DES de Radiodiagnostic – Cours de Spé
12/02/2021

Radiologie Interventionnelle
Techniques d'embolisation

Fabrice Deprez, MD, MSM, EBIR
Radiologue interventionnel - CHWapi / UCL

Michaël Vouche (ULB) & Christophe Valkenborgh (Ulg)

UCLouvain

Centre Hospitalier de Wallonie picarde

INFOS UTILES

BELGIAN SOCIETY OF RADIOLOGY

BSR Section Meeting
Interventional Radiology

! Next (web)meeting ***1st April 2021***
! Via BSR mailing list – login in
https://www.bsr-web.be/

Dr. Frank Hammer - french representative / secretary:
frank.hammer@uclouvain.be

Dr. Peter Vanlangenhove - flemish representative / president:
peter.vanlangenhove@uzgent.be

EBIR

European Board of Interventional Radiology

IR Curriculum & Syllabus
European Trainee Forum
EBIR
- General Information
- EBIR Examination Council
- How to apply - General
- How to apply - IRSA
- How to prepare for the EBIR
- EBIR Australia/New Zealand
- Contribute to the EBIR

CVIR
ESIRonline
CIRSE Guidelines
Subspecialty Status for IR
IR Patient Safety Checklist
Job Announcements
Drugs and Doses App
UEMS IR Division

CERTIFIED EXPERTISE - The European Board of Interventional Radiology

The European Board of Interventional Radiology has been running its successful course for 5 years now. To date, over 400 interventional radiologists hold this coveted qualification, and the number is steadily increasing. Examinations are always fully booked long before they take place.

Why take the EBIR?

Built on the pillars of scientifically proven assessment techniques, high-quality material and a dedicated steering committee, the examination has asserted itself as the internationally valued IR qualification that it set out to be.

Career Development

EBIR holders improve their career development, whether they take the examination right at the beginning of their tenure or further down the road. Employers can expect not only firm knowledge of the contents of the **European Curriculum and Syllabus of Interventional Radiology** which serves as the comprehensive guideline for the exam, but also certain skill sets and additional valuable competencies confirmed by trainers or supervisors.

Free movement

Supplemental to any national qualifications, the EBIR also aims to facilitate the free movement of IRs across Europe and even globally.

EBIR

European Board of Interventional Radiology

CESMA
UEMS

2017 UEMS-CESMA recognition

EBIR

European Board of Interventional Radiology

- IR Curriculum & Syllabus
- European Trainee Forum
- **EBIR**
  - General Information
  - EBIR Examination Council
  - How to apply - General
  - How to apply - IRSA
  - **How to prepare for the EBIR**
    - Recommended reading
    - Recommended online lectures
    - Sample questions and cases
  - EBIR Australia/New Zealand
  - Contribute to the EBIR
- CVIR
- ESIRonline
- CIRSE Guidelines

How to prepare for the EBIR

The European Board of Interventional Radiology is based on the **European Curriculum and Syllabus for Interventional Radiology**.

Recommended reading

Recommended lectures from CIRSE events and courses on ESIRonline

Sample questions and cases

INFOS UTILES: CIRSE GROUP MEMBERSHIP !

>115 Group Memberships **offered** through the IR section of the BSR
→ *15-20 reserved for « Juniors » / Radiologists in training !*

How to get your *free* CIRSE Membership?
! You must be a BSR member
! Send an email to both your French and Flemish representatives:
- including all required contact information
- your status “junior” (in training radiologist).

Advantages:
1- CVIR Journal free access 2- CIRSE/ECIO/GEST congresses reduced fees
3- ESIR Online education full access 4- EBIR appliance 5- CIRSE opportunities

CIRSE

BELGIAN SOCIETY OF RADIOLOGY

MERITMEDICAL®
Understand. Innovate. Deliver.™

Techniques d'embolisation et indication spécifiques

1. Concept, indications générales et sélections des patients
2. Techniques d'embolisation et matériaux disponibles
3. Coûts et remboursements
4. OncoRI: chimio-embolisation (TACE), radio-embolisation (TARE/SIRT), embolisation portale (+/- sus-hépatique)
5. Embolisation prostatique, fibromes utérins et autres indications actuelles (pré-op tumoral, épistaxis, varicocèles/v.utérines…)
6. Futur / indications émergentes (hémorroïdes, bariatrique) ?

Cf. cours oncoRI (M.Vouche)

1- EMBOLISATION: CONCEPTS

- Embolisation = occlusion vasculaire
- Buts: hémorragies, (pseudo)anévrysmes / MAV/FAV, dévascularisation tumorale (+/- action locale additionnelle)
- Embolisations proximales vs distales
- Sous guidage RX (c-arm CBCT) (>>> US: pseudoanévrysme AFC R/thrombine)
- Abord vasculaire par cathétérisme (>>> ponction directe)
- Complications:
  - Liées à la ponction et au cathétérisme
  - Liées au produit de contraste iodé / liées aux RX
  - Spécifiques: ISCHEMIE et EMBOLISATION non dirigée !

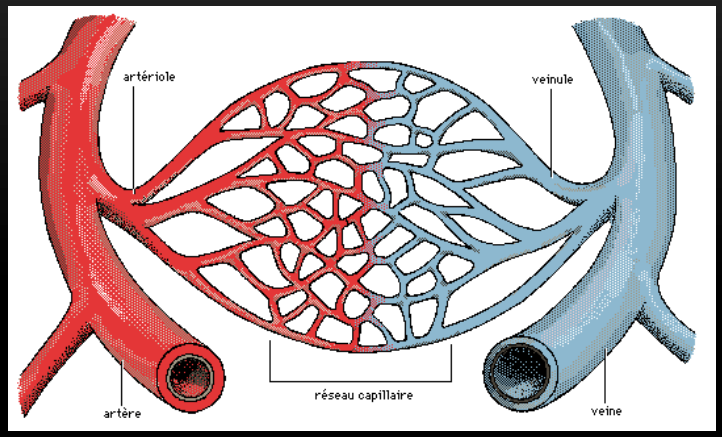
1- EMBOLISATION: HEMORRAGIES

- Potentiellement TOUT ce qui saigne peut s'emboliser
- Indications: saignements ACTIFS → démontrés par imagerie idéalement

- Conseil: TOUJOURS réaliser un CT injecté multiphasique AVANT EMBOLISATION !
  - Le CT multiphasique est nettement plus sensible que l'artério *non sélective* (= validation de l'indication), en particulier en phase portale/tardive
  - CT non injecté (1ère phase): DD blush contraste vs autres hyperdensités sur les phases suivante + détection occasionnelle du « caillot sentinelle »
  - Le CTA permet le plus souvent d'identifier l'artère responsable du saignement et ses connexions anatomiques (! Variantes) = gain de temps et efficacité
  - On n'embolise que les hémorragies artérielles avec blush visible à l'artério sélective (exception éventuelle: bassin polytrauma – visée hémodynamique)
  - (exception au CT préalable: TIPPS pour hémorragie sur varices gastro-œsophagiennes, et épistaxis)

2- EMBOLISATION: TECHNIQUES ET MATÉRIAUX

Types d'embolisation:	*Agents d'embolisation:*
• Proximale	Coils (2-20mm), plugs (3-25mm)
	Collagène (Spongel)
• Distale	Onyx 34
	n-butyl 2-cyanoacrylate (NBCA) + Lipiodol (2:1)
	Onyx 18
	Poudre de collagène (Hemostat)
• Tissulaire	n-butyl 2-cyanoacrylate (NBCA) + Lipiodol (10:1)
	Micro-particules (40-1000 µm)

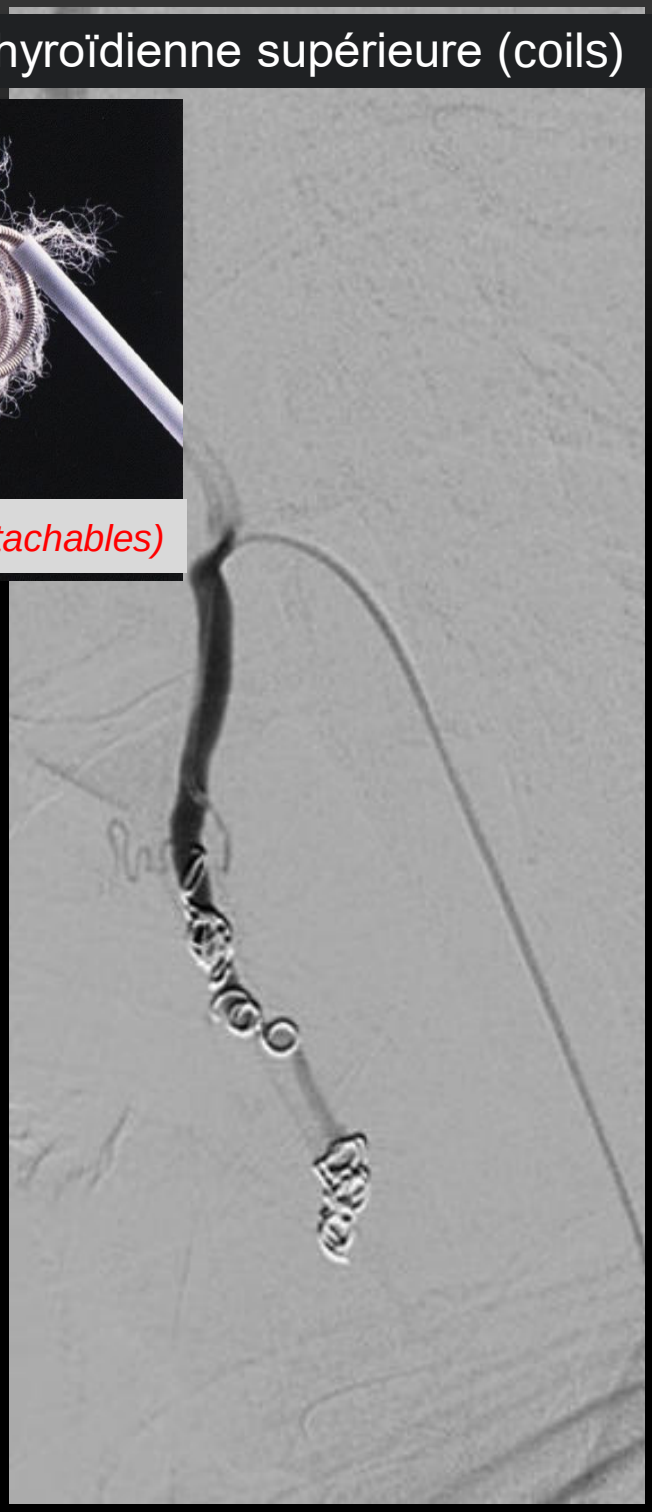


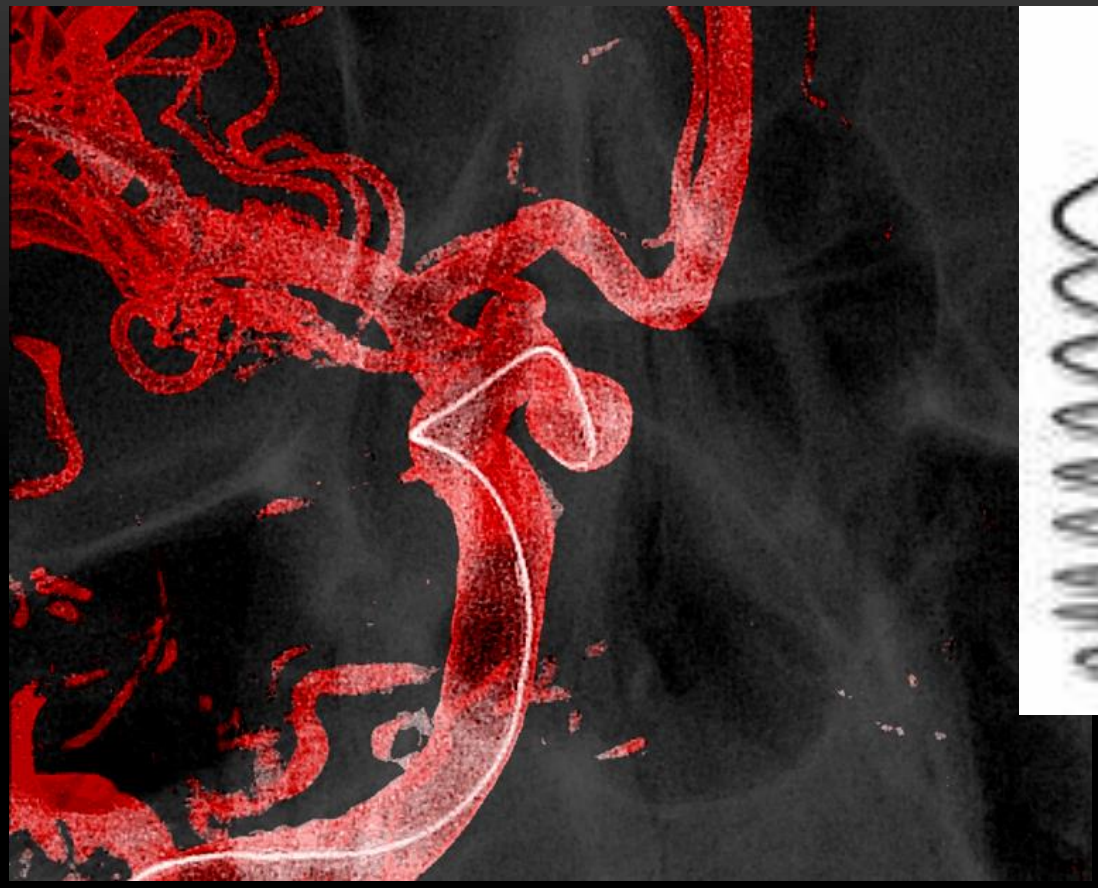
! Variation: selon débit sanguin, selon taille matériel, flux libre vs bloqué

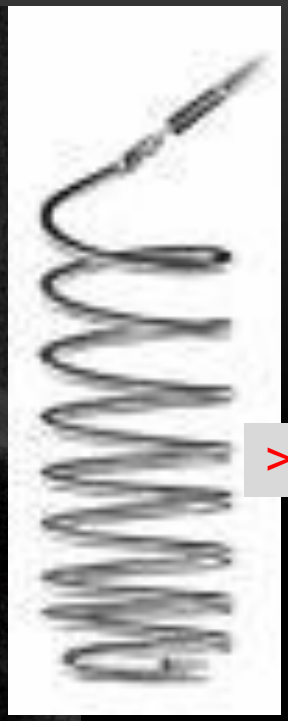
Embolisation de l’artère thyroïdienne supérieure (coils)

35-150 €

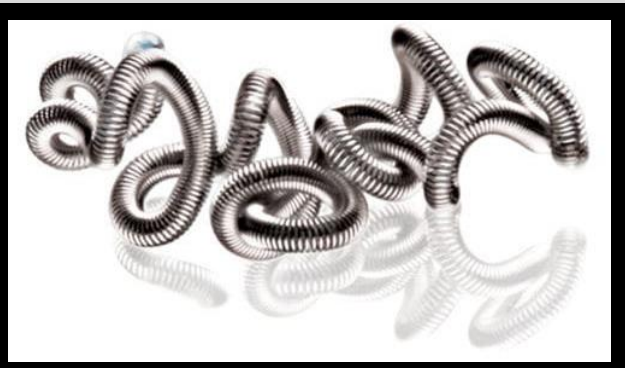
250-450€ (détachables)

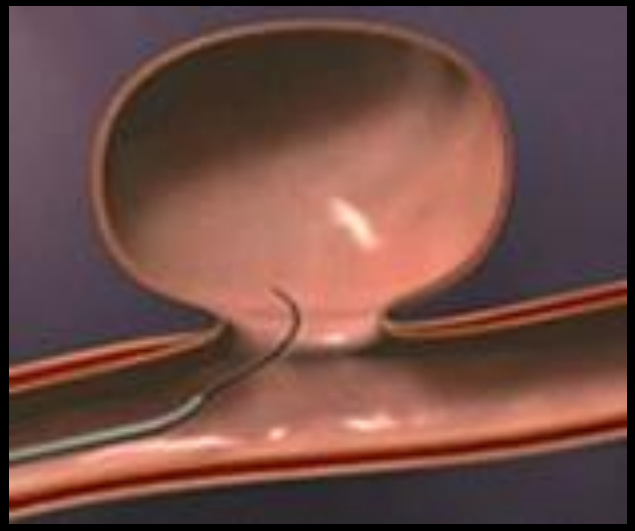


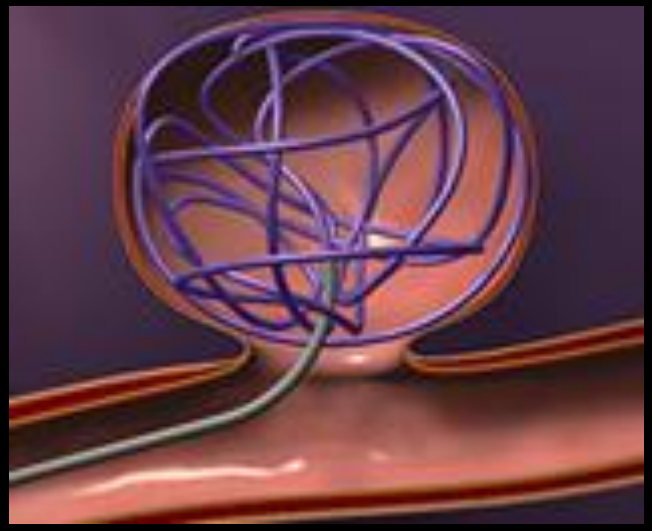


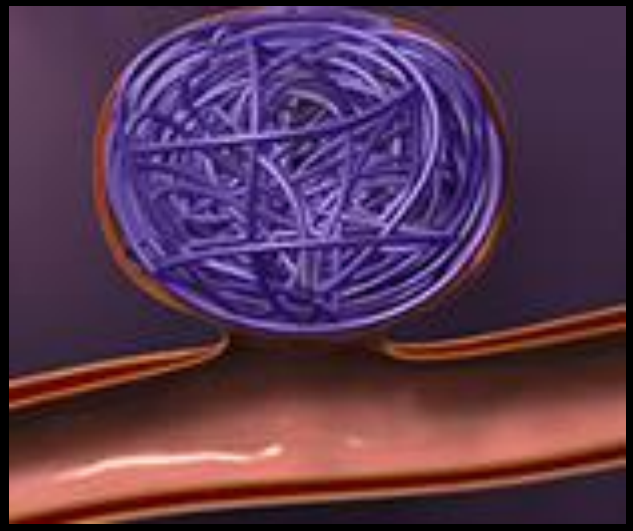


> 1000 € (neuro, détachables)



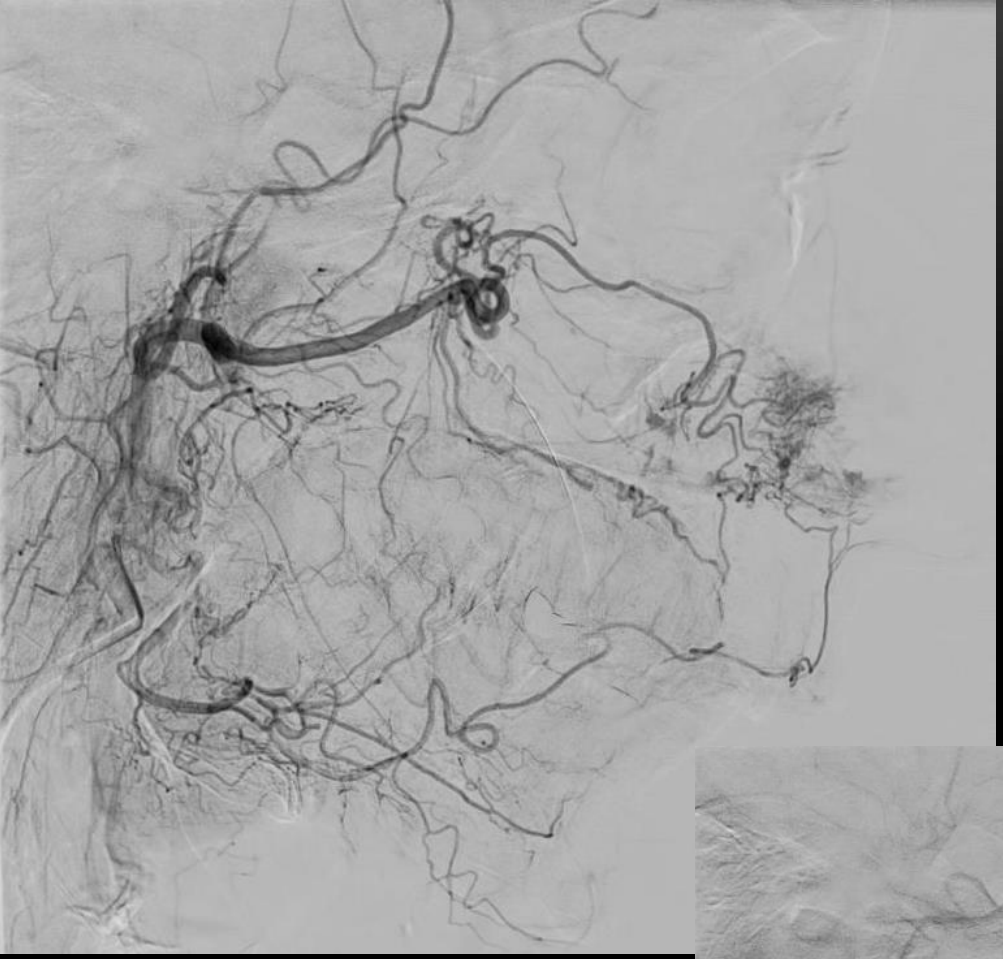


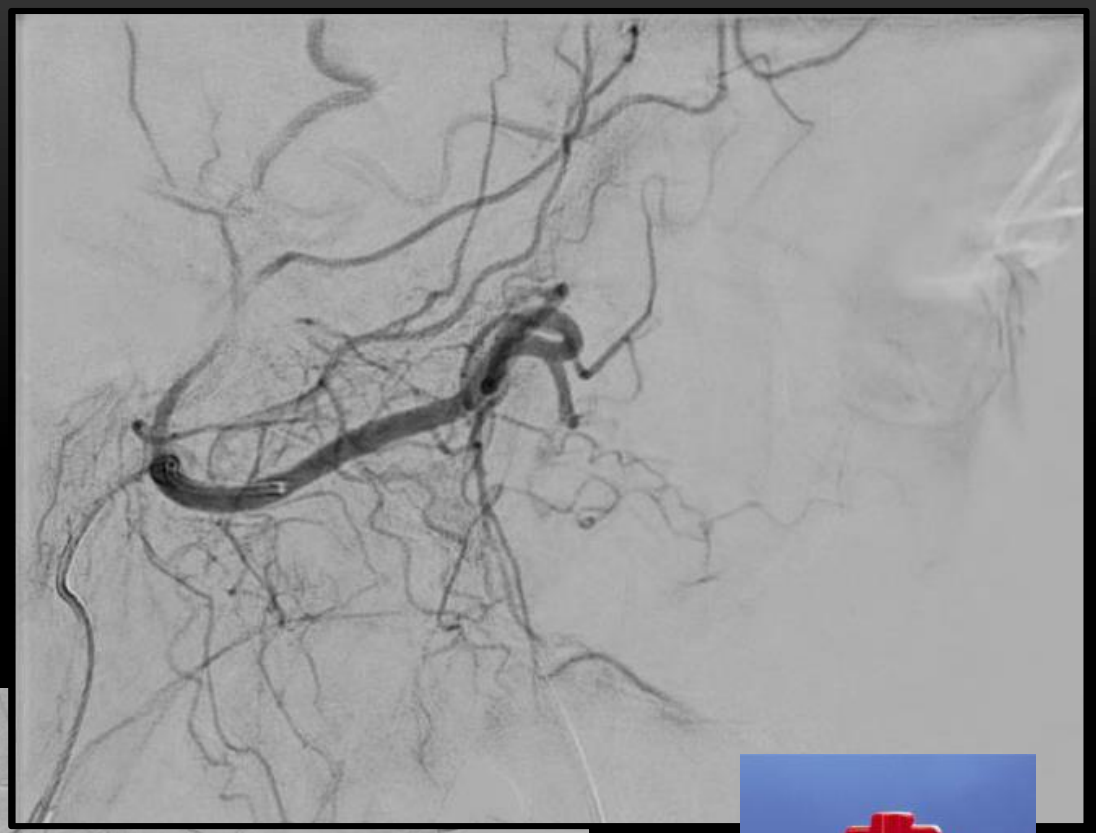


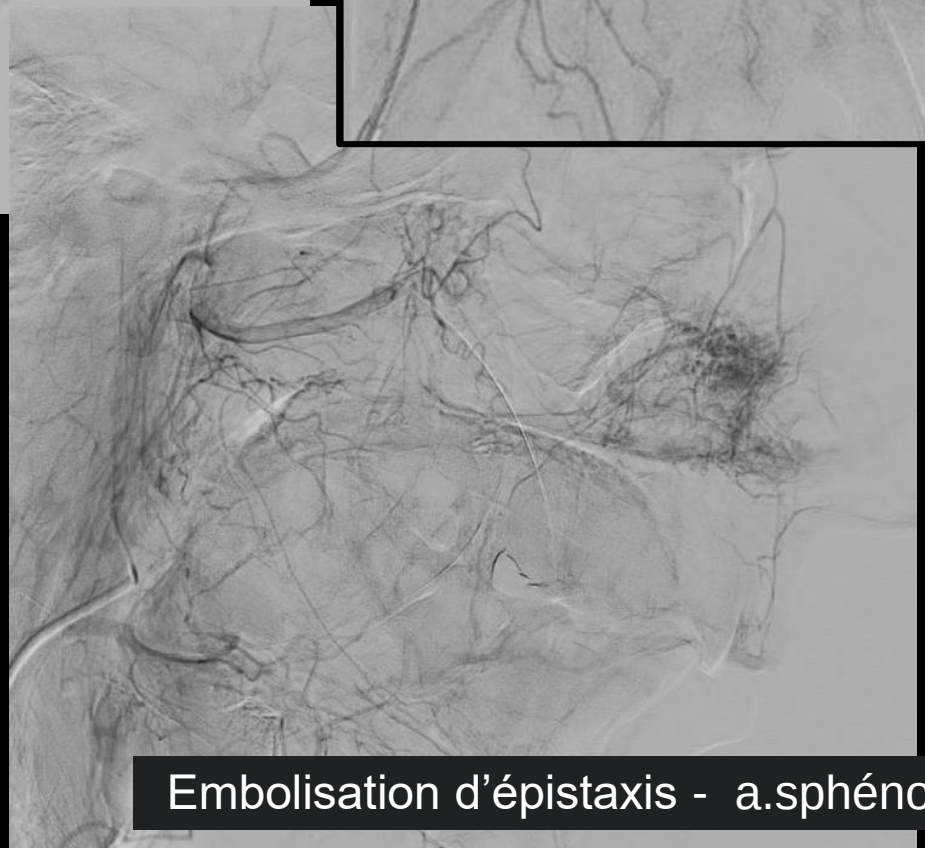


Hydro-coils (poussables ou détachables)

450 € (détachables)

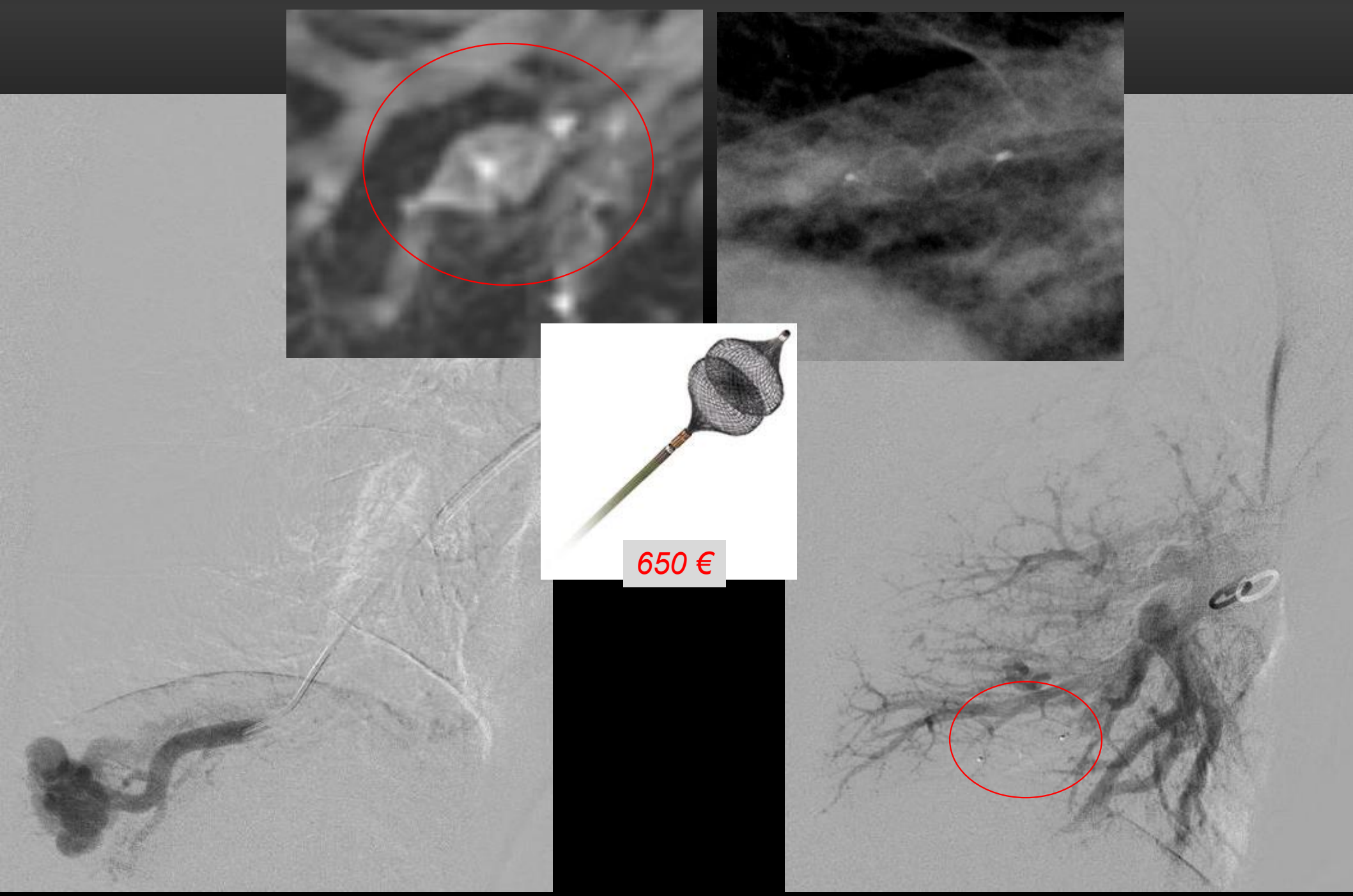




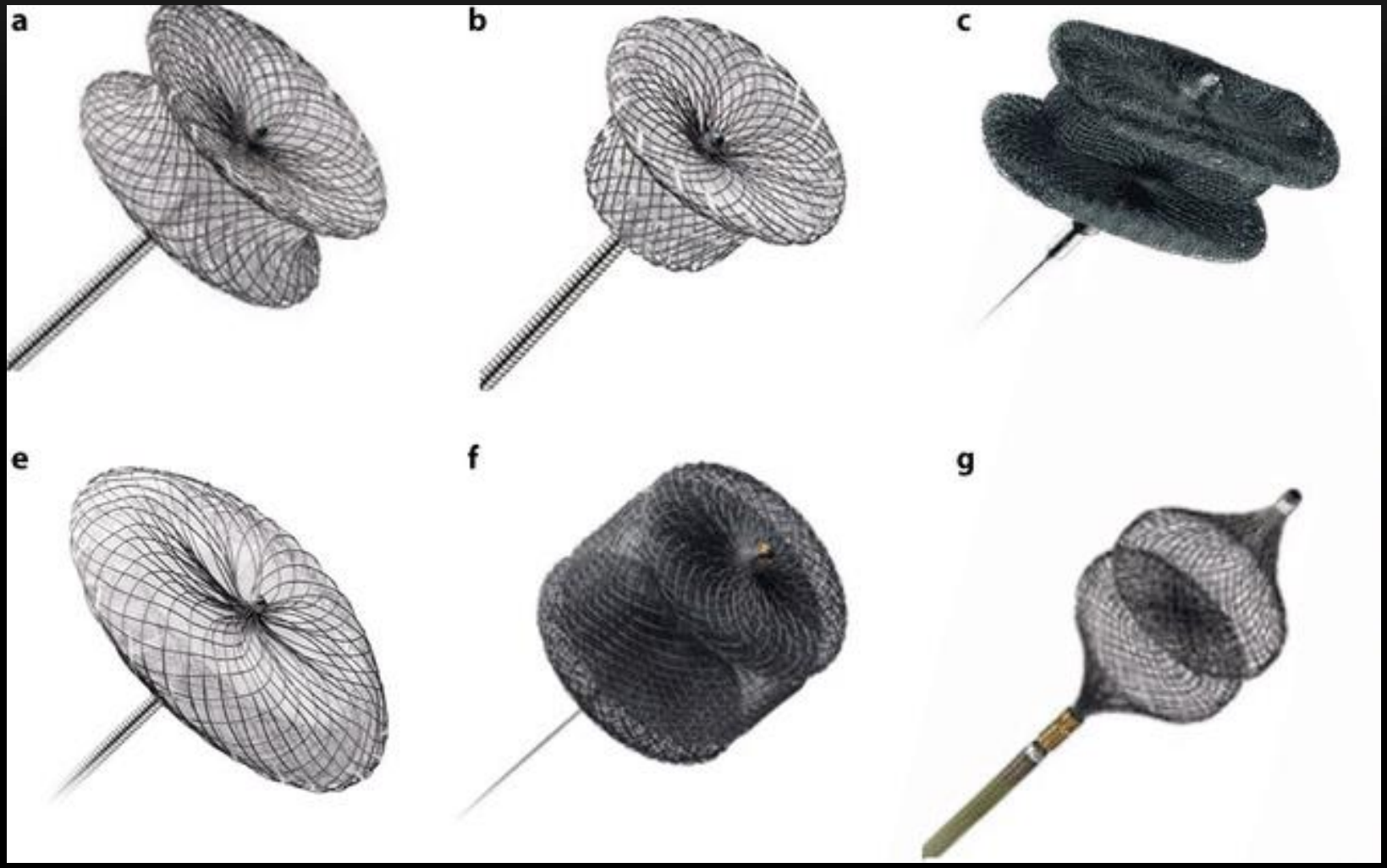


100 €

Embolisation d'épistaxis - a.sphénopalatine (µ-particules)



