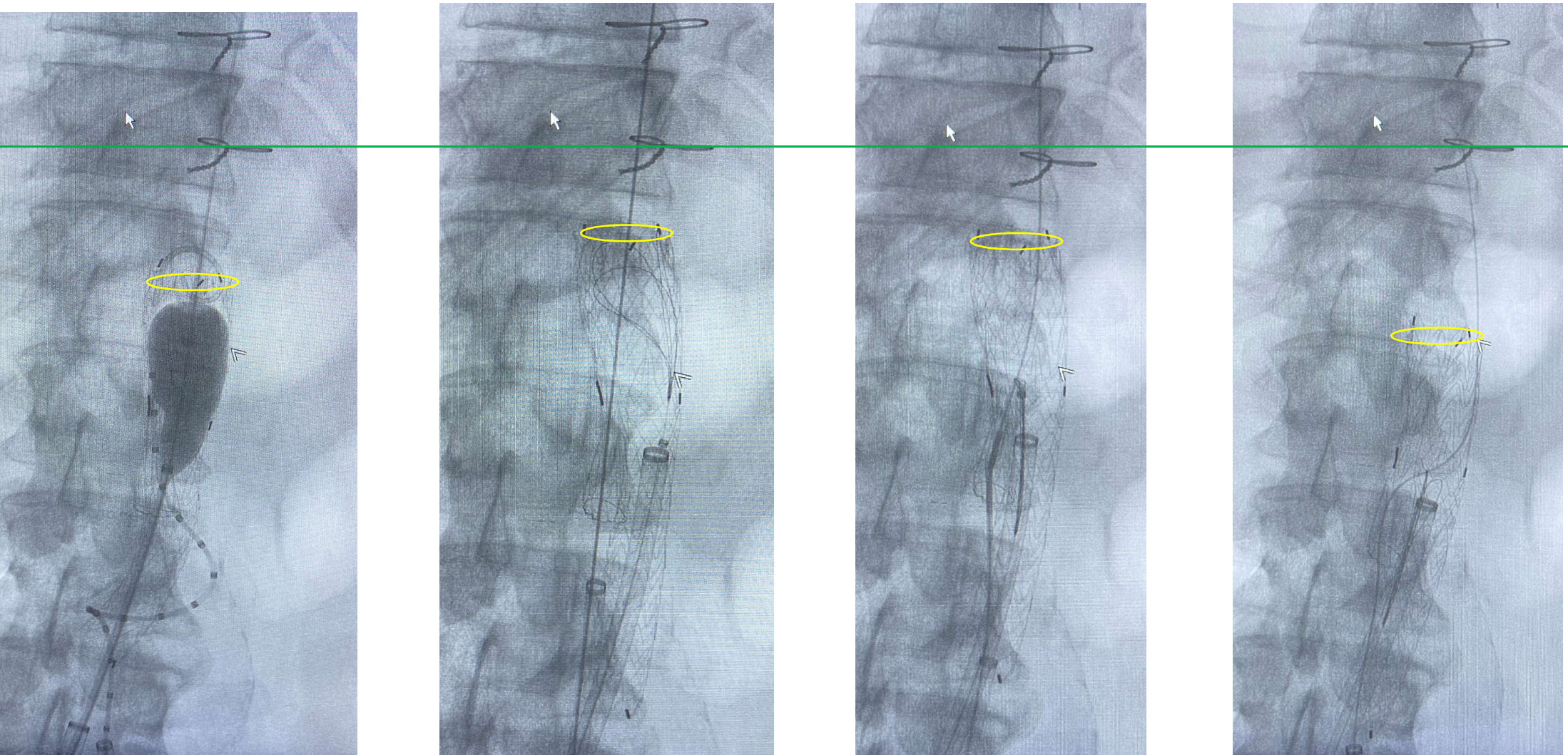
Cas clinique 2



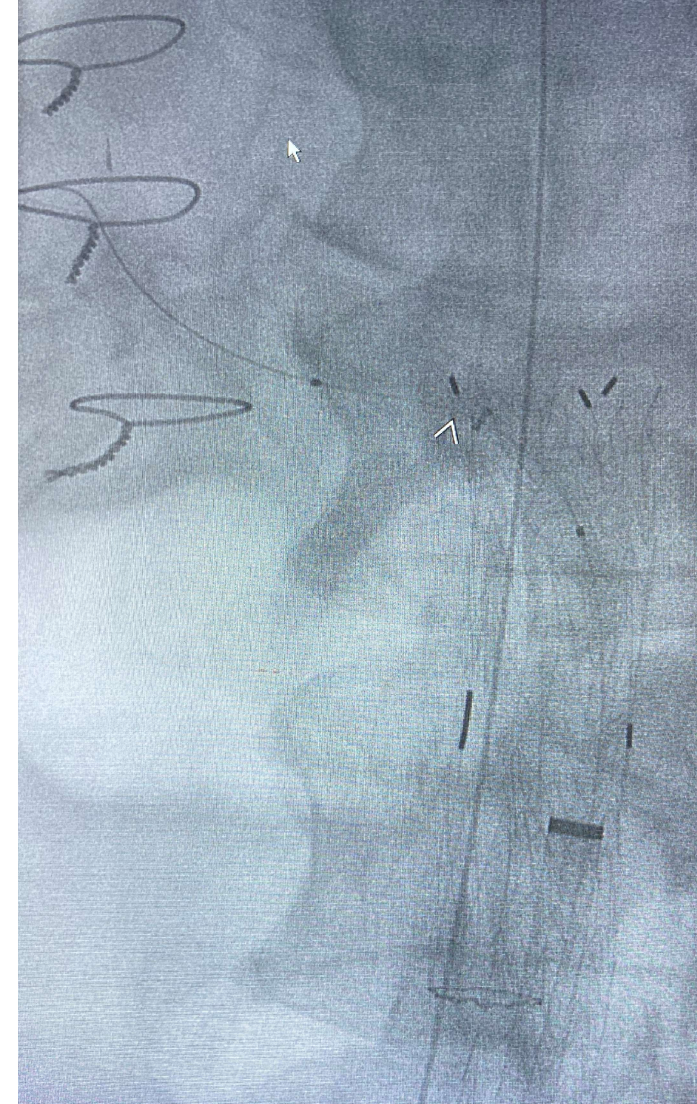
