

MANAGEMENT OF ENDOLEAKS

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MANAGEMENT OF EVAR INCONTINENCE

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PRESENTER DISCLOSURE

Presenter: Alison Michels

I have no current relationships with commercial entities

DISCLAIMER

- The focus is primarily on post-operative management of endoleaks in AAA repairs versus thoracic or iliac aneurysms.

SOURCES

IMPLEMENTATION OF GUIDELINES · Volume 74, Issue 6, P1792-1794, December 2021 · [Open Archive](#)

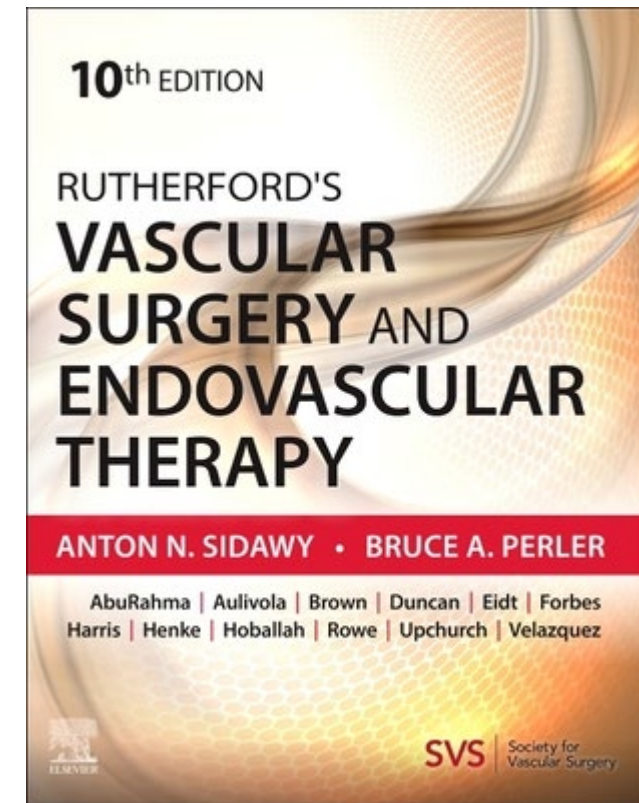
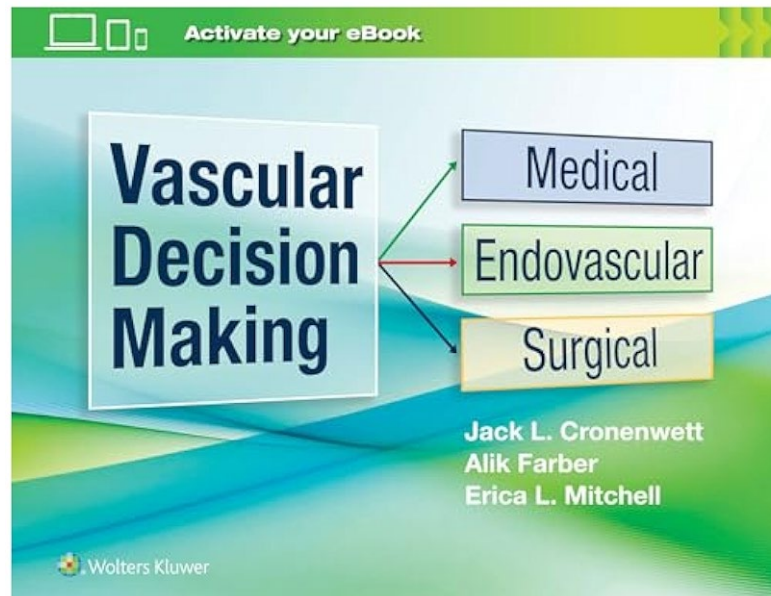
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Society for Vascular Surgery implementation of clinical practice guidelines for patients with an abdominal aortic aneurysm: Endoleak management

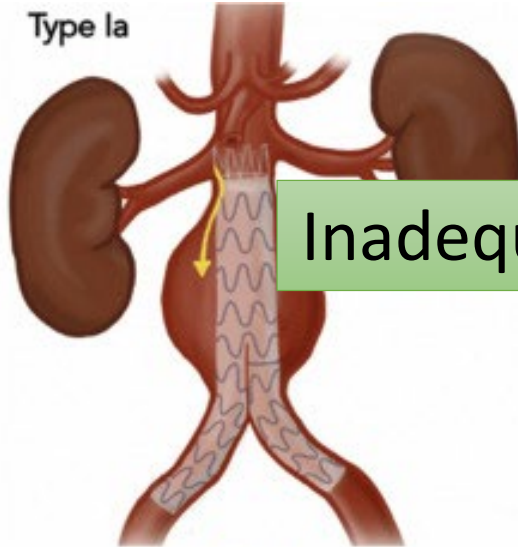
[Rae S. Rokosh, MD^{a,b}](#) · [Winona W. Wu, MD^a](#) · [Ronald L. Dalman, MD^c](#) · [Elliot L. Chaikof, MD, PhD^a](#) [✉](#)

CLINICAL PRACTICE GUIDELINE DOCUMENT

Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Abdominal Aorto-Iliac Artery Aneurysms[☆]