Embolisation d’une MAV pulmonaire (Amplazer plug 4)


a
b
c
e
f
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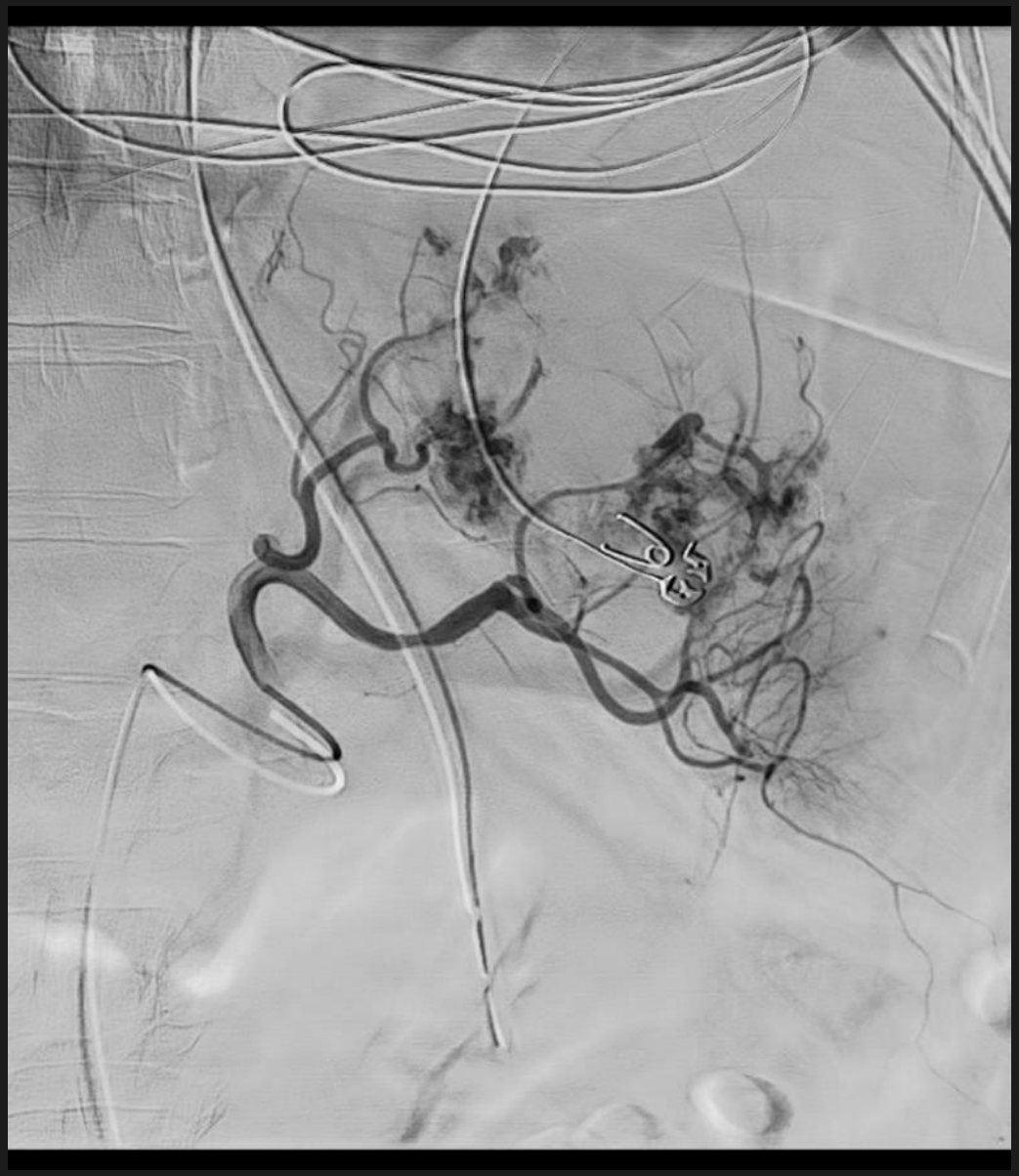
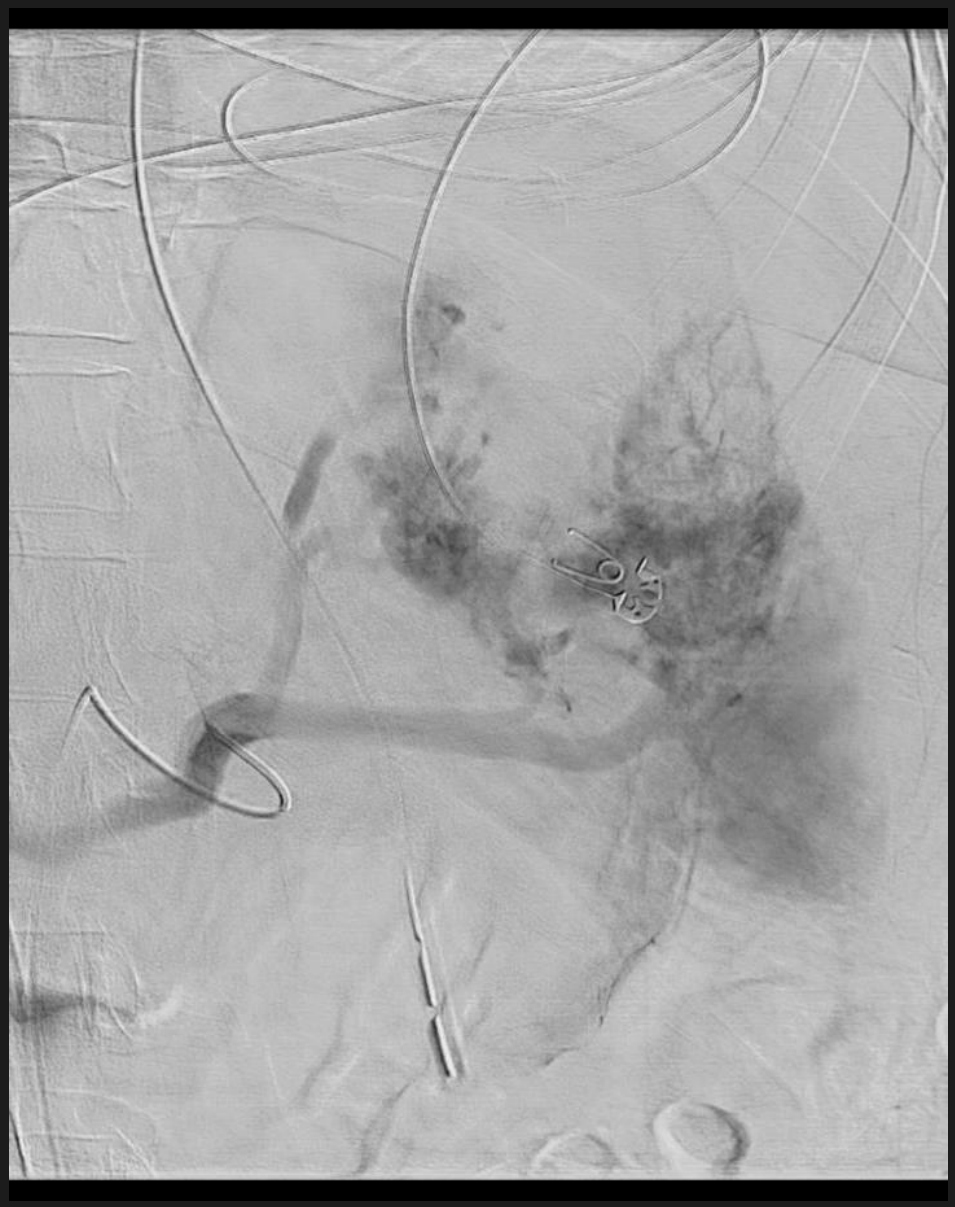
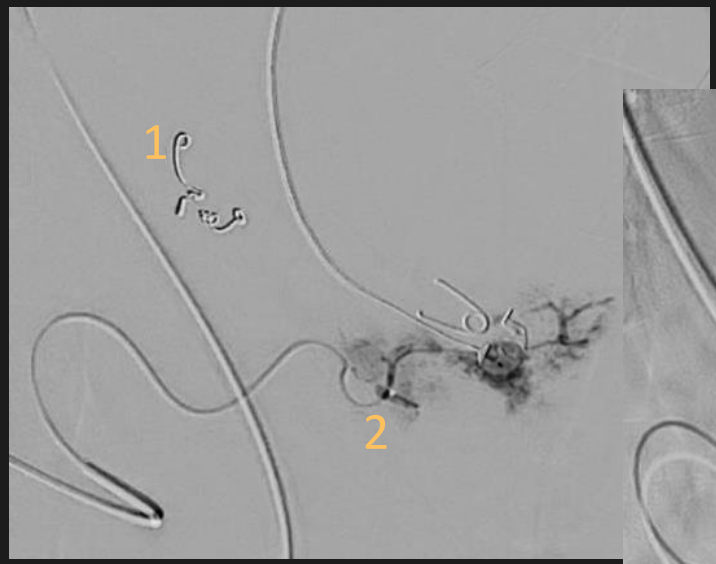
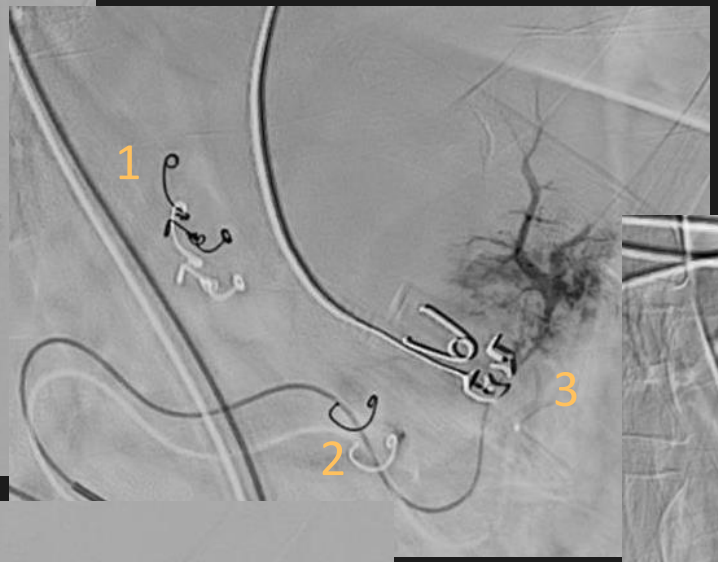


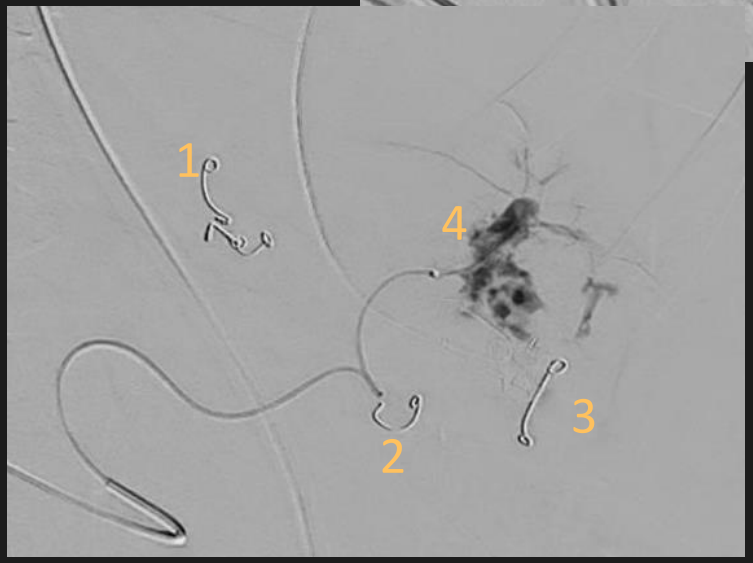


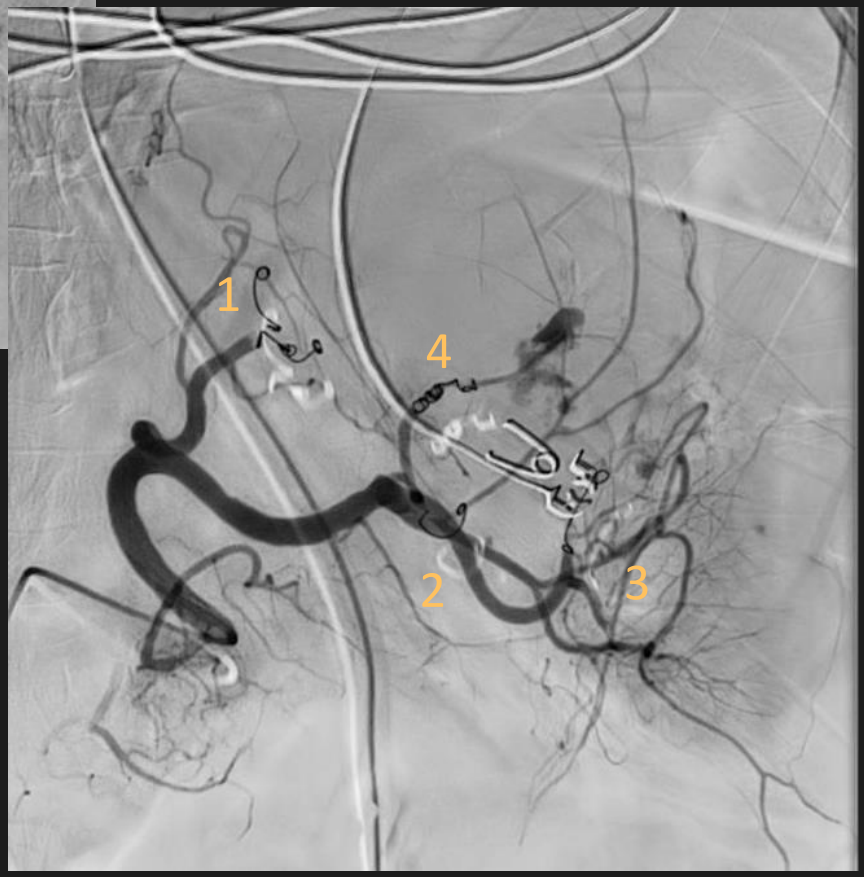
Embolisation d’un trauma splénique avec multiples blush

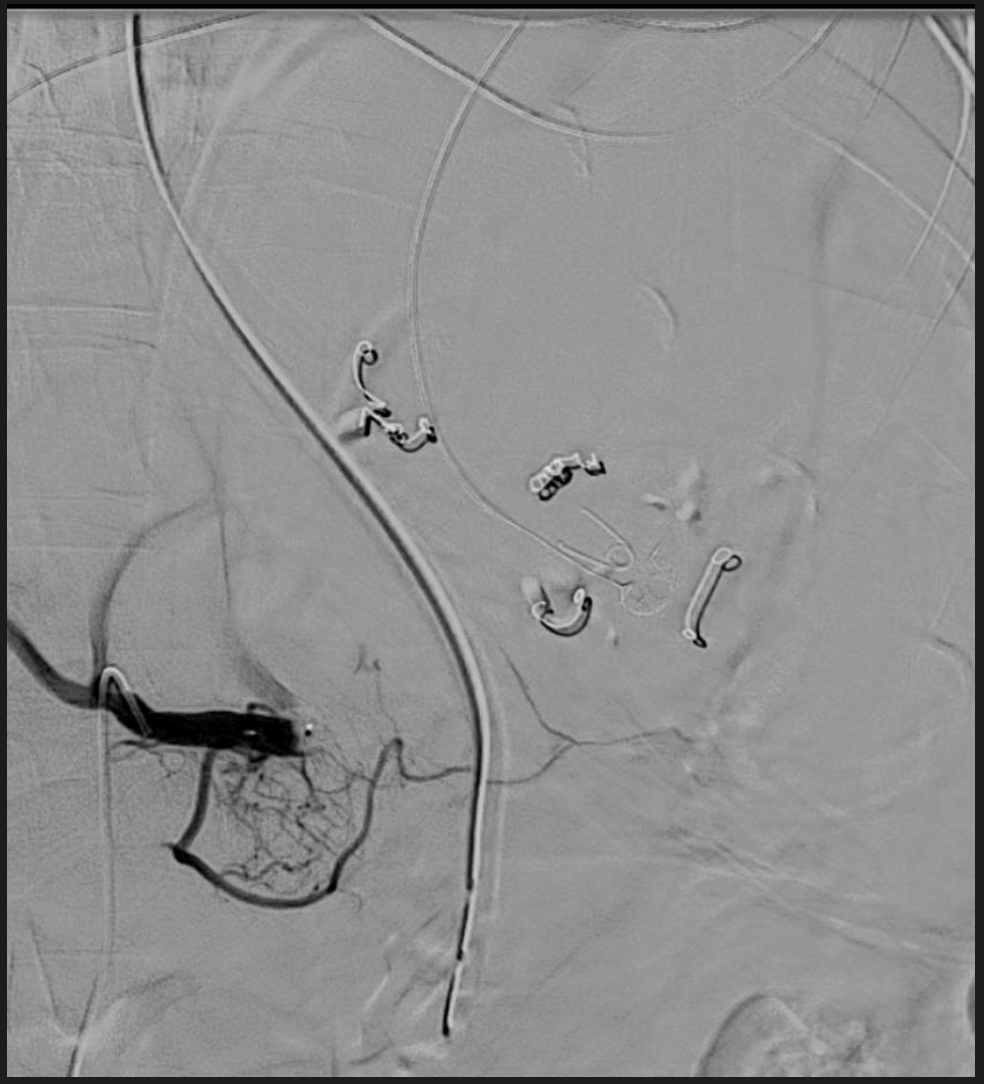
µcoils 0,018 poussables

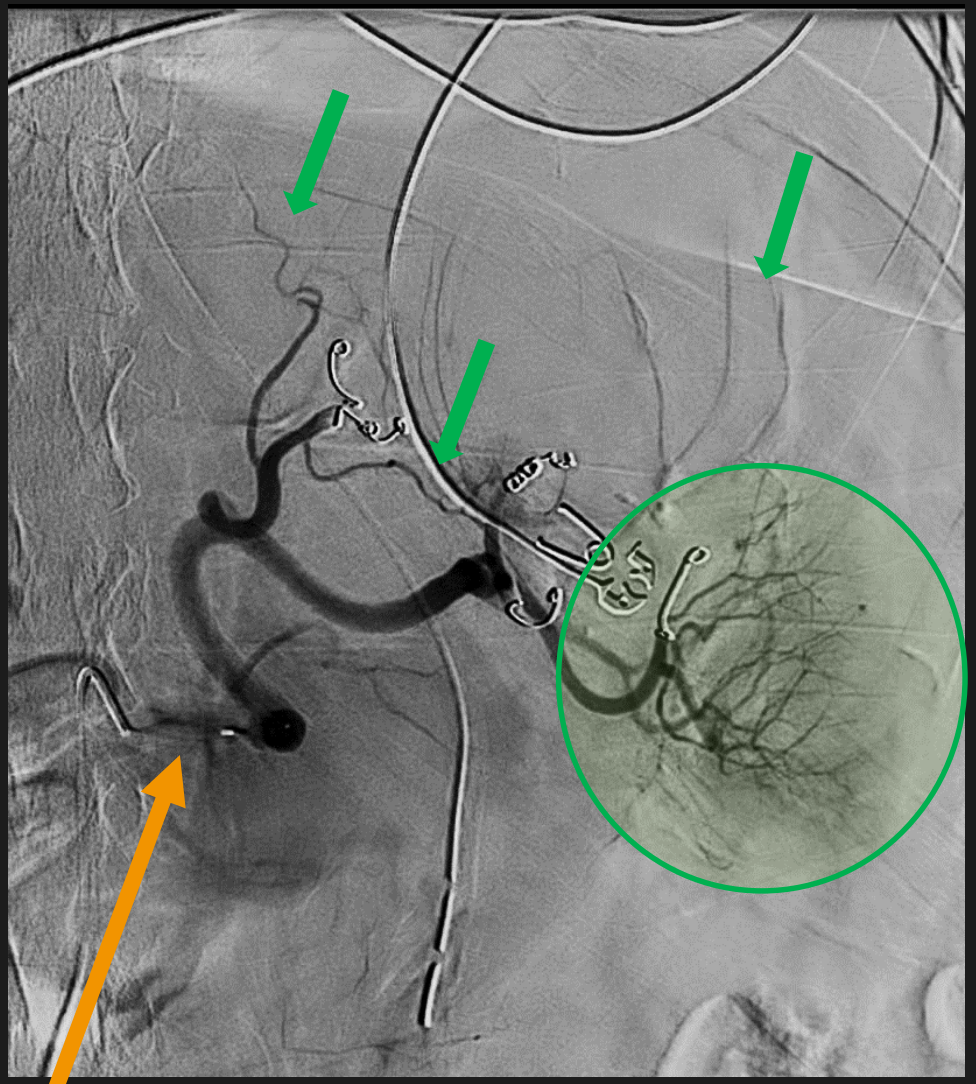











Plug 8mm

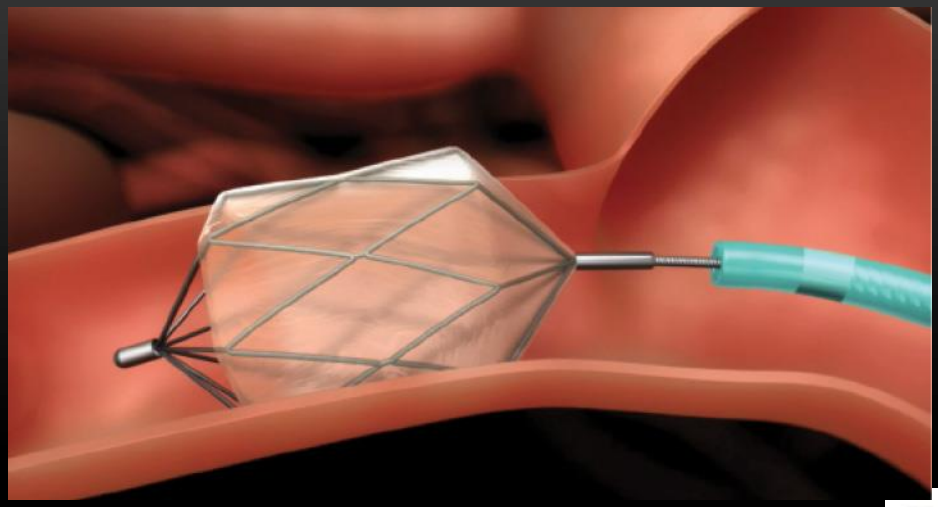
EMBOLISATION SPLÉNIQUE: PROXIMALE OU DISTALE ?

- Embolisation trop **distale**: risque ++ de **nécrose → abcédation**
- Embolisation **proximale**: suffit, en théorie… Reprise très compliquée (via la gastrique gauche) ?

- **Eviter les agents d'embolisation distale**: PVA, particules, glue…

- BUT: conserver du tissu splénique fonctionnel (éviter l'asplénie et ses complications: infections, vaccins…)

- *Ma préférence*: embolisation **mixte**
  - «Sub»-embolisation *distale par µcoils* des branches présentant de larges blushs (absence de tissus viables en aval)
  - Embolisation *proximale de sécurité par plug* ou coils compactés



850 €

Diamètres: 3-5-9 mm

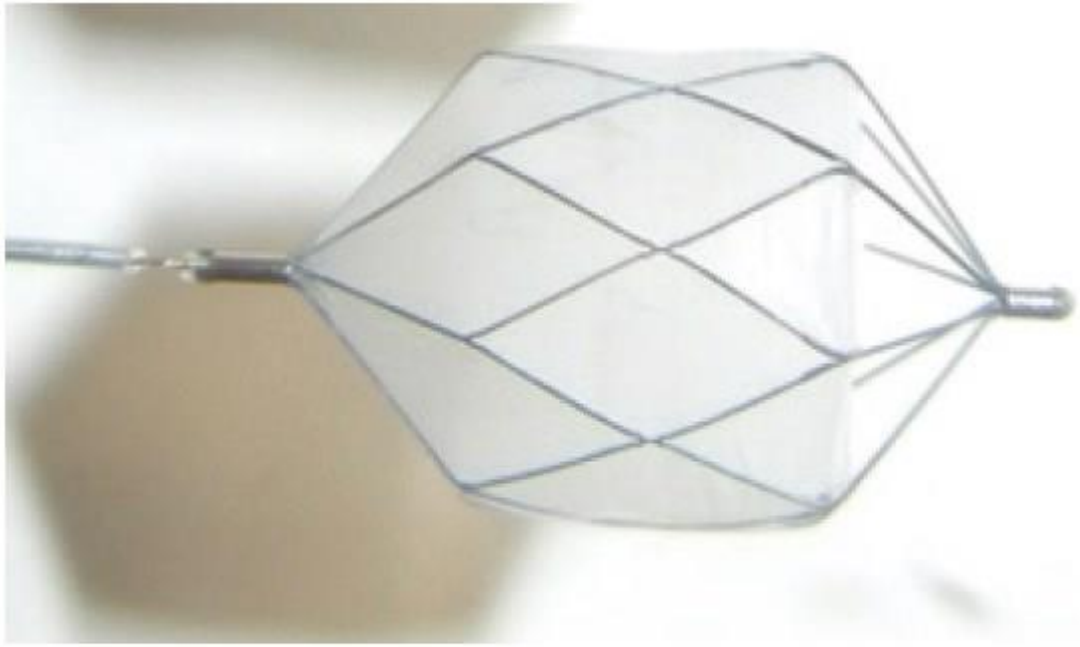
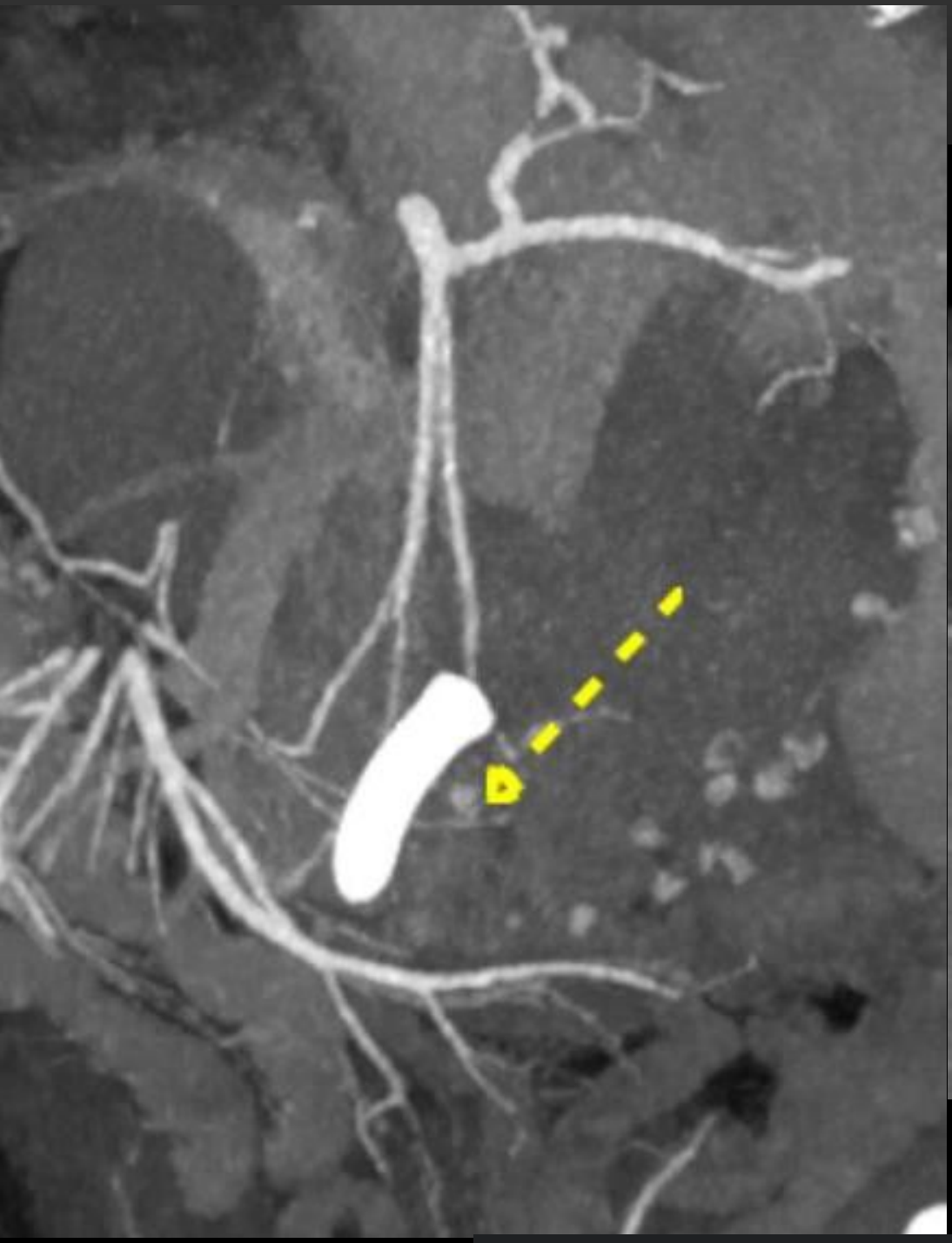
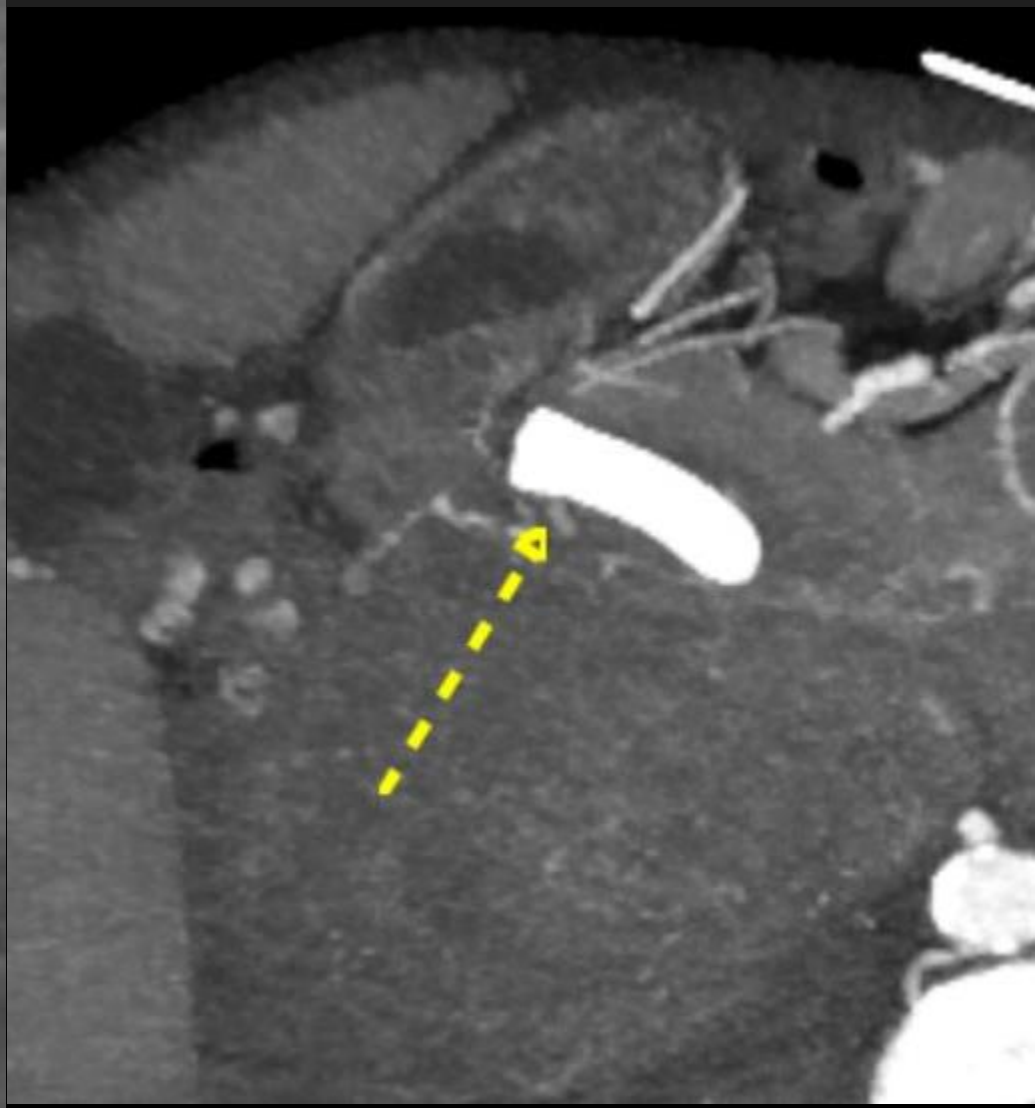
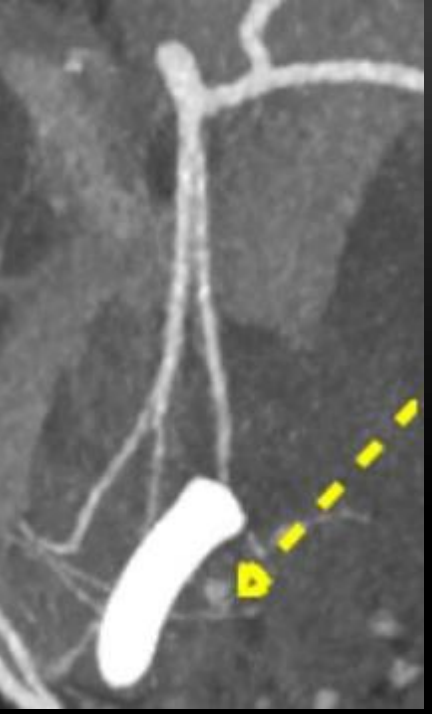


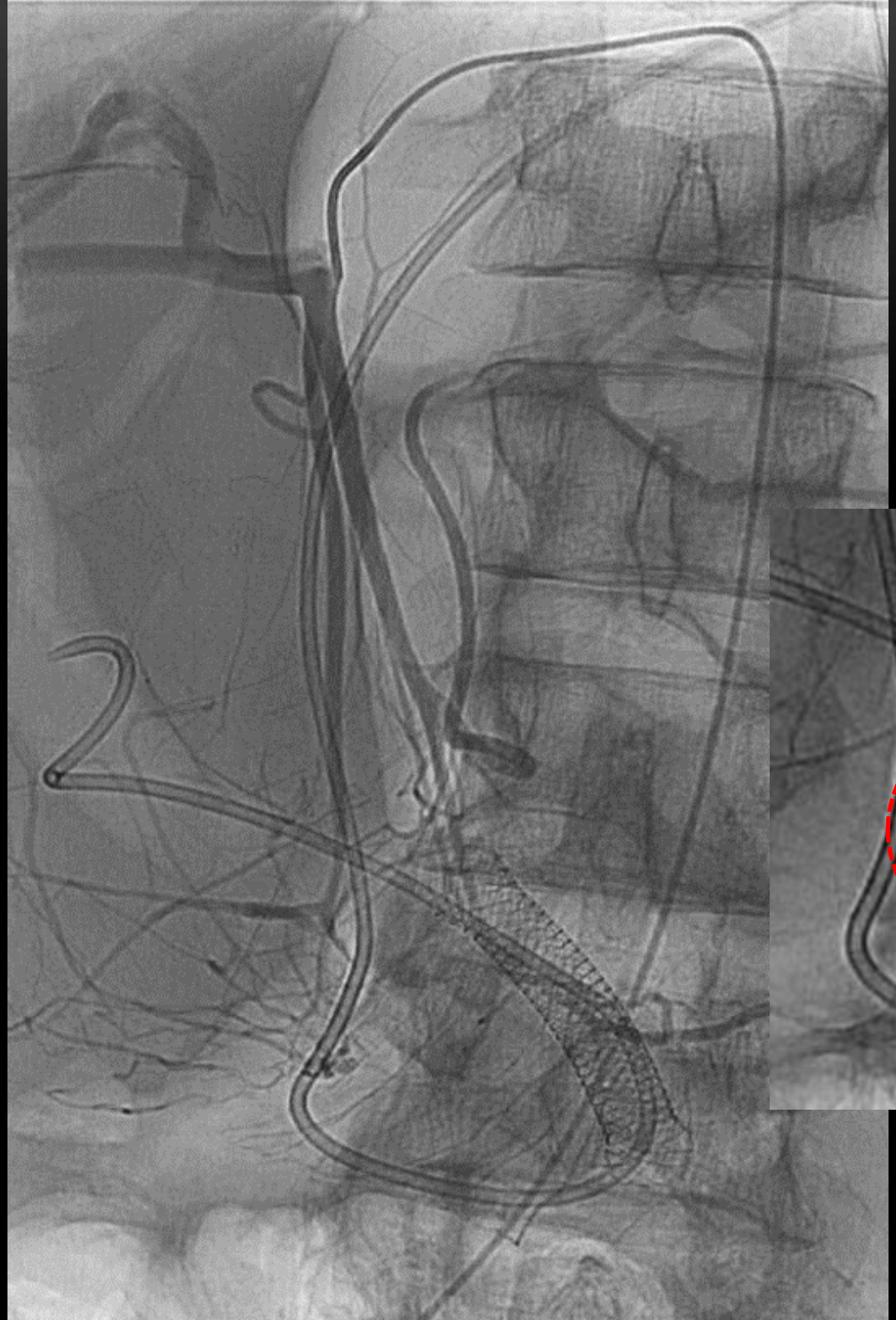
Figure 1. The MVP™ plug, composed of nitinol and covered by a PTFE membrane at the proximal portion, is designed for immediate vascular occlusion. Reprinted with permission from Medtronic.