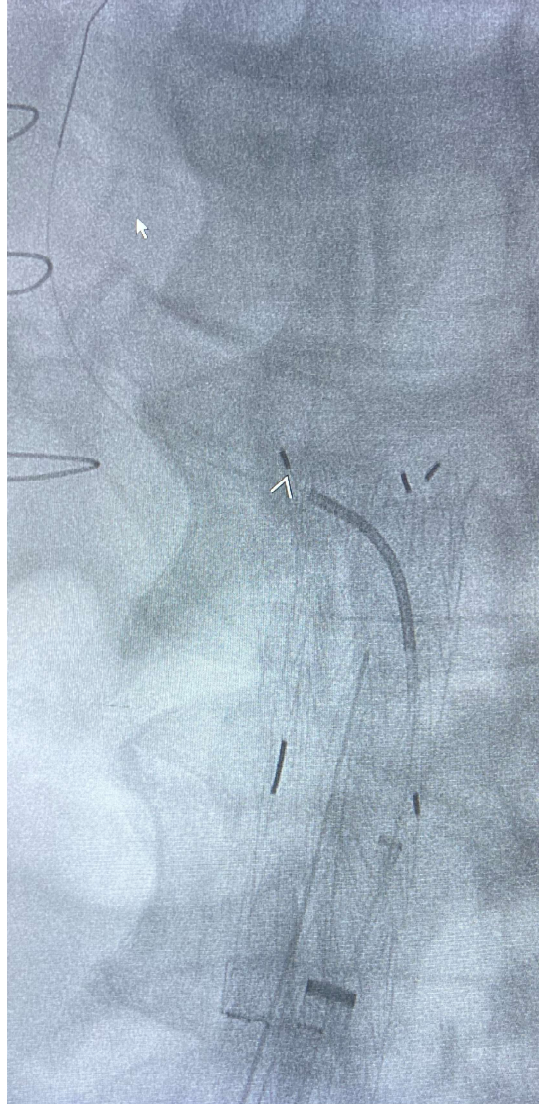
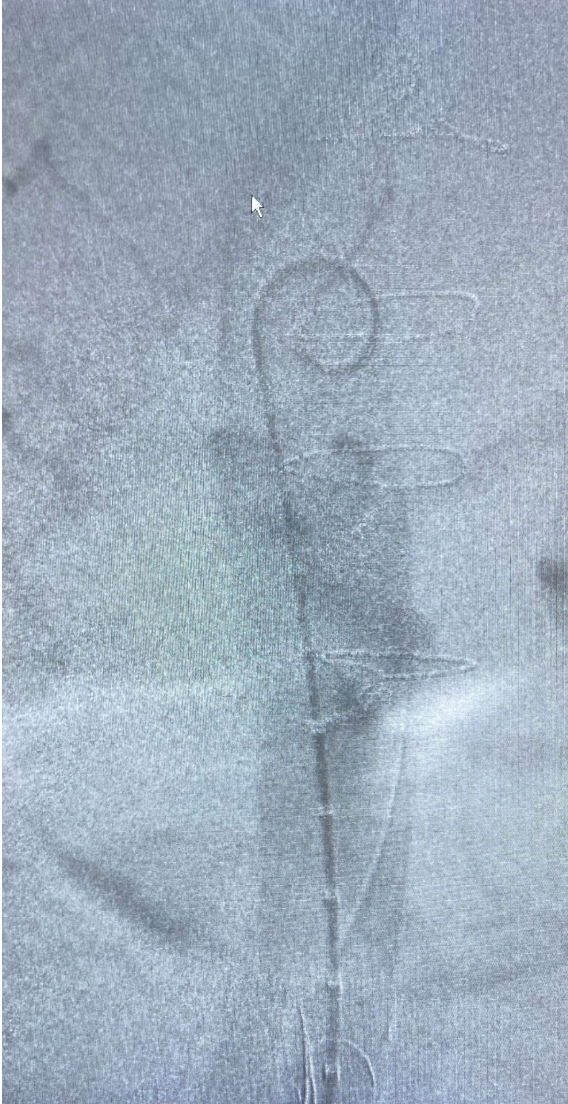
Cas clinique 2



