Hemodialysis Access Update

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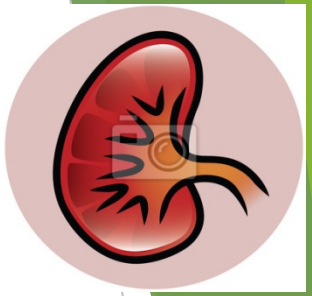
Objections



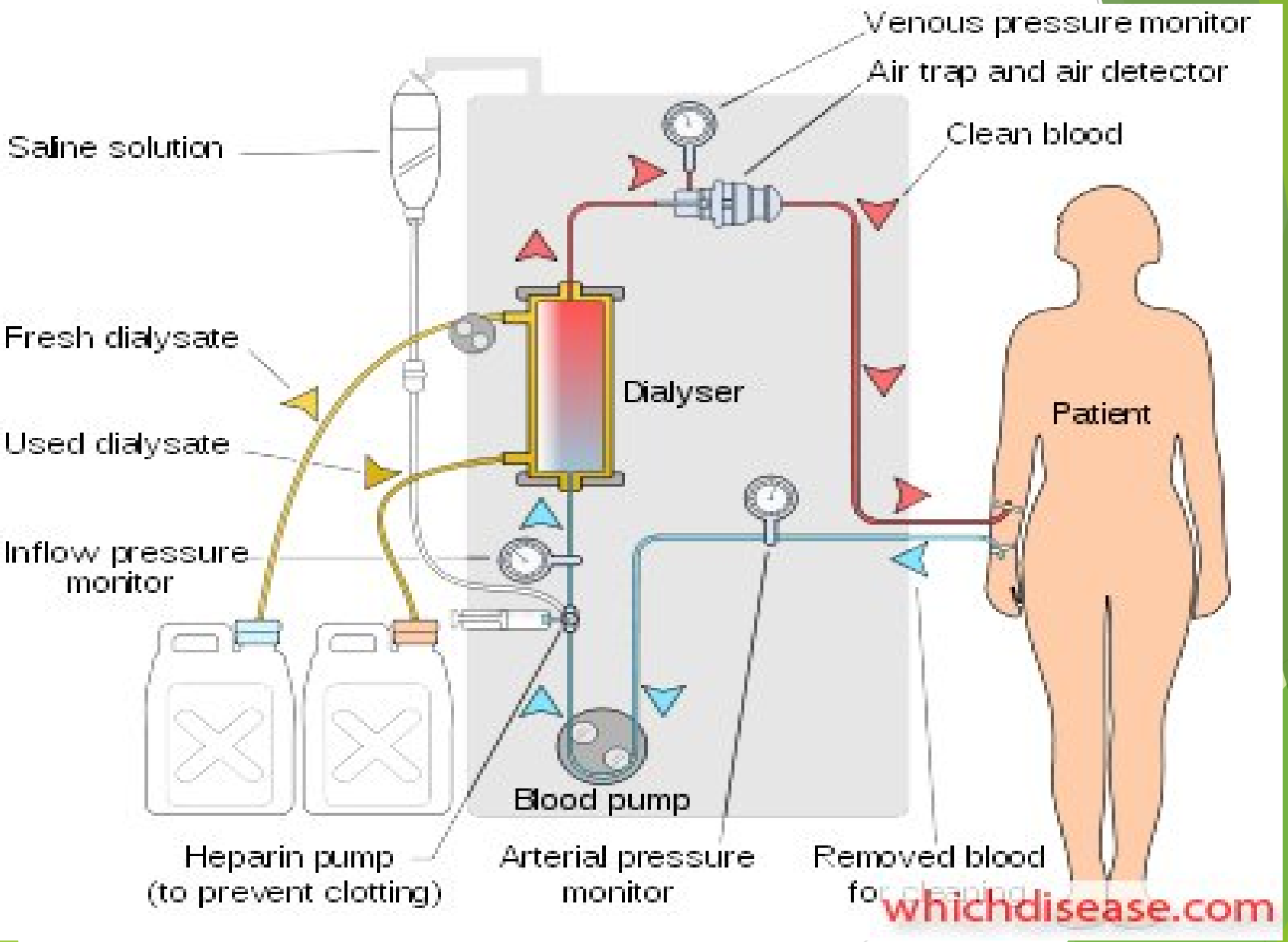
- Define hemodialysis
- Identify the indications for hemodialysis
- Define the different methods of vascular access for hemodialysis
- Indentify reasons for hemodialysis access failure or troubles that occur
- Explain how to troubleshoot and fix non functioning hemodialysis vascular access
- Review new trends in Hemodialysis vascular access

Definition

- **hemodialysis**
- /he·mo·di·al·y·sis/ (-di-al´ĭ-sis) removal of certain elements from the blood by virtue of the difference in rates of their diffusion through a semipermeable membrane while being circulated outside the body; the process involves both diffusion and ultrafiltration.