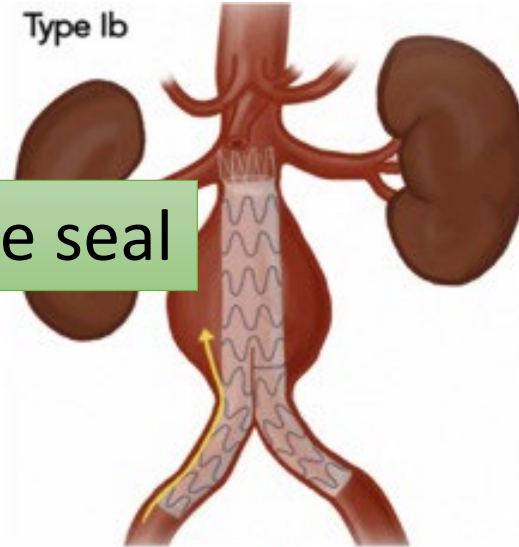


TYPES

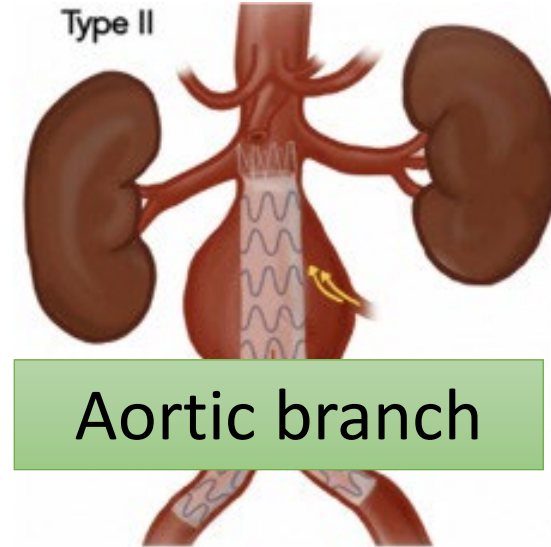


Type Ia

Inadequate seal

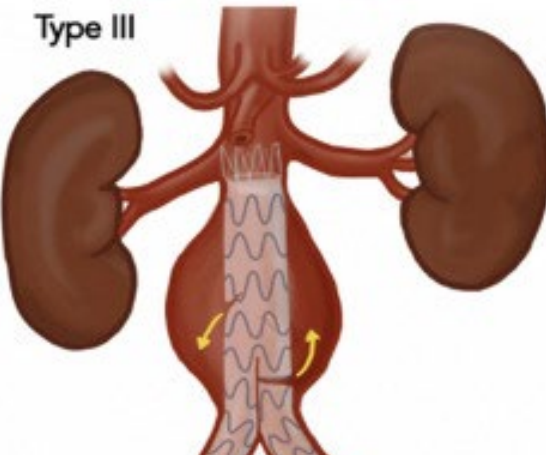


Type Ib



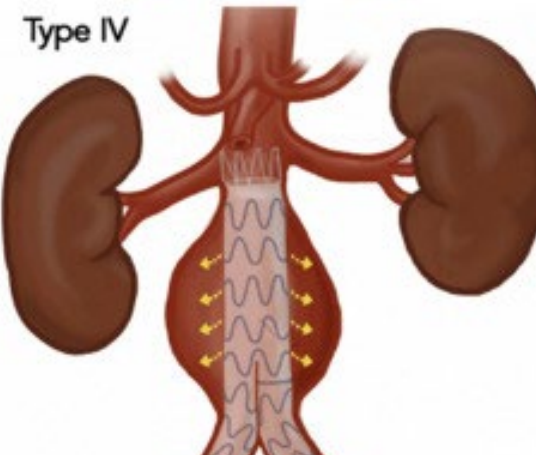
Type II

Aortic branch



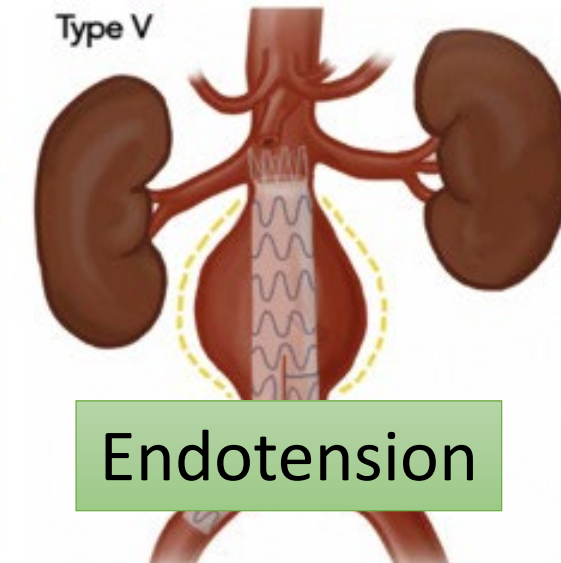
Type III

Graft separation



Type IV

Porosity



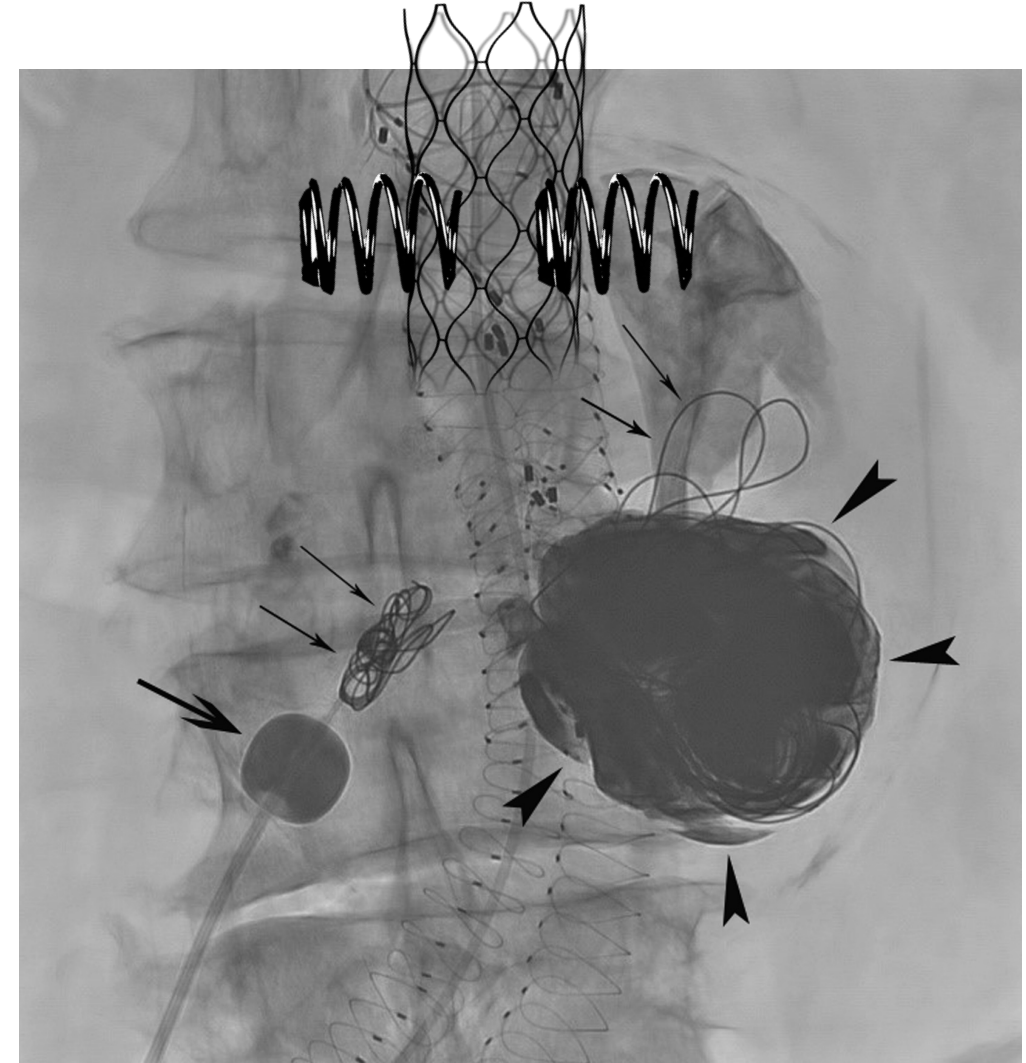
Type V

Endotension

INSTAGRAM



REALITY

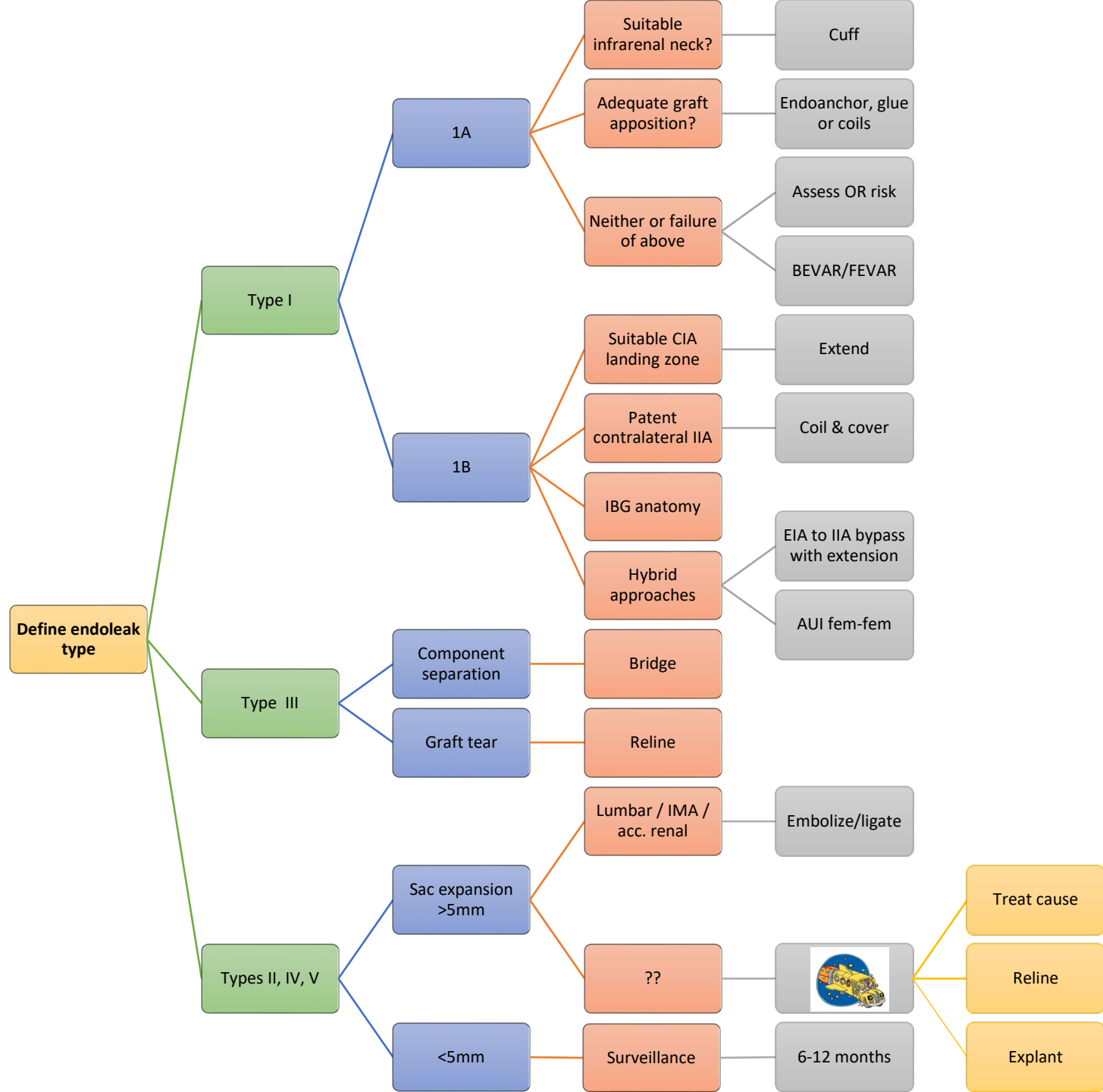


INSTAGRAM

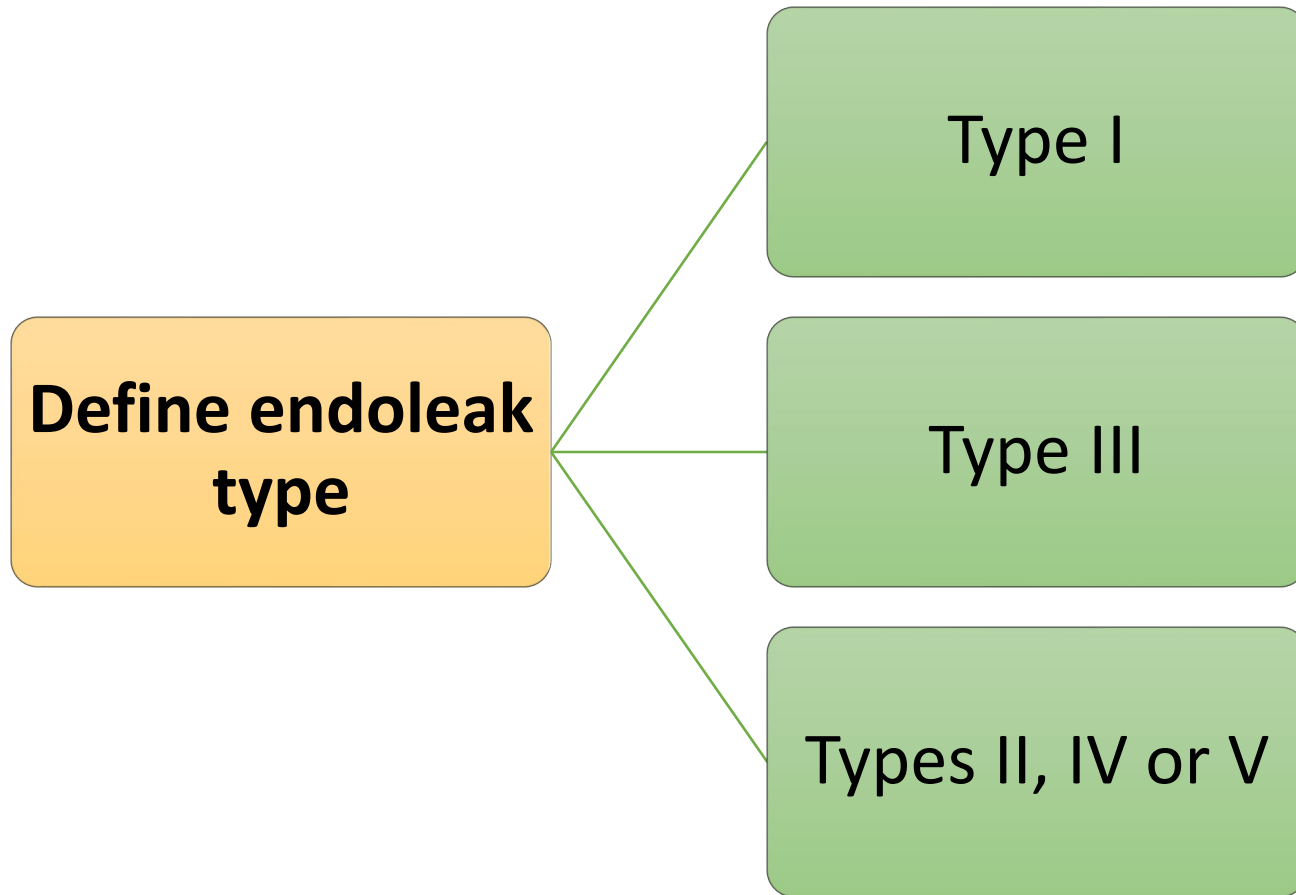


REALITY





DEFINE THE ENDOLEAK



Triphasic CTA

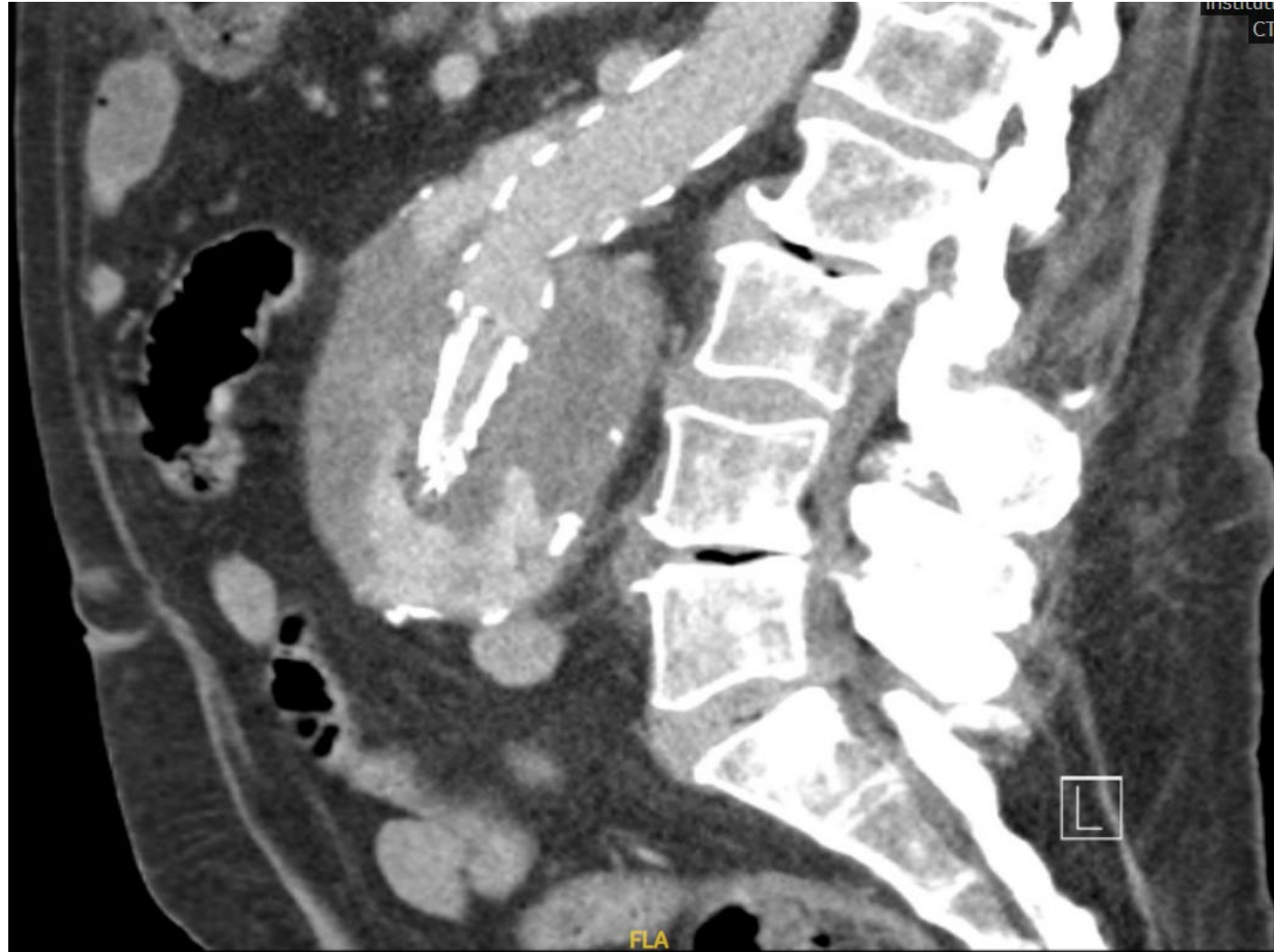
Type I & III: on arterial phase CT

Type II: delayed phase CT

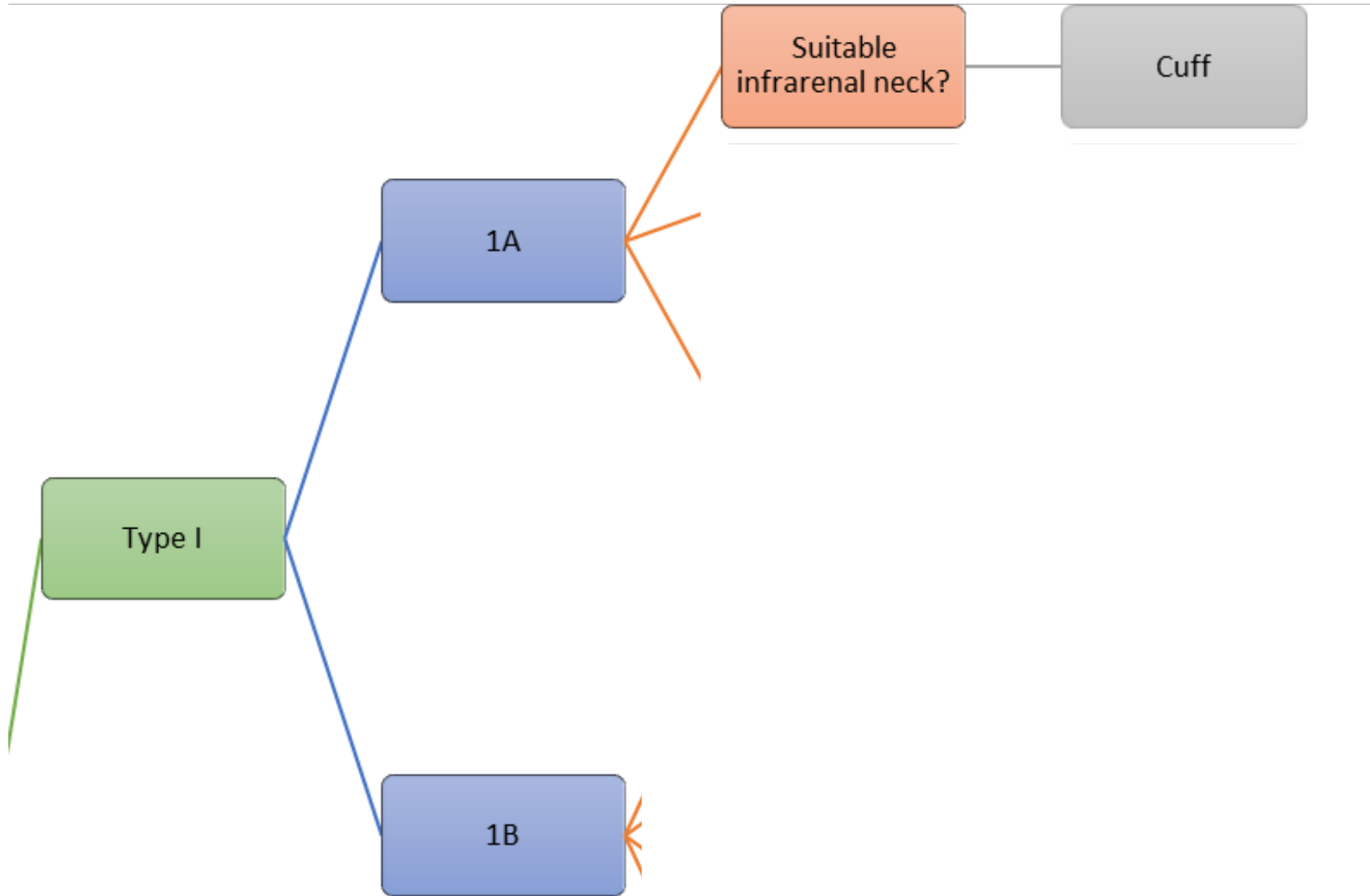
Other imaging modalities:

- Contrast-enhanced ultrasound
- Dynamic CTA
- MRI

TYPE 1A



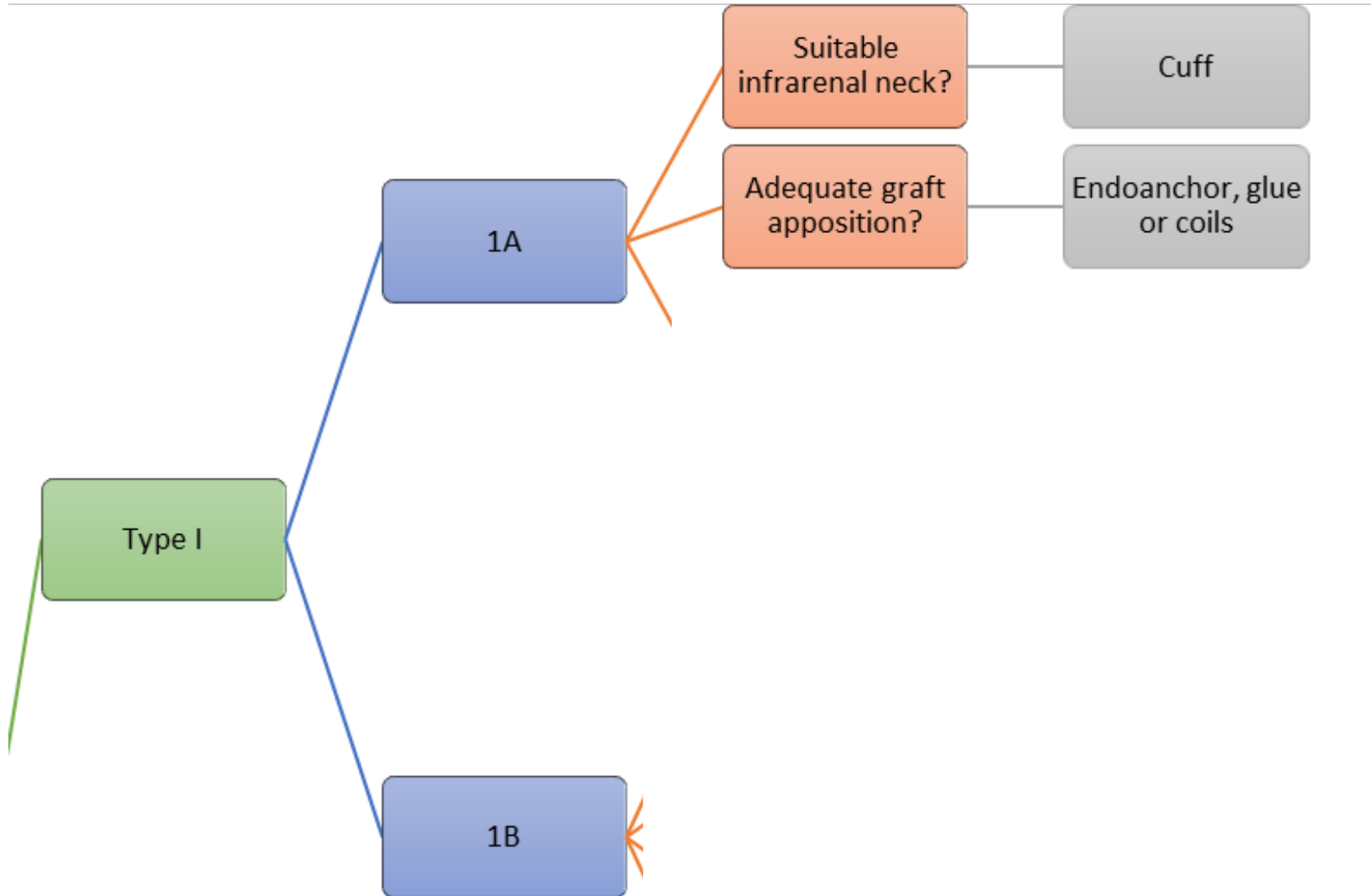
1A



Cuff **>5mm** of neck

- +/- endoanchors

1A



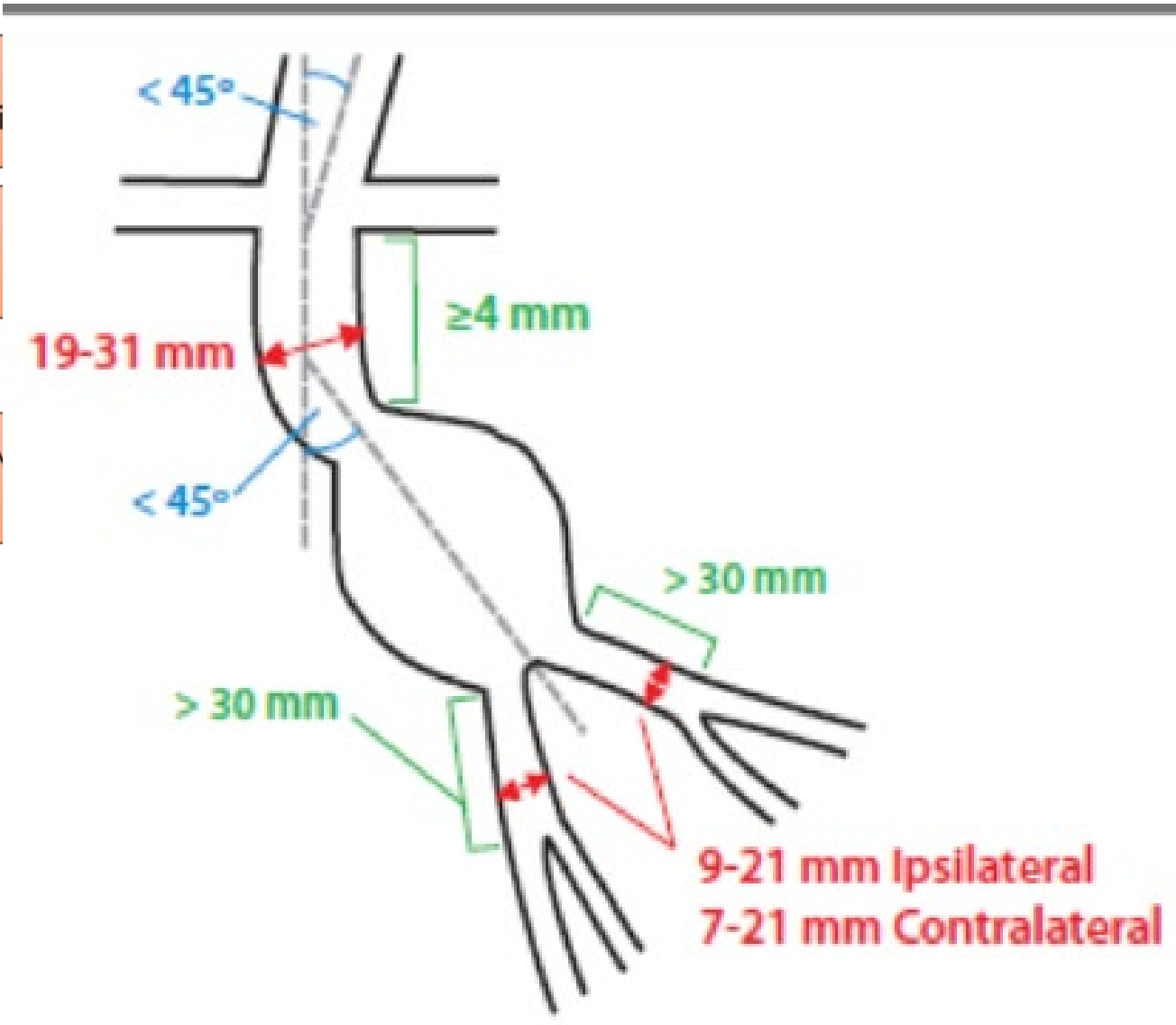
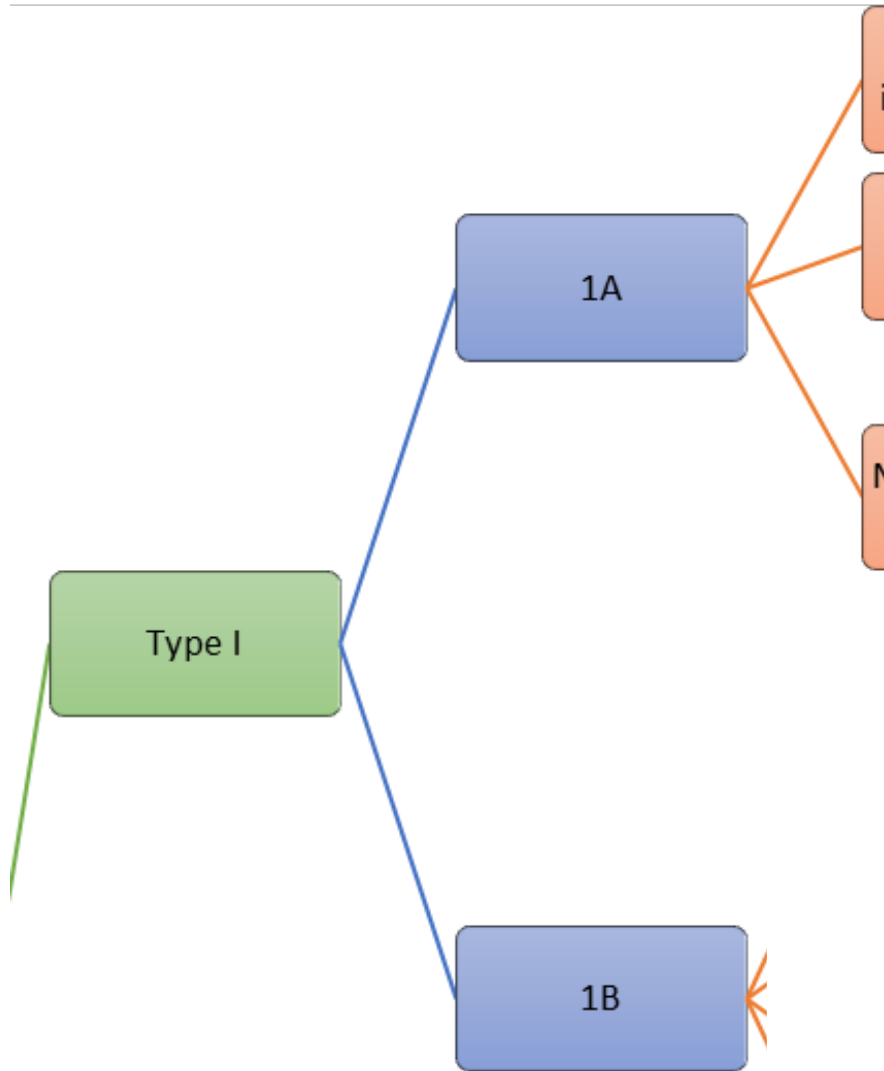
Cuff >5mm of neck

- +/- endoanchors

Coils:

- Small retrospective study showed resolution in 8/9 patients (Sheehan 2004 JVS)

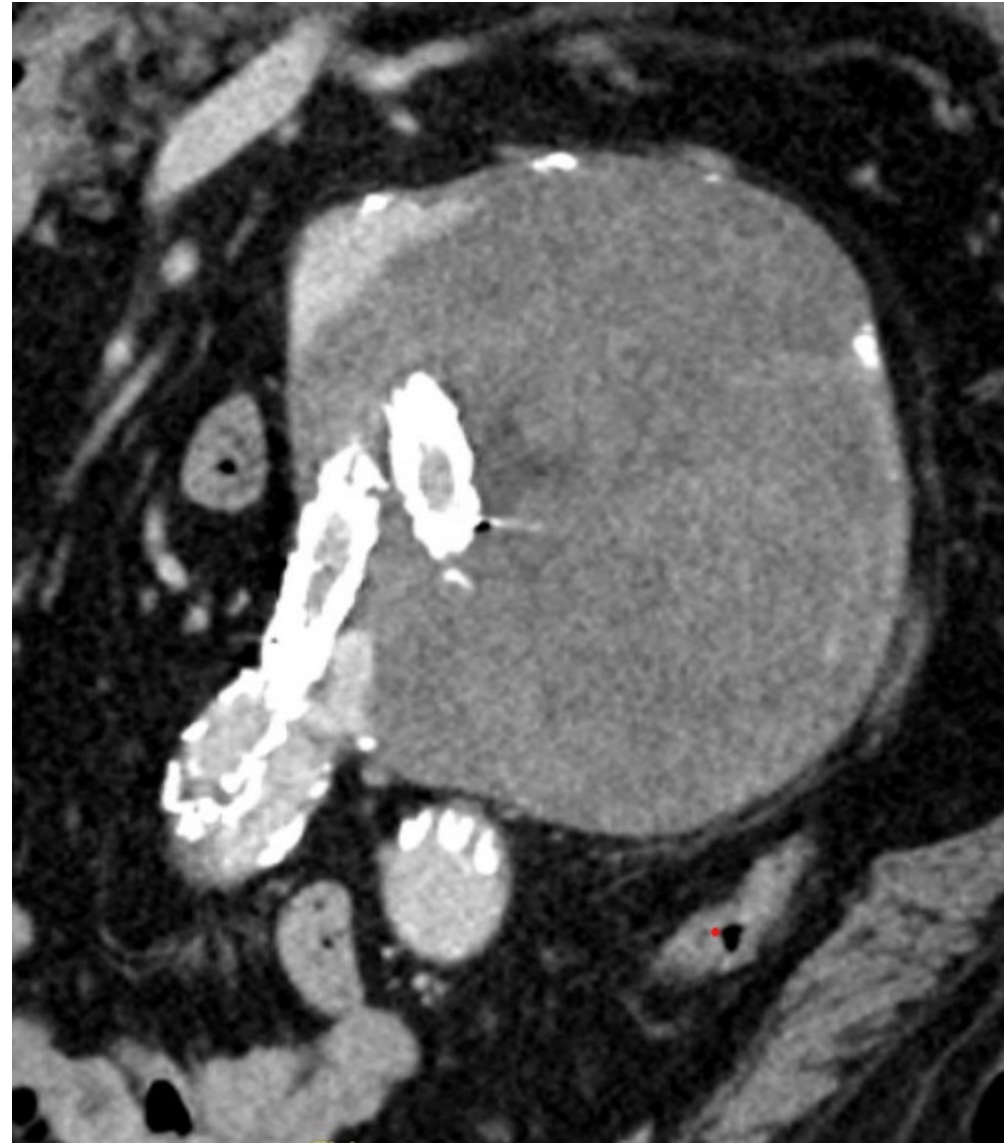
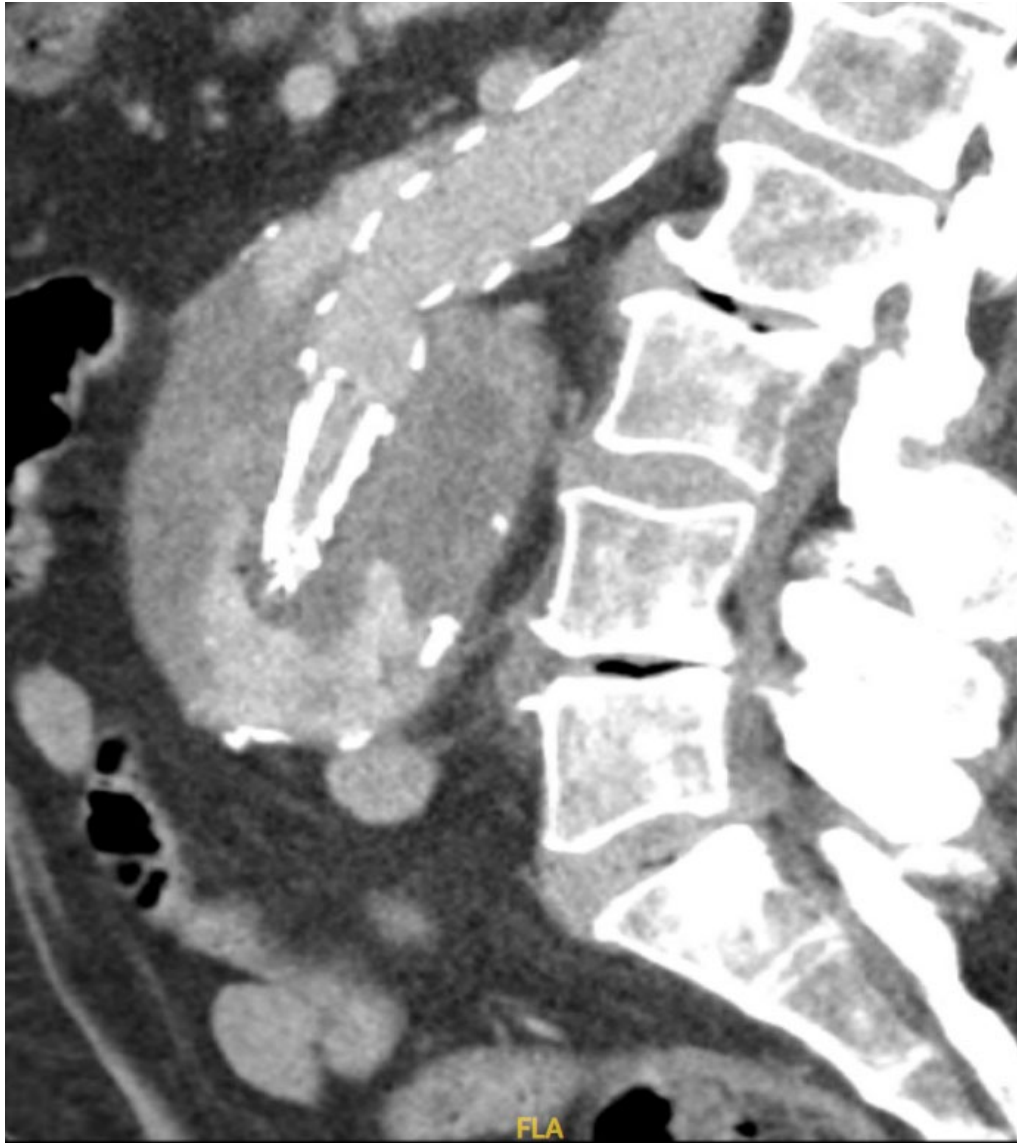
1A



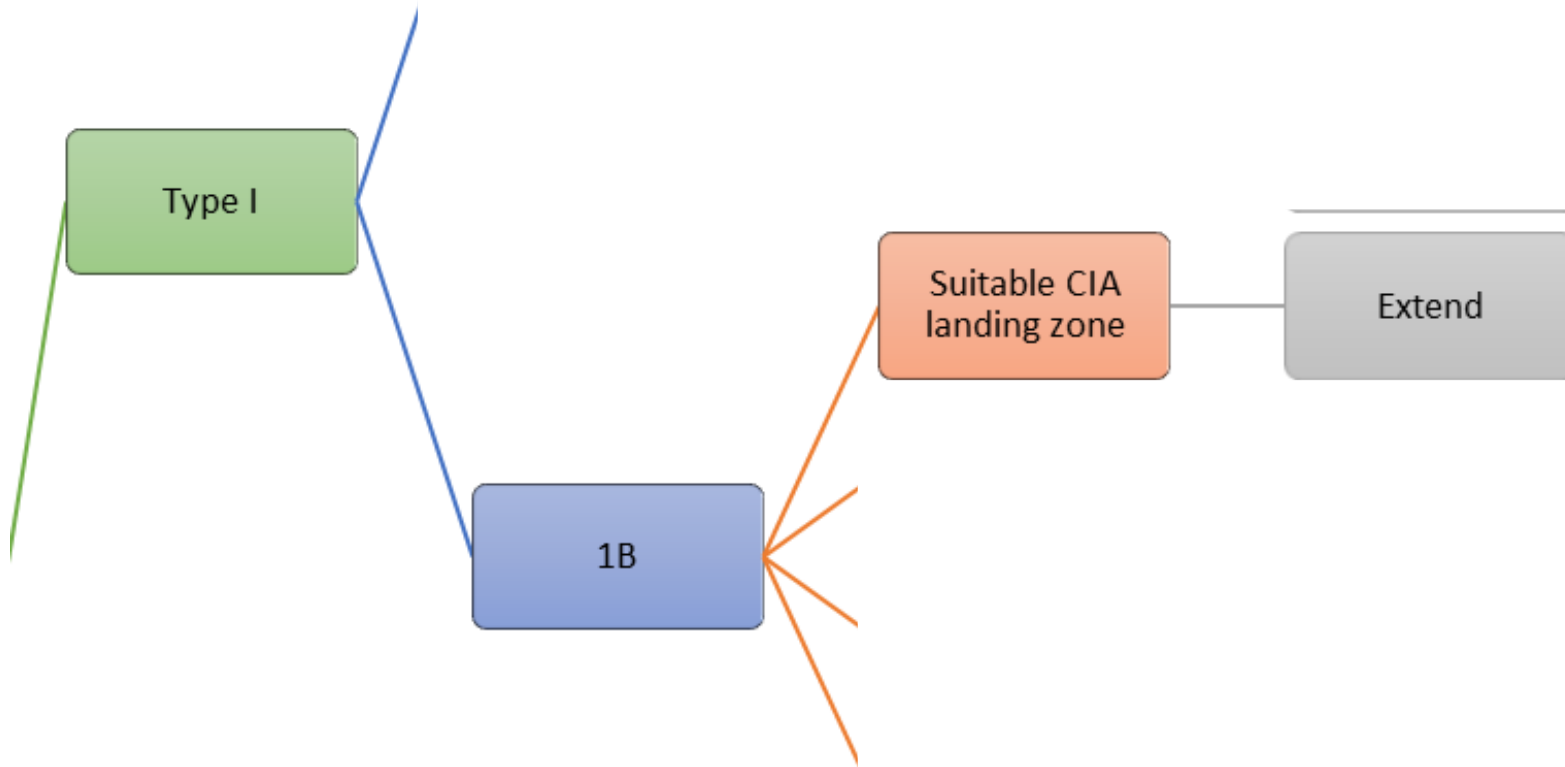
ve study
n in 8/9
(04 JVS)