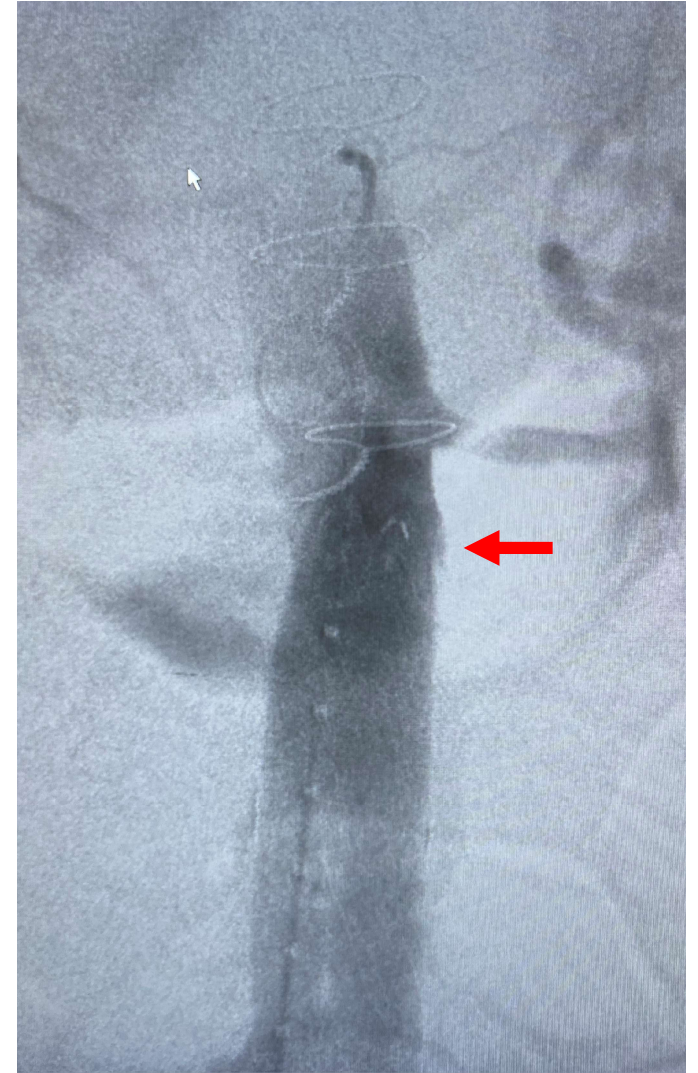
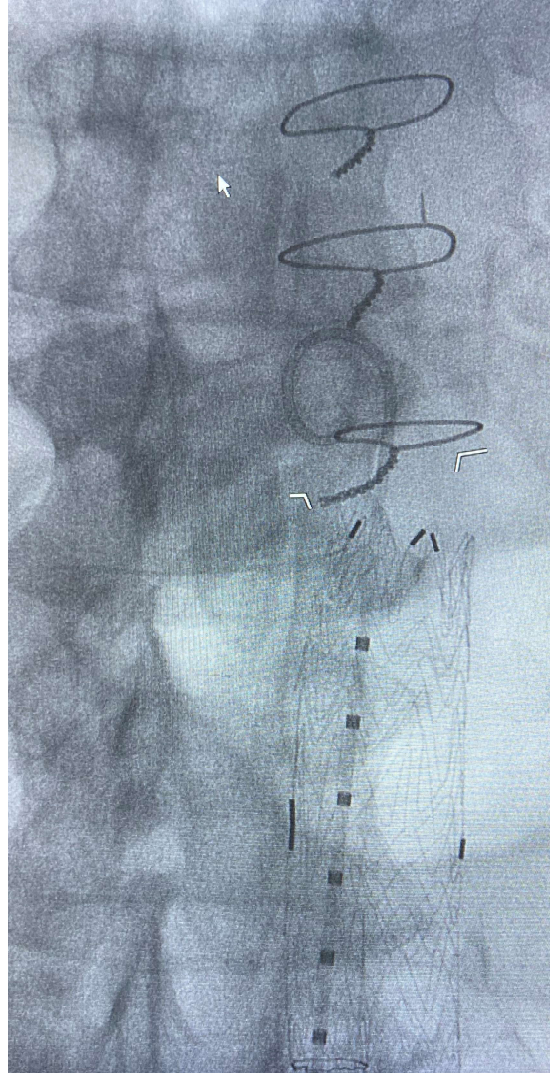