History

- 1854 First Hemodialysis machine made in England using ox bladder
- 1924 first Human Hemodialysis preformed in Germany
- 1940 use of cellophane membrane bath used in hemodialysis (Artificial Renal Substitute Therapy)
- 1960's saw first use of grafts and shunts for dialysis


Venous pressure monitor
Air trap and air detector
Saline solution
Clean blood
Fresh dialysate
Dialyser
Patient
Used dialysate
Inflow pressure monitor
Blood pump
Heparin pump (to prevent clotting)
Arterial pressure monitor
Removed blood
whichdisease.com

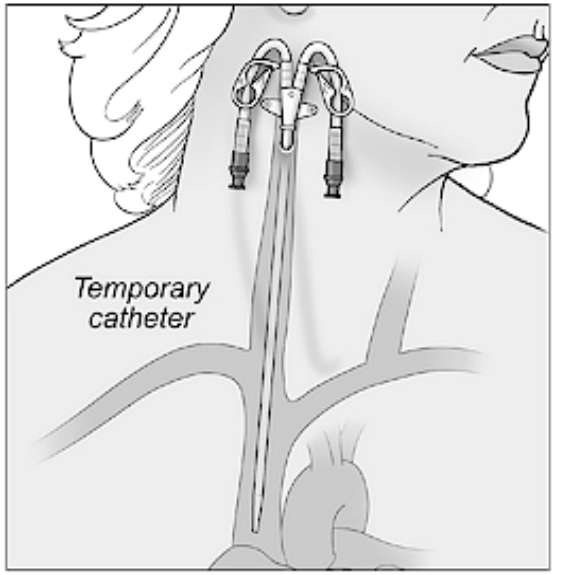
Indications-Emergent

- A: Acidosis
- E: Electrolytes
- I: Ingestions
- O: Overload
- U: Uremia

Indications-Chronic

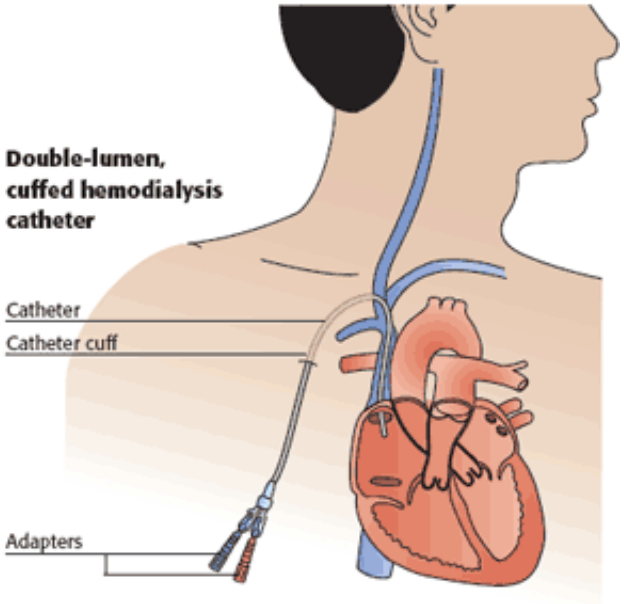
- Declining Nutritional Status
- Persistent and difficult to treat volume overload
- Fatigue and Malaise
- Mild cognitive impairment
- Refractory acidosis: hyper kalemia and hyperphosphatemia

Vascular access for Hemodialysis-Emergent



Non Tunneled Hemodialysis Catheter

Tunneled Vascular Access



Problems with Catheter access

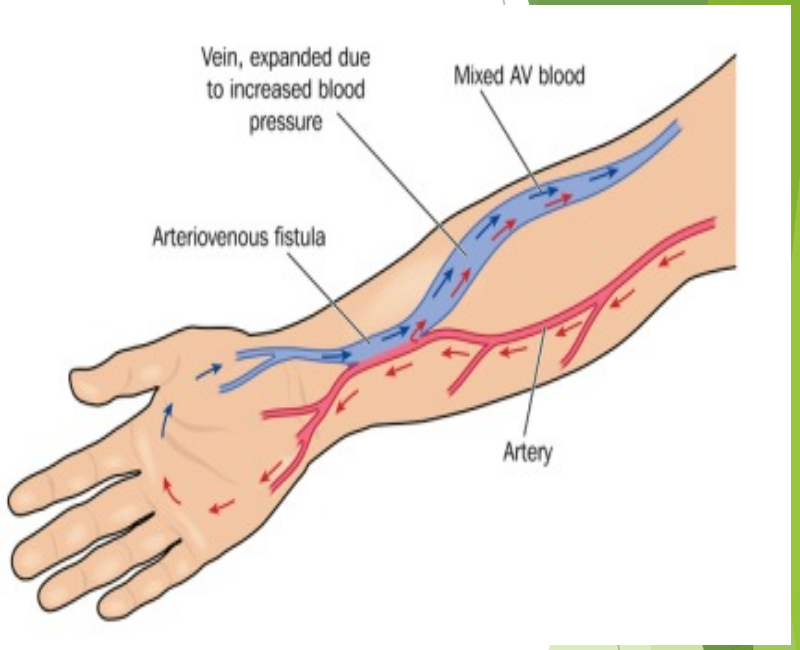
- Infection
- Fibrin sheaths
- Thrombus
- Temporary
- Catheter malfunction
- Vascular problems