ap

AND A TYPE 1B

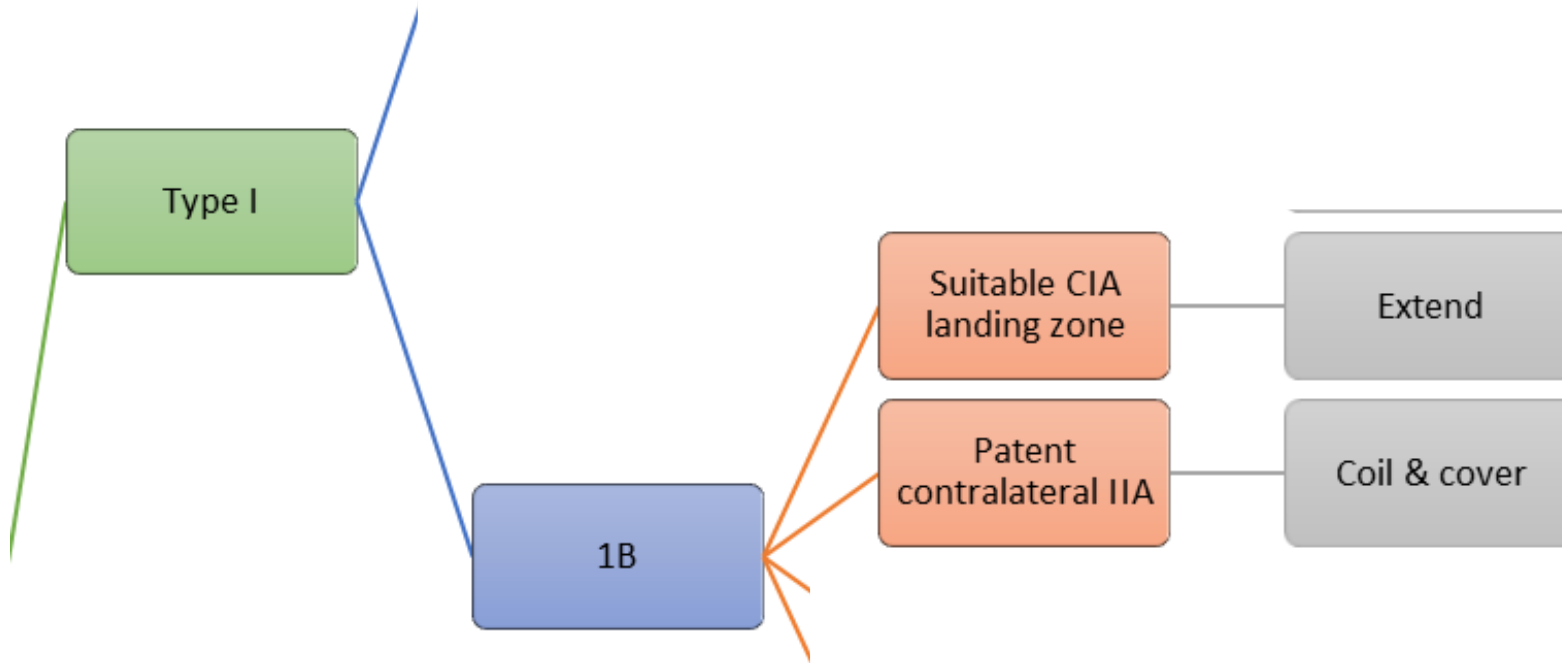


1B



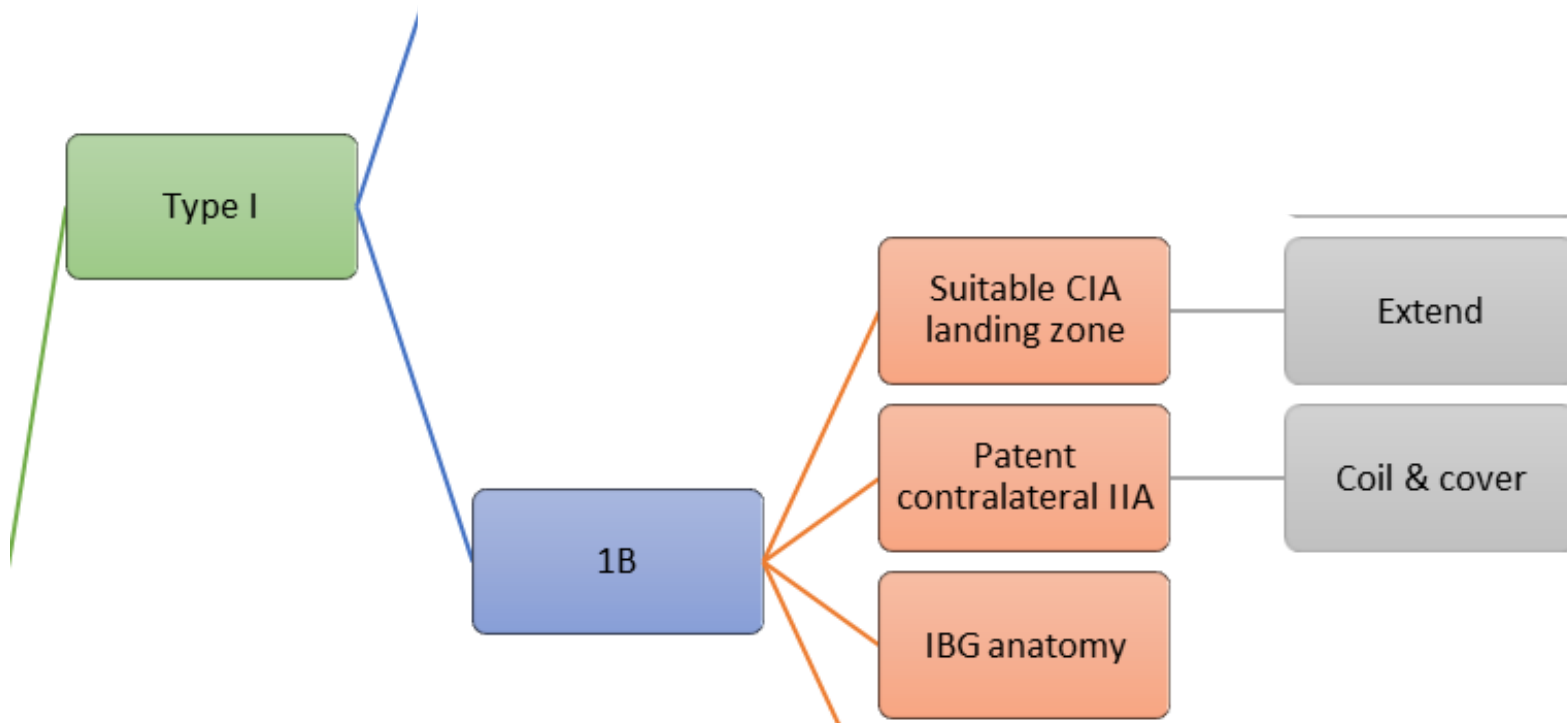
- **Extending:** >20mm length, be aware of flare zones, internal diameters

1B



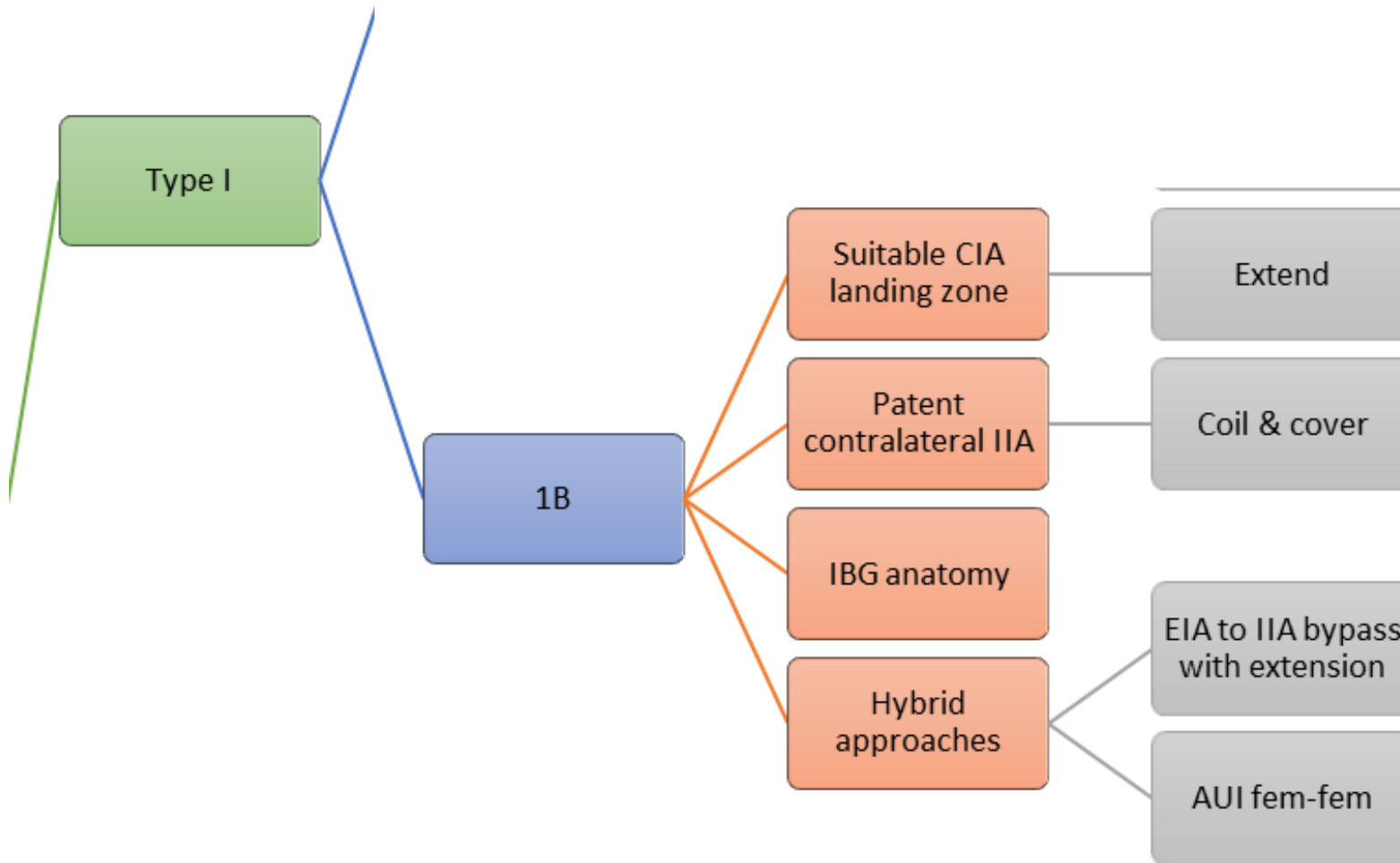
- **Extending:** >20mm length, be aware of flare zones, internal diameters
- **Cover:** Unilateral buttock claudication & ED may be up to 40% BUT typically improve over time
- **Coils** ?debatable

1B



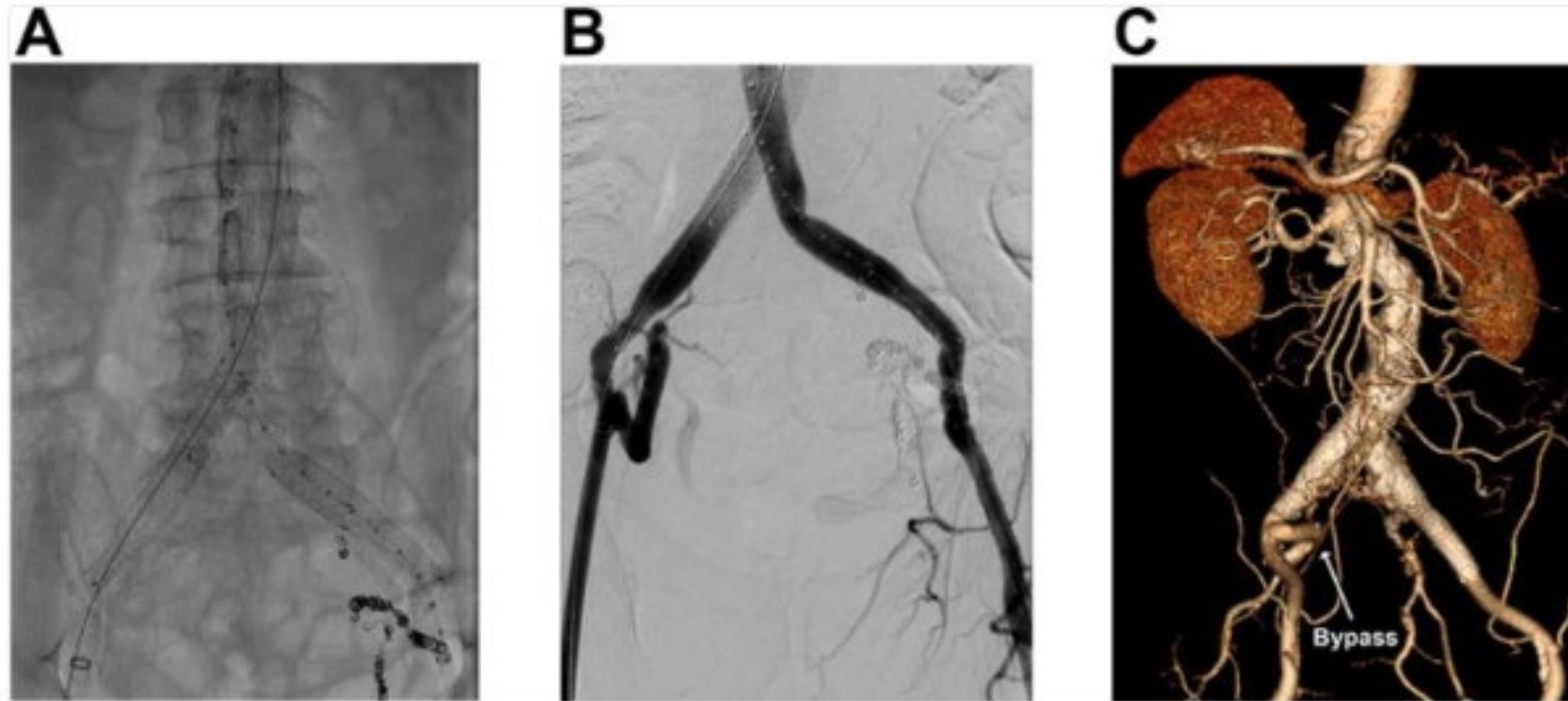
- **Extending:** >20mm length, be aware of flare zones, internal diameters
- **Cover:** Unilateral buttock claudication & ED may be up to 40% BUT typically improve over time
- **Coils** ?debatable
- **IBG:**
 - CIA: L>40, D>16mm
 - EIA: L>20mm, D 8-11mm
 - IIA: L>10mm, D>6mm

1B



- **Extending:** be aware of flare zones, internal diameters
- **Cover:** Unilateral buttock claudication & ED may be up to 40% BUT typically improve over time
- **Coils** ?debatable
- **IBG:**
 - CIA: L>40, D>16mm
 - EIA: L>20mm, D 8-11mm
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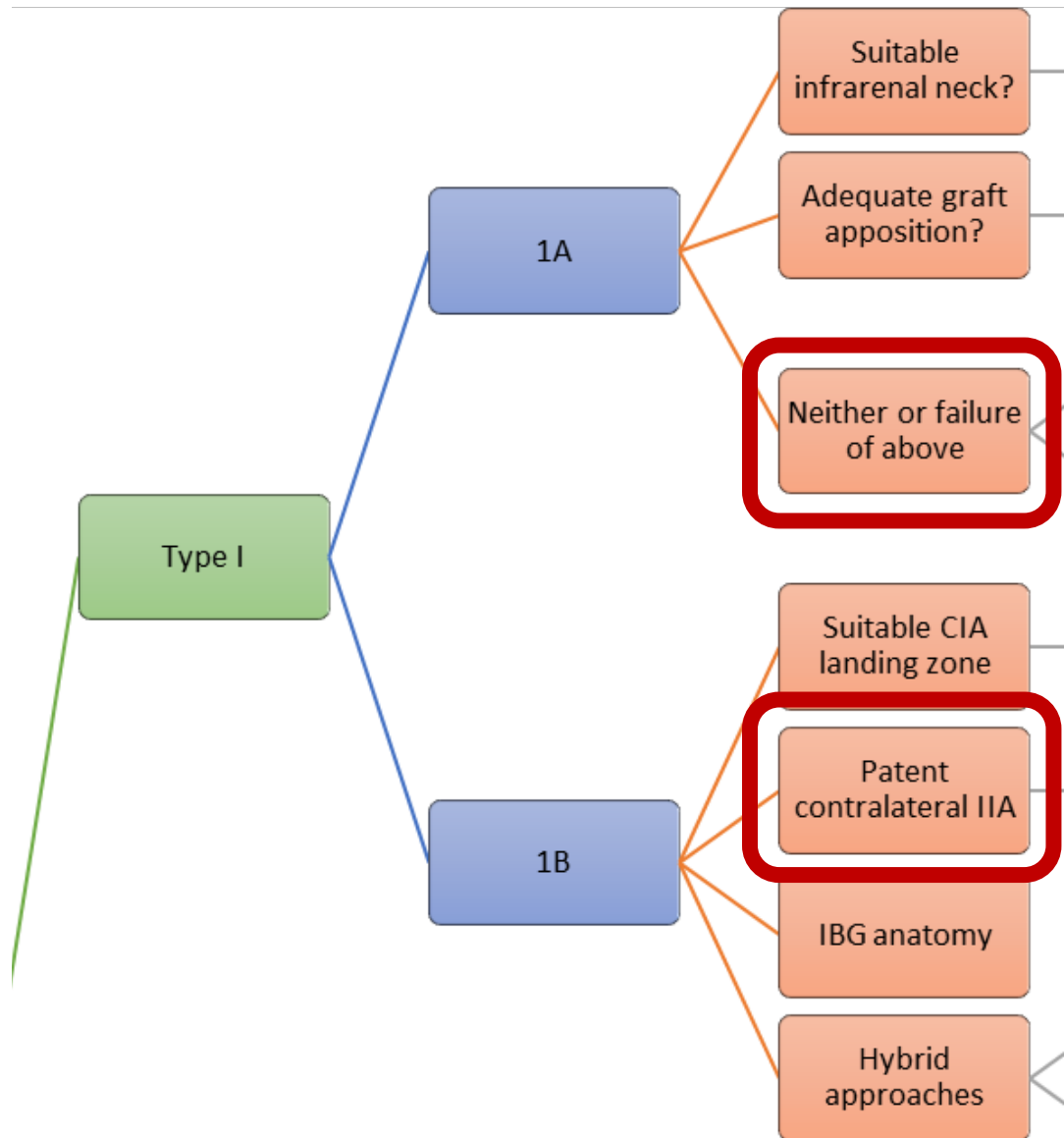
1B EXTERNAL TO INTERNAL BYPASS



EVAR and left internal iliac artery coiling (A), completion angiogram after EVAR and patent EIA-IIA bypass(B) and post-operative CT angiogram showing patent left EIA-IIA bypass (C).