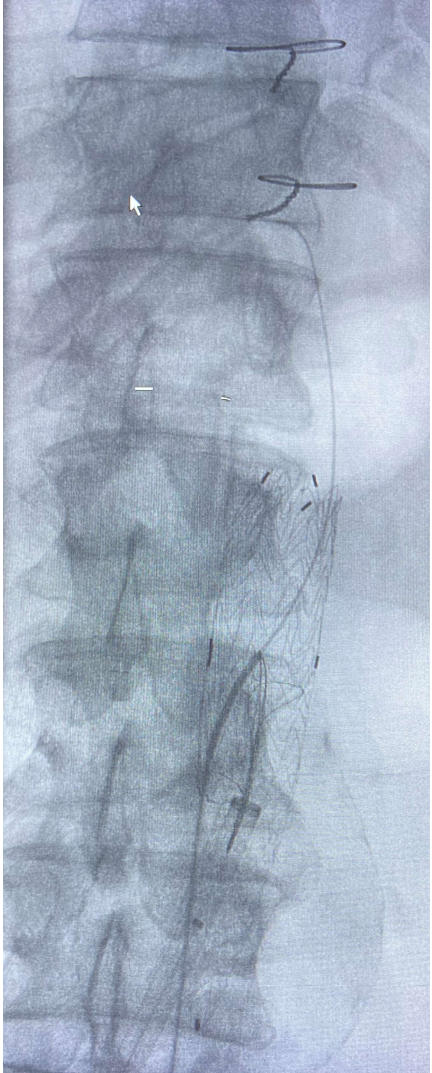
Cas clinique 2



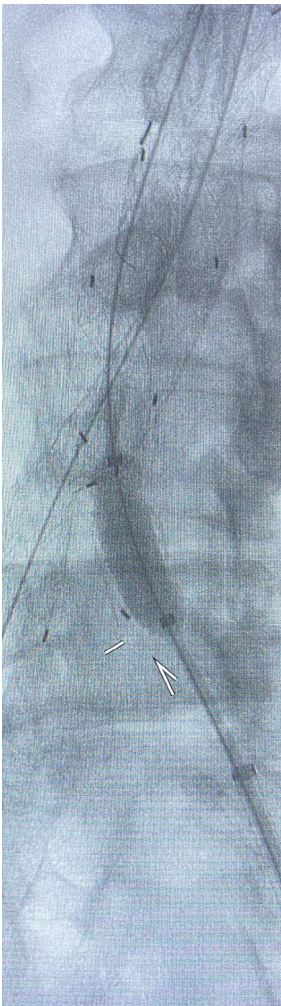