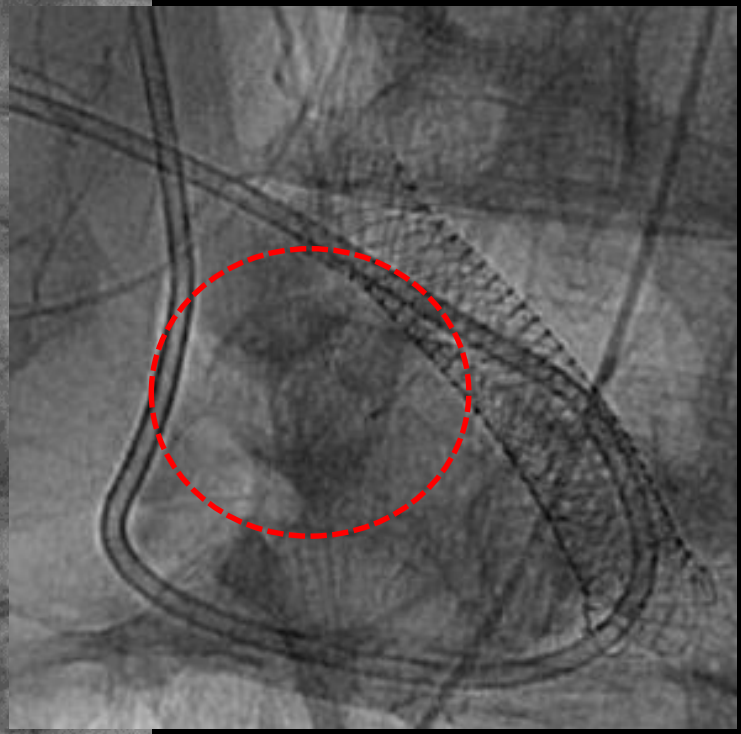


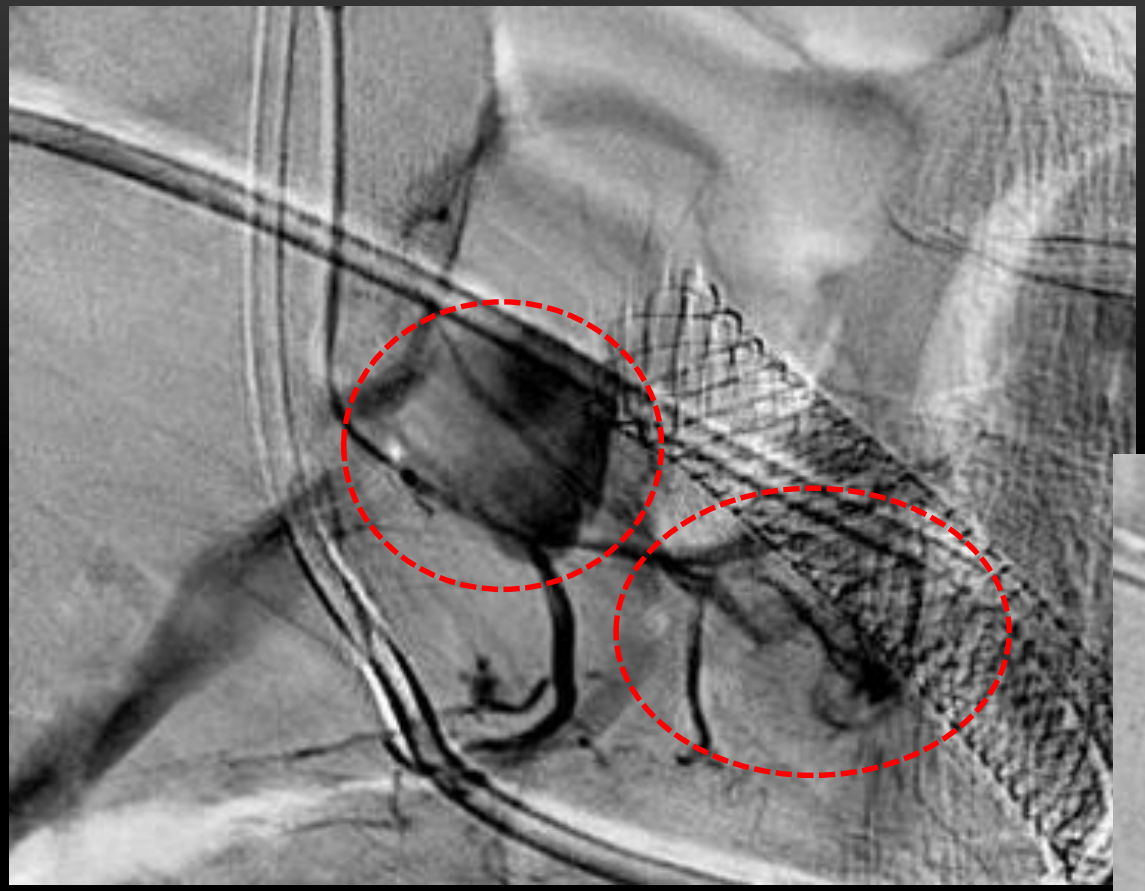


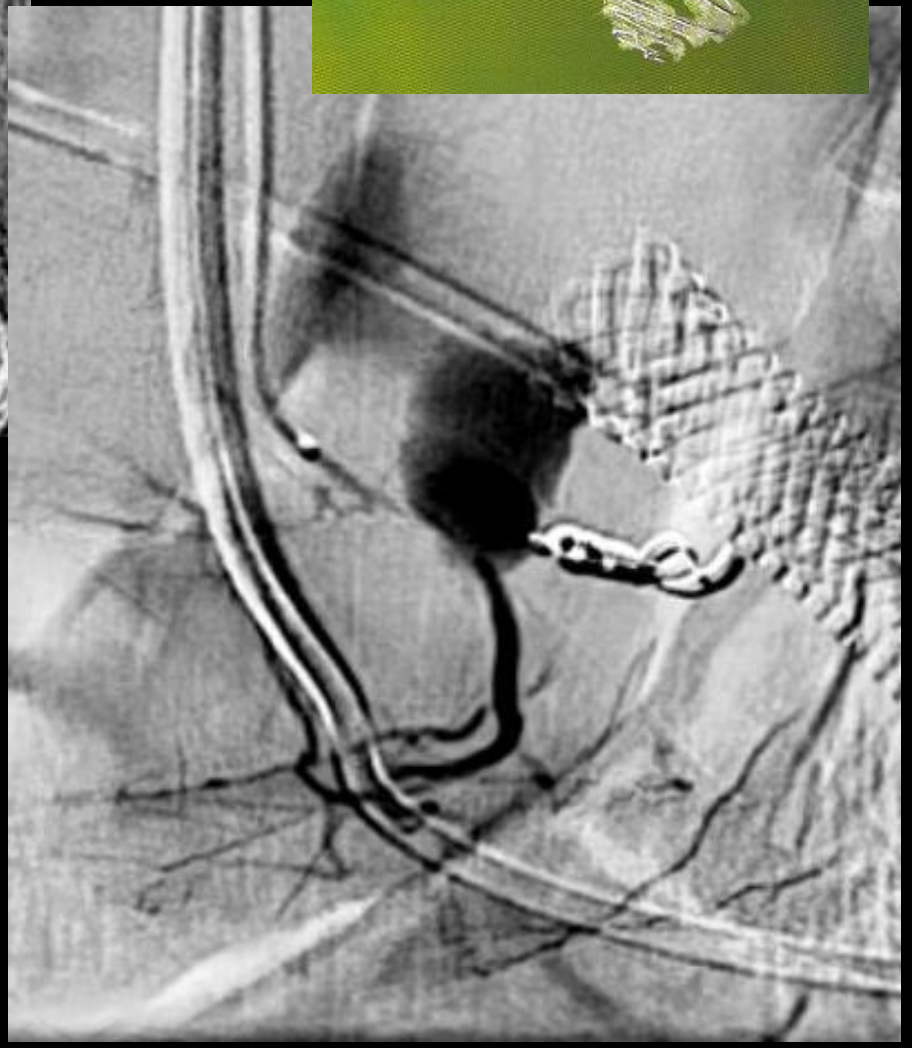
Pseudoanévrysme d’une branche gastro-duodénale (post ERCP)

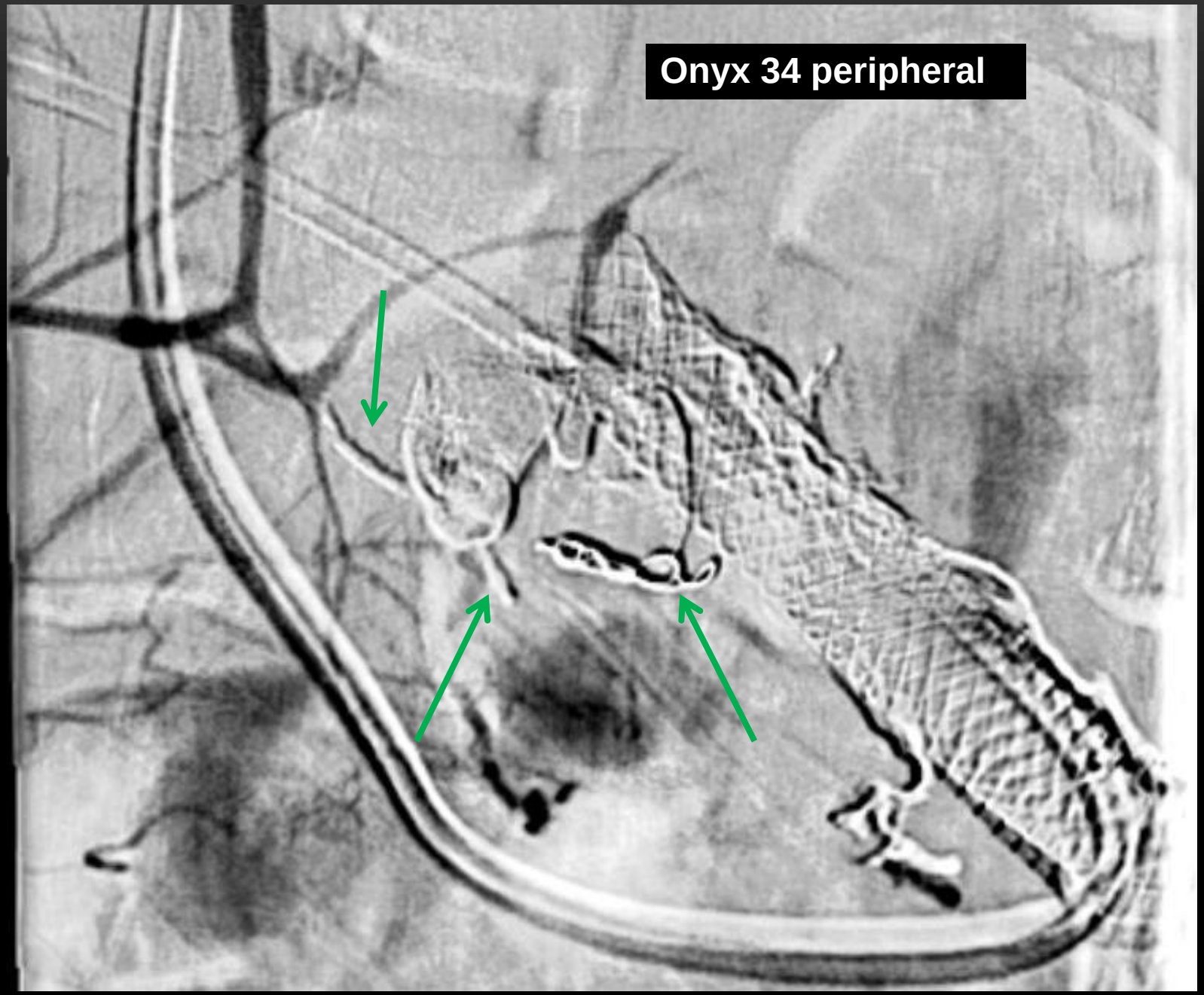












650 € / 1,4cc

Pseudo-anévrysmes vs anévrysmes

- PAS de paroi réelle (rupture intima et média)

- Embolisation: **« en sandwich »**

= artère afférente ET efférente ! (+++ réseau vicariant, type splanchnique)

- Coils, plugs et/ou Onyx

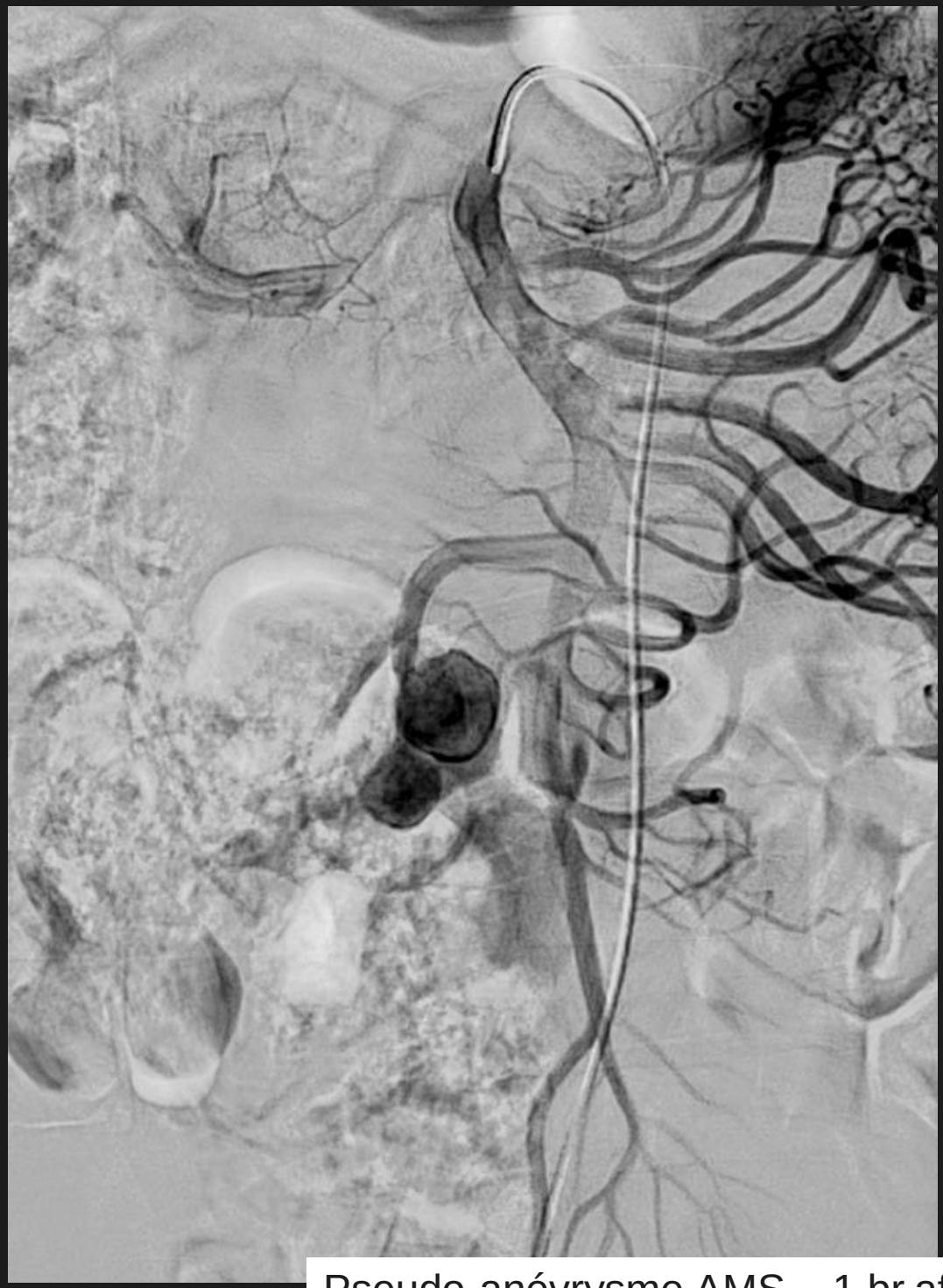
- Variantes:
  - Thrombose par injection de thrombine (AFC)
  - Exclusion par stent couvert (! Si mycotique)

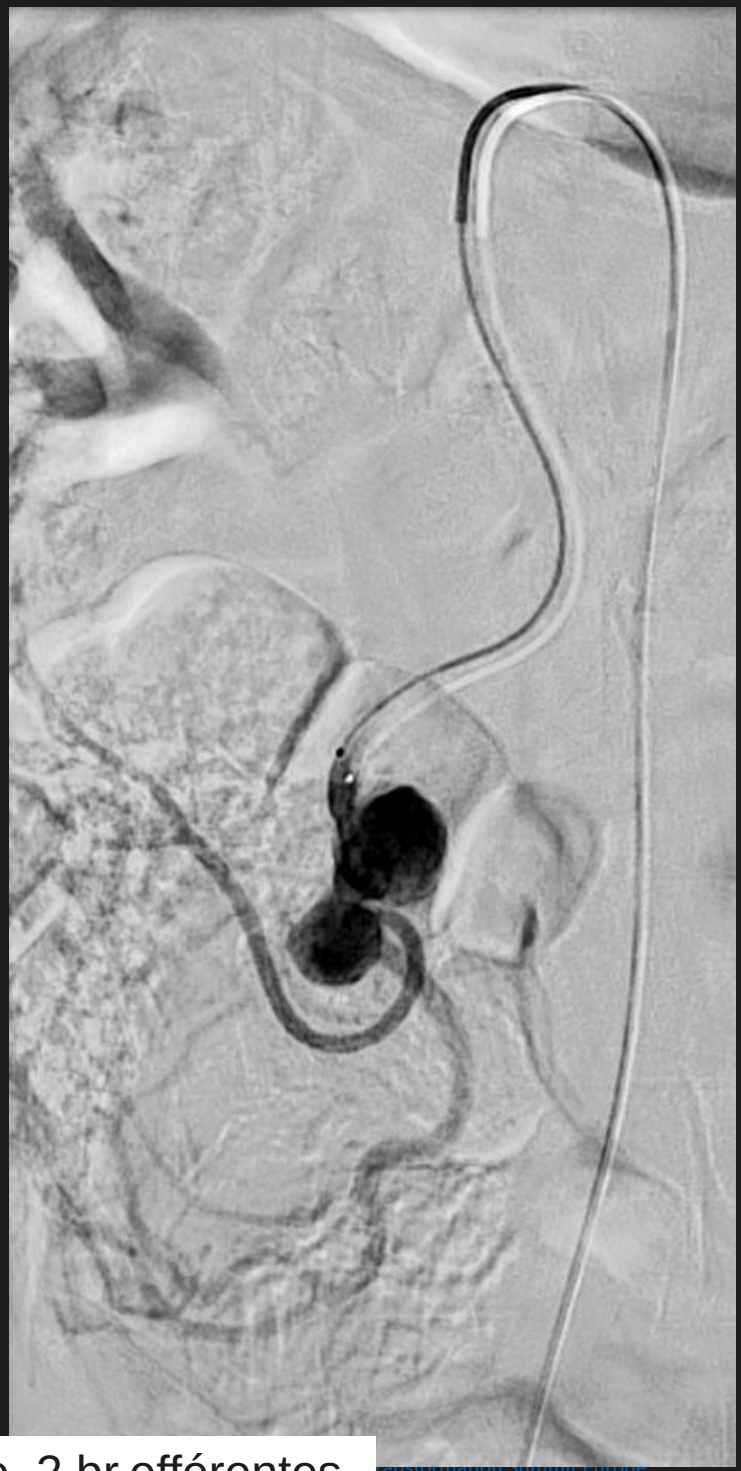
- Paroi artérielle conservée

- Embolisation: **de l'anévrysme**

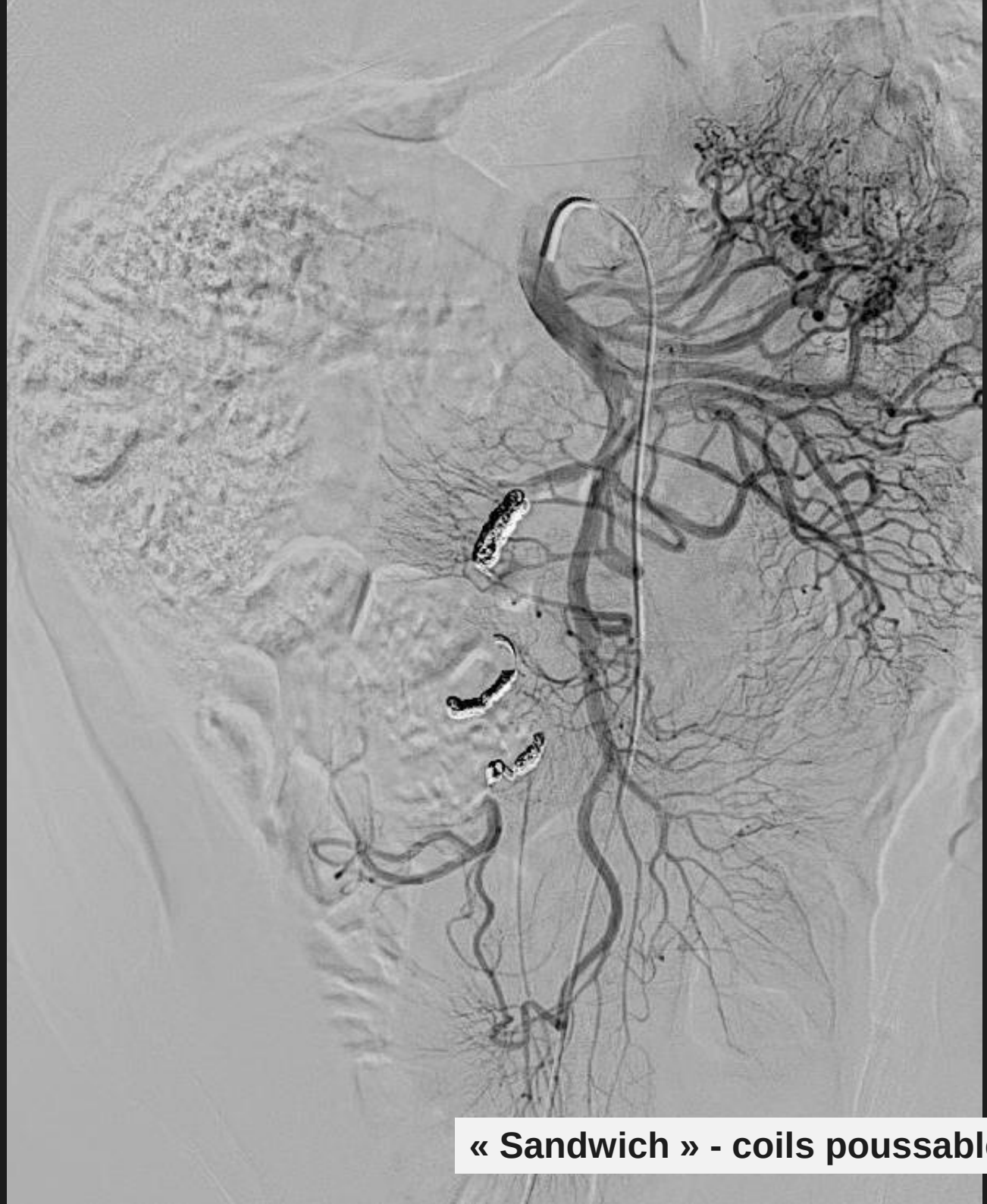
= préserver l'artère porteuse si possible

- Si sacciforme: coils
- Si fusiforme: stent couvert

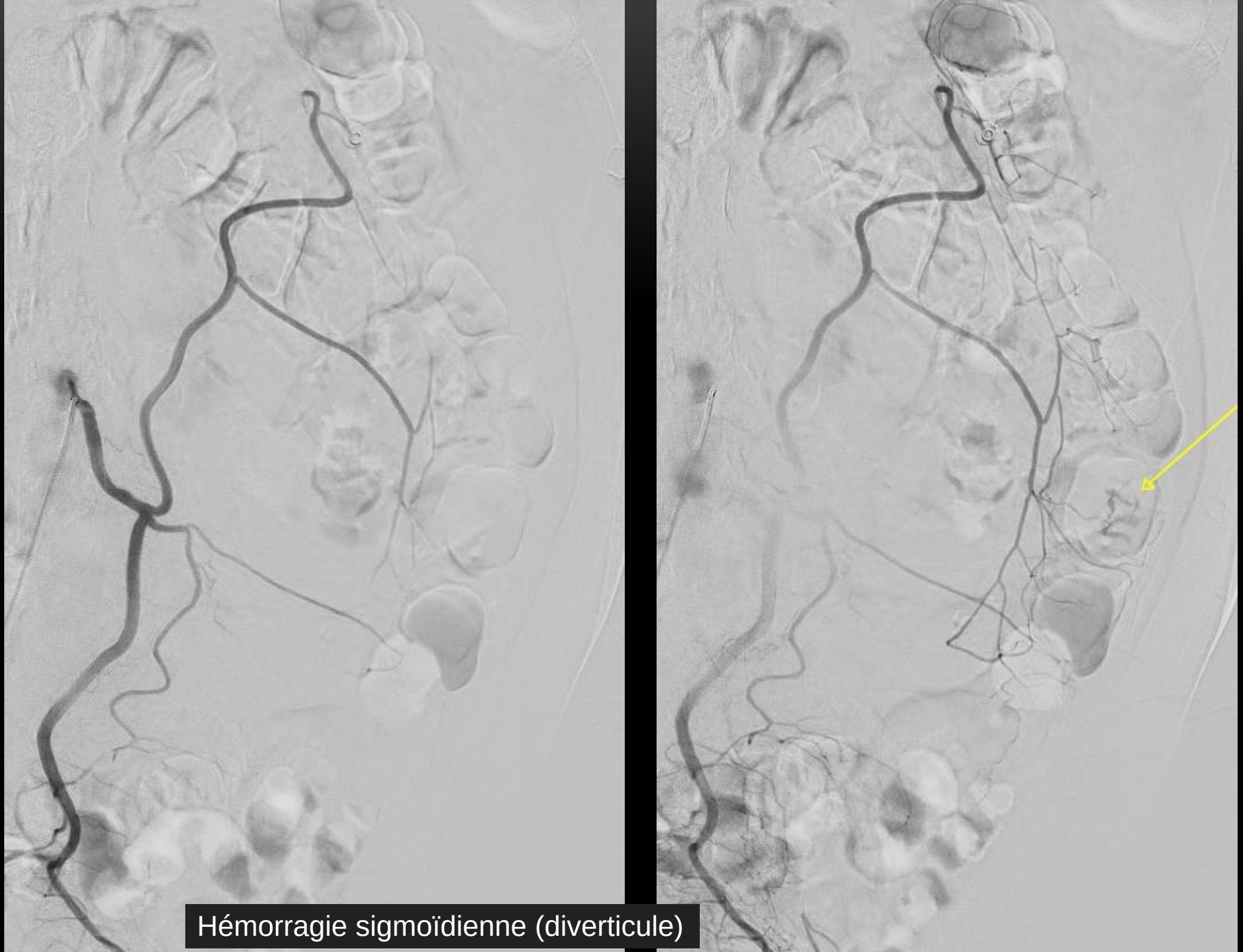




Pseudo-anévrysme AMS – 1 br.afférente, 2 br.efférentes

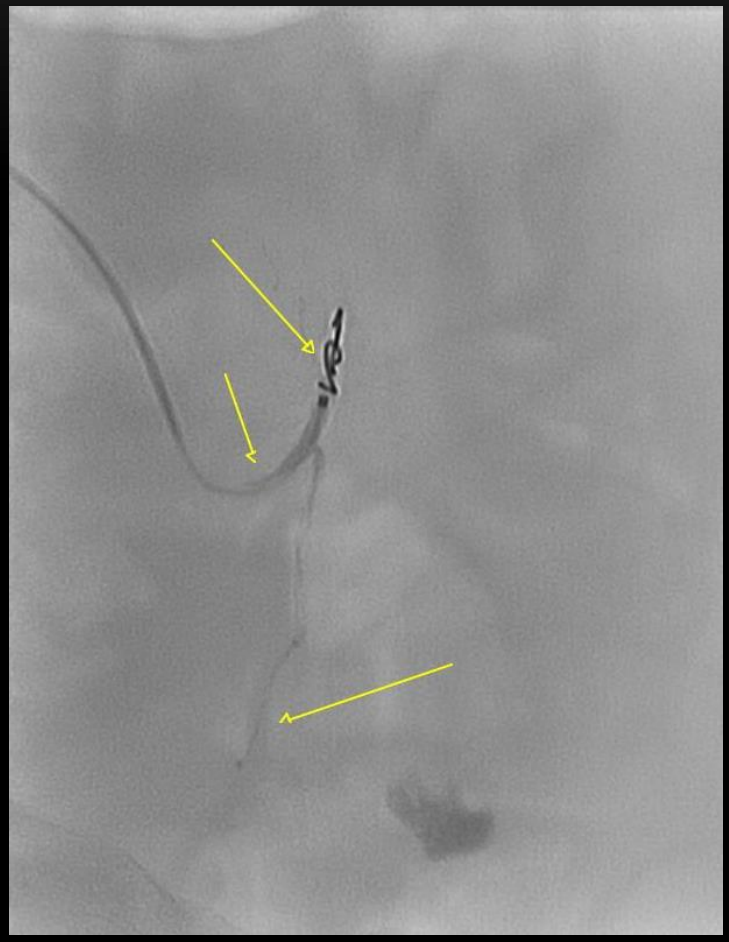


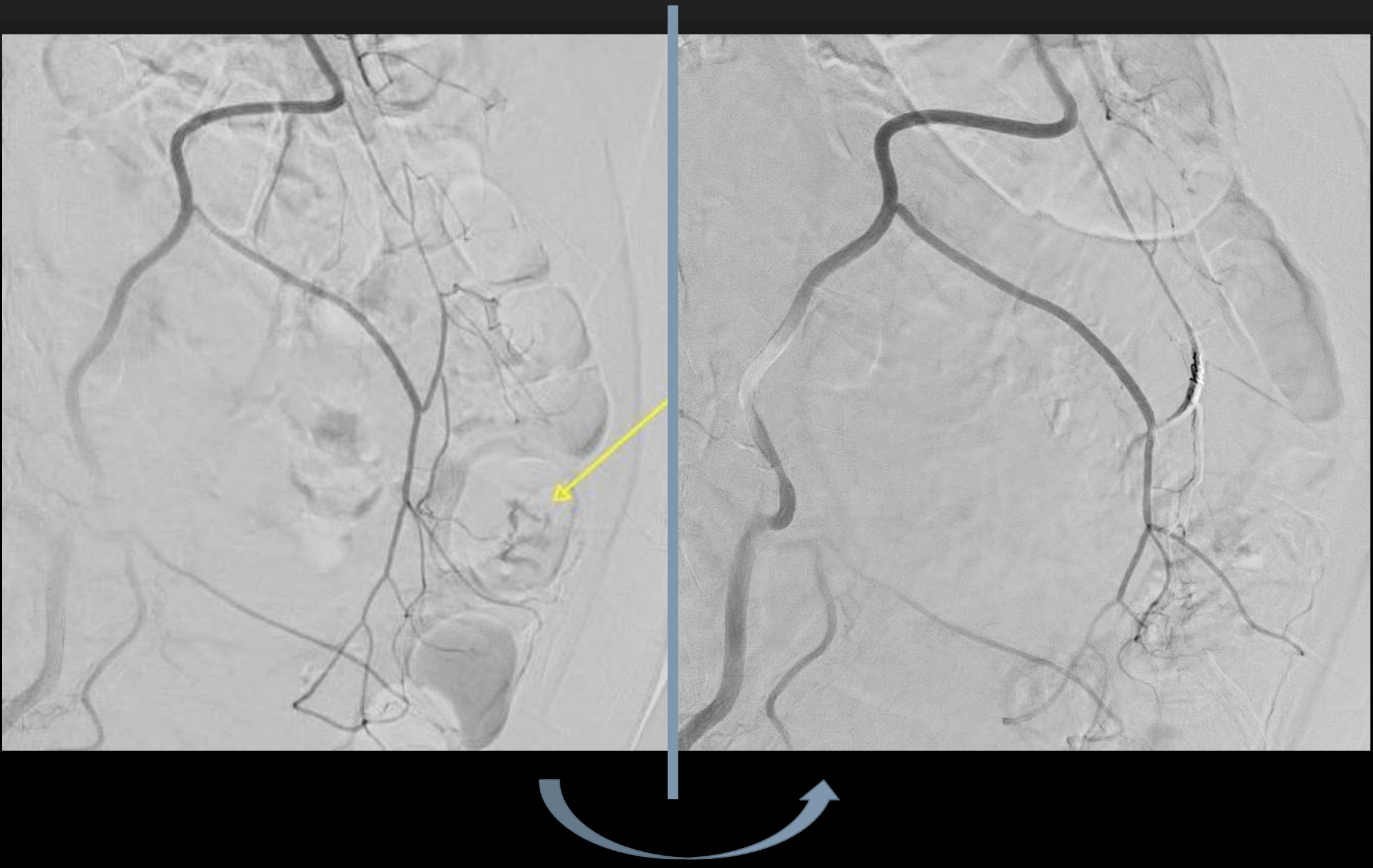
« Sandwich » - coils poussables + détachables



Hémorragie sigmoïdienne (diverticule)