Mansukhani NA, Havelka GE, Helenowski IB, Rodriguez HE, Hoel AW, Eskandari MK. Hybrid Endovascular Aortic Aneurysm Repair: Preservation of Pelvic Perfusion with External to Internal Iliac Artery Bypass. Ann Vasc Surg. 2017 Jul;42:162-168

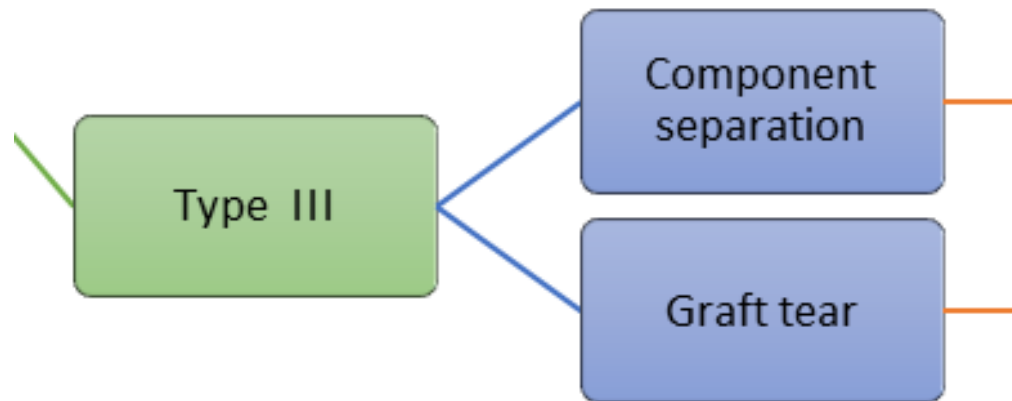
CASE

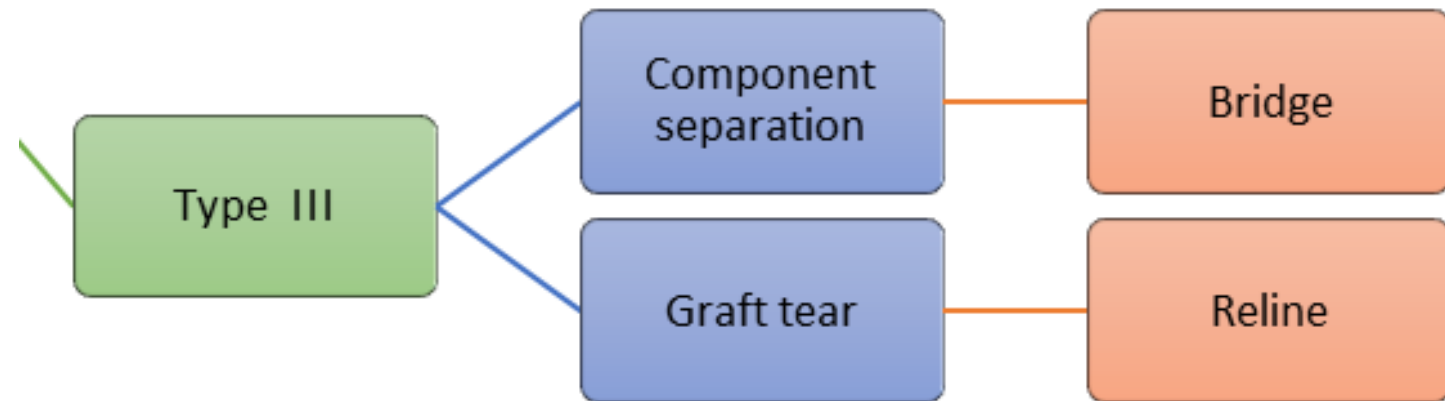


**Fenestrated
cuff**

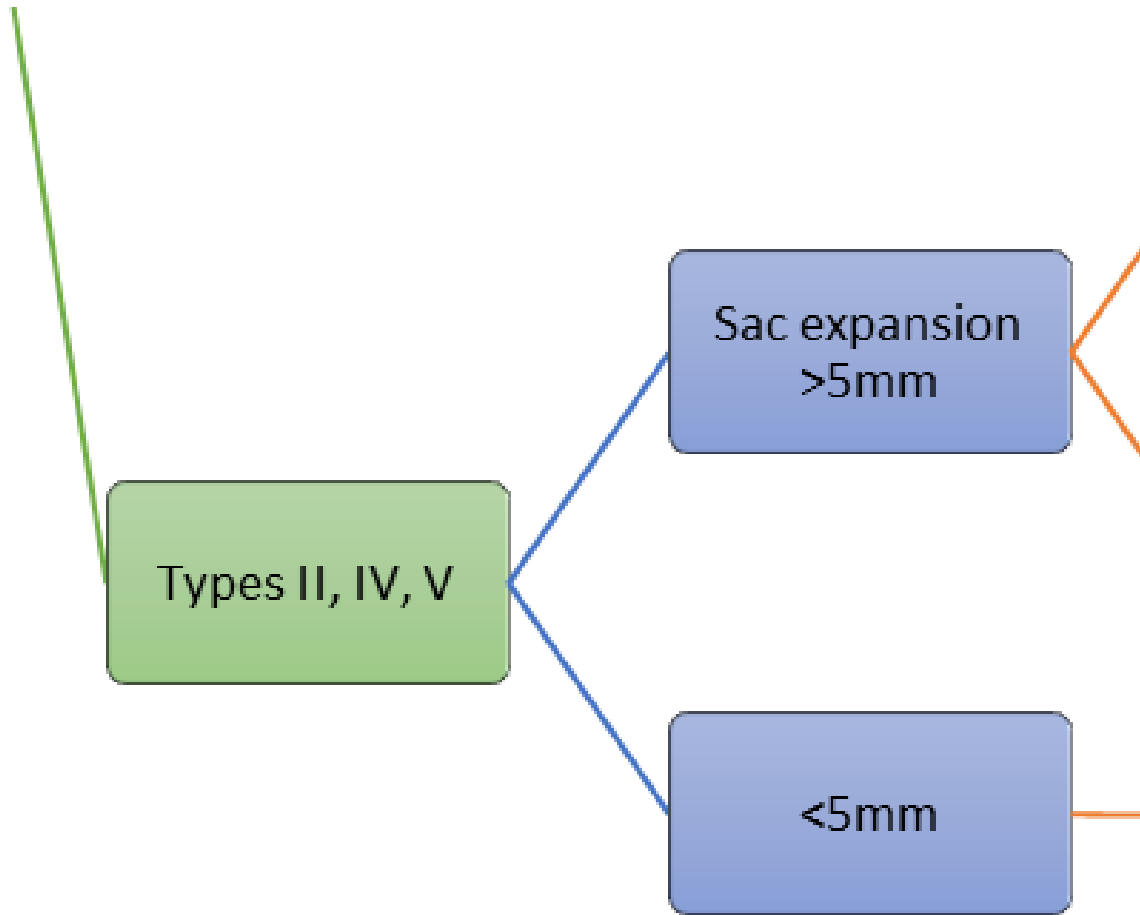


**Coil & extend
into EIA**





II, IV AND V



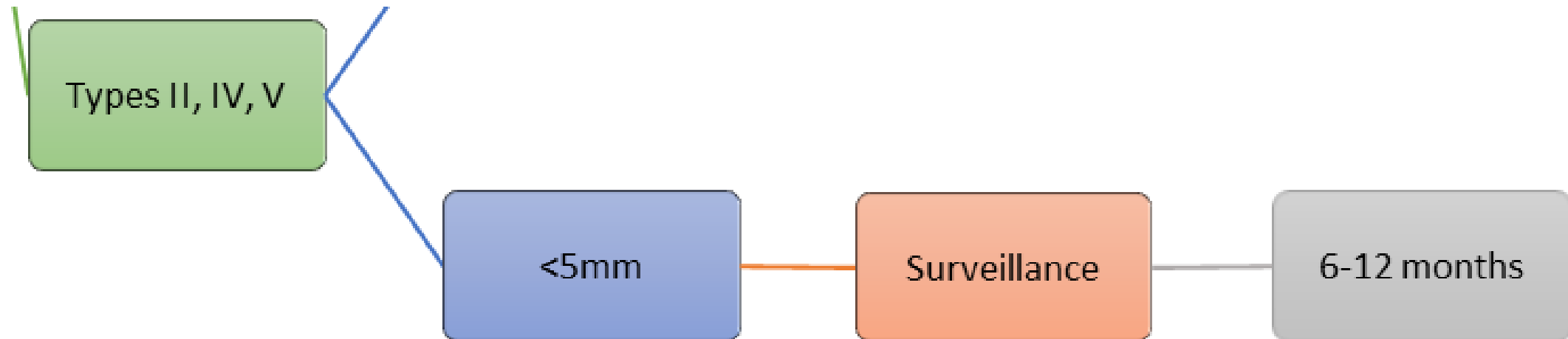
Type II

- 10-20% patients on 4-6 week post op CTA
- 80% resolve 6-12 months
- Contribute to a small risk of aneurysm rupture