Cas clinique 2

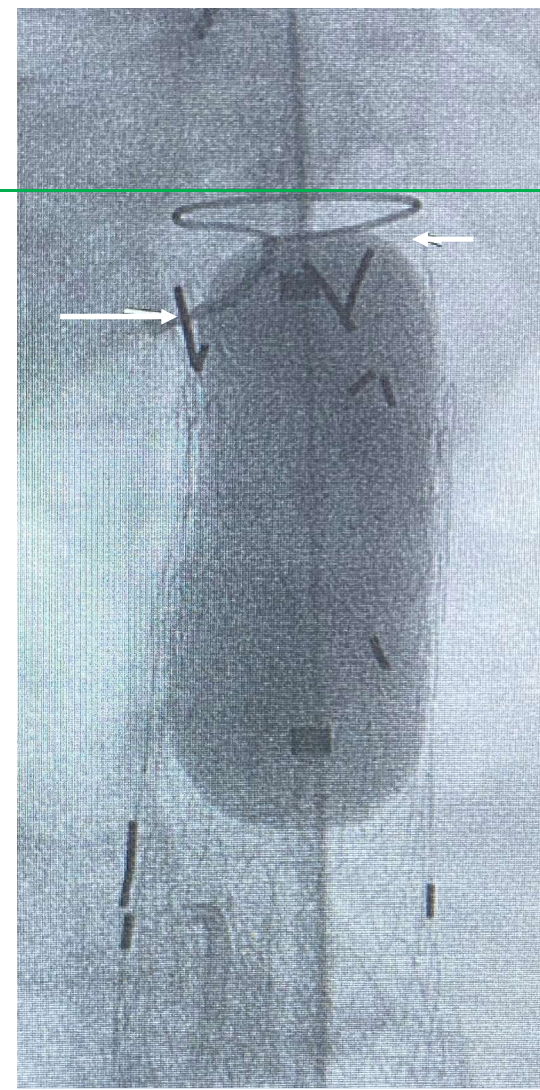
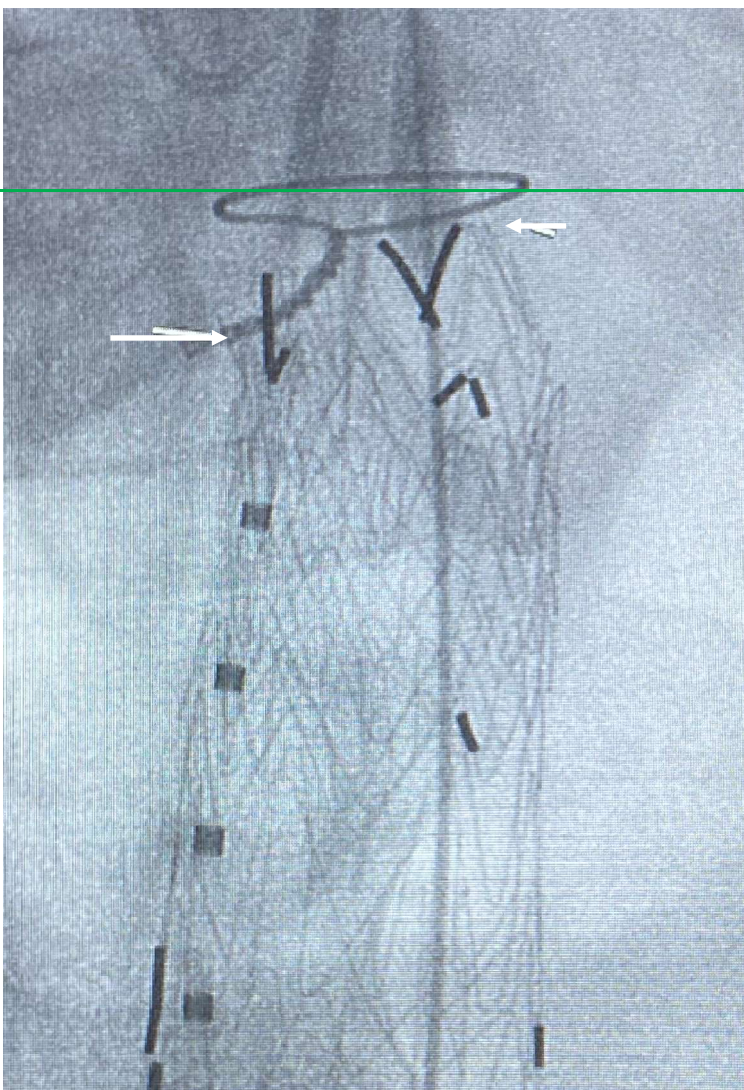