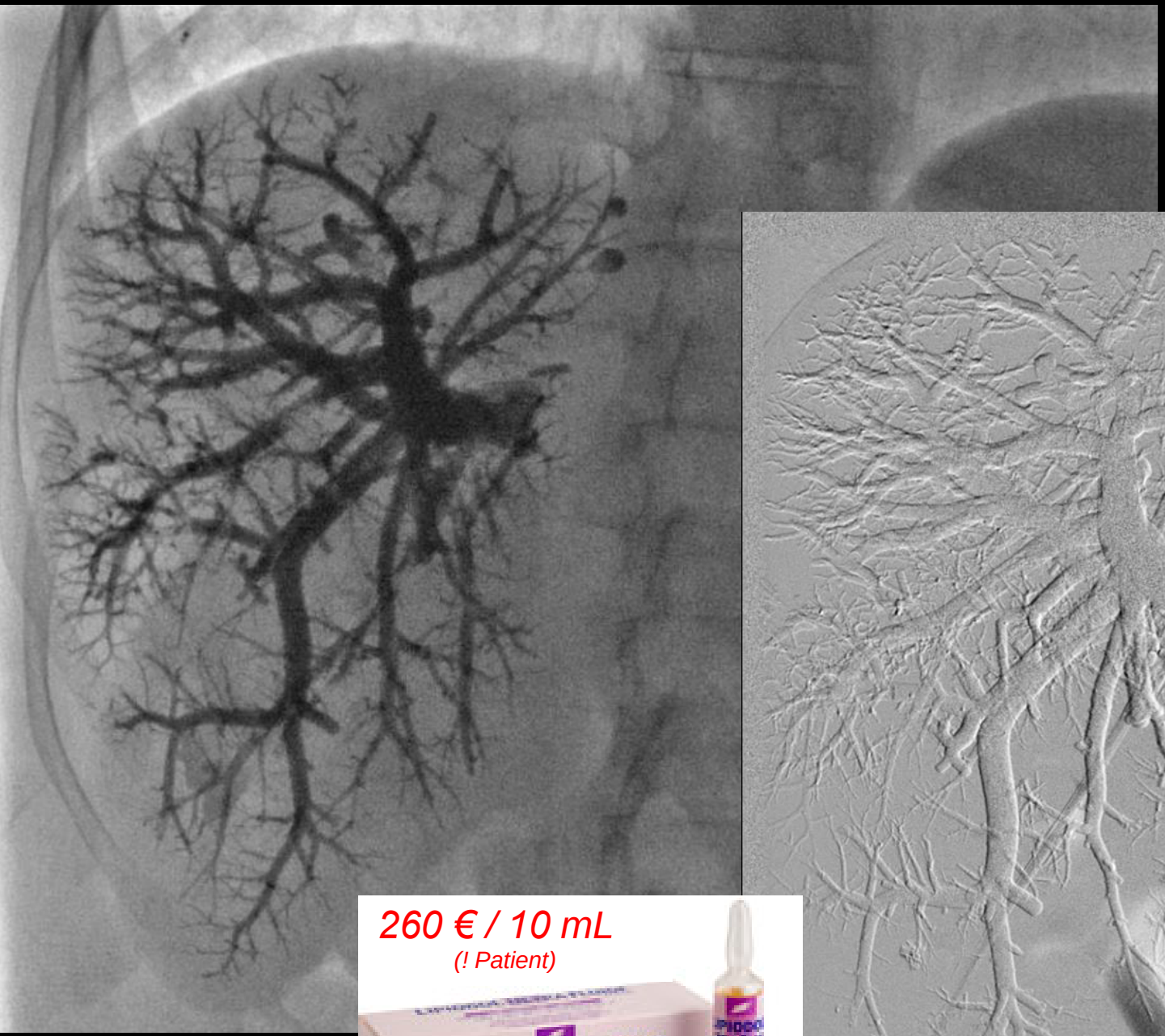
µcoils + Onyx 34

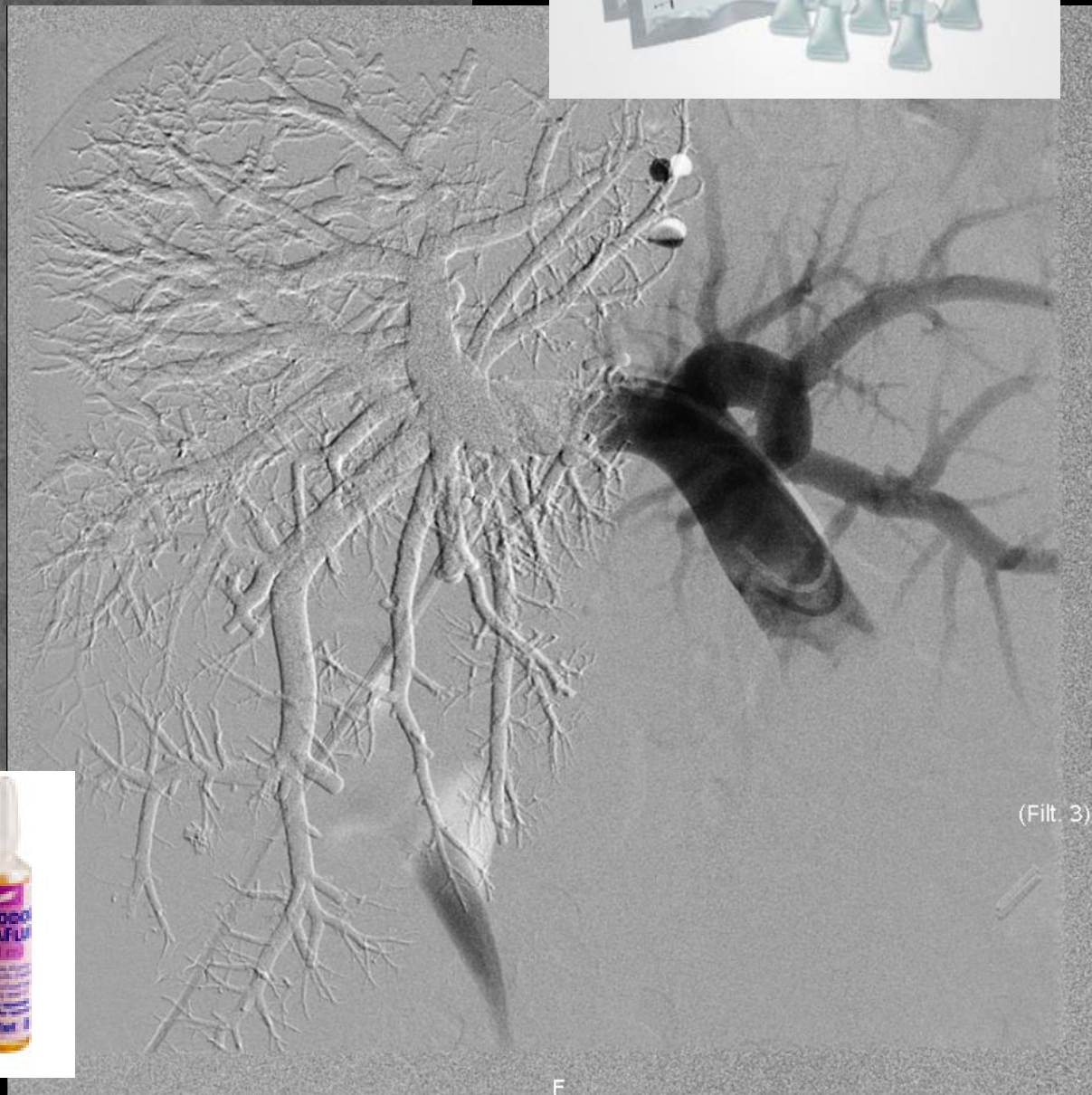




Embolisation portale Dr (Glubran 2cc – Lipiodol 20cc)

100 € / 1mL





260 € / 10 mL

(! Patient)

RPVE (20cc Glubran/Lipiodol 1/10)

+

RHVE (coils + 7cc Glubran/Lipiodol 1/5)

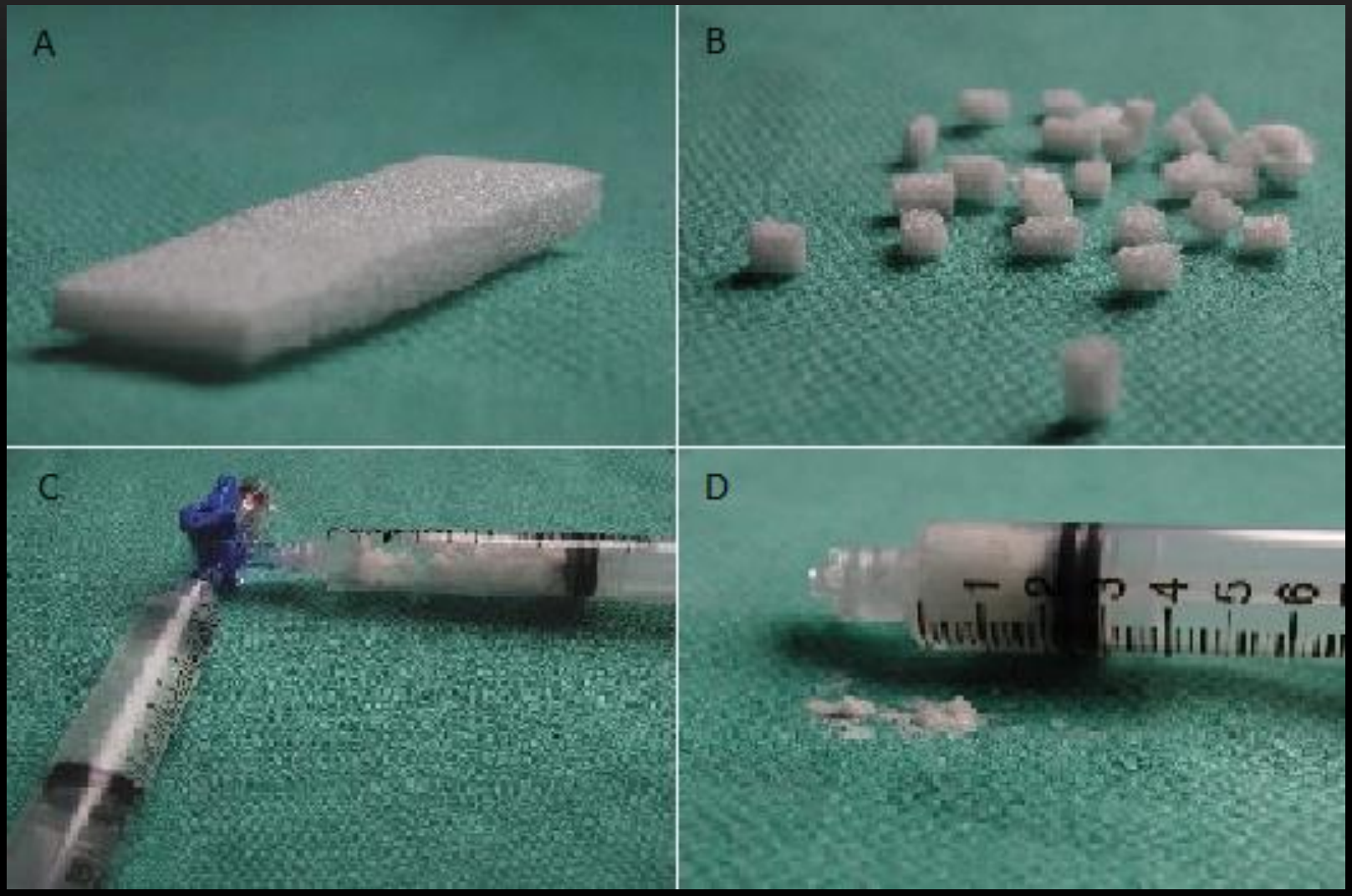
Results (+ 2w):

Left Liver hypertrophy (volume): +71%

Left Liver function (HIDA): 65 % total
(vs 45% before embolization)

→ Successfull right hepatectomy performed

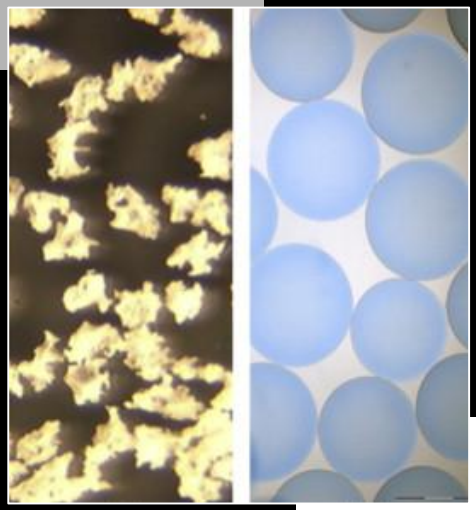
as efficient as ALPPS (Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy) !!



5-10€ (bloc) à 25€ (poudre)

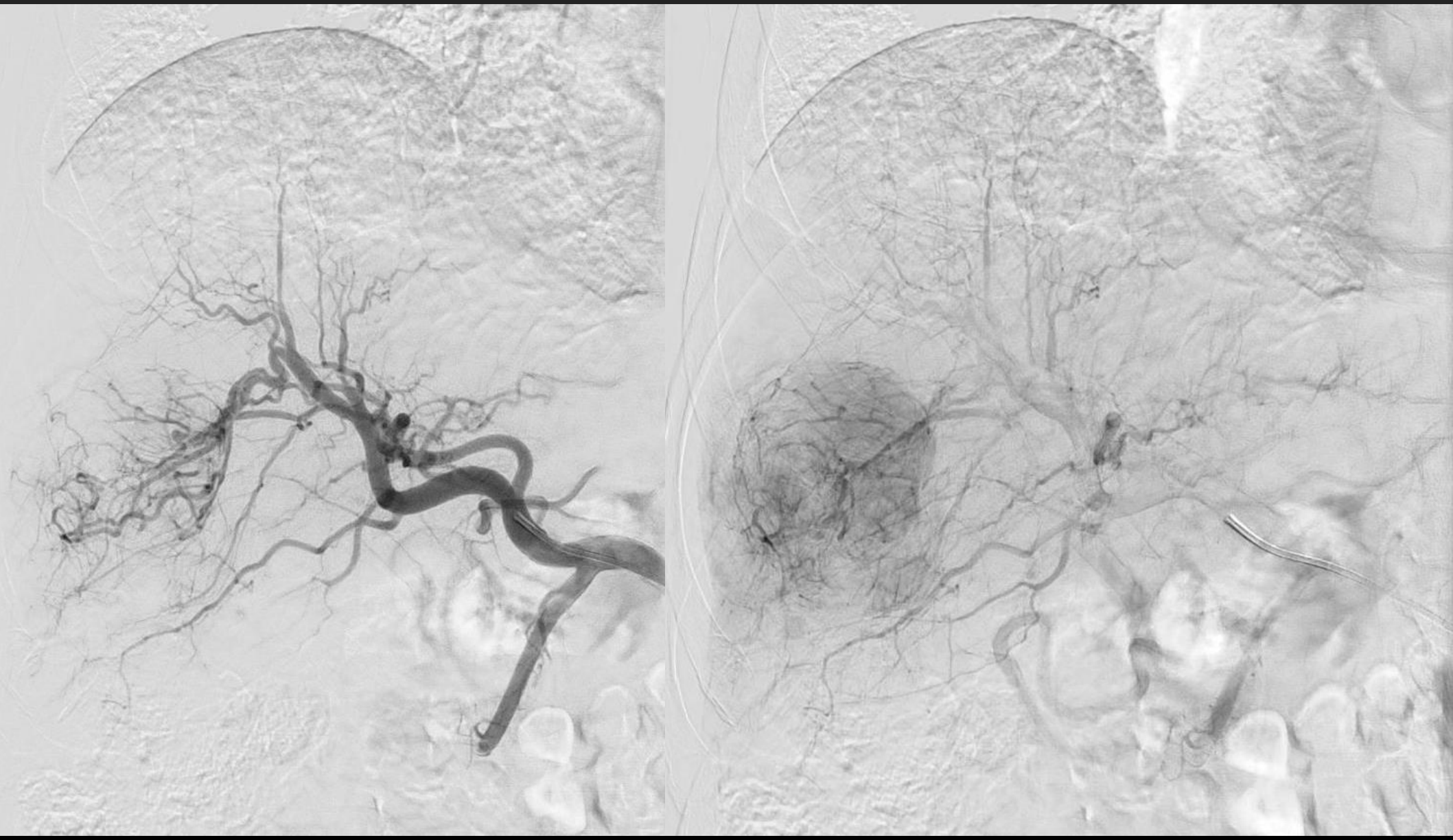
PVA

<100 €

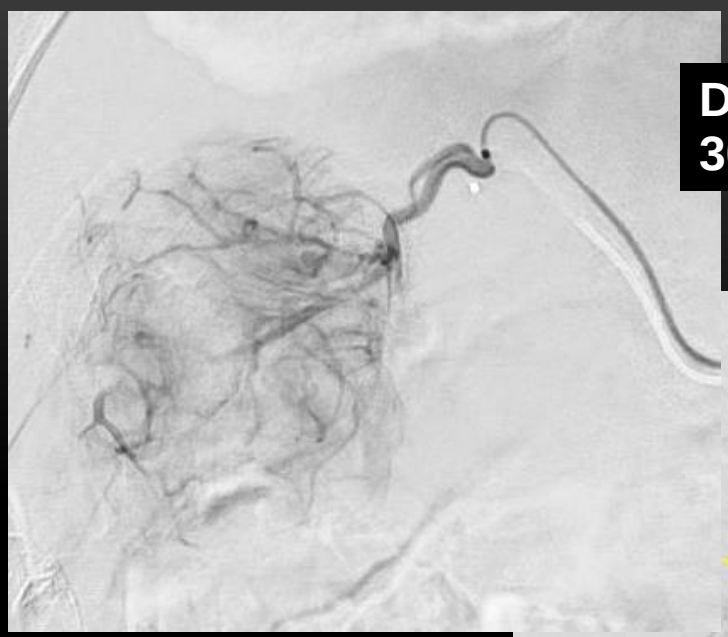


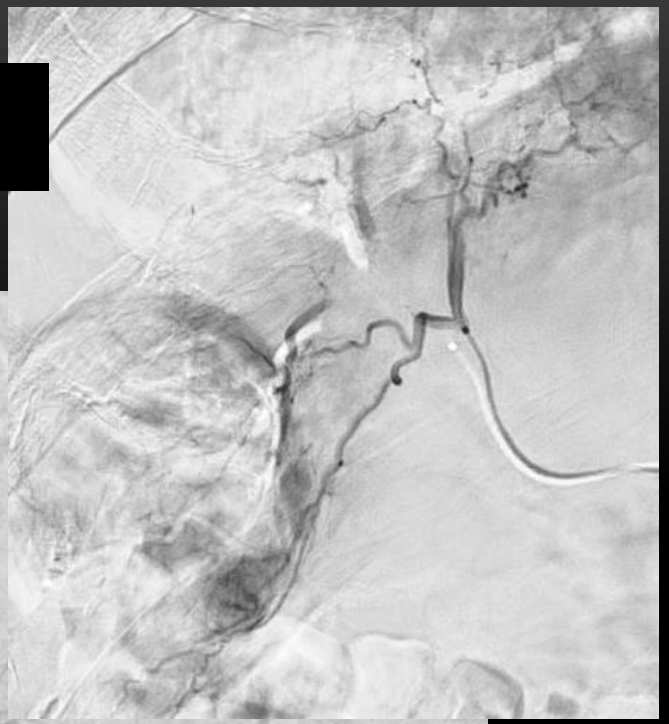
100 €

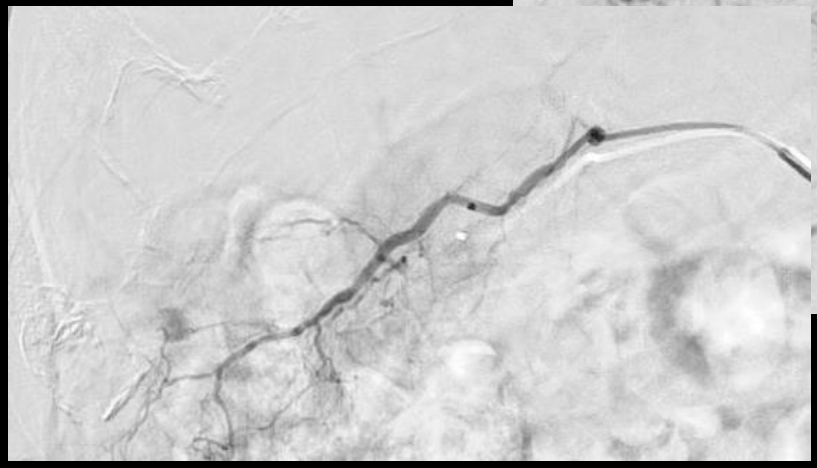
Microsphères



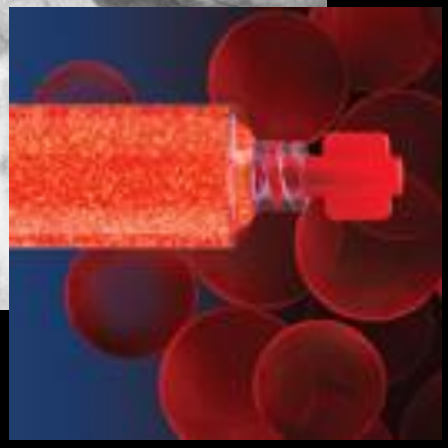
DEB-Tace (Drug Eluting Beads)
300-500µm + 75mg doxorubicine

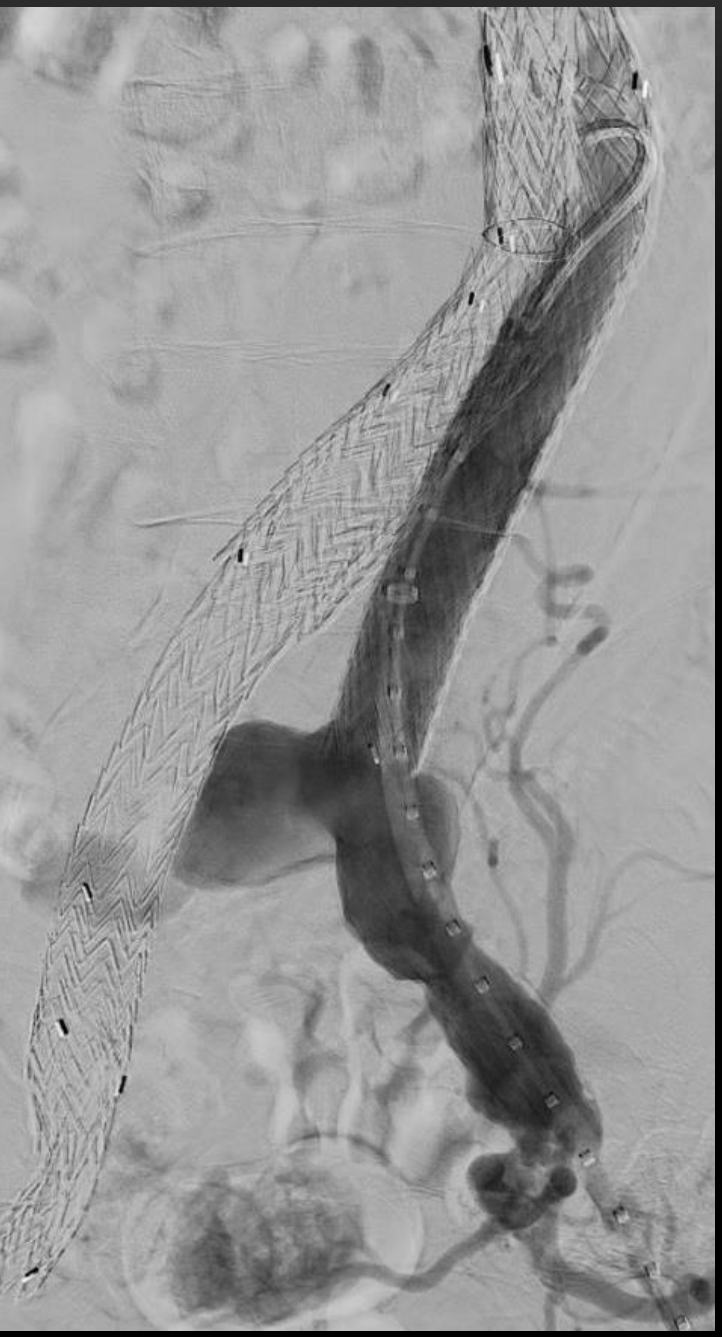


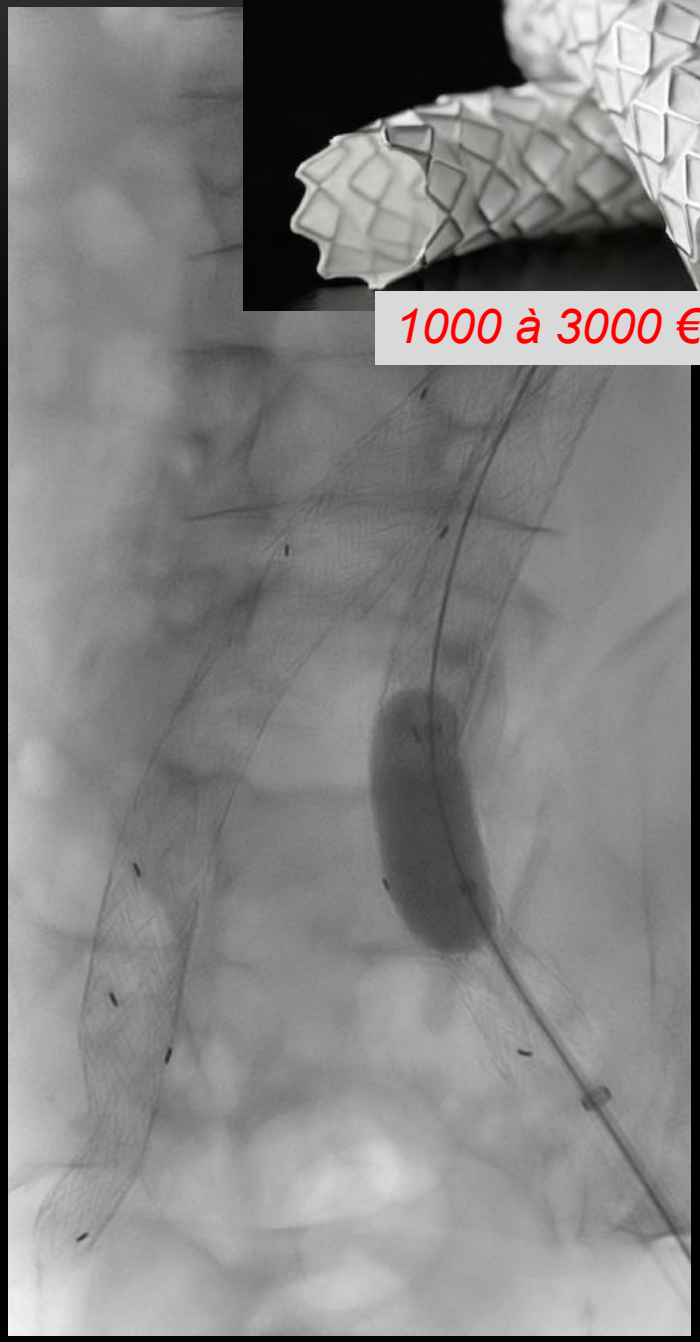




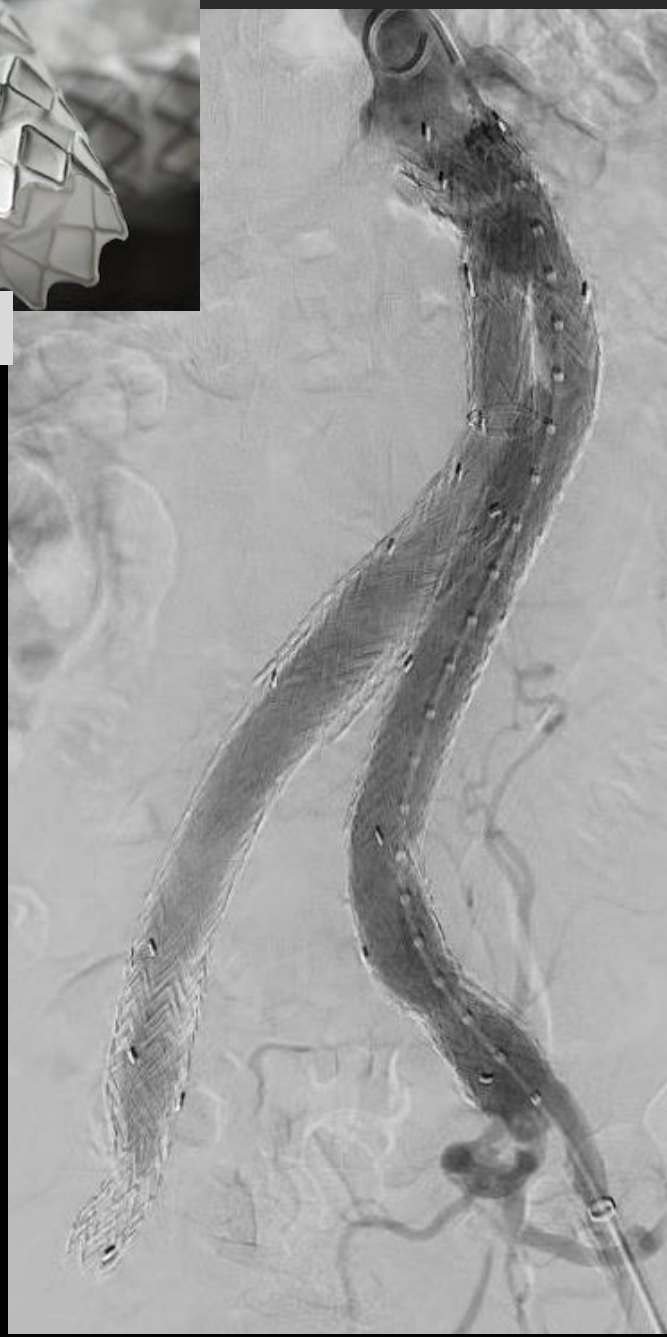
950 €



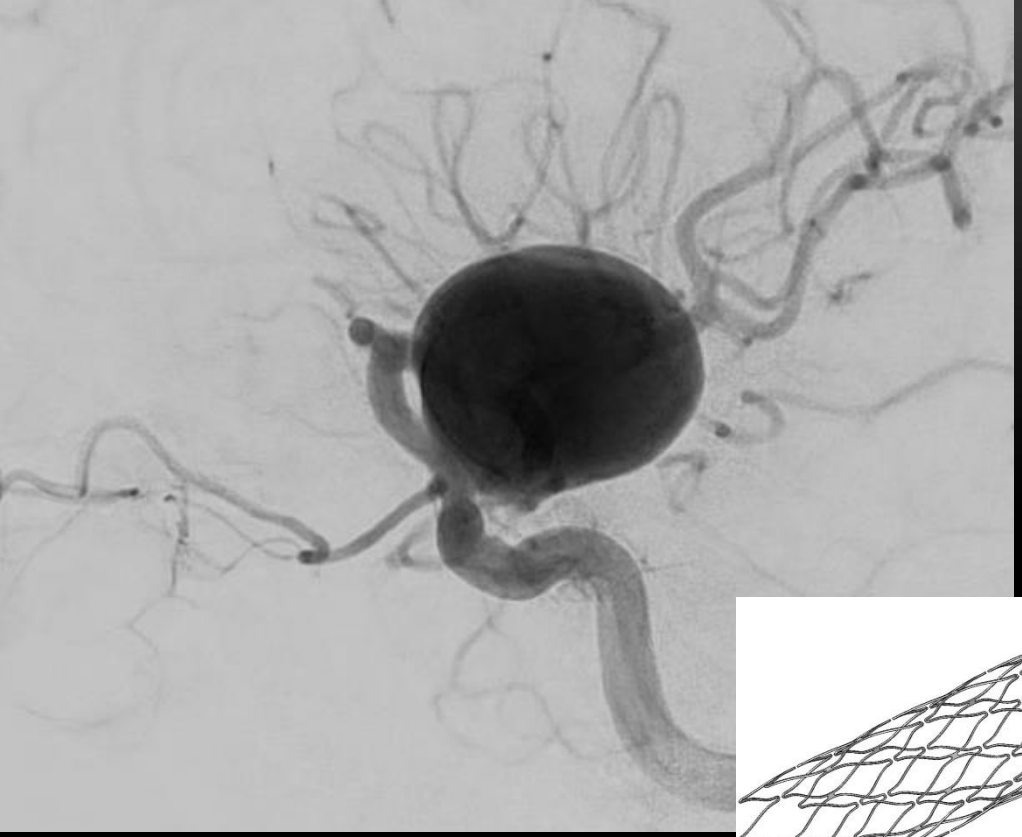


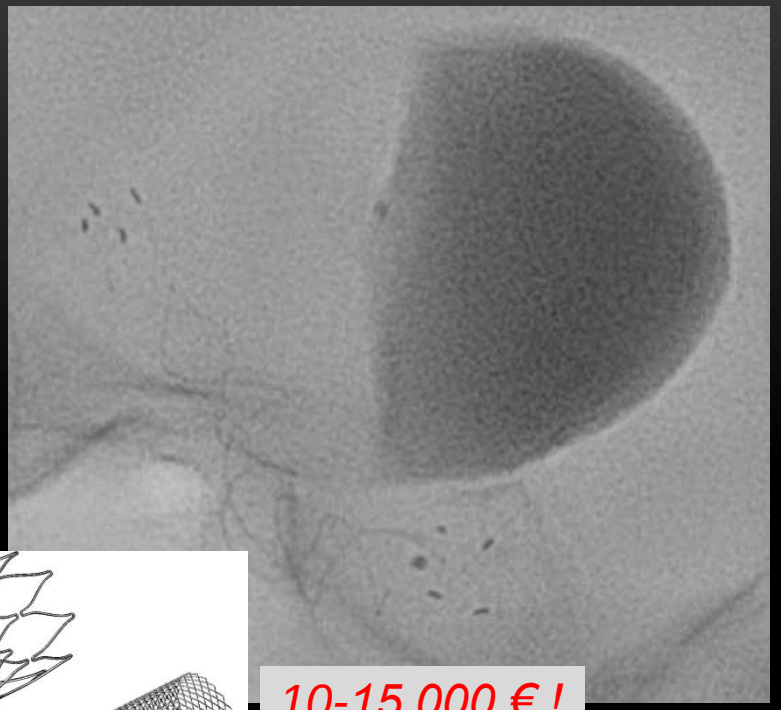


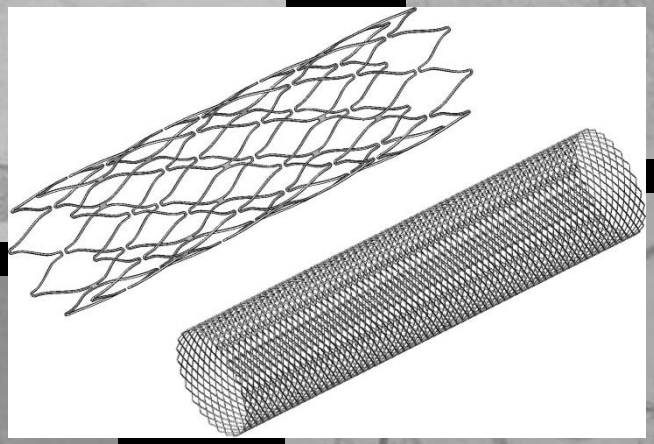
1000 à 3000 €



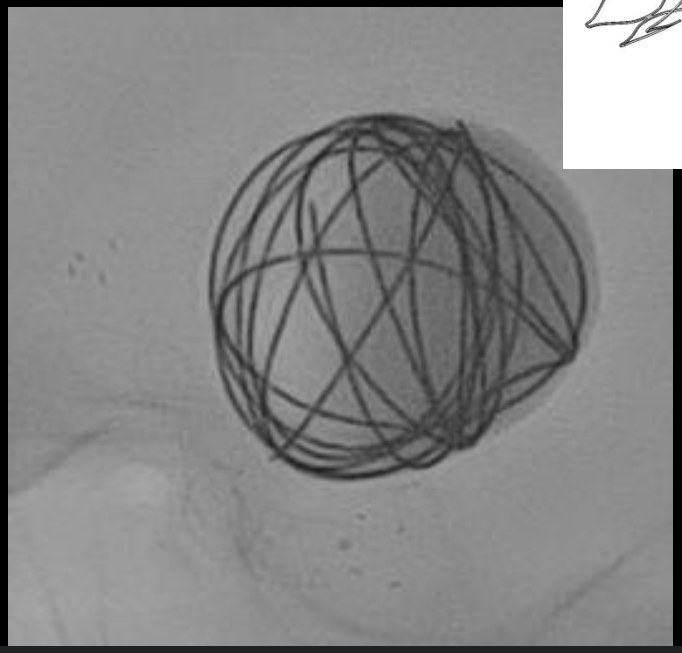
Extension d’une endoprothèse Ao-iliaque par stent couvert

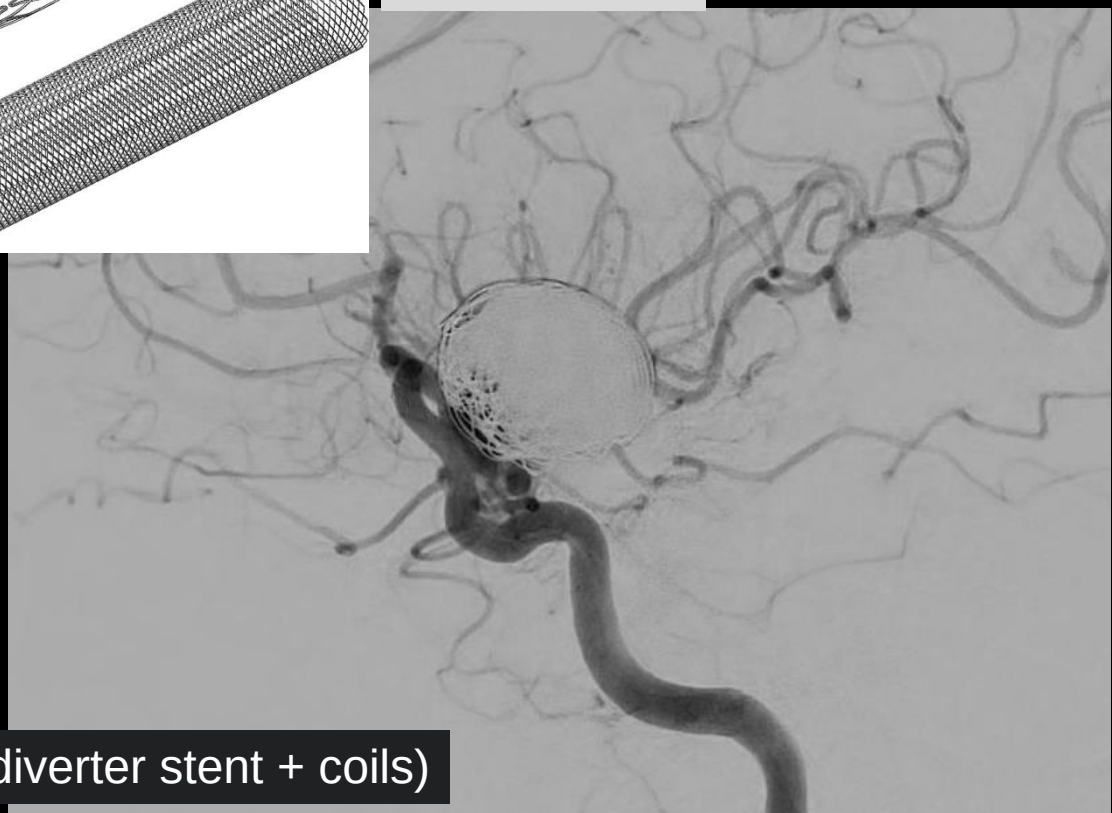






10-15.000 € !