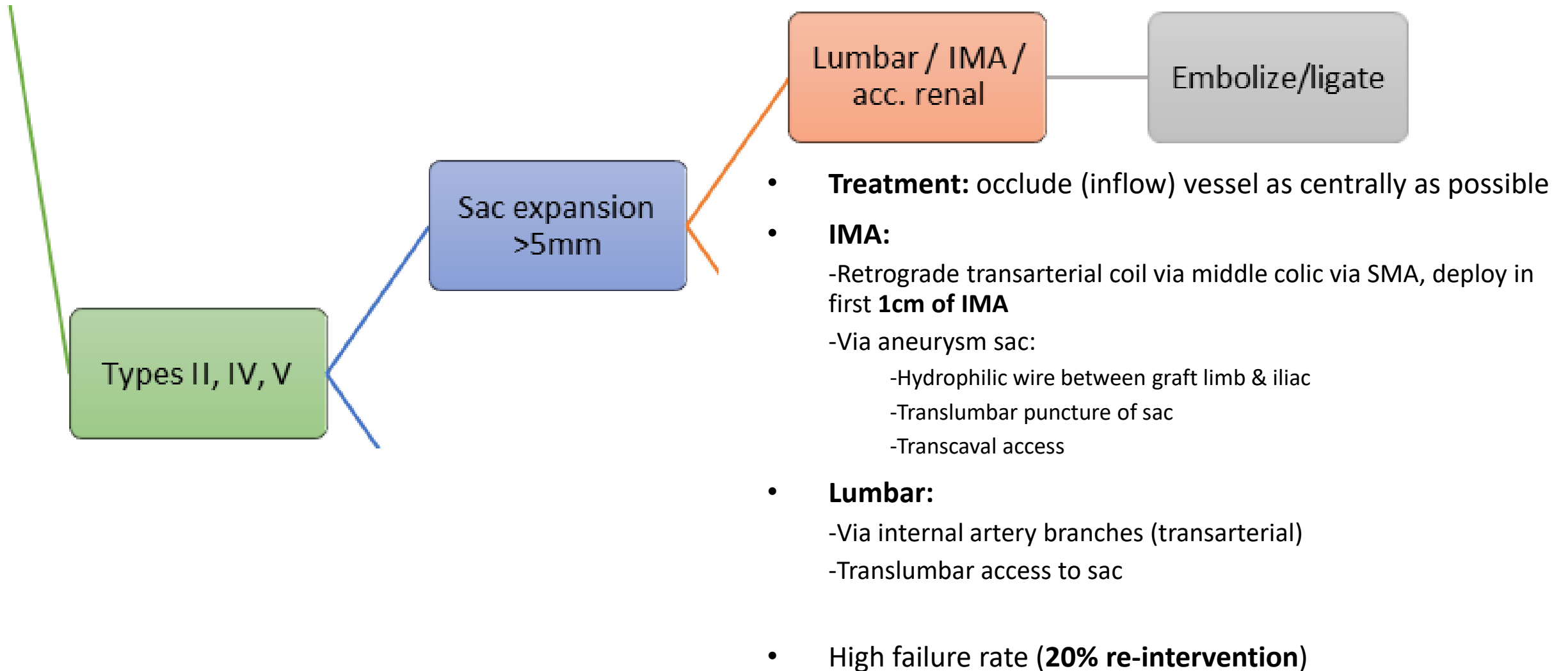
Type IV

- Early
- Typically related to antithrombotic status & resolve spontaneously

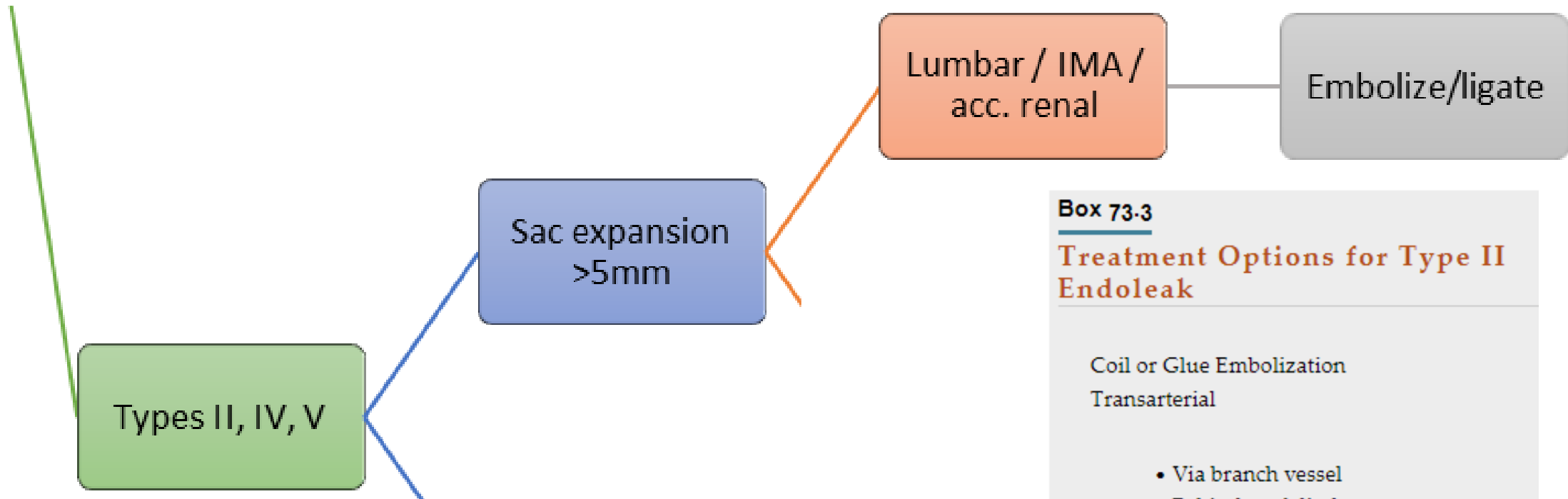
II, IV AND V



II, IV AND V WITH SAC EXPANSION



II, IV AND V WITH SAC EXPANSION



Box 73.3

Treatment Options for Type II Endoleak

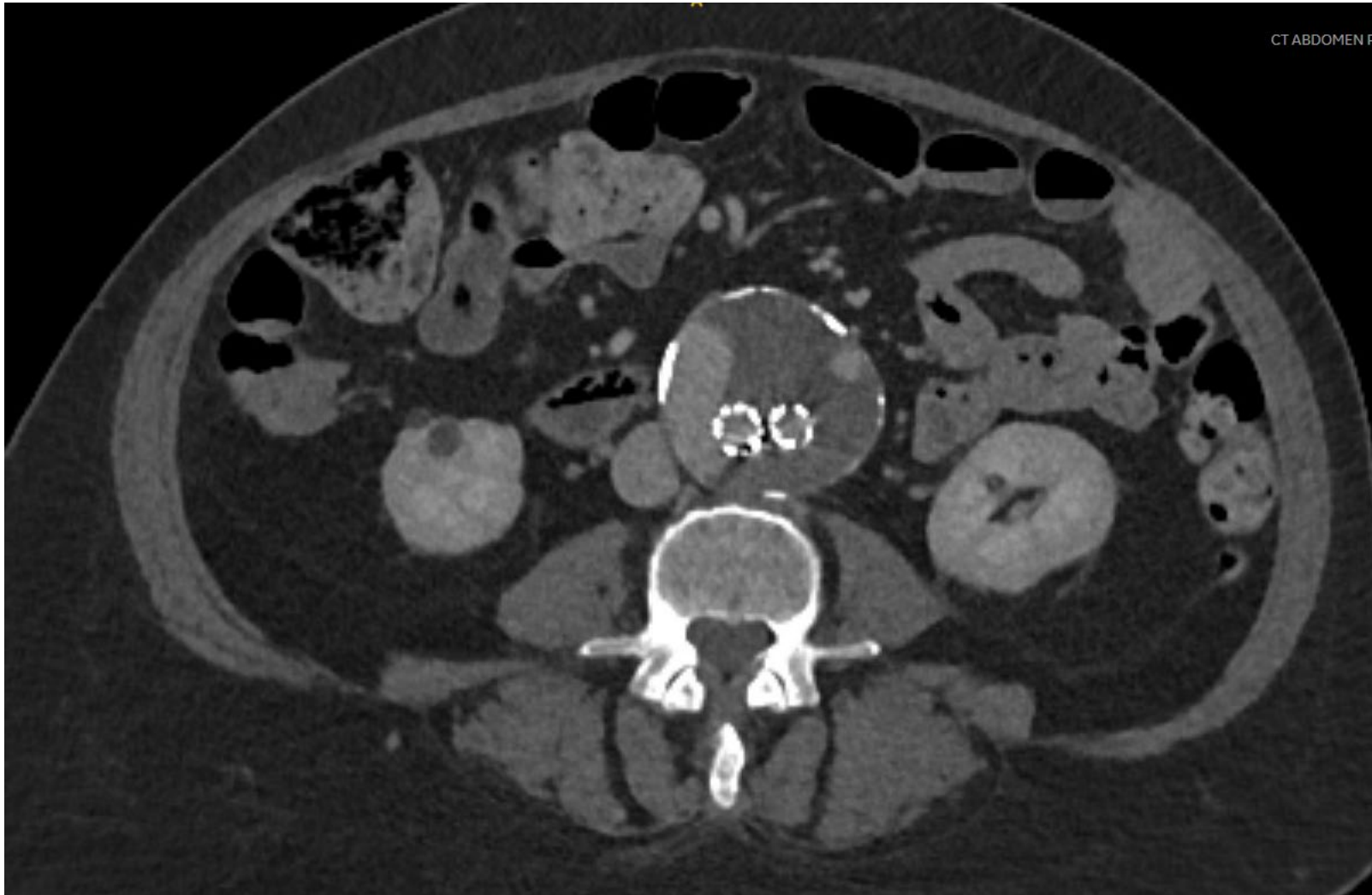
Coil or Glue Embolization
Transarterial

- Via branch vessel
- Behind graft limb

Translumbar
Transcaval
Laparoscopic Ima Clipping
Open Surgical

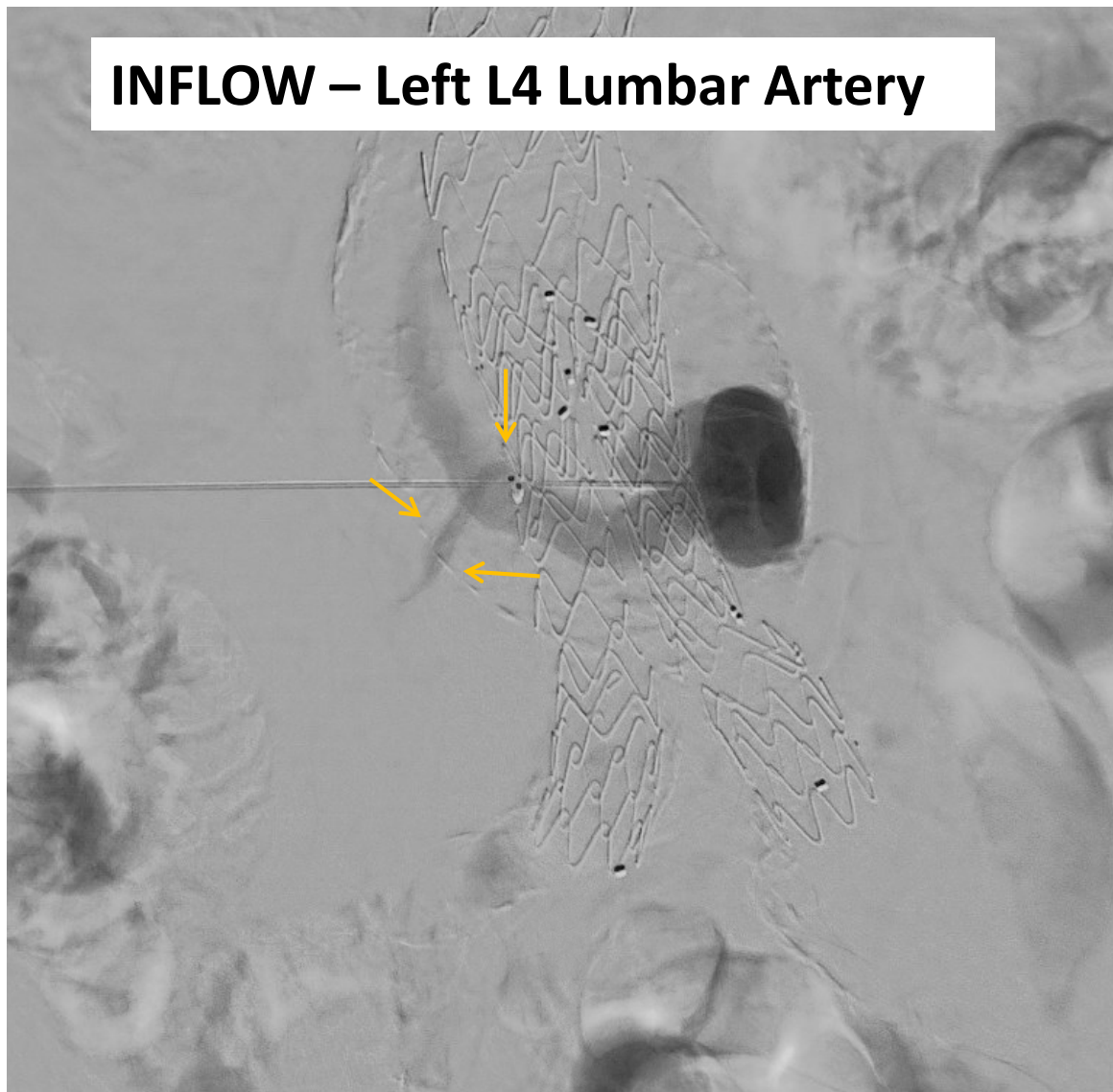
- Ligation of lumbar or IMA
- Open conversion

EXAMPLE OF TREATMENT OF TYPE II ENDOLEAK



CT GUIDED TRANSLUMBAR AAA ACCESS

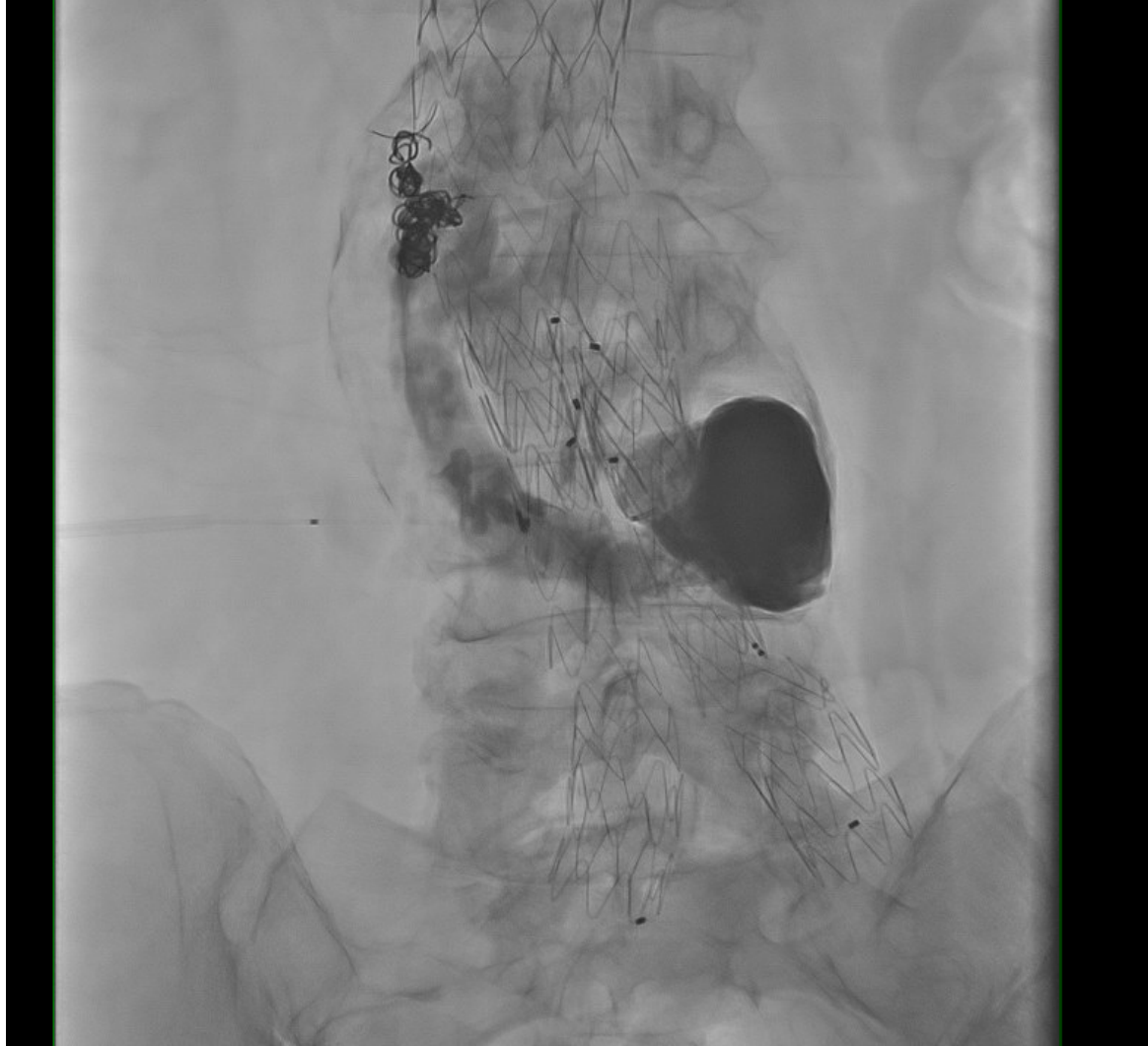
INFLOW – Left L4 Lumbar Artery



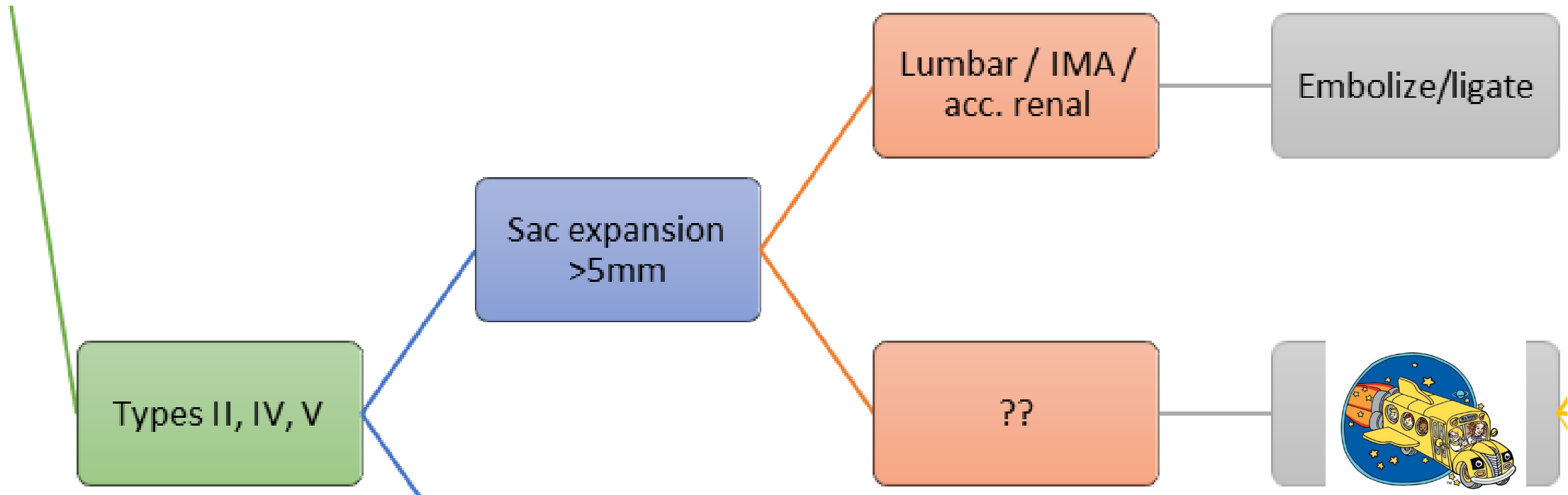
OUTFLOW – IMA



IMA COILS & SAC GLUE FOR LUMBAR



II, IV AND V WITH SAC EXPANSION

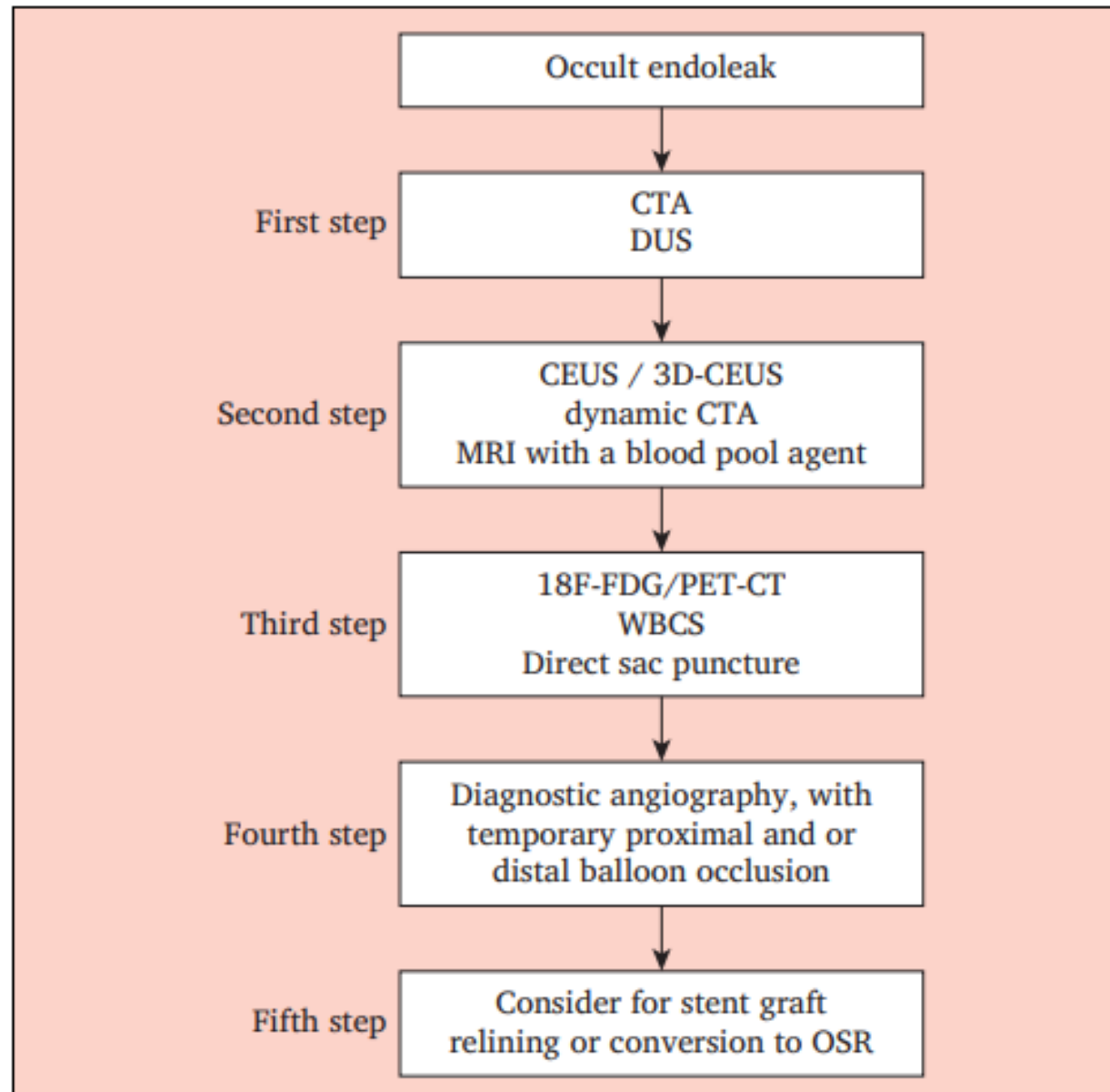


QUESTION 1:

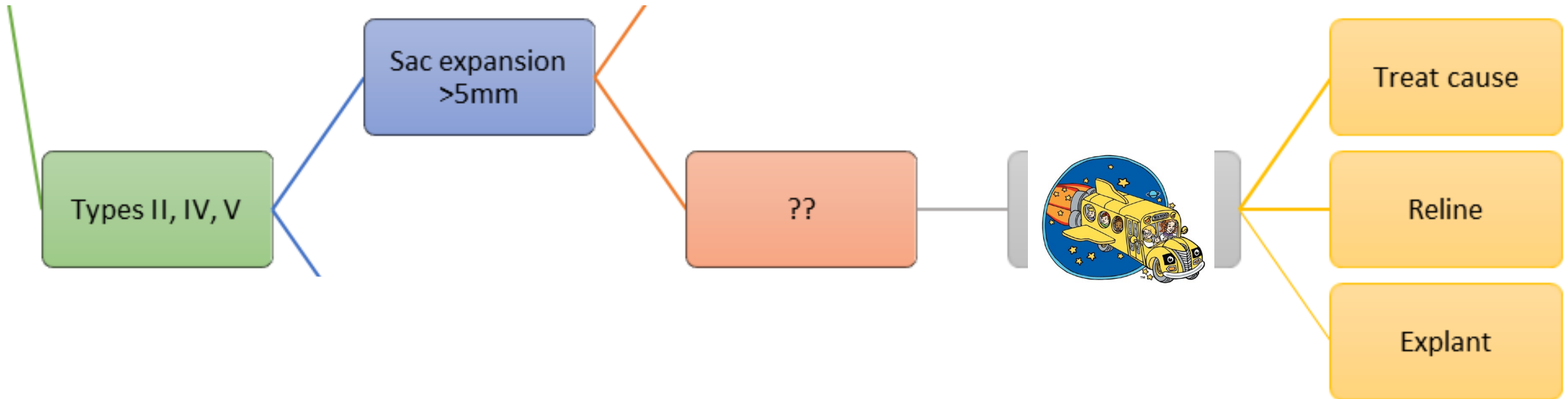
What is your first step for characterizing an occult endoleak (on CTA/standard ultrasound)?