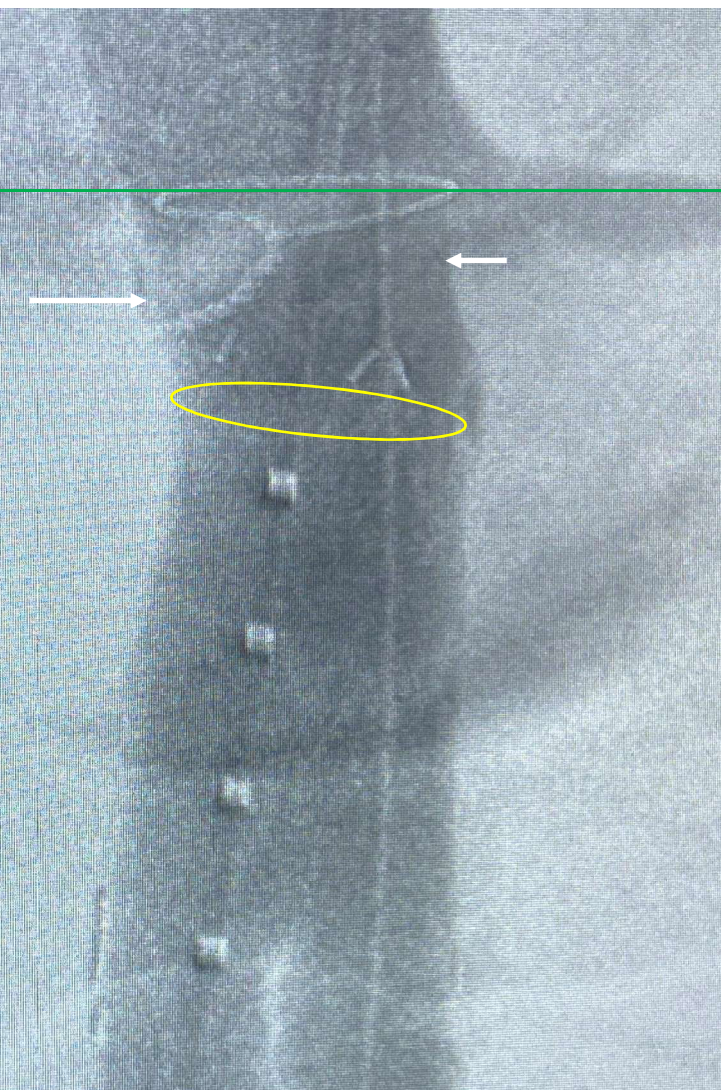


Cas clinique 2



Cas clinique 2





Cas clinique 2