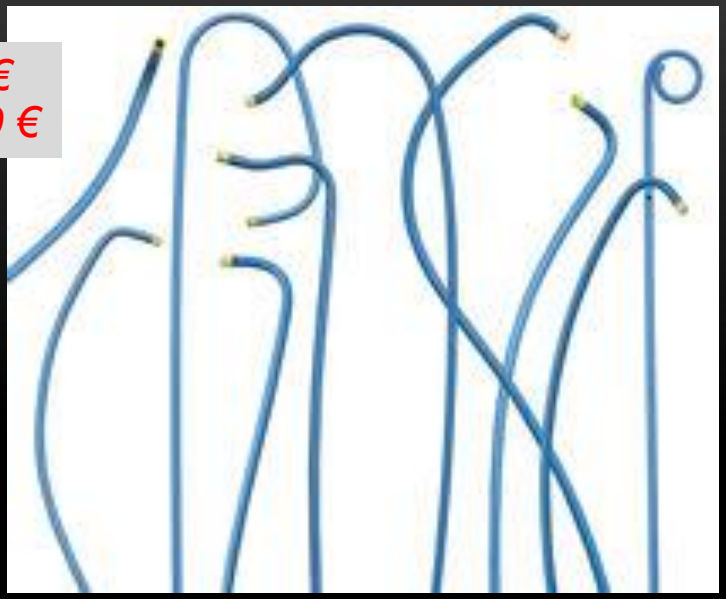


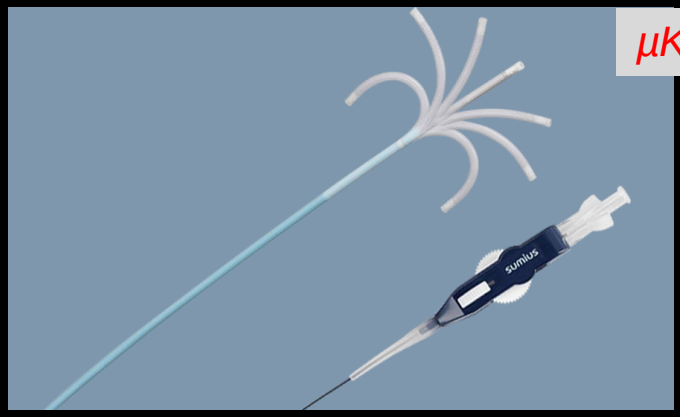


Embolisation d’un anévrysme cérébral (flow diverter stent + coils)

Micro-cathéter: 220-300 €
Micro-guide: 0 €(inclus) - 70 à 200€

Intro: 10-15€
Cathéter: 30 €





µKT directionnel 1000 €

µKT anti-reflux 2500 €

µKT à ballon occlusif 1000 €

3- EMBOLISATION: COUTS ET REMBOURSEMENTS

- 589131/42 Embolisation face / thorax / abdo I600 468.75€ + G3

  Matériel 161490/501: KT + matériel d'embolisation ***671,55€ !! forfait***

- 589411/22 Embolisation membre 468.75€

  Matériel 161512/23: KT + matériel d'embolisation ***309,95€ !! forfait***

- 589116/20 Embolisation encéphalique ou médullaire 1445,31€ + G6

  Matériel 161512/23: KT + matériel d'embolisation ***prix fixe/matériel, nb +/- illimité***

! Non cumulable avec :

589050-61 : PTA-stenting artériel

589175-86: Recanalisation par fibrinolyse ou recanalisation mécanique

4- EMBOLISATION: ONCO-RI

- Embolisation simple
  - Hémorragie
  - Nécrose tumorale (HCC)
  - Pré-exérèse chirurgicale

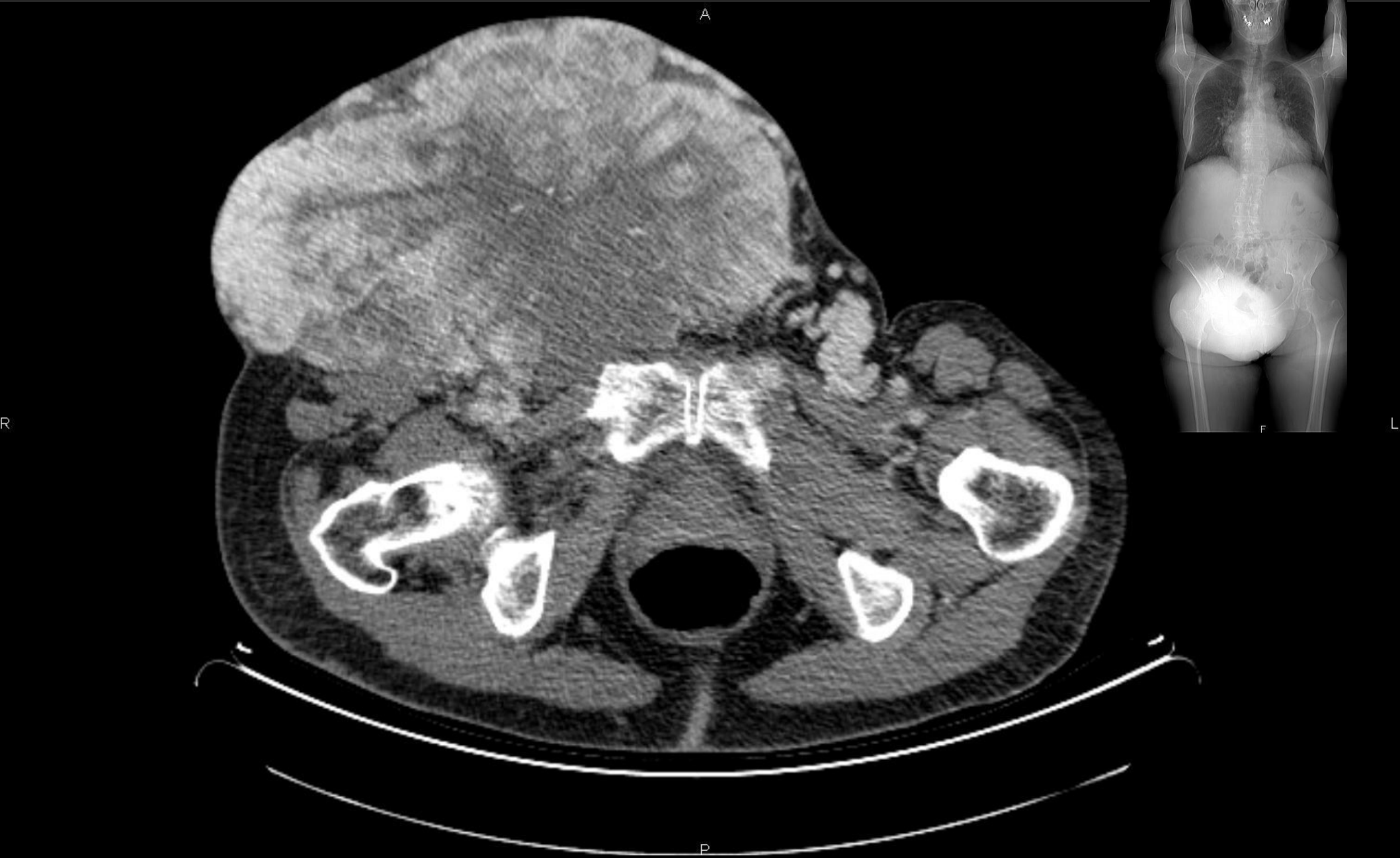
- Chimio-embolisation : c-TACE vs DEB-TACE

- Radio-embolisation : SIRT/TARE

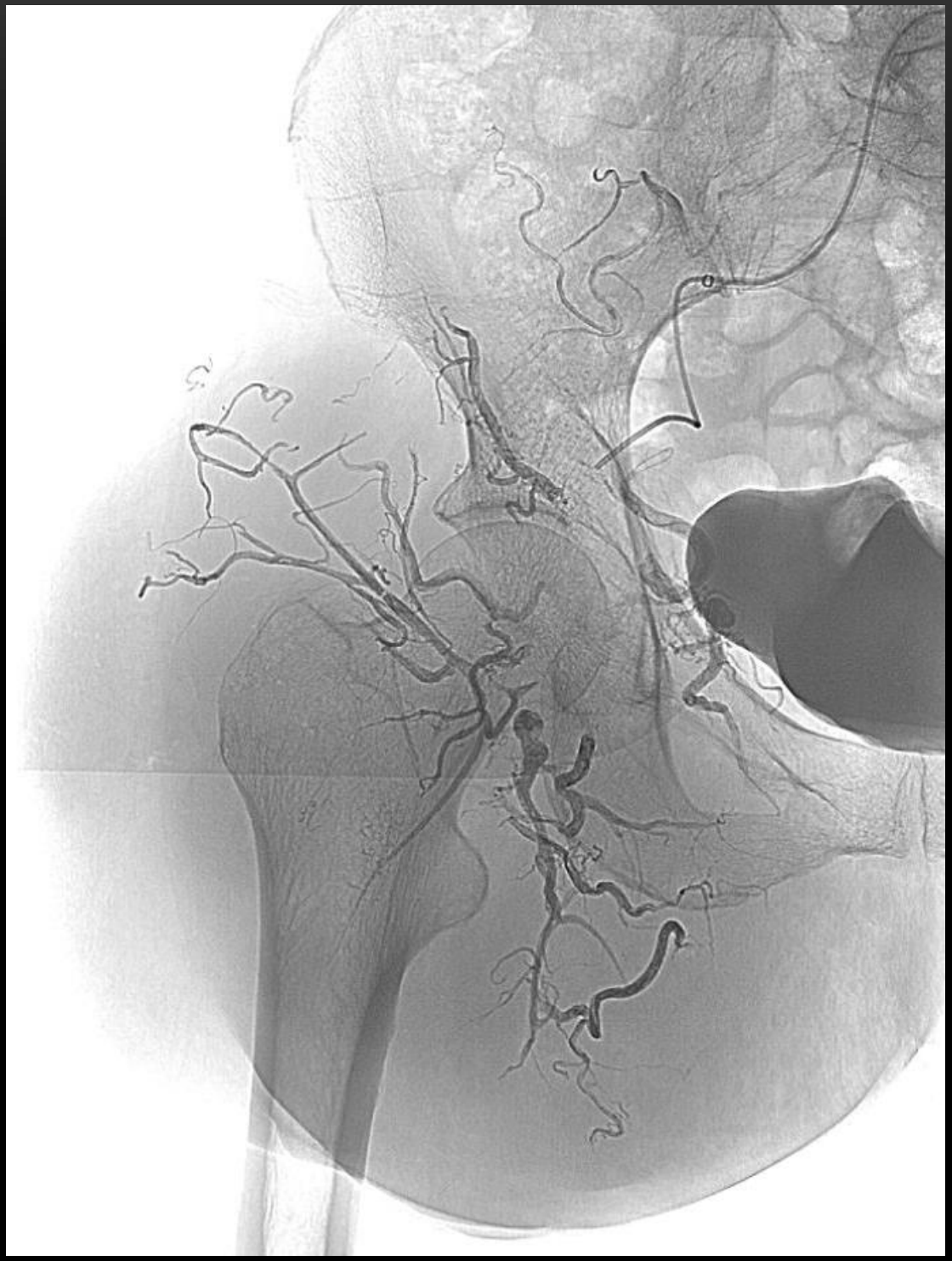
- Embolisation portale droite (+/- veine sus-hépatique droite)

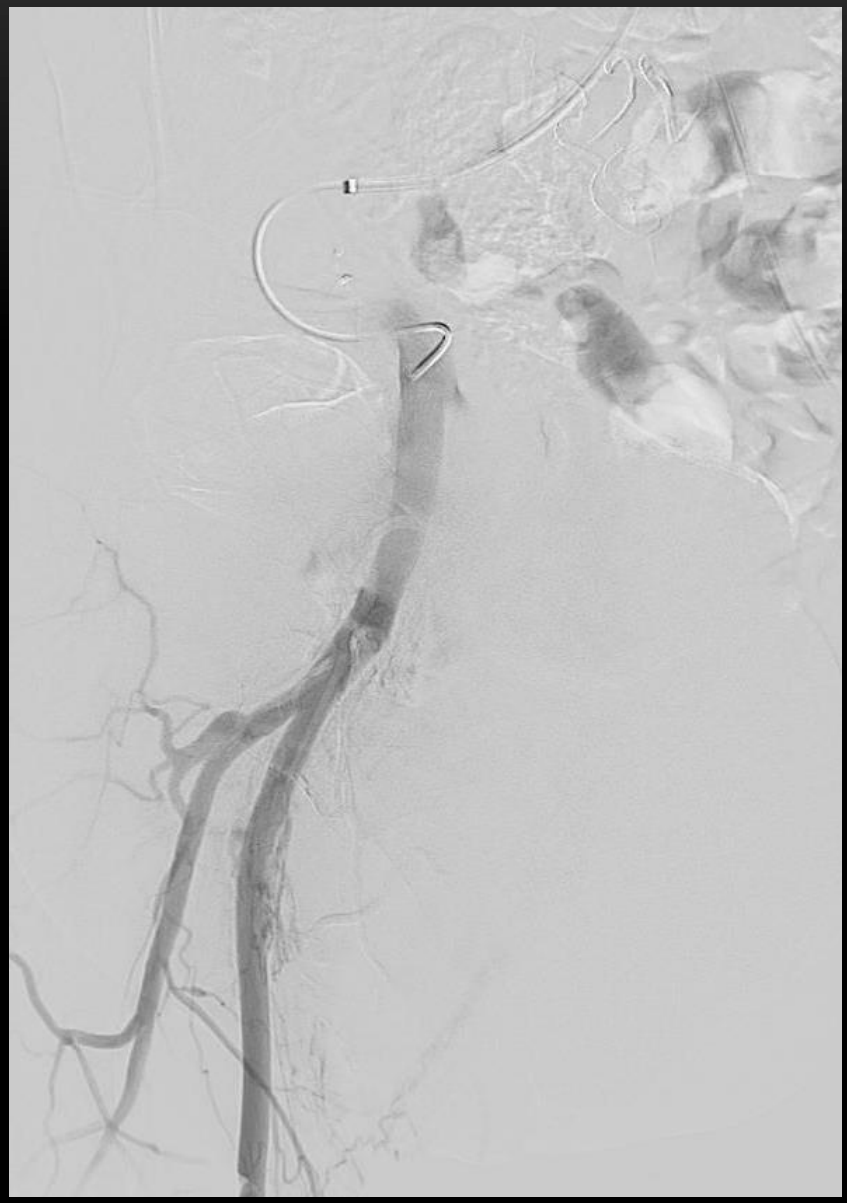
Cf. cours oncoRI (M.Vouche)

EMBOLISATION PRE-CHIRURGIE



Embolisation pré-op d’un sarcome de la cuisse (Onyx 34)





Onyx 34 L (6cc) – 21cc tot

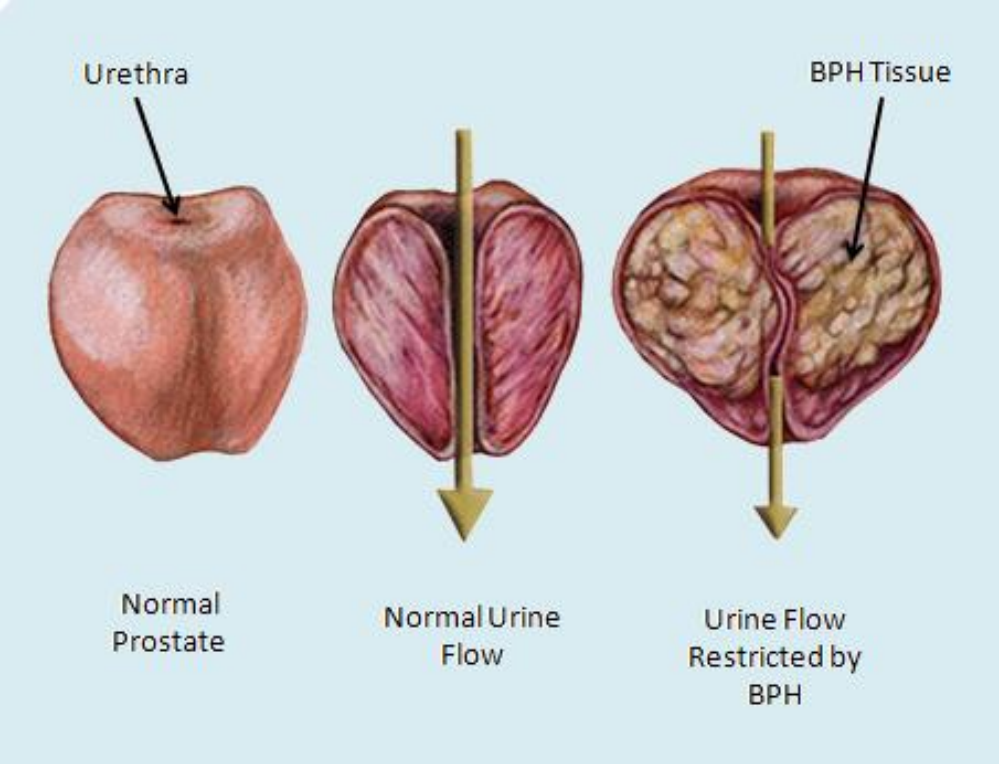
4 x 1800 € !

5- EMBOLISATION: AUTRES INDICATIONS ACTUELLES (HORS HÉMORRAGIE)

- Embolisation prostatique
- Embolisation des fibromes utérins
- Embolisation des varicocèles et des varices pelviennes
- MAV/FAV
- (Embolisation splénique dans l'hypersplénisme)

L'hypertrophie prostatique bénigne

- Hypertrophie **adénomateuse (supéro-médiane)** de la prostate
- Homme >50ans - prévalence: 50% si >80ans
- <u>Symptômes:</u> **troubles mictionnels** → pollakiurie, mictions de petit volume, bas débit, nycturie… plus rarement, rétention urinaire aigue



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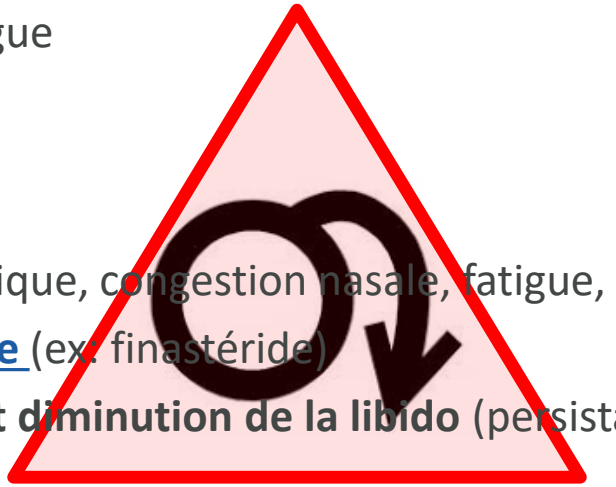
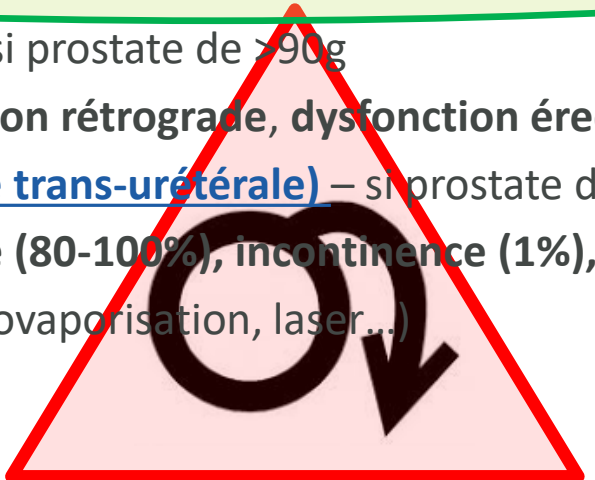


- Traitements:
  - ✓ **α-bloquants** (ex: tamsulosine)
    - E2aires: hypotension orthostatique, congestion nasale, fatigue, **troubles de l'érection**
  - ✓ **Inhibiteurs de la 5-α-reductase** (ex: finastéride)
    - E2aires: **dysfonction érectile et diminution de la libido** (persistante après R/), infertilité, dépression,
  - ✓ (Anti-cholinergiques)
  - ✓ **Embolisation des artères prostatiques** – PAE (Prostatic Artery Embolization)
  - ✓ **Prostatectomie chirurgicale** – si prostate de >90g
    - E2aires: **incontinence, éjaculation rétrograde**, **dysfonction érectile** (40%), hémorragie…
  - ✓ **TURP (resection endoscopique trans-urétérale)** – si prostate de >30g <90g
    - E2aires: **éjaculation rétrograde (80-100%), incontinence (1%), sténose urétrale (10%)**…
  - ✓ Autres (thermothérapie, électrovaporisation, laser…)



International Prostate Symptom Score (I-PSS)

Patient Name: _____ **Date of birth:** _____ **Date completed** _____

In the past month:	Not at All	Less than 1 in 5 Times	Less than Half the Time	About Half the Time	More than Half the Time	Almost Always	Your score
1. Incomplete Emptying How often have you had the sensation of not emptying your bladder?	0	1	2	3	4	5	
2. Frequency How often have you had to urinate less than every two hours?	0	1	2	3	4	5	
3. Intermittency How often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5	
4. Urgency How often have you found it difficult to postpone urination?	0	1	2	3	4	5	
5. Weak Stream How often have you had a weak urinary stream?	0	1	2	3	4	5	
6. Straining How often have you had to strain to start urination?	0	1	2	3	4	5	
	None	**1 Time**	**2 Times**	**3 Times**	**4 Times**	**5 Times**	
7. Nocturia How many times did you typically get up at night to urinate?	0	1	2	3	4	5	
Total I-PSS Score							

Score: 1-7: *Mild* 8-19: *Moderate* 20-35: *Severe*

Quality of Life Due to Urinary Symptoms	Delighted	Pleased	Mostly Satisfied	Mixed	Mostly Dissatisfied	Unhappy	Terrible
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?	**0**	**1**	**2**	**3**	**4**	**5**	**6**

IPSS

The questions refer to the following urinary symptoms:

Questions	Symptom
1	Incomplete emptying
2	Frequency
3	Intermittency
4	Urgency
5	Weak Stream
6	Straining
7	Nocturia

Question eight refers to the patient's perceived quality of life.

The first seven questions of the I-PSS are identical to the questions appearing on the American Urological Association (AUA) Symptom Index which currently categorizes symptoms as follows:

Mild (symptom score less than of equal to 7)
Moderate (symptom score range 8-19)
Severe (symptom score range 20-35)

QoL

Sélection des patients

- Equipe MULTIDISCIPLINAIRE !
  - ✓ Toujours via un **urologue référent** (*CHU Godinne: Dr. Marcelo Di Gregorio*)
  - ✓ Collaboration urologie – radiologie interventionnelle – radiologie diagnostique

- Evaluation du patient (par l'urologue):
  - ✓ IPSS et QoL, IIEF
  - ✓ TRUS et RMI + CTA
  - ✓ PSA +/- biopsies écho-guidées
  - ✓ Evaluation urodynamique

PAE (prostatic arterial embolization) ssi:

IPSS>18 et/ou QoL>3

Prostate > 30cm³

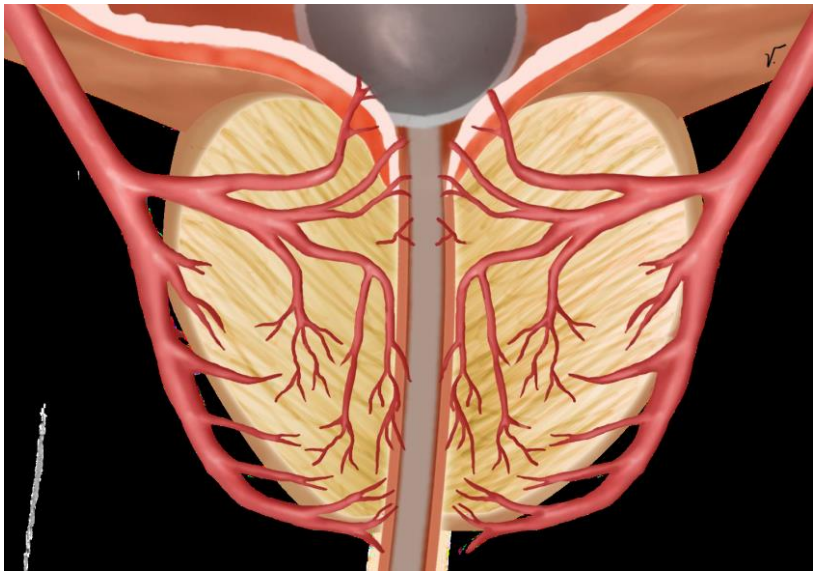
Pas de cancer

Pas de vessie «neuro» / décomp.

- Consultation en radiologie interventionnelle
  - ✓ Discussion de l'ensemble des options thérapeutiques
  - ✓ Technique, effets secondaires, consentement

- Critères d'exclusion: **très rares**
  - ✓ IRC sévère *(option: CO2),* **artériosclérose sévère des artères iliaques (CTA)**
  - ✓ Troubles de la coagulation marqués, infection urinaire…

Technique



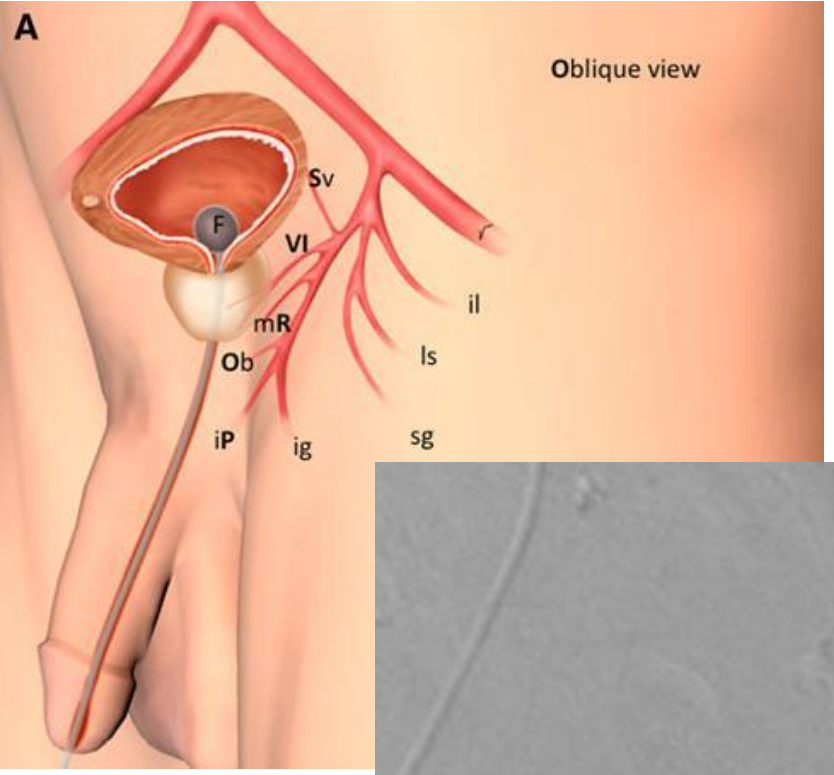
- Intervention **« one-day »** (hôpital de jour)

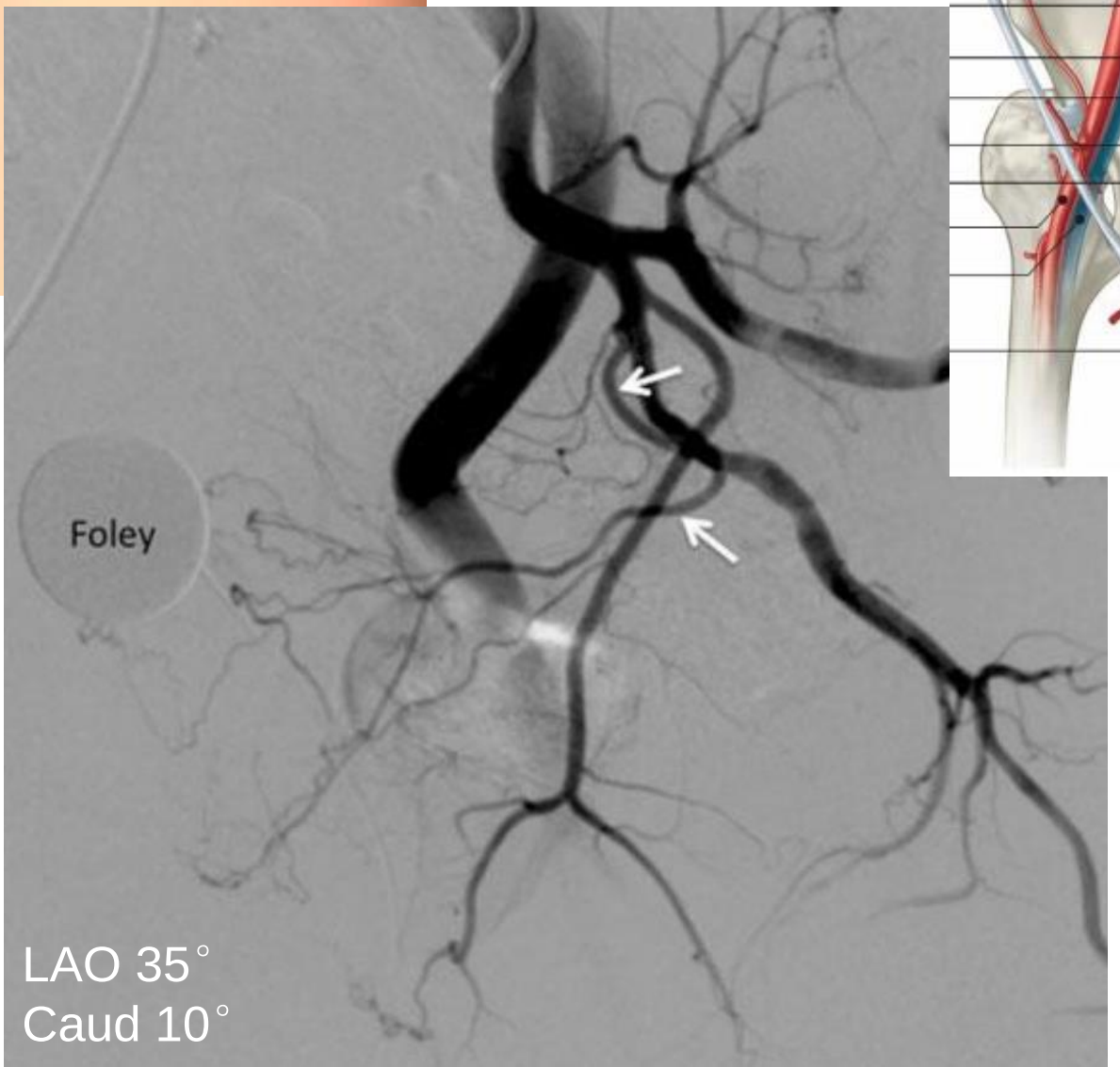
- Sonde urinaire (Foley) – retrait avant sortie
- Sous anesthésie locale
- Abord fémoral commun unilatéral (4F + système de fermeture)
- Micro-cathétérisme hyper-sélectif des artères prostatiques
- Embolisation par µsphères de 300-500 µm, bilatéralement

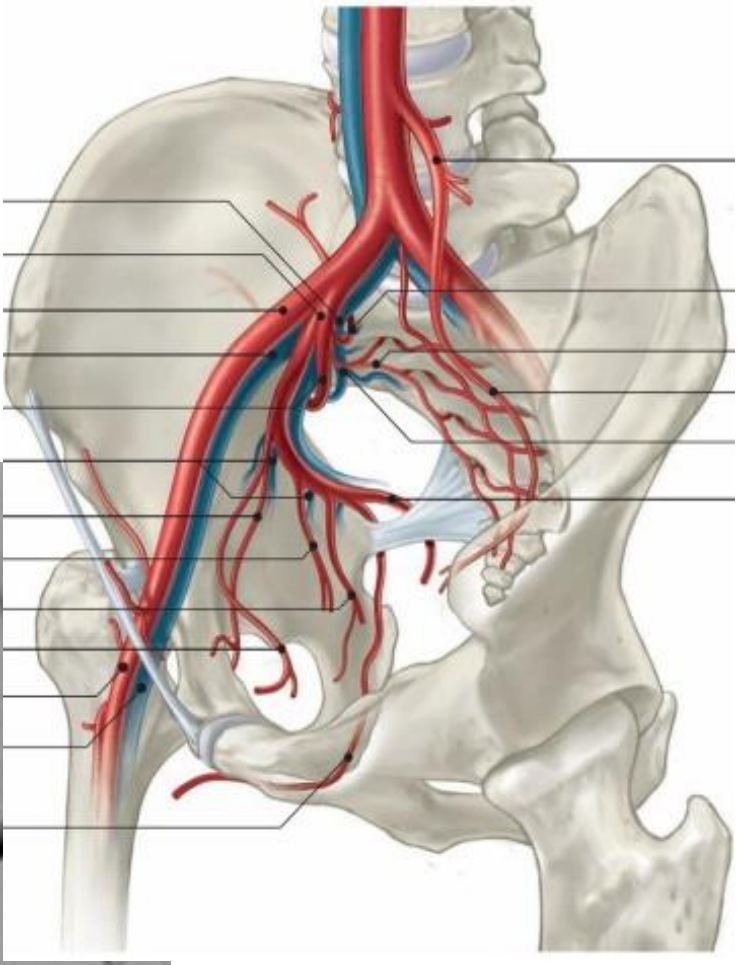
! Procédure longue: 2 à 3h en moyenne

- Traitement antidouleur post-op (2-3j): paracétamol +/- tramadol SN
  + prednisone 20mg/j pdt 3j