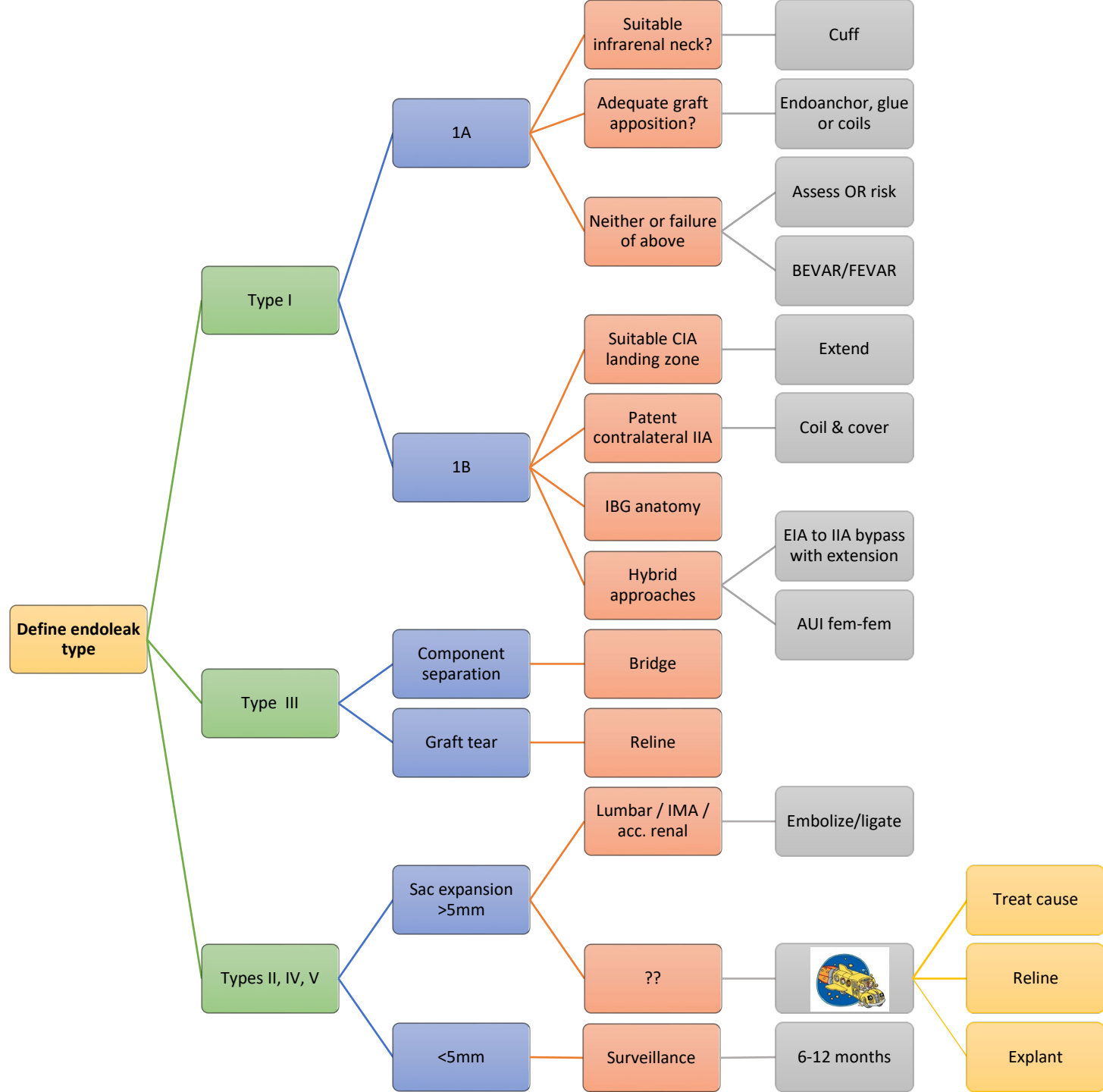
1. MRI/MRA
2. Diagnostic angiography
3. Contrast-enhanced ultrasound
4. Nuclear scan
5. Direct AAA sac puncture with contrast

OCCULT ENDOLEAK – ESVS GUIDANCE



II, IV AND V WITH SAC EXPANSION



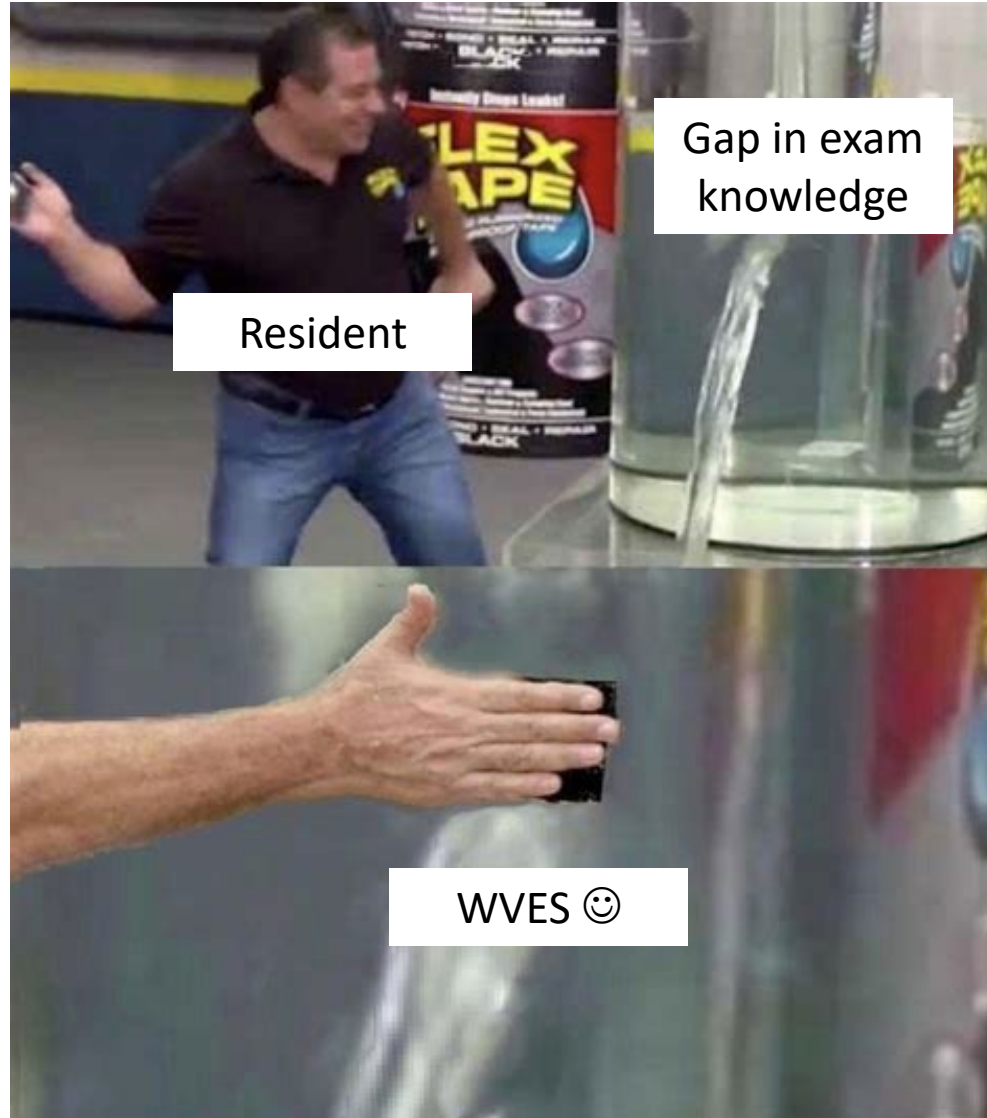


QUESTION 2:

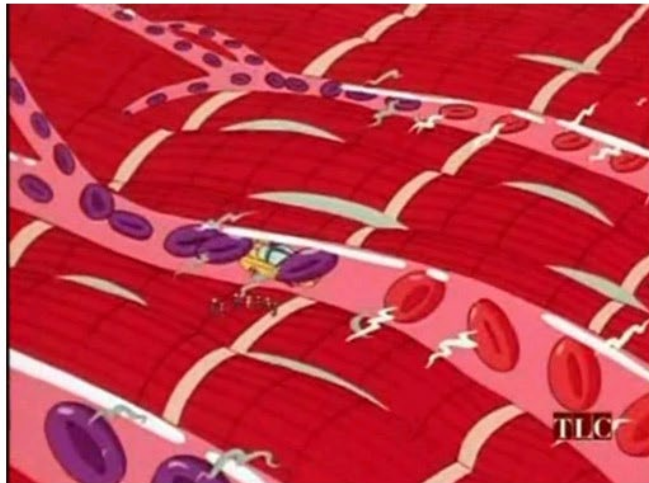
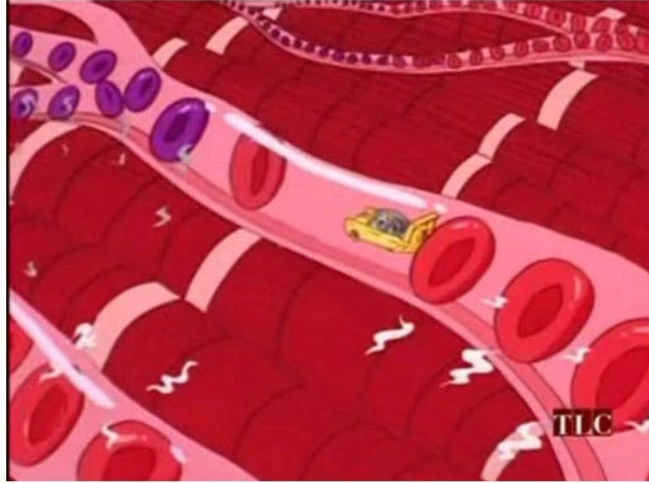
How should “endoleak” be renamed?

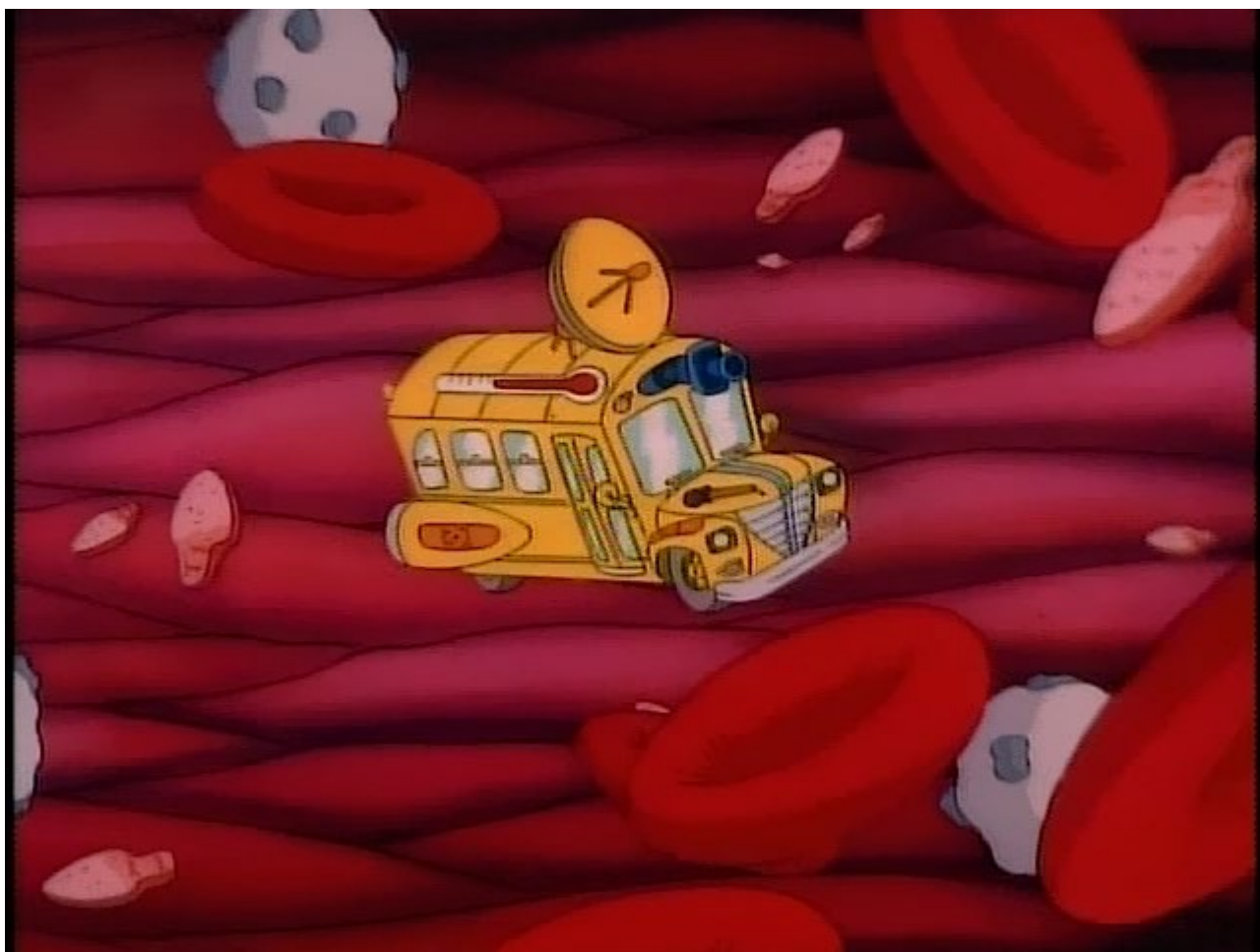
1. Residual aneurysm flow (RAF) via type I-V mechanism
2. Perfusion of residual aneurysm sac (PRAS) via type I-V mechanism
3. EVAR incontinence
4. EVAR with failure to thrive
5. Donay Eaklay (Pig Latin for endoleak)

THANK YOU!