Anatomie

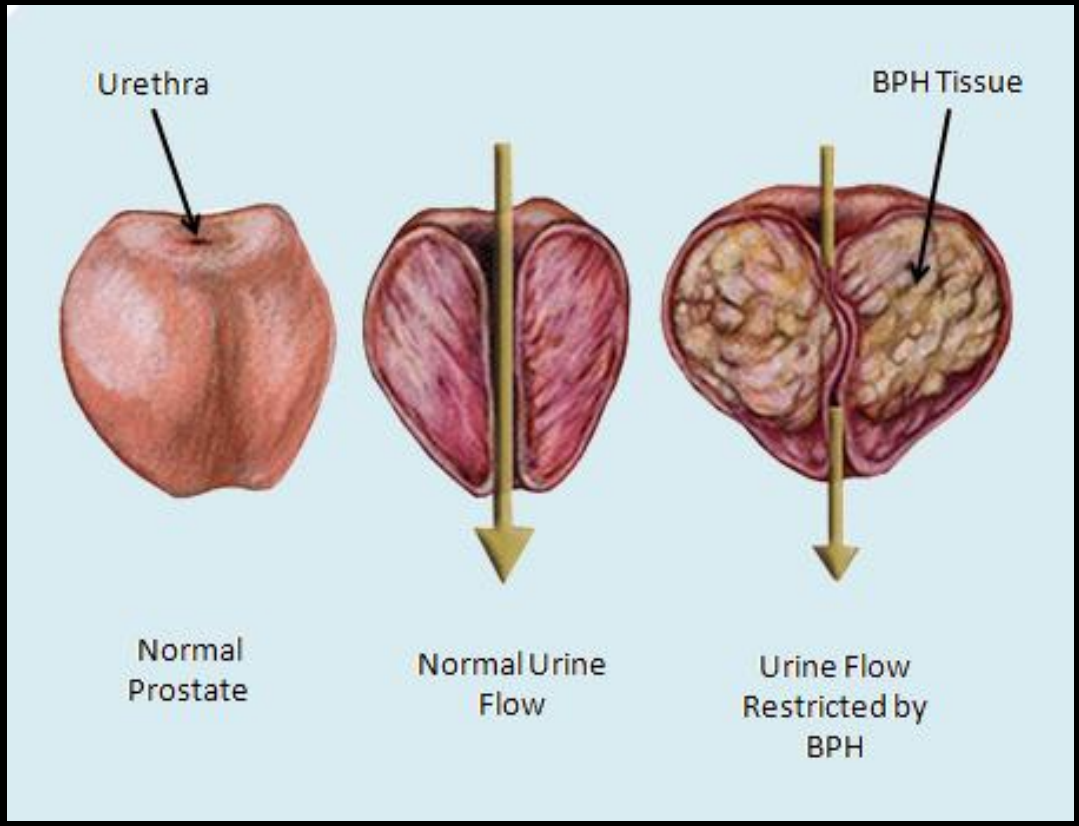


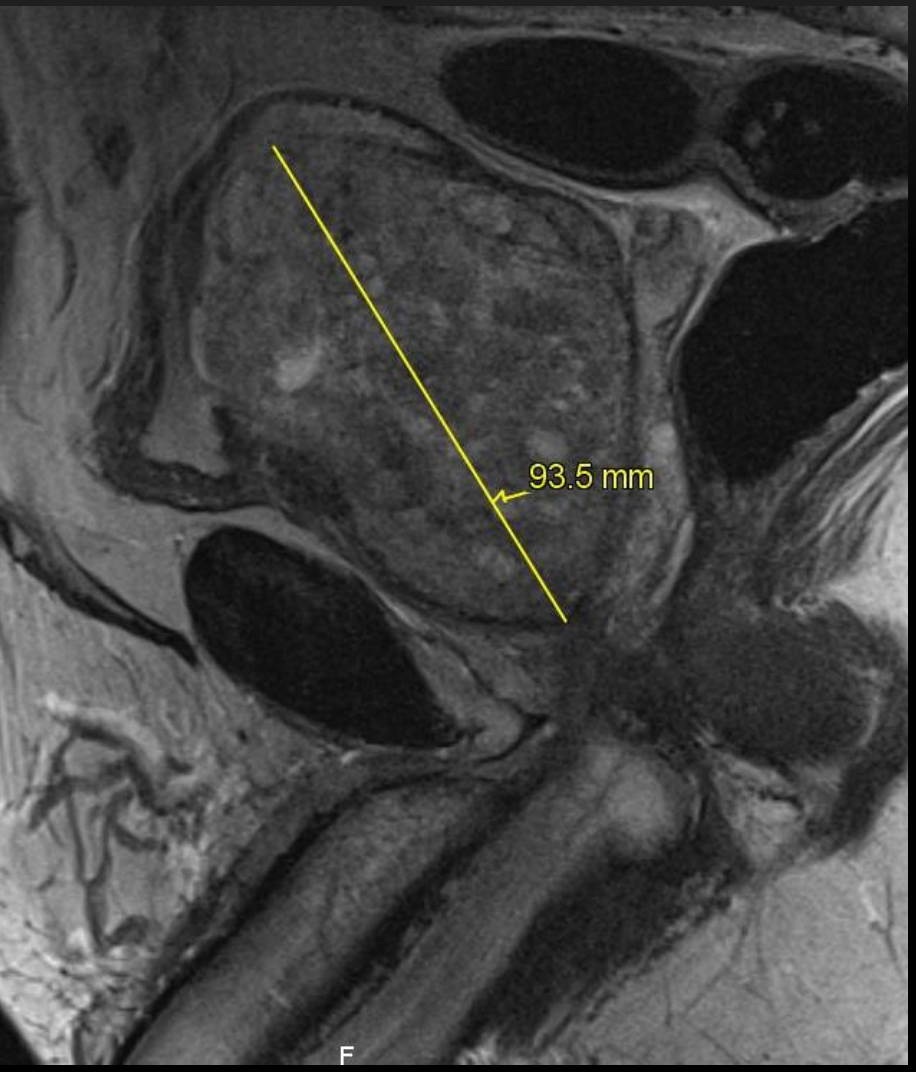


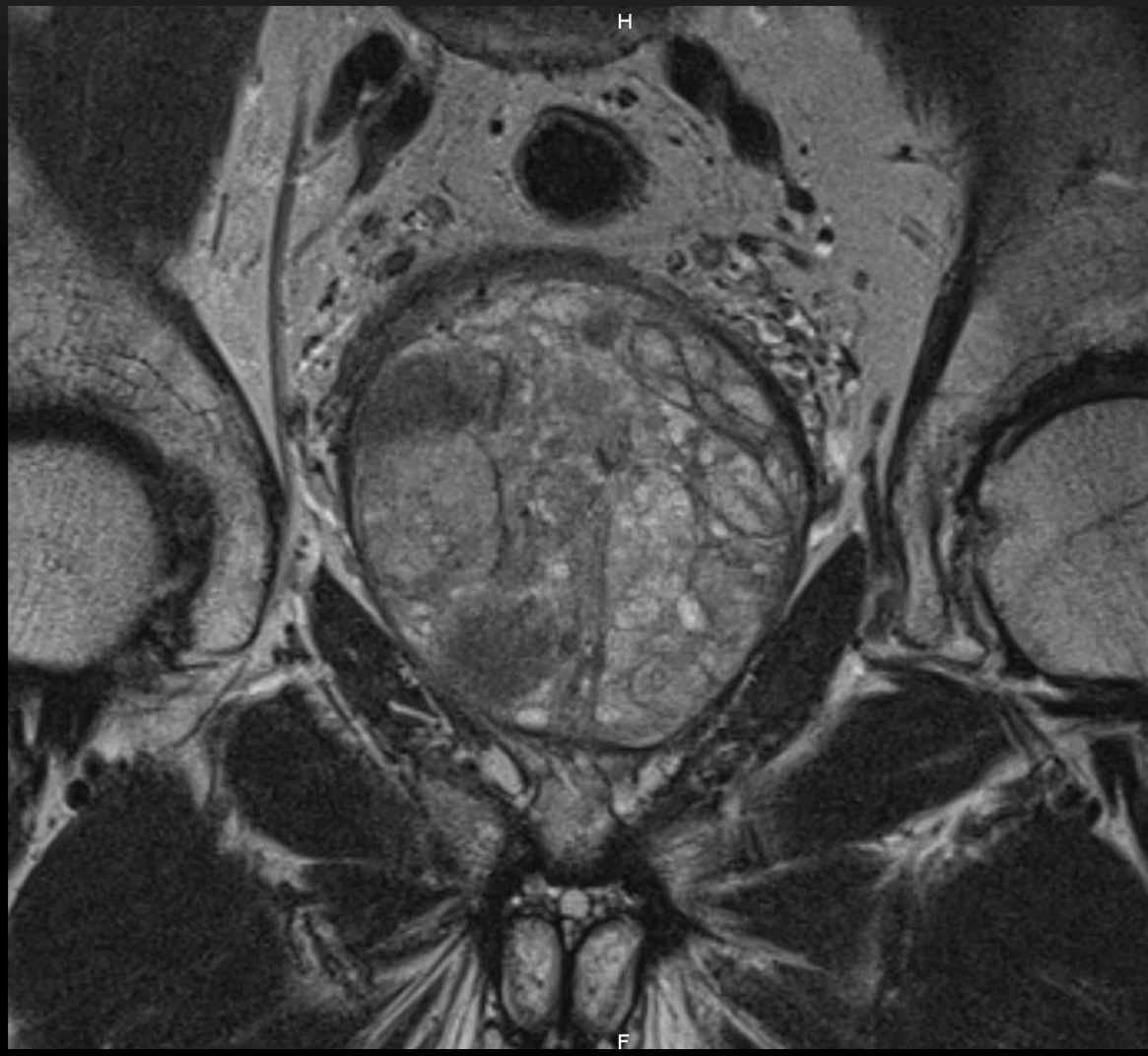


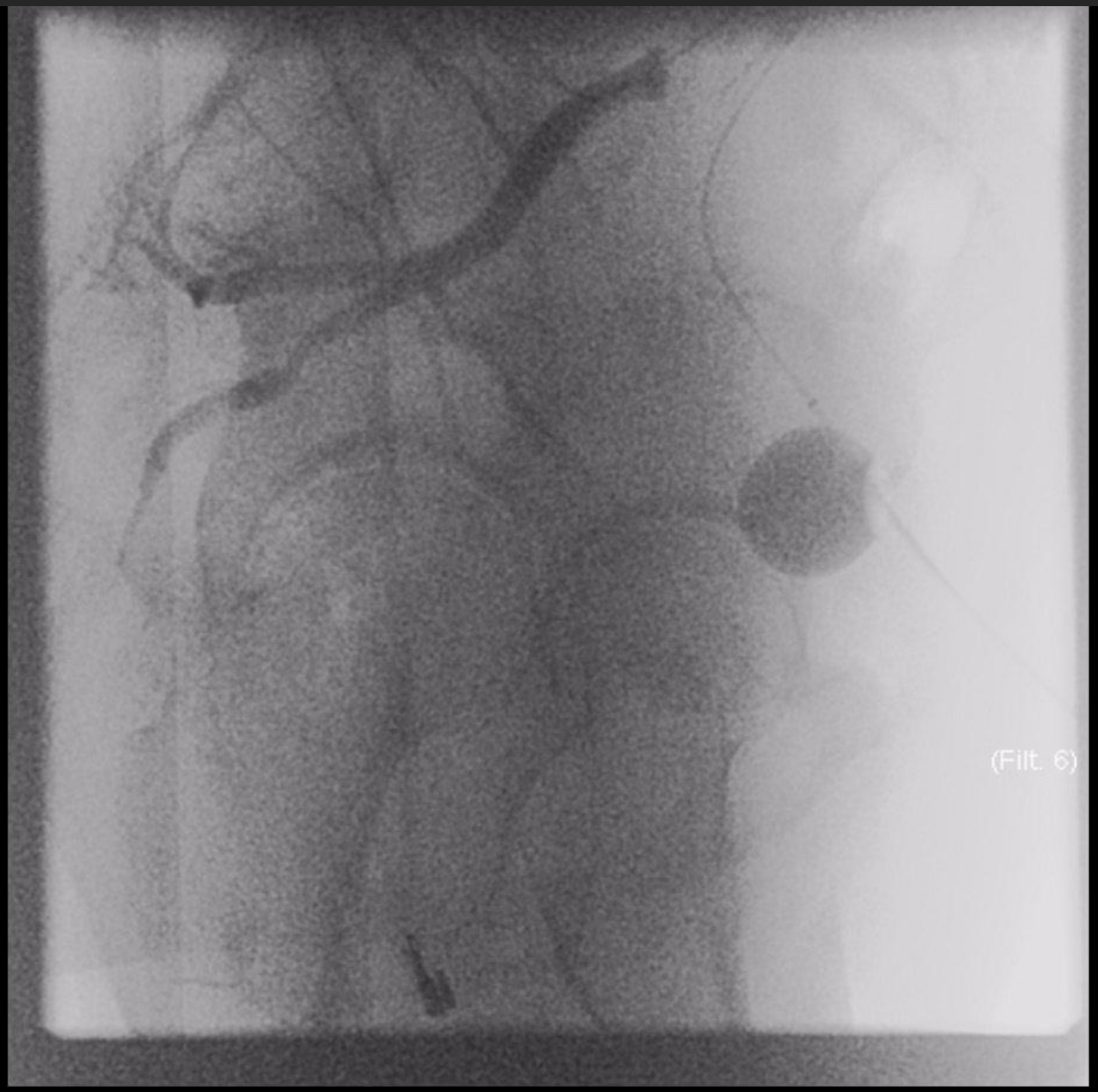
Prostate Embolization

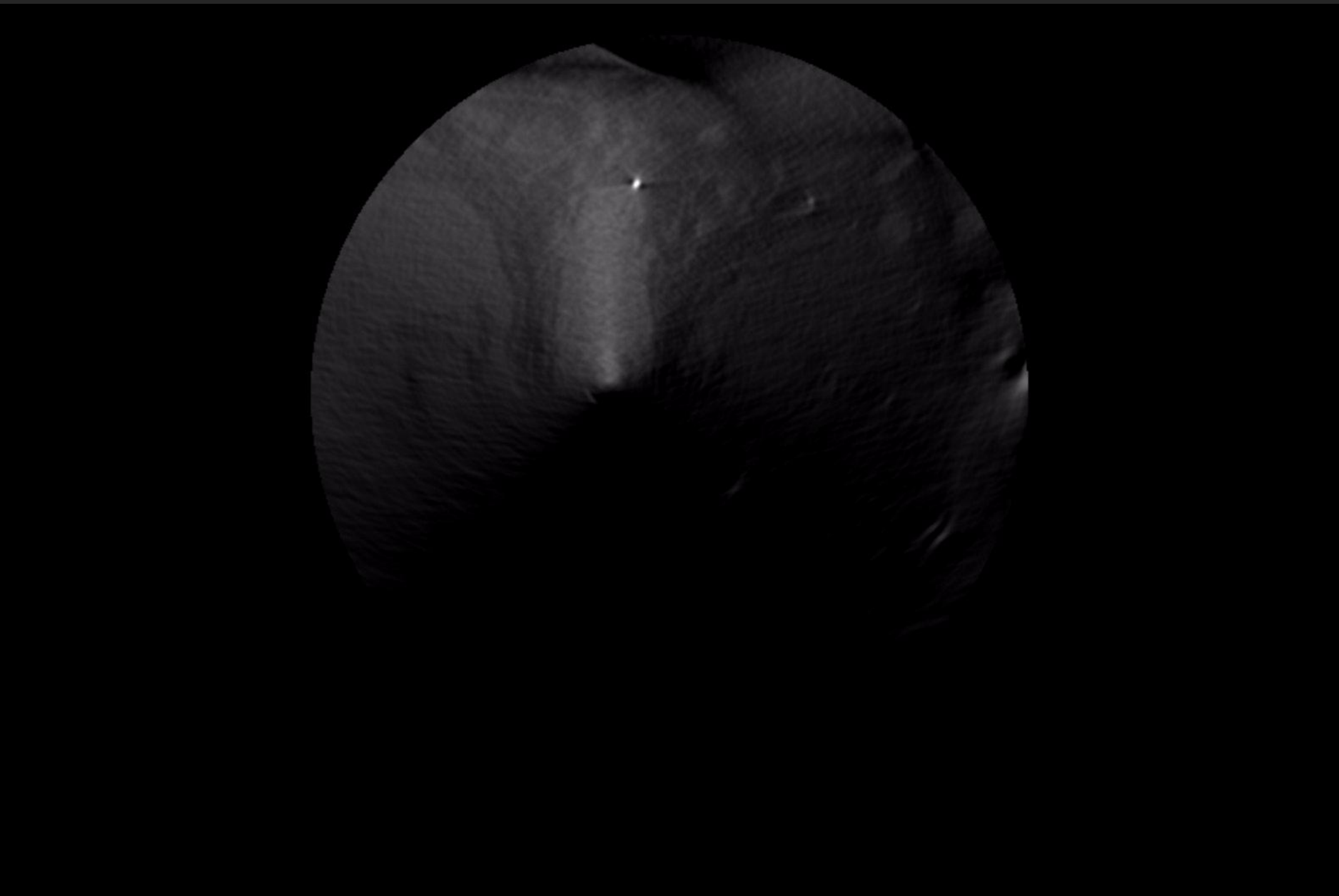
- ♂, 85y
- Very large BPH (140g)

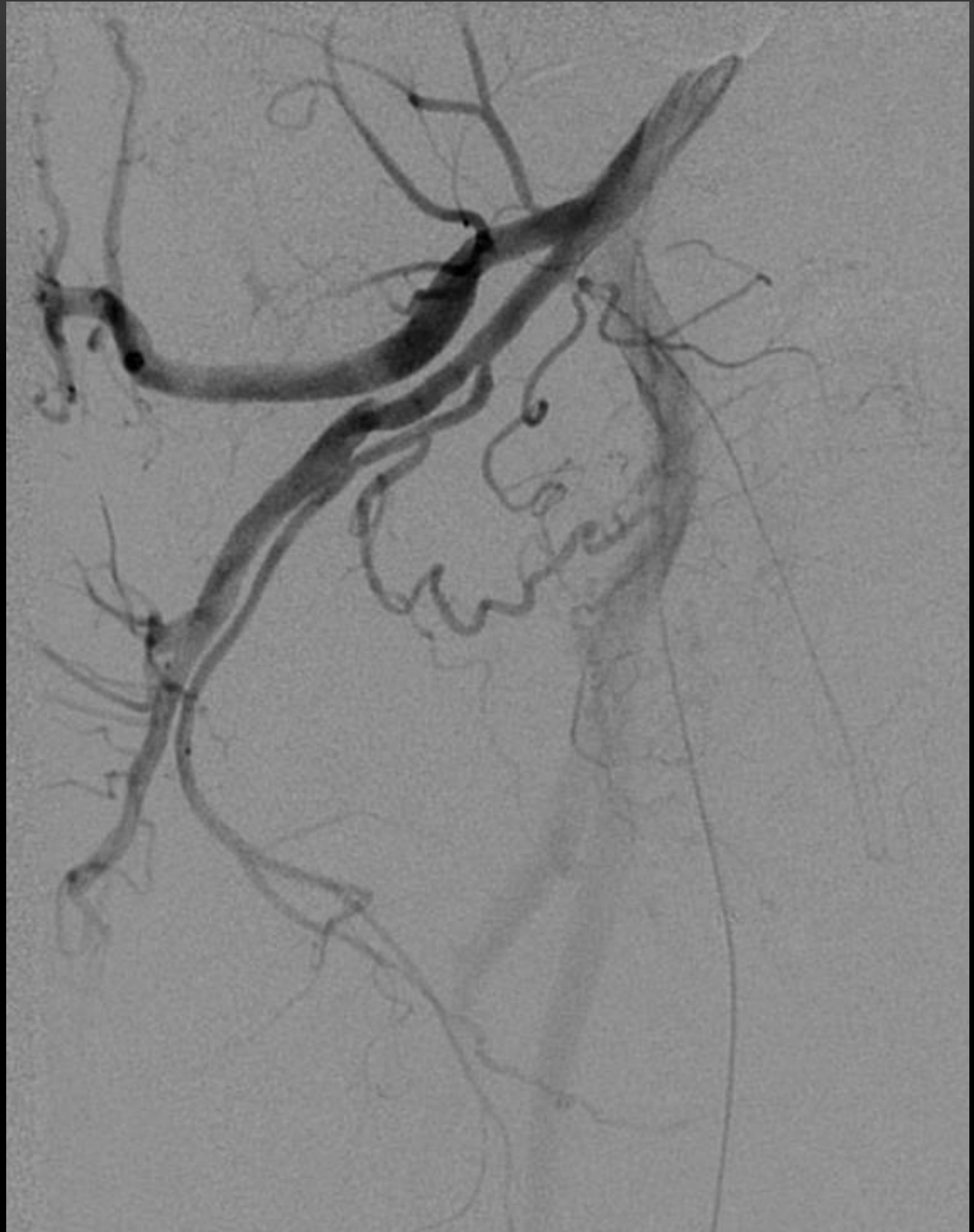



93.5 mm
F

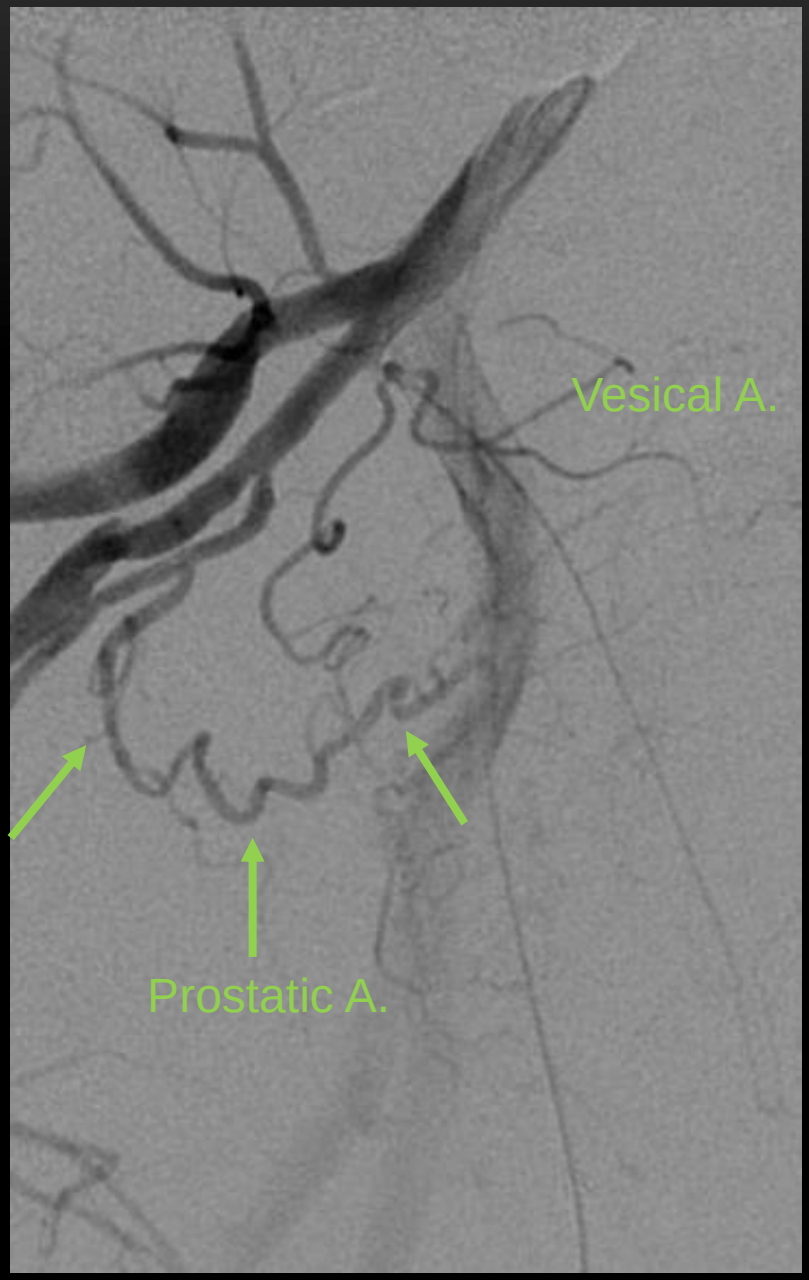

H
F

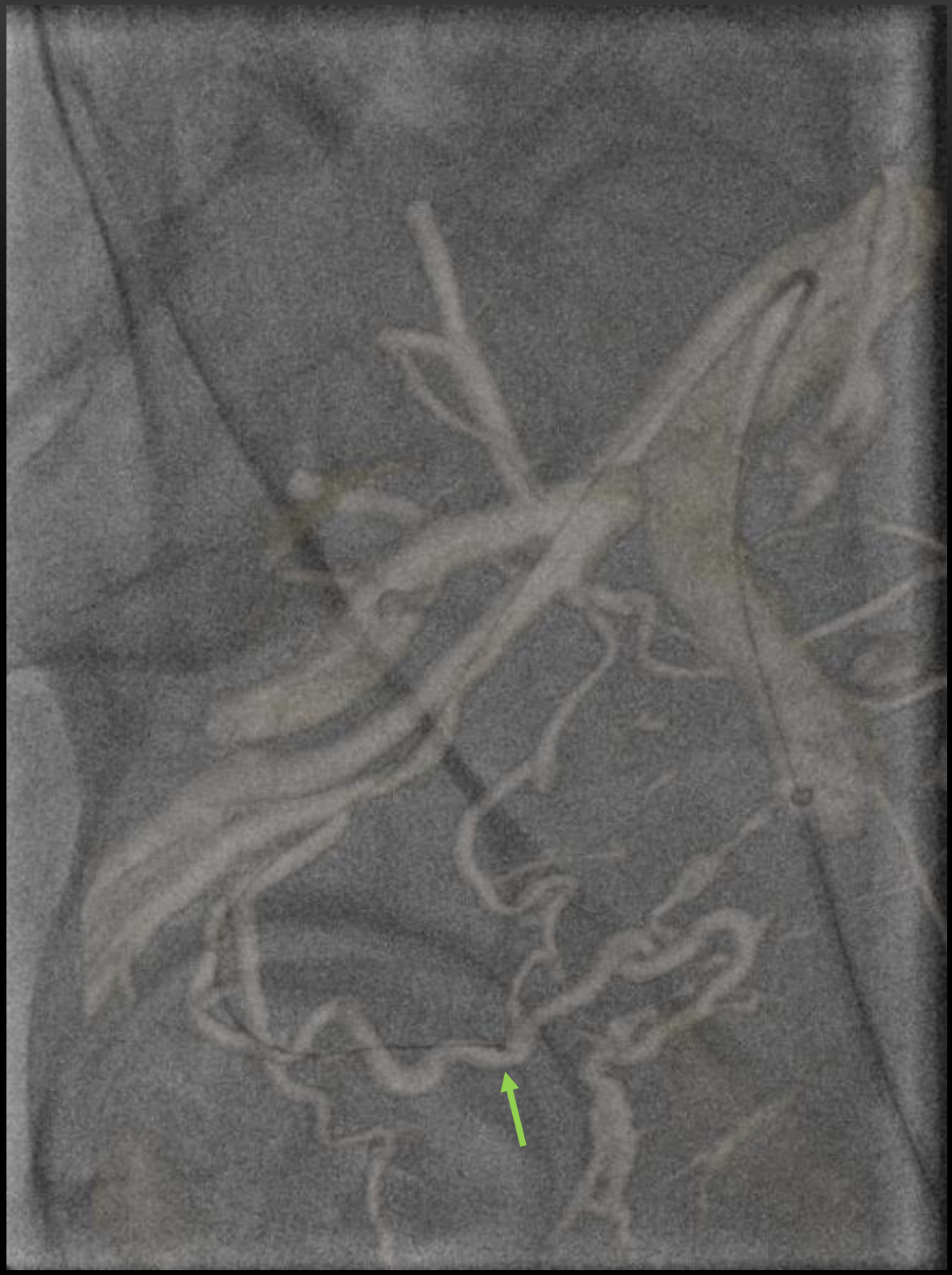

(Filt. 6)

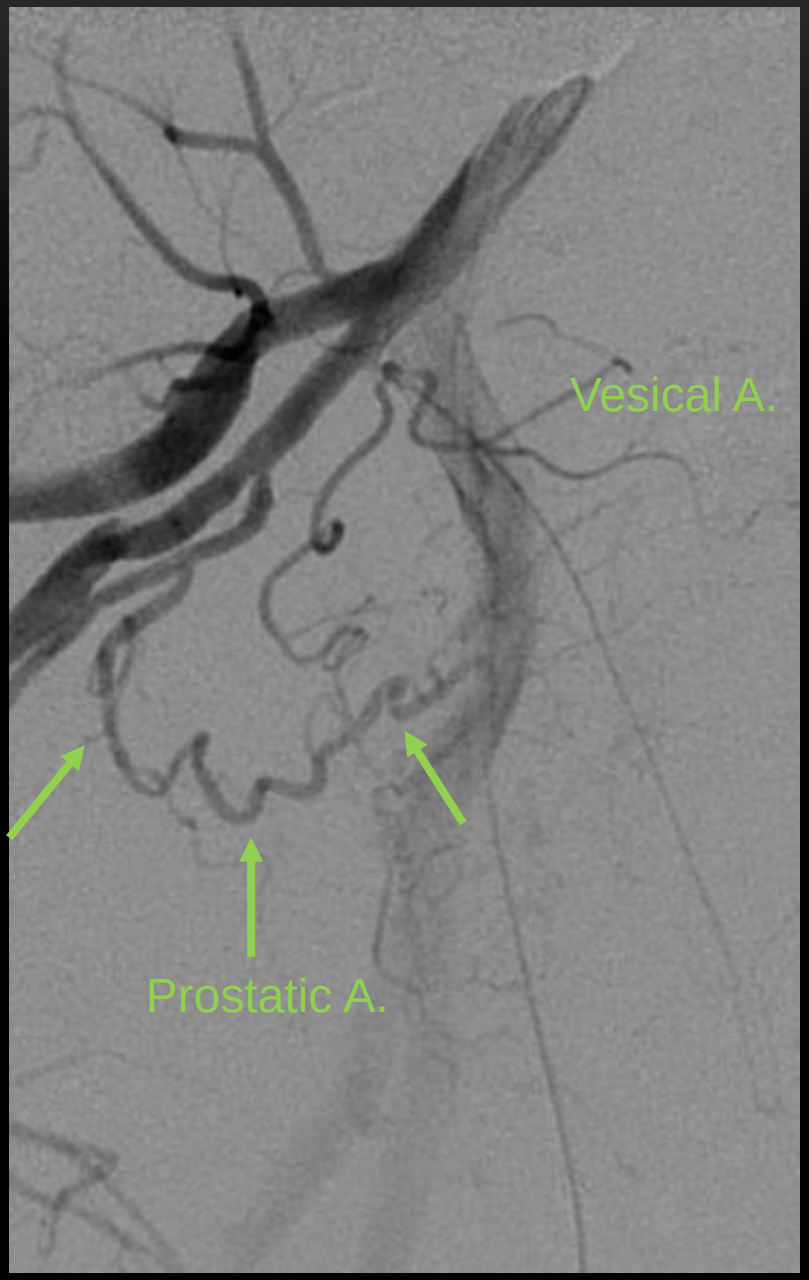


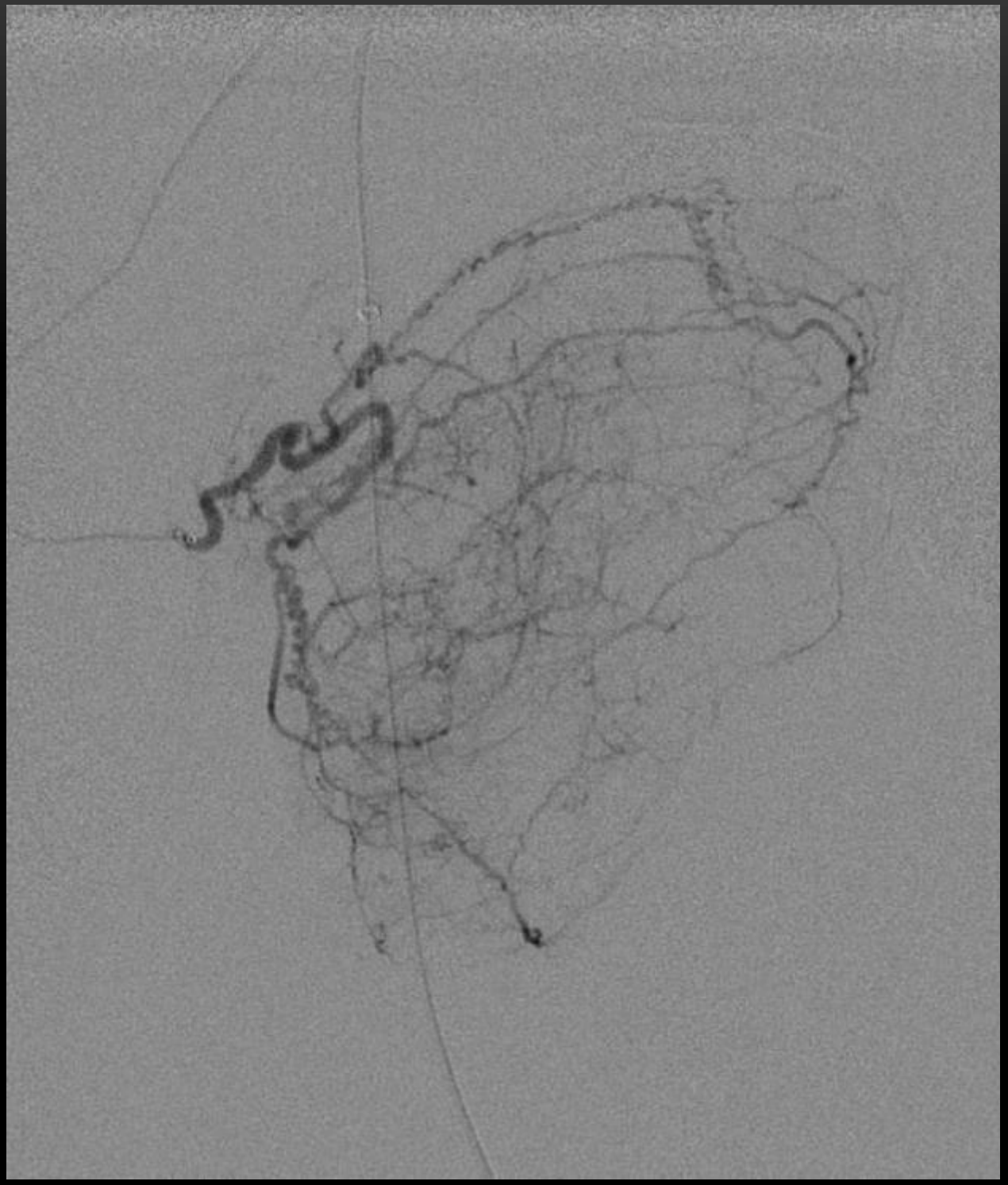


RAO 35°
Caud 10°


Vesical A.
Prostatic A.




Vesical A.
Prostatic A.



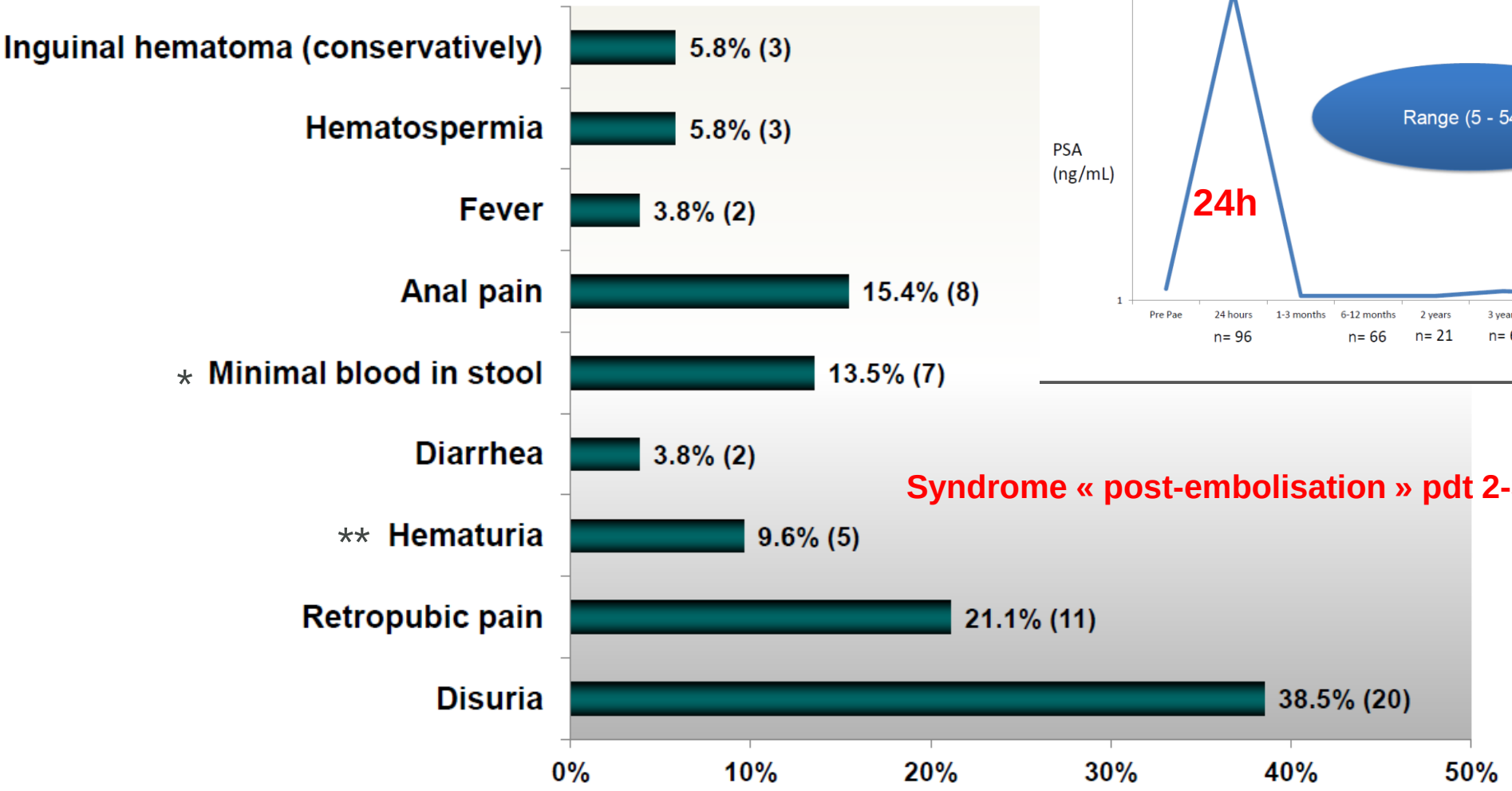
Clinical Results to Date (2008 →)

- Succès **technique**: **bilateral PAE**
  - ✓ 92% des cas
  - ✓ mais **amélioration des symptômes** même si échec technique partiel (**embolisation unilatérale**)!