INFECTION PRESENTING AS ENDOLEAK







EXTRAS

THE FUN SCALE

TYPE I



ENJOYABLE AT THE TIME &
PLEASANT TO REMINISCE ABOUT.
EXAMPLES: FAIR-WEATHER
TRAMPING, A DAY ON THE SLOPES,
BEERS AT THE SWIMMING HOLE

TYPE II



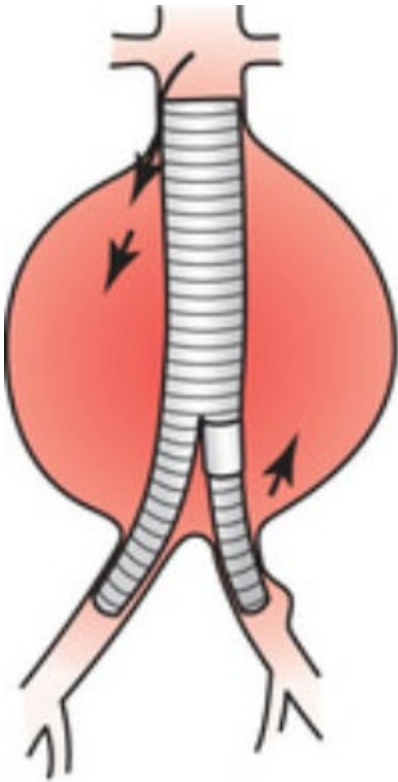
AWFUL AT THE TIME BUT **AMAZING**
IN RETROSPECT. THIS KIND OF FUN IS
ADDICTIVE & WILL LEAVE YOU CRAVING
THE NEXT SUFFERFEST.
EXAMPLES: ULTRAMARATHONS, EPICS,
THE DUSKY TRACK, NAVIGATION FAILS

TYPE III

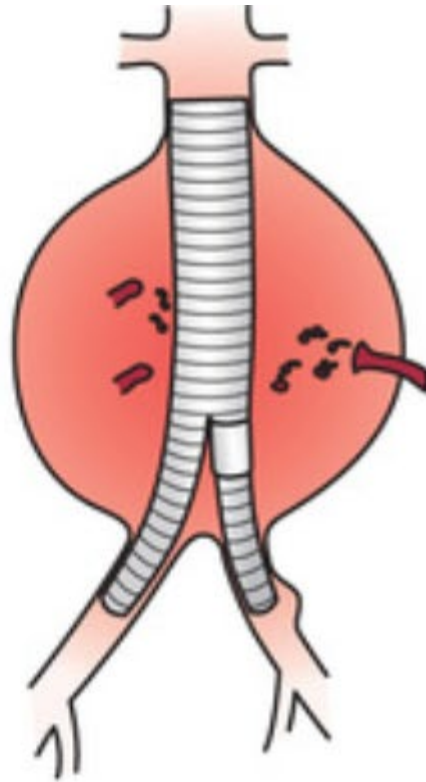


PTSD-WORTHY MISERY THAT WILL GIVE
YOU FLASHBACKS FOR **DECADES**.
OFTEN ENDS IN A HELI-EVAC OR
A MENTION IN THE 10 O'CLOCK NEWS
EXAMPLES: AN UNPLANNED NIGHT
WITHOUT SHELTER, POLAR EXPEDITIONS,
'127 HOURS'-TYPE MISHAPS.

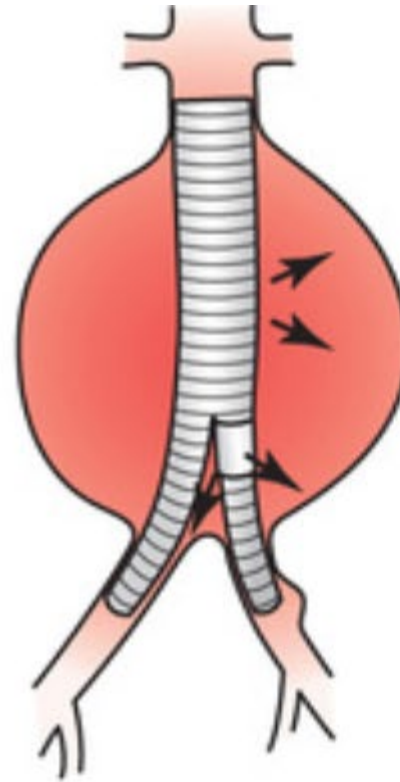
COMPLICATIONS - ENDOLEAK



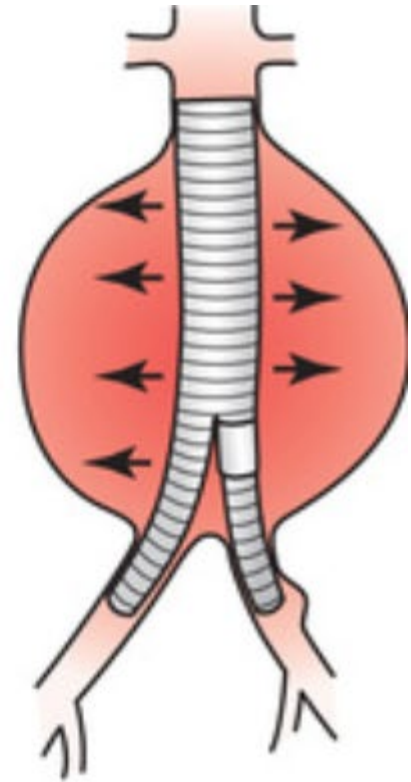
Type I



Type II



Type III



Type IV

Type I & III: on arterial phase CT

Type II: delayed phase CT

TROUBLESHOOTING

Type II leaks:

- May be due to internal iliacs, consider embolization if high suspicion

Late Type II leaks

- if >5mm sac growth consider treatment
- Rule out occult type I/III leaks
- Frequently due to IMA/patent lumbar
- Selective arteriography SMA/internals

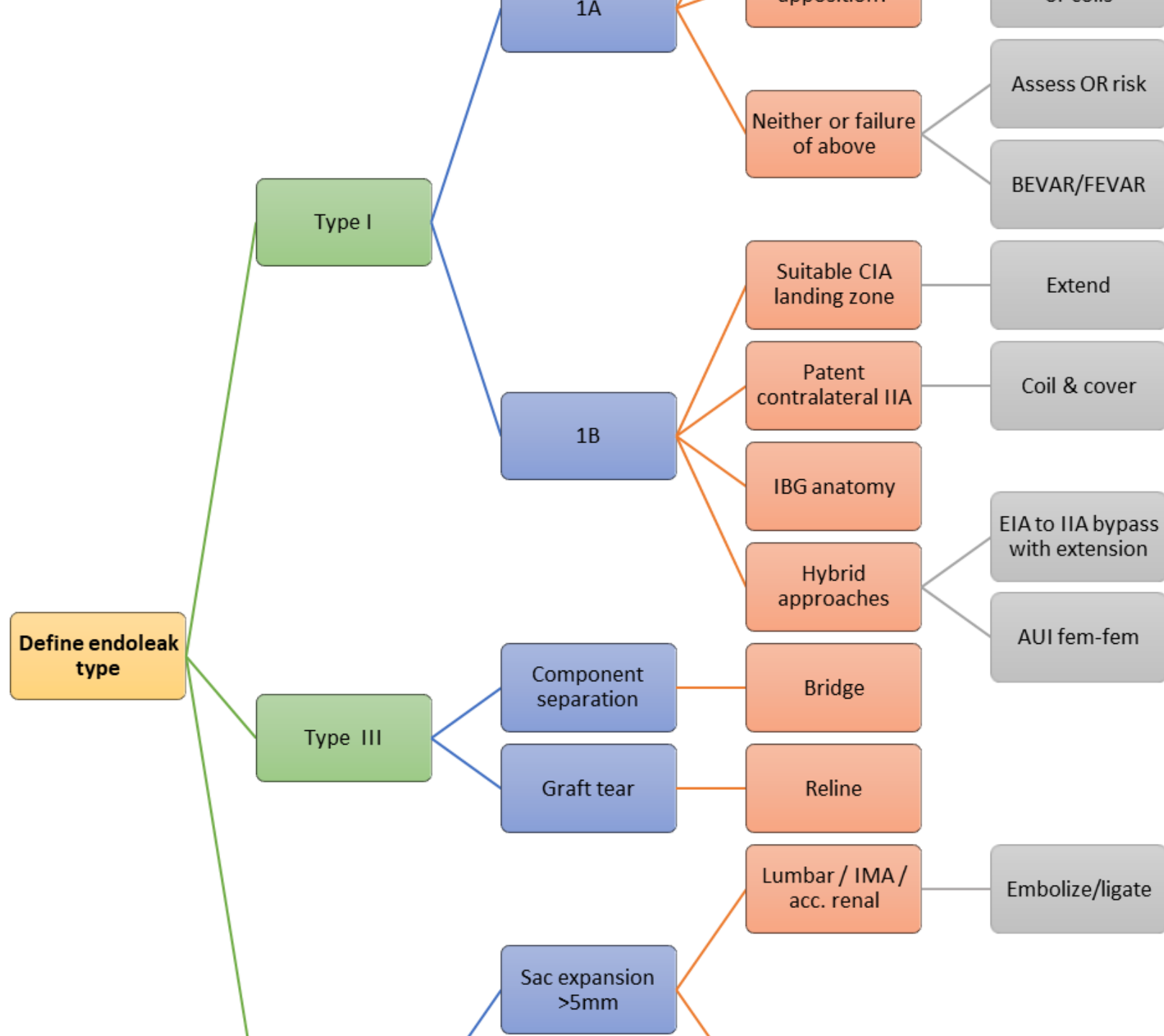
TROUBLESHOOTING

Type IB

- repeat angioplasty
- Extend limb with cuff, extend into EIA (beware oversizing re: thrombosis), consider branched endograft to preserve internal

TYPE II

- Due to: large endoleak cavity, inflow/outflow artery persistent flow, large IMA/lumbstd
- Management: coil, N-butyl cyanoacrylate glue
 - embolize IMA through SMA marginal artery of Drummond
 - Trans-lumbar aneurysm sac puncture
 - Catheterize sac behind iliac through femoral puncture
 - Transcaval

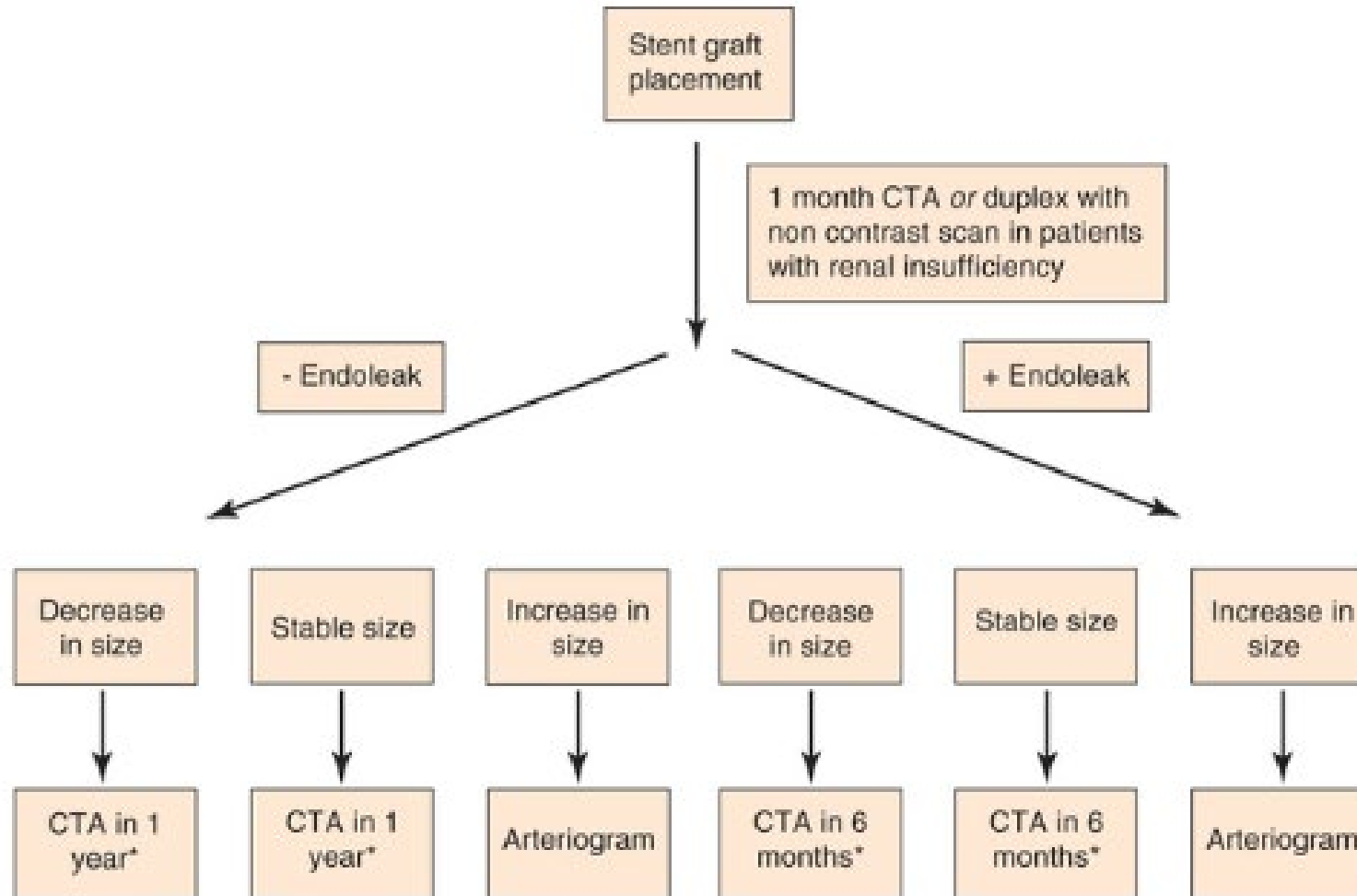


TYPE IV

- Porosity of graft fabric
- Frequently resolve once the interstices thrombose (therefor this is an EARLY endoleak)

Type V

- Endotension from sac thrombus
- Sac expansion without an endoleak “when increased graft permeability allows pressure to be transmitted through the aneurysm sac, affecting the native aortic wall, but this is only a theory.”
- Sac perfusion evading our imaging techniques
- Pressure transmission through the fabric
- Accumulation of fluid across the endograft fabric
- ?relining



- Ultrasound may be appropriate if no endoleak/sac enlargement on first annual CT
- Life-long surveillance
- ?Sac pressure measurement
CardioMEMS sensor implanted at EVAR

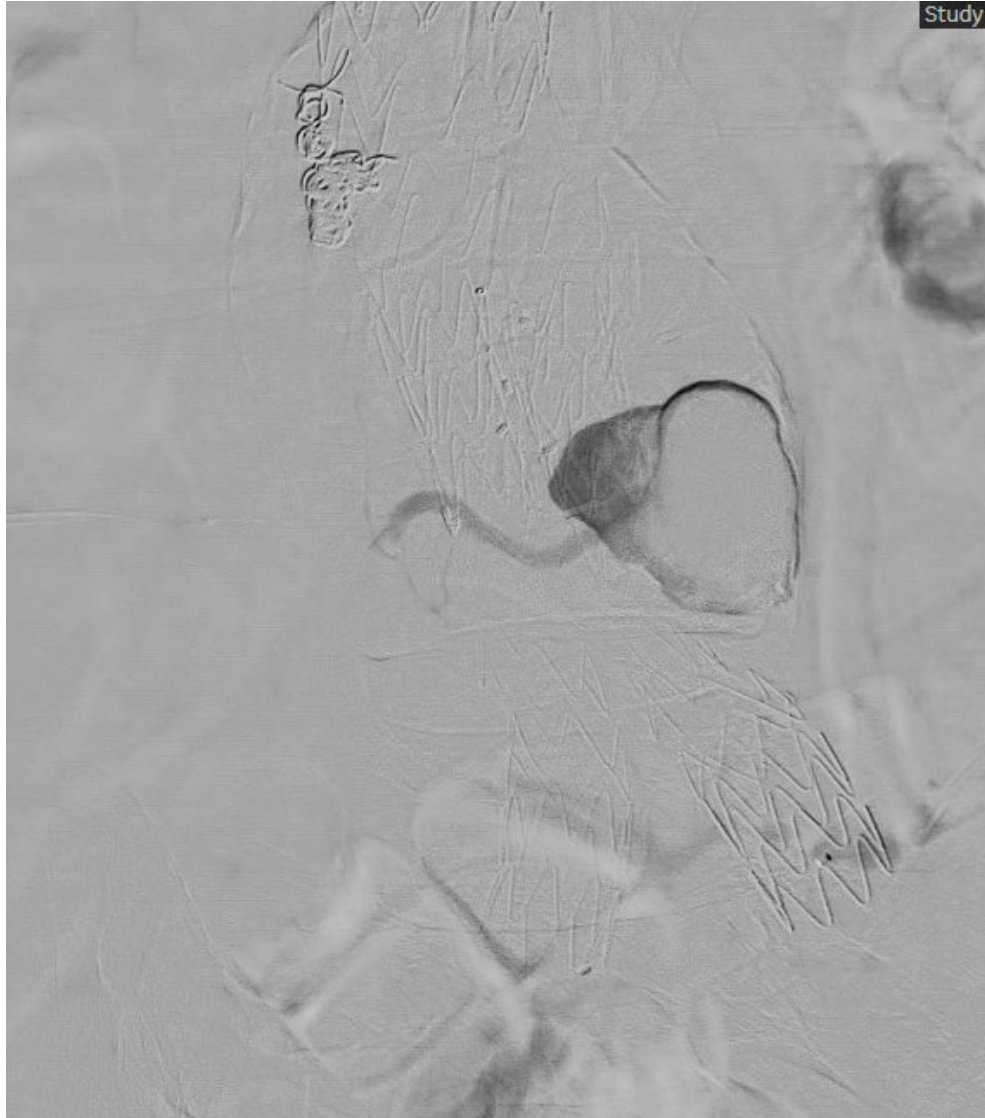


We asked 100 people...

Name something that might be leaking
where a plumber would be no help...

tune in today to find out the answers:

- Roof
- Oil in car
- Bladder
- Nose
- Secrets/information



GLUED