- Succès **clinique**, 3-6 mois post-PAE:
  - ✓ **98%** des patients décrivent une **amélioration des symptômes**
    - → **98%** des patients ont un score **IPSS<8** *(versus >18 avt PAE)*
    - → **96%** des patients ont une **QoL≤3** *(versus >3 avt PAE)*

- Suivi des patients: par l'urologue !

Suivi, complications



Syndrome « post-embolisation » pdt 2-3j

* Très rares cas d'ischémie rectale → résolution spontanée
** Très rares cas d'ischémie vésicale nécessitant une résection (0,5%)

The role of prostatic arterial embolization in patients with benign prostatic hyperplasia: a systematic review.

Schreuder SM, Scholtens AE, Reekers JA, Bipat S.

Cardiovasc Intervent Radiol. **2014 Oct**;37(5):1198-219. PMID: 25005565

But: Méta-analyse de 9 séries (between June 2008 and March 2013)

706 patients – suivi jusqu'à 12 mois post PAE.

Résultats:

IPSS and QOL-related symptoms improved mainly during the first month, with a further improvement up to 30 months.

- Mean IPSS score: **t0 = 23.31** → t+1m = 11.92 → **t+30m = 8.1**
- Mean QOL: **t0 = 4,34** → t+1m = 2,4 → **t+30m = 1,67**

No deterioration of the IIEF was seen after PAE

No case of impotence or retrograde ejaculation reported.

The PAE procedure seems **safe**:

- 6 bladder ischemia → 2 transient, 4 R/minor surgery (resection of a small area of necrosis).
- 20 transient rectal bleeding
- No cases of intestinal wall ischemia or corpus cavernosum ischemia.
- Most patients experienced no or mild pain. 4 patients with severe pain (VAS 9 or 10 – dt 4 bladder ischemia).
- Minor complications: hematoma on puncture site (n = 26), hematuria (n = 59), hematospermia (n = 38), urinary tract infection (n = 67), prostatitis and balanitis (n = 10) → Transient and R/Ab.

Embolisation des fibromes utérins

INTRODUCTION

- L'embolisation utérine est proposée depuis 1979
  - Saignement traumatique ou tumoral
  - Hémorragie du post-partum

- L'embolisation des **fibromes utérins** est proposée depuis 1989/**1995** (Lancet)

- **Essor récent** (USA, France, Allemagne…)
  1. Pression *économique* (assurances US)
     * USA: 350 000 hystérectomies/an pour fibrome
     * France: 60 000 env.
  2. Influence des résultats d'*études favorables*

(France : Femic , Ecosse : Rest trial , Nederland : Emmy trial , Canada : arrêtée car préférence embolisation…)

… retard +++ de la Belgique !

(lobby gynécologique – UCL+++)

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POLITICS

Rice 'resting comfortably' after surgery

Expected to return to work on Monday

Friday, November 19, 2004 Posted: 4:07 PM EST (2107 GMT)

WASHINGTON (CNN) -- National security adviser Condoleezza Rice, President Bush's nominee to be the next secretary of state, is doing well after successful surgery, Jim Wilkinson, deputy national security advisor, told CNN Friday.

Rice is "out of surgery and resting comfortably after undergoing a successful uterine fibroid embolization at Georgetown University Hospital this morning," he said. "The minimally invasive procedure took an hour and a half and was performed by interventional radiologist James Spies."

National security adviser Condoleezza Rice

NBC NIGHTLY NEWS WITH BRIAN WILLIAMS

sponsored by Cialis (tadalafil)

Treating uterine fibroids without surgery

Alternative to hysterectomy often not discussed with patients

By Robert Bazell
Correspondent
NBC News
Updated: 12:59 p.m. ET Aug. 25, 2004

Laura Rogers, a 38-year-old allergist, suffered from uterine fibroids, a condition that strikes hundreds of thousands of women each year. Even though she is a physician, her own gynecologist did not tell her about a non-surgical treatment option.

"Frustr

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The Frontier: Interventional Radiology

To fix a brain aneurysm, doctors had to saw open the skull. Now they can use a tiny catheter instead. The promise of IR.

Choice: An aneurysm under IR repair

Silent Treatment

Hysterectomy Alternative Goes Unmentioned to Many Women

Gynecologists Often Don't Cite Less-Invasive Procedure To Treat Fibroid Tumors

Bailiwick of Other Specialists

By Kevin Helliker And Lauren Etter

Hundreds of thousands of women go to gynecologists each year with a common condition known as uterine fibroid tumors. When it's severe, a majority of them get the same recommendation: a hysterectomy, or removal of the uterus.

In recent years, a less invasive procedure, known as uterine artery embolization or UAE, has been growing in popularity. Yet some patients, and even some gynecologists, say many gynecologists aren't telling their patients about the alternative.

A study presented at a medical conference in 2002 found that of 100 UAE patients at Chicago's Northwestern Memorial Hospital, 79 had learned about the procedure from a source other than a gynecologist. A survey by Yale University School of Medicine in 2002 found that 13 of 21 UAE patients had learned about the procedure from the Internet.

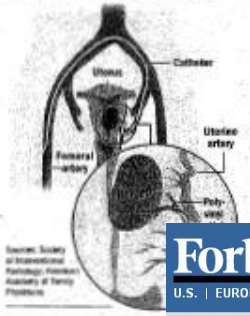
"It's sad," says Juergen Eisenmann, a gynecologist who is medical director of the South Florida Institute for Reproductive Medicine. "We do a disservice not to mention all the options."

In the large majority of cases, UAE brings relief from uterine fibroid tumors, and it has a much shorter recovery time than hysterectomies. These tumors aren't cancerous, but their growth can be debilitating. UAE involves cutting off the blood supply to the tumors, causing them to shrink.

Some gynecologists blame the failure

Delicate Remedy

Uterine artery embolization uses small polymer particles to cut off the blood supply to fibroid tumors in the uterus.



that they provide, they are refer you" to another spe Ruth Rhaber, a gynecologis women's health at Kaiser Northern California, a large tenance organization.

Gynecologists in the U about 200,000 hysterectomie fibroids, meaning that $400 nual fees in at stake. Wom have uterine problems simp to, or are referred to, gyne medical profession's expe uterus.

UAE isn't a perfect solu recommended for women have children. Studies have as many as 20% of patie dergo it experience further toms after three years, and the procedure is too new for doctors to know whether that percentage will rise with

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Health

Nonsurgical Technique Effective Against Fibroids

-- Robert Preidt

FRIDAY, April 1 (HealthDay News) -- A nonsurgical treatment for uterine fibroids, known as uterine fibroid embolization (UFE), has a five-year success rate of 73 percent, according to a new study involving 182 women.

The New York Times nytimes.com

PRINTER-FRIENDLY FORMAT SPONSORED BY SIDEWAYS NOW PLAYING IN THEATERS

November 23, 2004

Treating Troubling Fibroids Without Surgery

By LAWRENCE K. ALTMAN

Condoleezza Rice, the national security adviser, shares at least one thing with millions of other American women: she had fibroids, benign tumors in the uterus that required treatment.

Ms. Rice, the nominee for secretary of state, entered the hospital for an overnight stay last week to undergo a procedure - uterine artery embolization - that is rapidly becoming an alternative to major surgery for troublesome fibroids.

For most women, fibroids, consisting of muscle and fibrous tissue, are no bother. But for millions of others, fibroids can be so large (in some cases, the size of a melon) or so numerous that they cause discomfort, severe bleeding, anemia, urinary frequency and other symptoms.

abcNEWS

Elyse Fine found an alternative to hysterectomy for treatment of her uterine fibroids.
ABC News

Conflicting Opinions

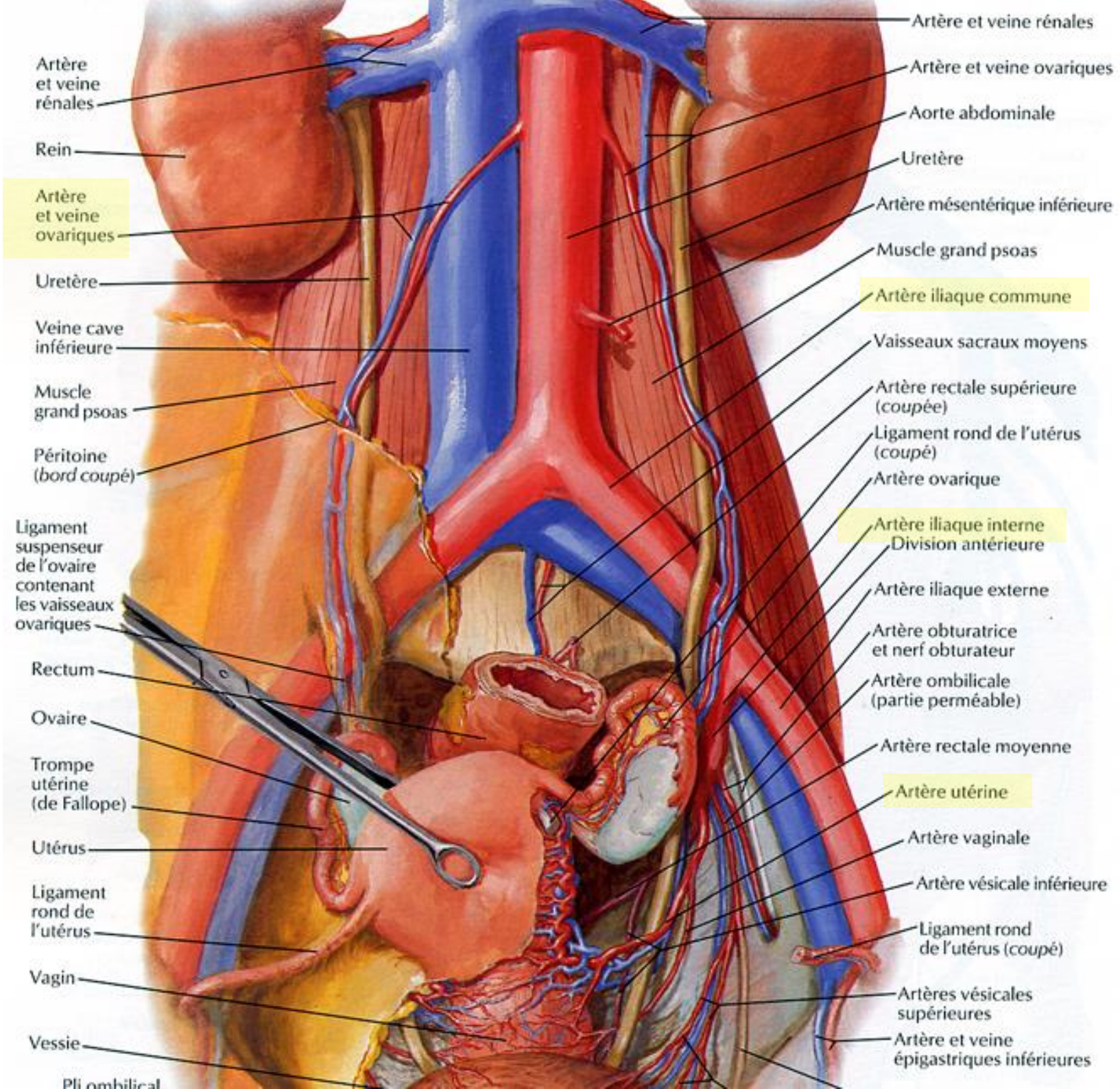
Is a Turf War Compromising Women's Medical Care?

ABCNEWS.com

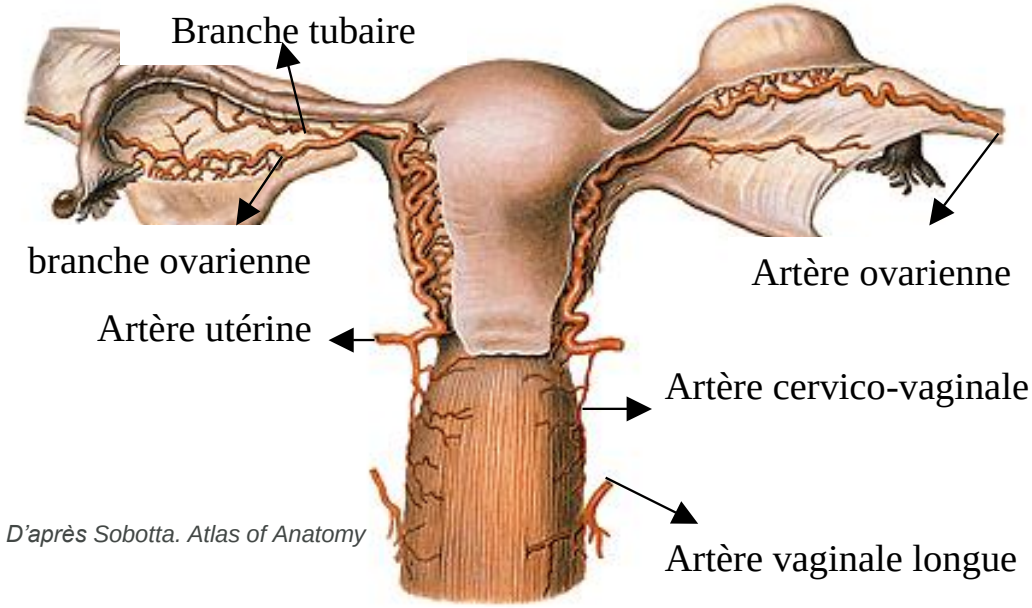
Aug. 27, 2004— Elyse Fine's gynecologist told her she needed a hysterectomy to treat a uterine fibroid that was causing heavy bleeding. But Fine, a 44-year-old mother of two, did not agree.

Every minute of every day in this country a woman has her uterus removed in a hysterectomy. Most of the surgeries are done on women under age 50, and the vast majority are performed to treat fibroids, benign tumors that develop in the uterus. Fibroids occur in as many as 80 percent of women. While the growths can cause pain and heavy bleeding, most do not need treatment.

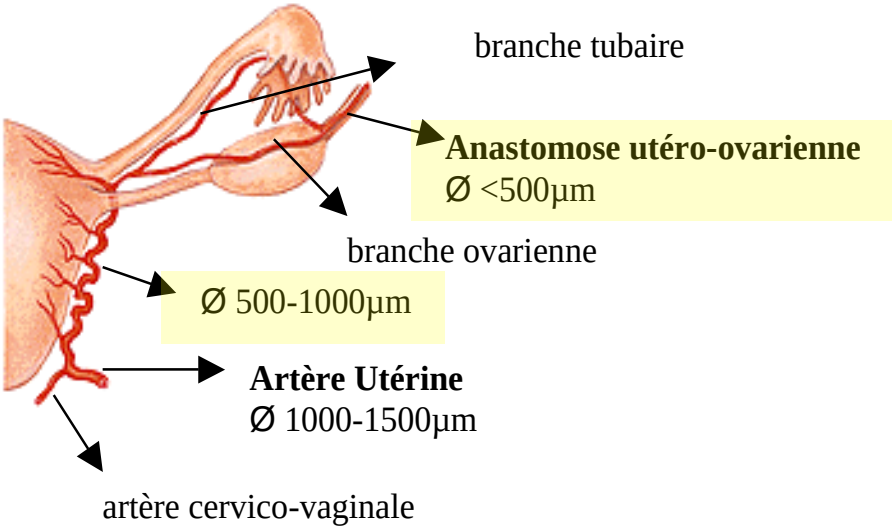
Non-Surgical Option


Artère et veine rénales
Artère et veine ovariques
Aorte abdominale
Uretère
Artère mésentérique inférieure
Muscle grand psoas
Artère iliaque commune
Vaisseaux sacraux moyens
Artère rectale supérieure (coupée)
Ligament rond de l'utérus (coupé)
Artère ovarique
Artère iliaque interne
Division antérieure
Artère iliaque externe
Artère obturatrice et nerf obturateur
Artère ombilicale (partie perméable)
Artère rectale moyenne
Artère utérine
Artère vaginale
Artère vésicale inférieure
Ligament rond de l'utérus (coupé)
Artères vésicales supérieures
Artère et veine épigastriques inférieures
Artère et veine rénales
Rein
Artère et veine ovariques
Uretère
Veine cave inférieure
Muscle grand psoas
Péritoine (bord coupé)
Ligament suspenseur de l'ovaire contenant les vaisseaux ovariques
Rectum
Ovaire
Trompe utérine (de Fallope)
Utérus
Ligament rond de l'utérus
Vagin
Vessie
Pli ombilical

Vascularisation de l'utérus



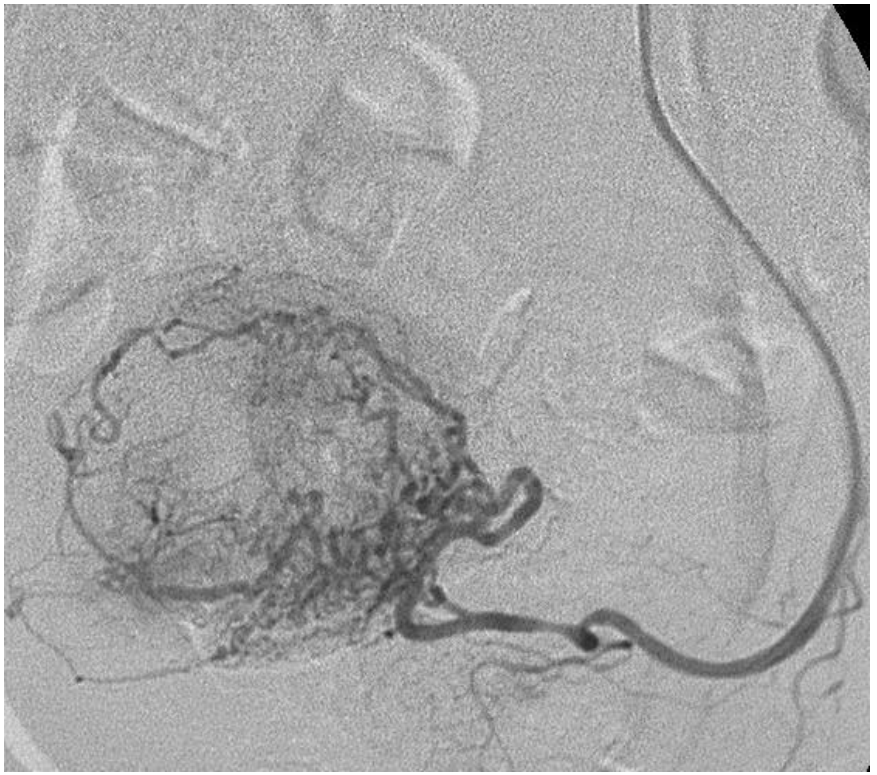
D'après Sobotta. Atlas of Anatomy



Les fibromes utérins sont vascularisés par un réseau artériel périphérique (pseudo-capsule), de 500-900µm Ø,

d'où partent des branches centripètes grêles.

→ **BUT: Obtenir la nécrose ischémique des fibromes**



Bilan Pré-Embolisation

- Sélection des patientes: **fibromes symptomatiques**
- Confirmation du diagnostic de fibrome
  - Nombre et taille
  - Localisation
  - Vascularisation
- Eliminer un cancer associé !
- Eliminer une infection gynécologique ou annexielle évolutive

- Prévention du spasme artériel:
  - ✓ Arrêt des analogues de la Gn-RH 3 à 4 mois avant la procédure
  - ✓ Arrêt des progestatifs 4 à 6 semaines avant la procédure

Pelage JP, et al. Radiology 1999;210:573-5

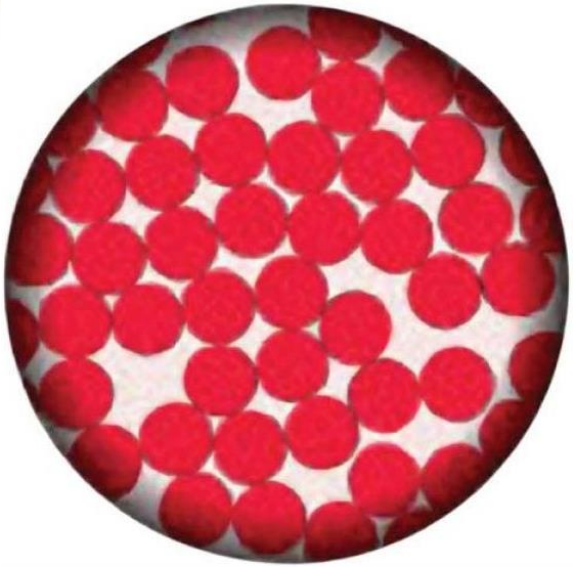
- **Contre indications:**
  - ✓ **Fibrome sous-séreux pédiculé**
  - ✓ Pathologies associées (cancer, infection)
  - ✓ Désir de grossesse **AVEC** alternative chirurgicale simple (myomectomie) ?

EN PRATIQUE

- Consultation gynécologique
  - Pose l'indication
    - Discussion des alternatives thérapeutiques !
  - Elimine les autres pathologies
- Consultation radiologue interventionnel
  - Faisabilité
  - Information, consentement
- +/- Consultation anesthésie

TECHNIQUE

- Abord artériel fémoral commun unilatéral (rarement bilatéral) – intro 4F (1,5mm)
- Cathétérisme A.iliaques internes puis micro-cathétérisme A.utérines.
- Matériel d'embolisation:
  - ✓ Particule de PVA (>500 µm Ø)
  - ✓ **Micro-sphères (500-700µm Ø)**
- Système de fermeture du point de ponction artériel



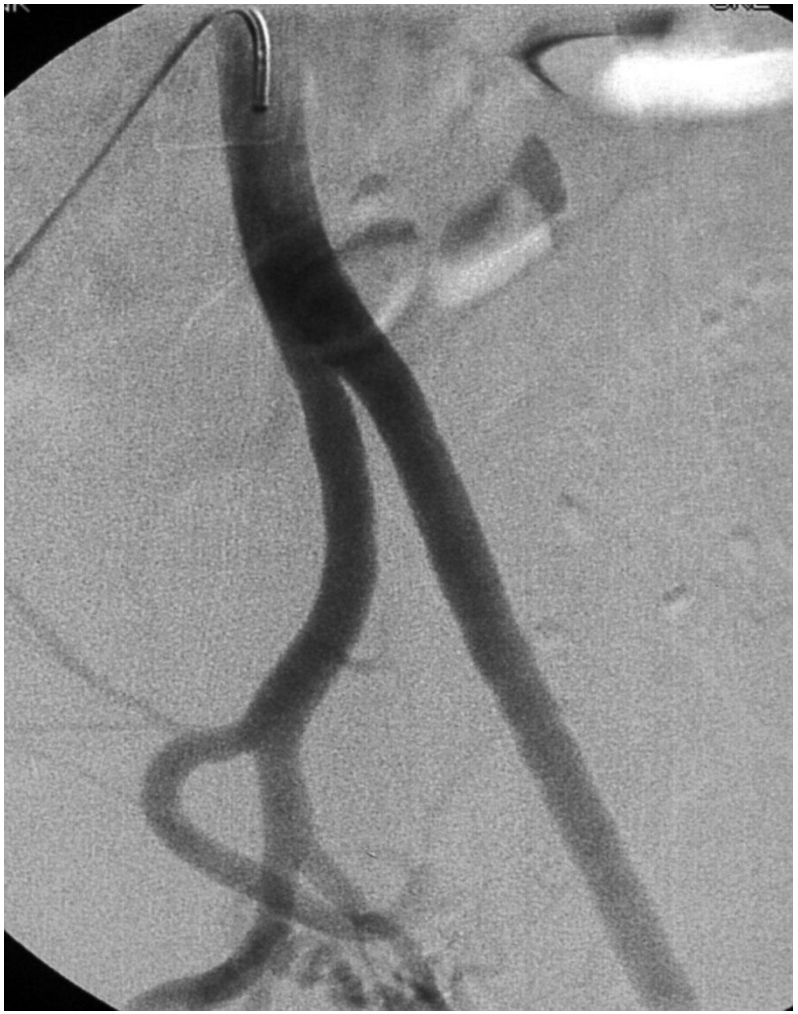
ANALGESIE

- Antidouleurs IV avant et pendant la procédure +/- anxiolytique

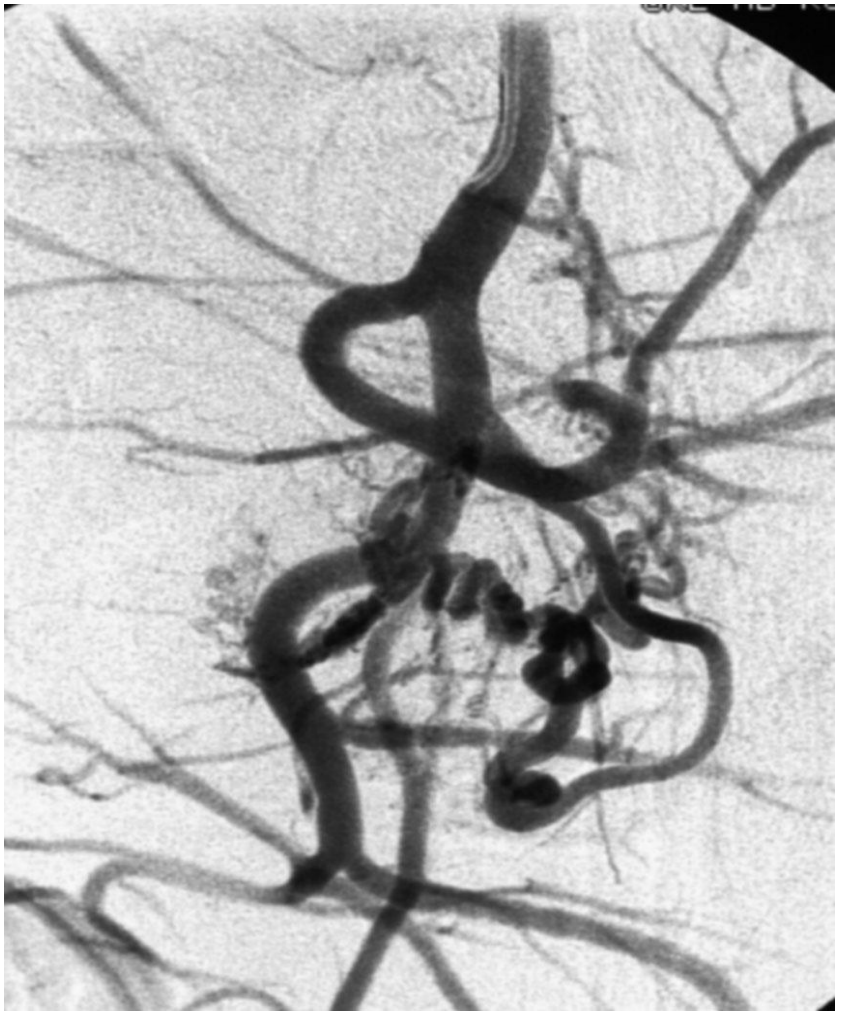
- Pendant la procédure: selon souhait patiente
  - ✓ **Pompe PCA**
  - ✓ Péridurale
  - ✓ Anesthésie générale

- **Après la procédure:**
  - ✓ **AINS**
  - ✓ Paracétamol +/- morphiniques

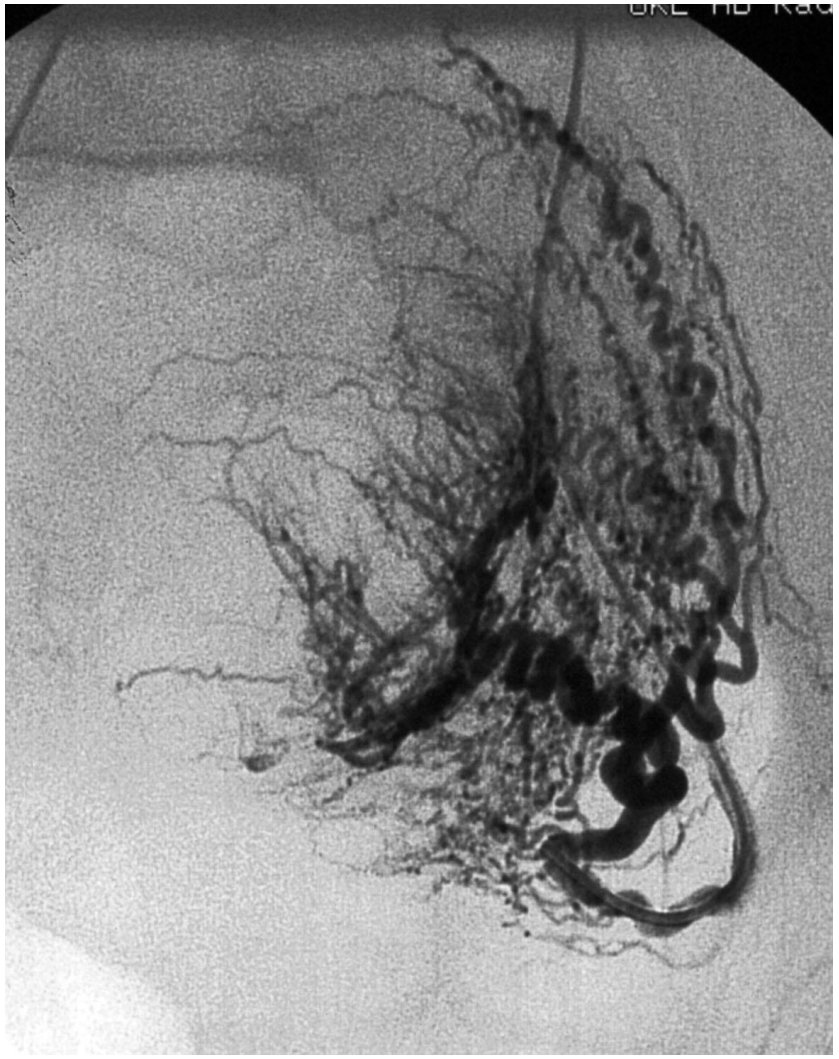
Déroulement d’une Embolisation



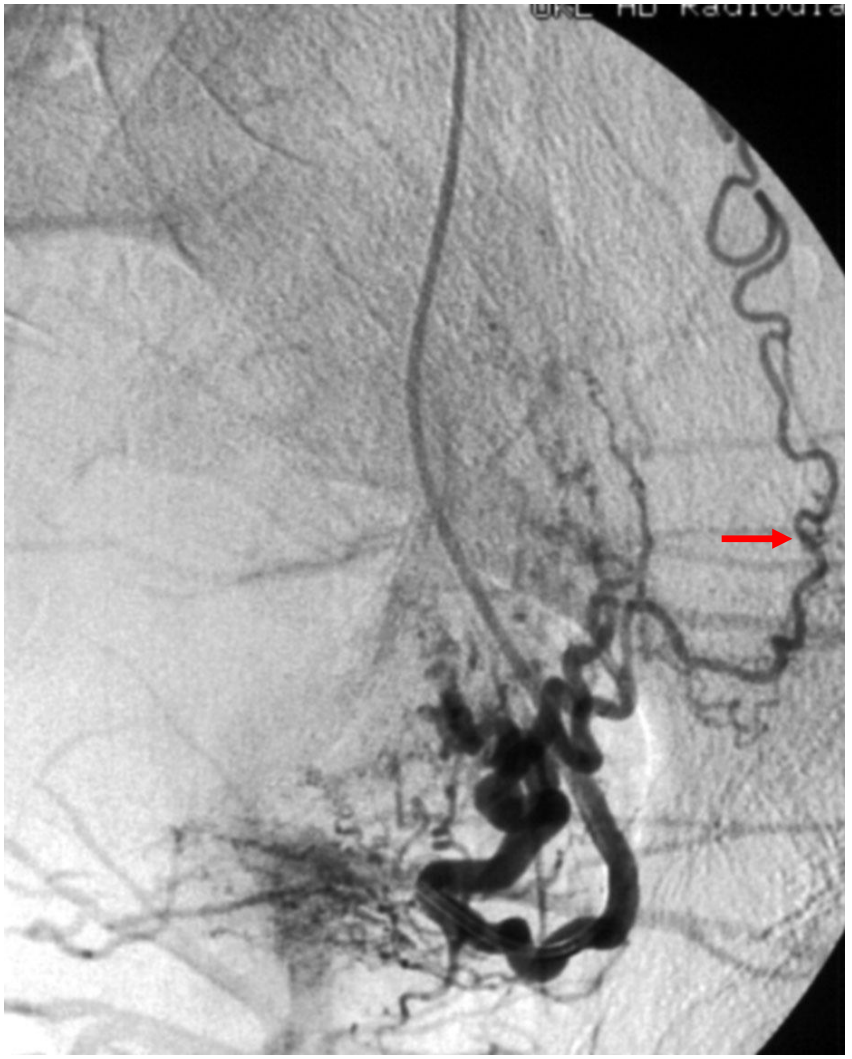
1: KT en cross over, dans l’artère iliaque primitive G



2: KT dans l’artère iliaque interne G



3. µKT sélectif de l’artère uterine G



4. Aspect après embolisation

- ✓ Disparition des branches distales
- ✓ Réduction du flux dans l’artère utérine
- ✓ Branches cervico-vaginales perméables
- ✓ Flux ovarien préservé (←)

RESULTATS

- **Disparition dans 85 à >90% des cas des symptômes, à 6 mois :**
  - ✓ Saignements
  - ✓ Douleur pelvienne
  - ✓ **Amélioration de la qualité de vie**

- Diminution de la taille des fibromes (IRM de contrôle à 6 mois)
  - ✓ volume utérin - 50%
  - ✓ volume des fibromes - 60-70%

- Absence d'amélioration clinique après embolisation: 10%
  - ✓ **Echecs techniques: 1 à 4%**
  - ✓ **Gros fibromes > 10cm**
  - ✓ Adénomyose associée
  - ✓ Leiomyosarcome
  - ✓ Vascularisation extra-utérine (artères ovariennes,…)

Symptômes (2007 Femmes)

Etude	Nombre	Mois	Ménorragies
Goodwin	60	16.3	81%
Ravina	88	?	89%
Hutchins	305	12	92%
Siskin	49	6	89%
Pelage	80	24	94%
Brunereau	58	3	90%
Andersen	62	6	96%
Mc Lucas	167	6	88%
Spies	200	21	85%
Walker	400	16.7	84%
Pron	538	8.2	83%

Volume (1125 femmes)

Etude	Nombre	mois	Utérus*	Fibrome*
Goodwin	59	10.2	- 42%	- 49%
Ravina	88	?	NA	- 69%
Hutchins	92	>3	- 48%	NA
Siskin	16	6	NA	- 47%
Walker	88	3	- 48%	- 48%
Pelage	80	6	NA	- 52%
Brunereau	46	6	- 23%	- 43%
Andersen	30	6	NA	- 68%
Mc Lucas	46	12	- 52%	- 37%
Spies	116	12	- 38%	- 58%
Pron	464	3	- 35%	- 33%

LIMITES et COMPLICATIONS

- Limites du traitement par embolisation:
  - ✓ Si désir de grossesse ? → voir si myomectomie possible
  - ✓ Myome sous séreux pédiculé → chirurgie facile
  - ✓ Myome sous muqueux → prévenir du risque d'expulsion
  - ✓ Myome interstitiel > 90 mm (douleurs) → protocole d'analgésie renforcé

- Complications post-embolisation et solutions:
  - ✓ **Douleurs: 100%** → bien contrôlées, protocole d'analgésie adéquat
  - ✓ **Pyométries (4%)** → suivi post-embolisation
  - ✓ **Aménorrhée transitoire ou définitive - Ménopause précoce**
    → privilégier µsphère de ø suffisant (>500µm)
  - ✓ Récidive ?
  - ✓ Expulsion des fibromes (sous-muqueux) → prévenir patiente

Complications Graves de l'Embolisation

- Infection sévère — <1-2 %
- Aménorrhée secondaire — 2-5 %

  dont **Aménorrhée définitive** — **2 %**

→ Plus fréquent chez les femmes de plus de 45 ans

→ Amélioration technique: particules plus grosses (>500 µm) et mieux calibrées

- Expulsion de fibrome — 1-5 %
- Hystérectomie en Urgence — 5,5/1000
  - Pour infection (et/ou nécrose)
  - Dans le premier mois après l'embolisation
  - Risque majoré avec les fibromes pédiculés
- Mortalité : 5 cas publiés (infection, EP)

Douleurs Post-Embolisation

- **Quasi-constantes**
  - ✓ Douleurs dorsales, crampes abdominales
  - ✓ Nausées et vomissements
  - ✓ Fièvre
  - ✓ Saignements

- Sévères dans 50% des cas

- Précoces, maximum d'intensité **12-24 heures après l'embolisation**
- Persistent **pendant 3-7 jours**

- Traitement intra-veineux durant l'hospitalisation
- Relais per os à la sortie (**antalgiques, AINS**)

UFE BENEFITS COMPARED TO SURGERY

	UFE[a]		Hysterectomy[a]	Myomectomy[b]
Minor complications[c]	28.4%	<<	52%	71.7%
Major complications[c]	3.9%[a] 4.0%[b]		12%	1.7%

	Embolisation		Hystérectomie	Δ
Hospitalisation (jours)	1.71 ± 1.59	<<	5.85 ± 2.52	4.14 $P < .001$
Retour à une activité normale (jours)	9.50 ± 7.21	<<	36.18 ± 20.47	26.68 $P < .001$

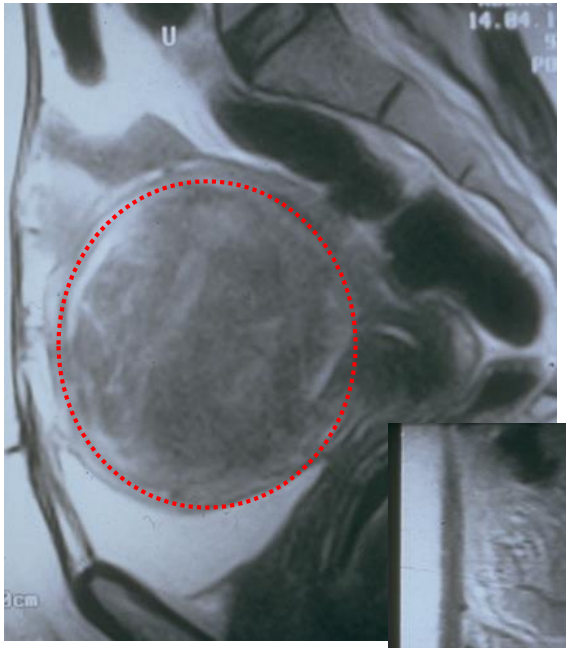
Pinto-Pabon. Radiology 2003;226: 425-431

a) Spies, J.B., et al. (March 2004). Outcome of uterine embolization and hysterectomy for leiomyomas: Results of a multicenter study. *American Journal of Obstetrics and Gynecology, 191,* 22-31.

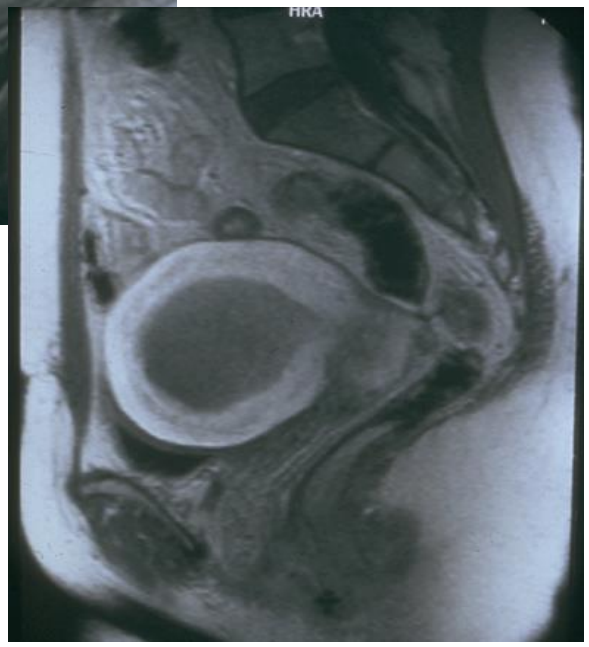
b) Goodwin, S.C., et al. (January 2006). Uterine artery embolization versus myomectomy: a multicenter comparative study. *Fertility and Sterility, 85,* 14-21.

c) Spies, J.B., et al. (November 2002). Complication After Uterine Artery Embolization for Leiomyomas. *Obstetrics and Gynecology, 100,* 873-880.
- Minor complications include Society of Interventional Radiology complication classification levels A & B
- Major complications include Society of Interventional Radiology complication classification levels C or higher

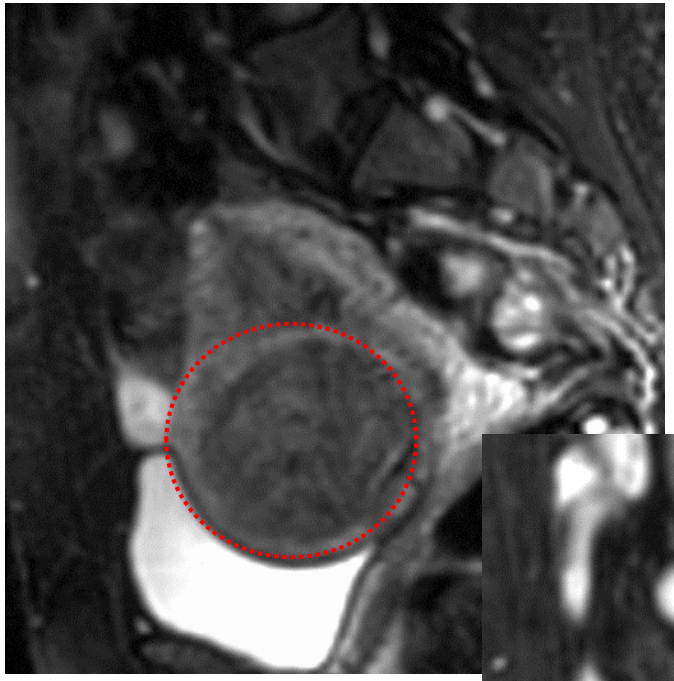
IRM Avant et Après Embolisation



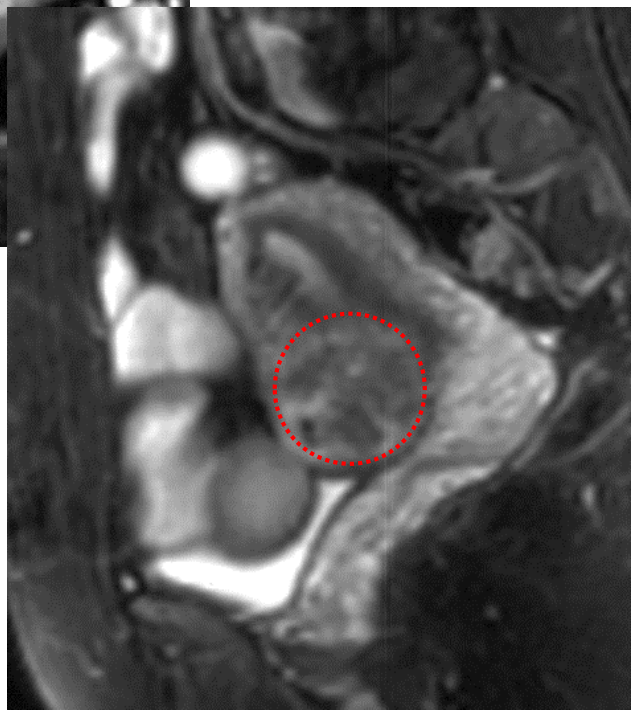
IRM initiale



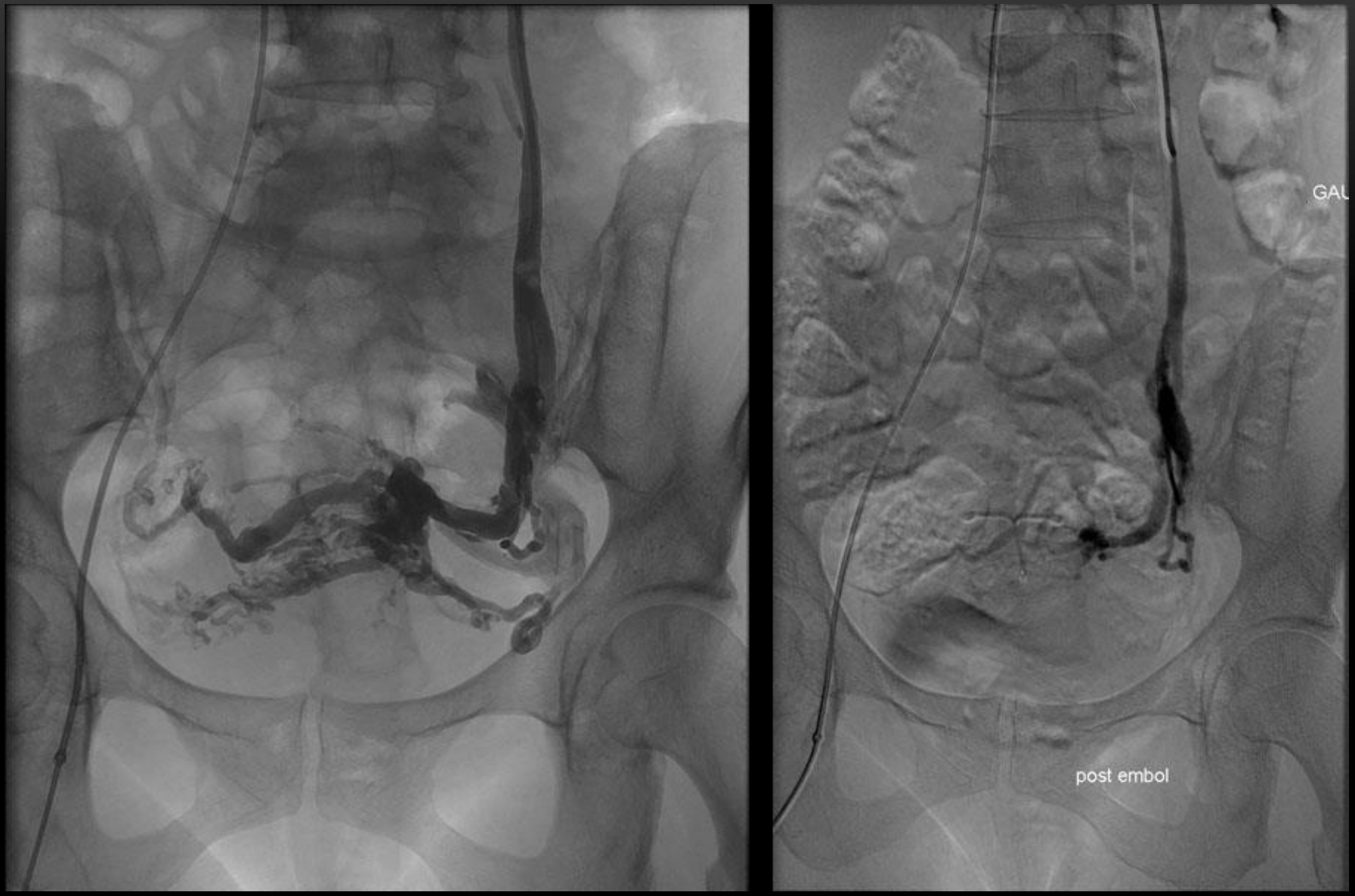
IRM à 6 mois



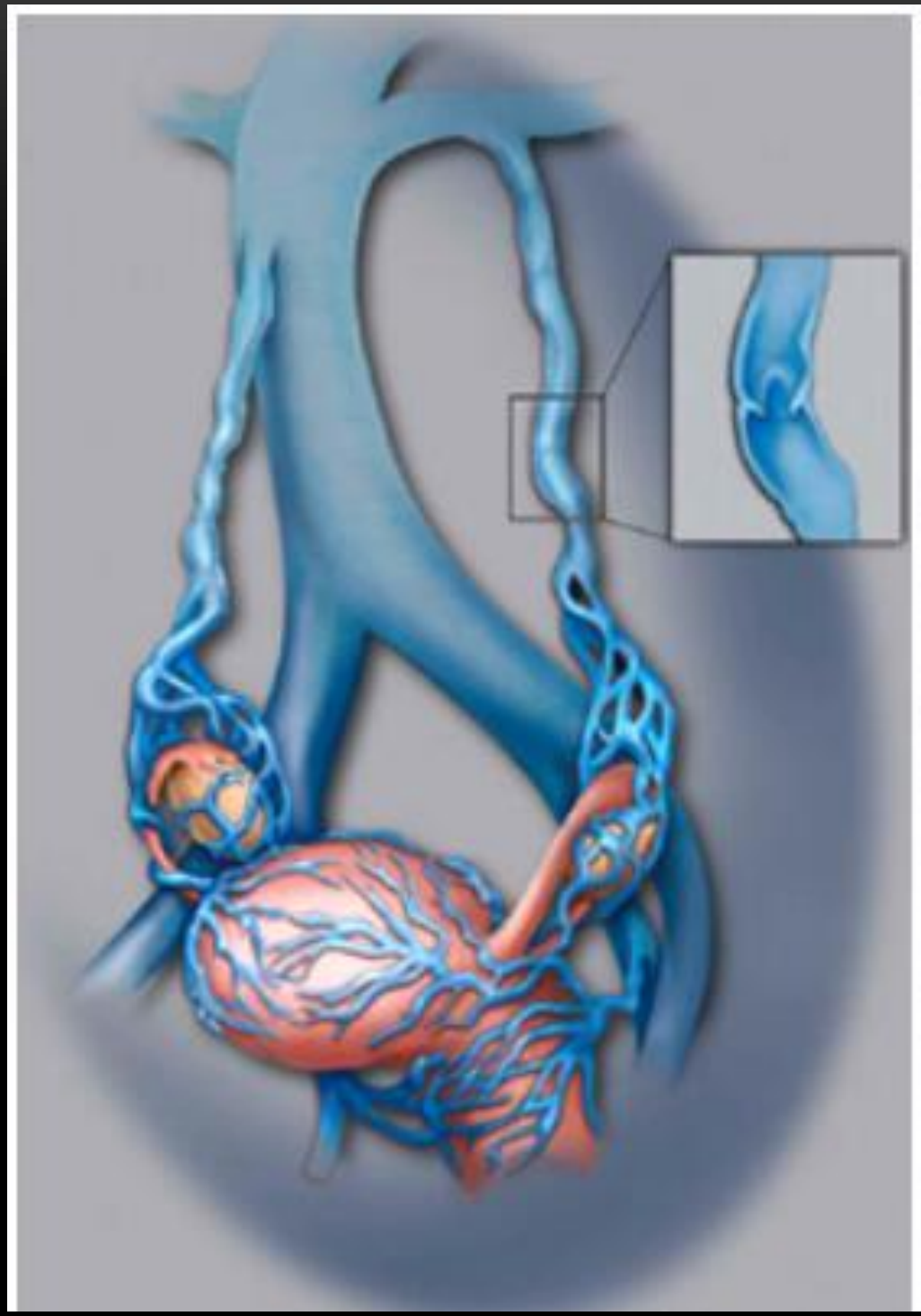
IRM initiale

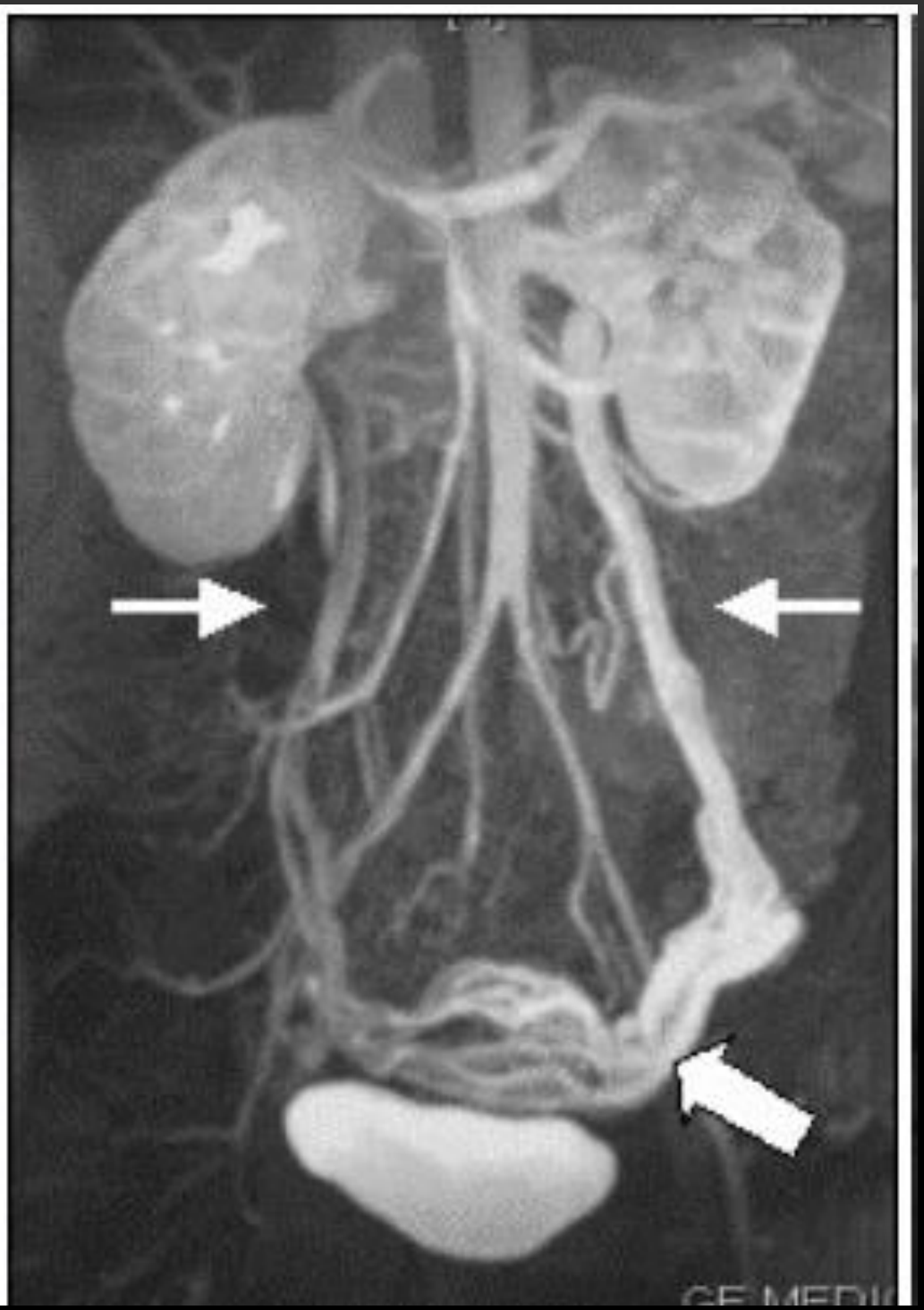


IRM à 4 mois



Embolisation de varices pelviennes – PCS Pelvic Congestion Syndrom





Pelvic pain prevalence & costs

PCS

16% - 31%

of all cases of CPP (2nd only to endometriosis)

Meissner et al (2015)

39% of women reported pelvic pain at some point

1/3 of multipar women suffer Chronic pelvic pain

2-10% of all gynae consults are for pelvic pain

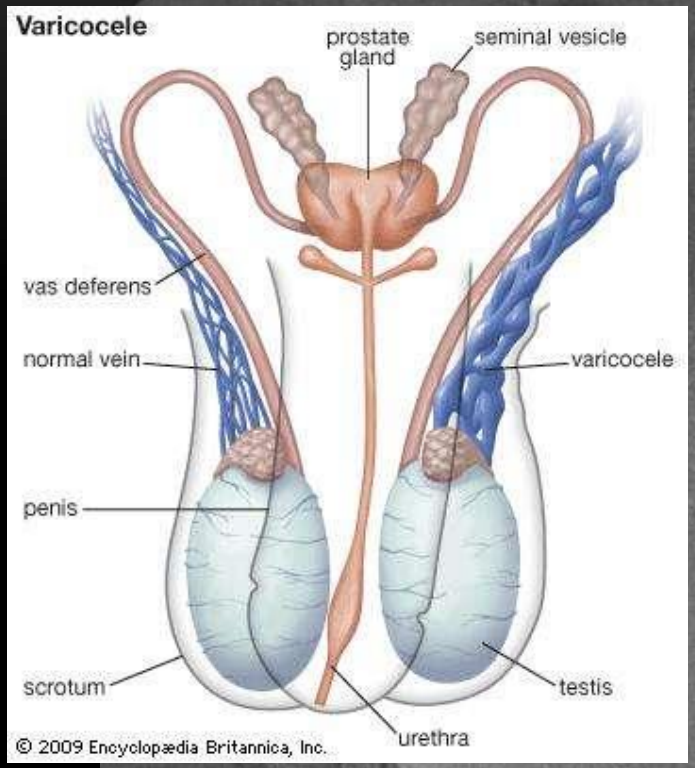
20% of all laparoscopic procedures are for pelvic pain

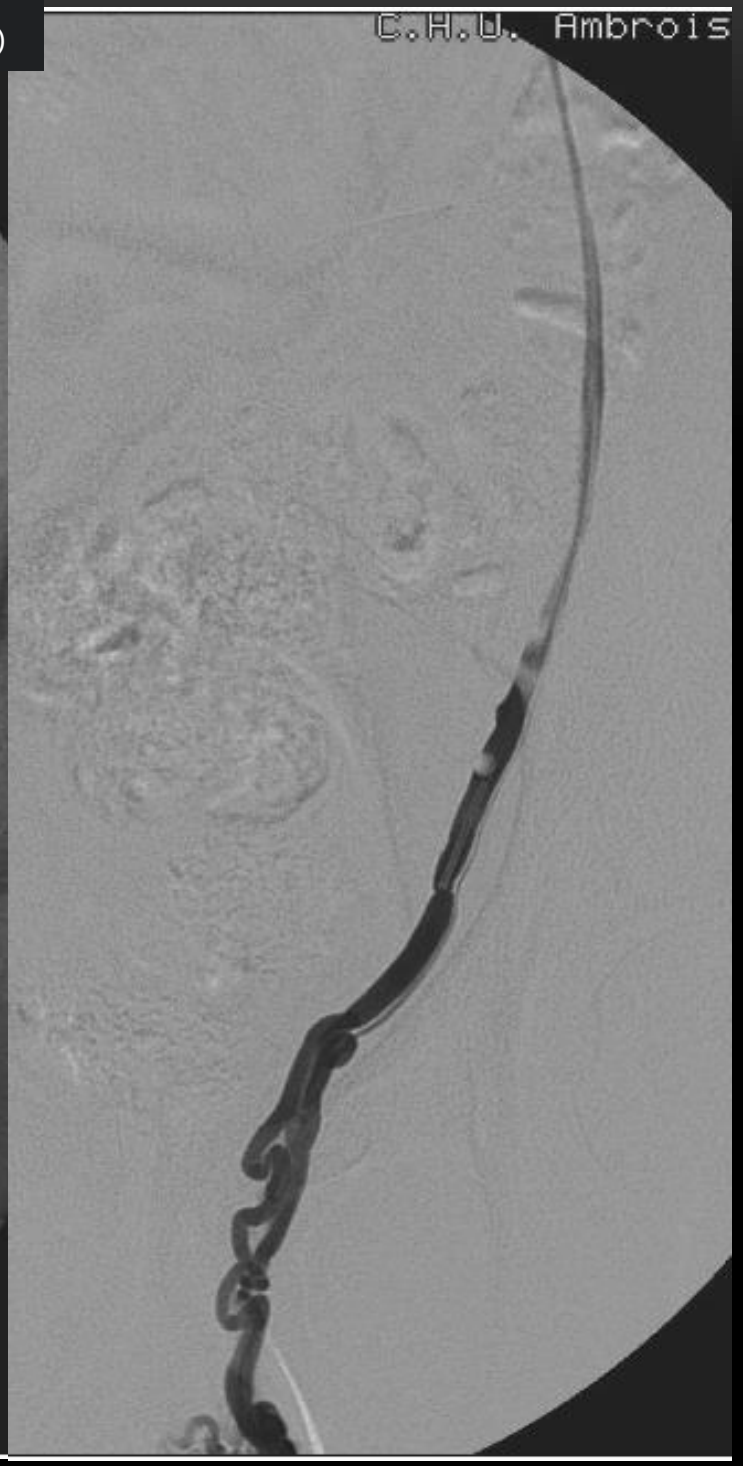
In the UK – 3.8% of primary care presentations

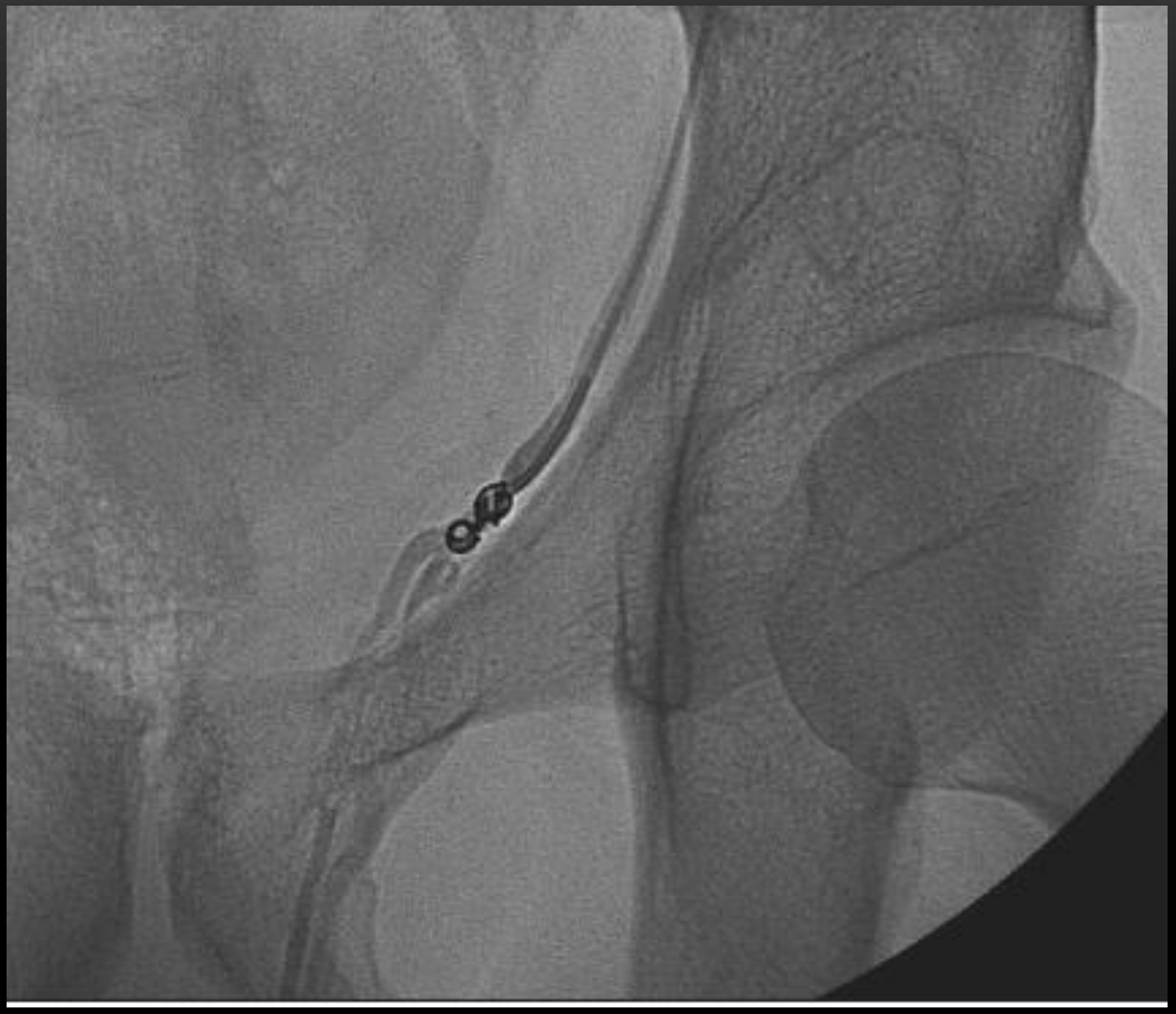
In the UK - Estimated 10 million women suffer with pelvic pain but only 3 million seek treatment

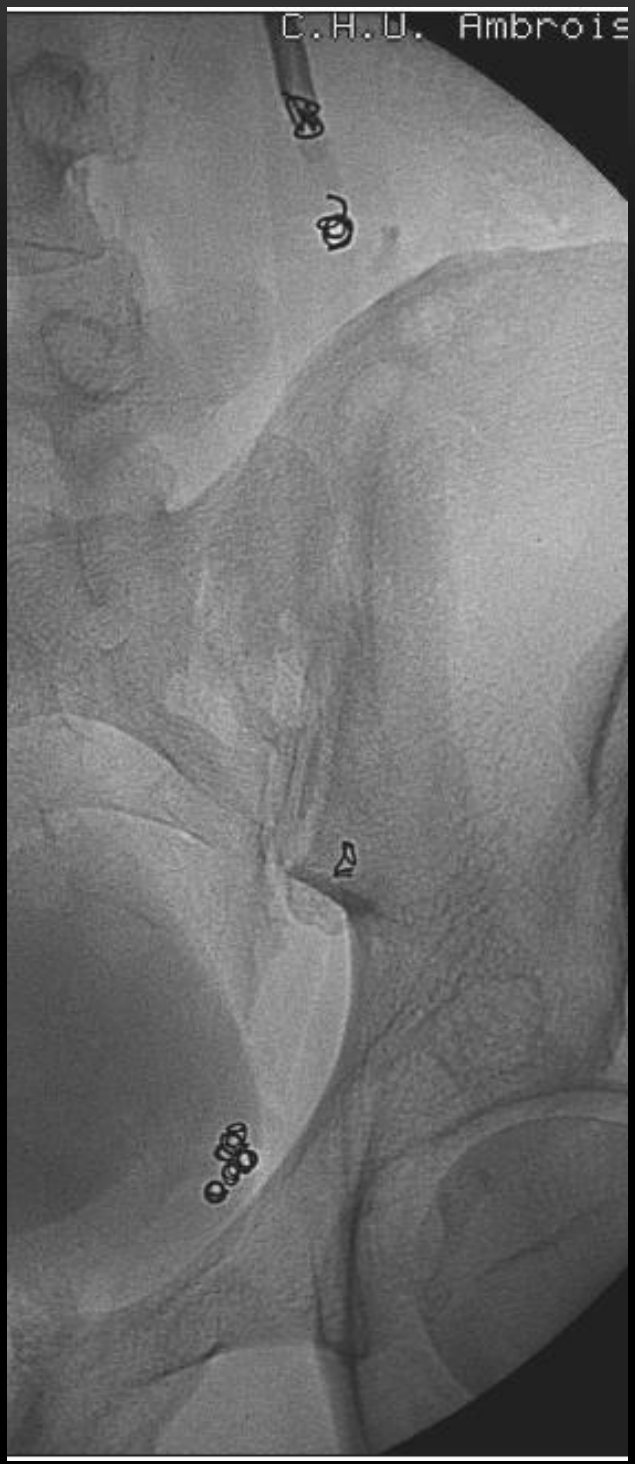
In the US – diagnosis and treatment $1.2 billion, loss of productivity $15 billion

Embolisation de varicocèles (Courtesy of Dr D.Wery)









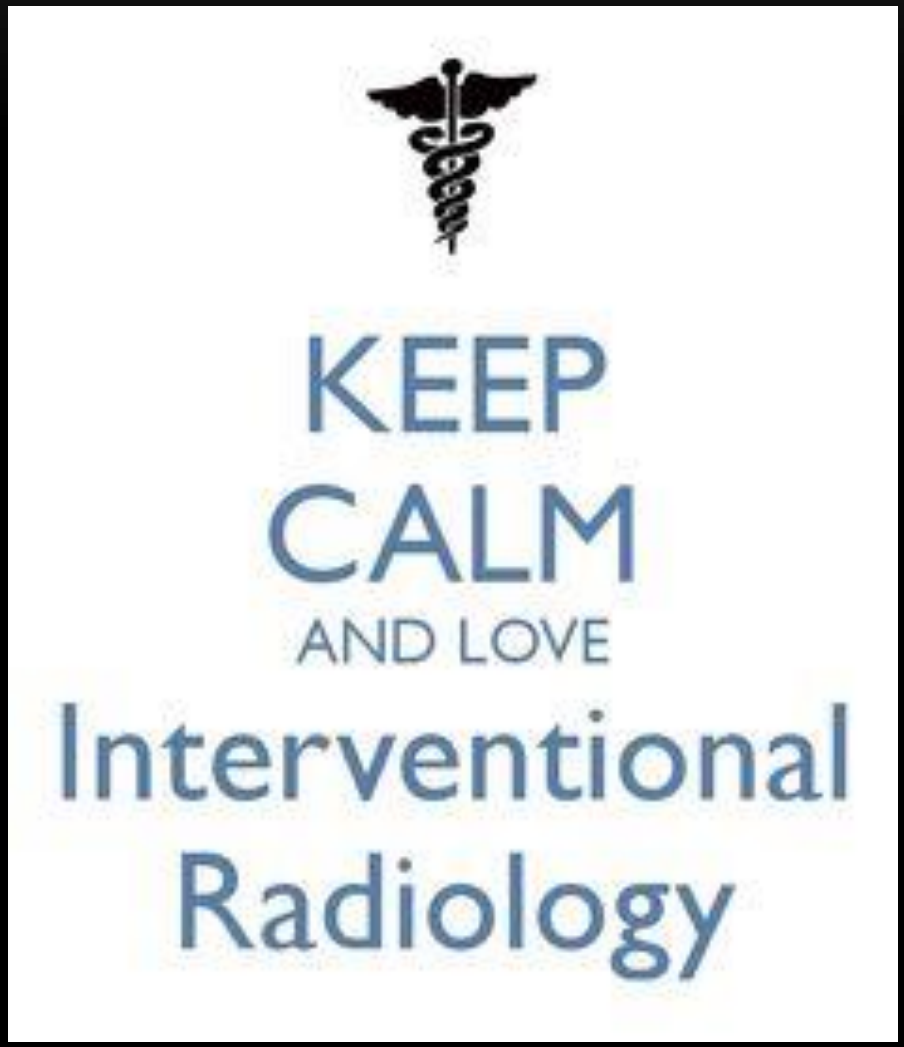
Embolisation de varicocèles – Coils +/- sclérosant

(Courtesy of Dr D.Wery)

6- EMBOLISATION: FUTUR ?

- Embolisation des hémorroïdes (artères rectales supérieures + moyennes)
- Embolisation « bariatrique » (artère gastrique gauche) → effet sur les cellules à gréline
- Embolisation des arthrites inflammatoires
- ONCO:
  - SIRT: autres organes ?
  - TACE: autres chimiothérapies ?
  - Autres agents transmis (thérapies ciblées) ?

Thanks for your attention !



Fabrice Deprez, MD, MSM, EBIR
Référent UCL – enseignement RI
CHWapi - site Union
7500 Tournai
+32.472.93.34.80
dr.fabrice.deprez@outlook.fr