Permanent Hemodialysis Vascular Access

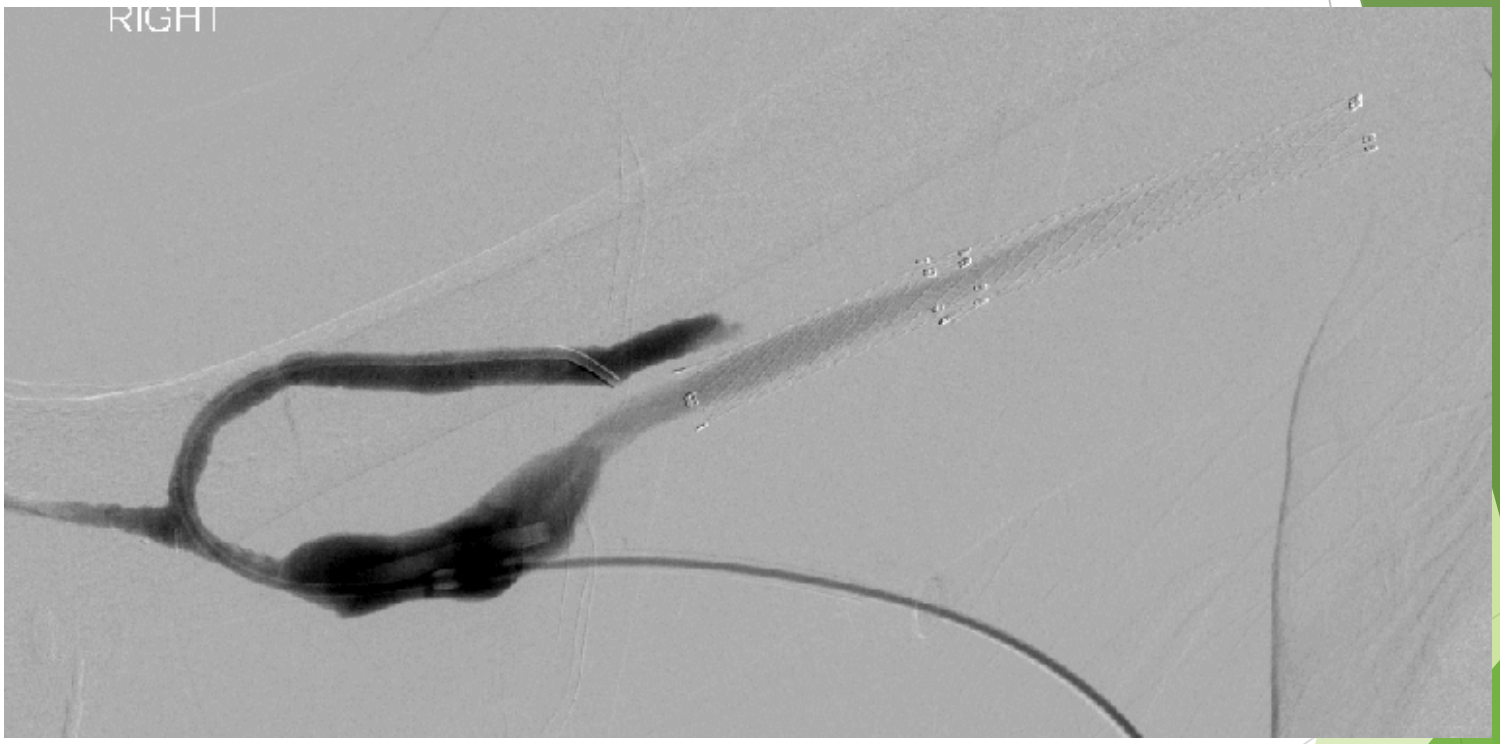
- Fistula
- AV graft
- HeRO graft

Fistula

- 1966 was introduction of Brescia-Cimino fistula
- The procedure uses patient own vessels to make a fistula
- When the artery and vein are joined together they will make the vein larger and stronger tolerating multiple needle sticks

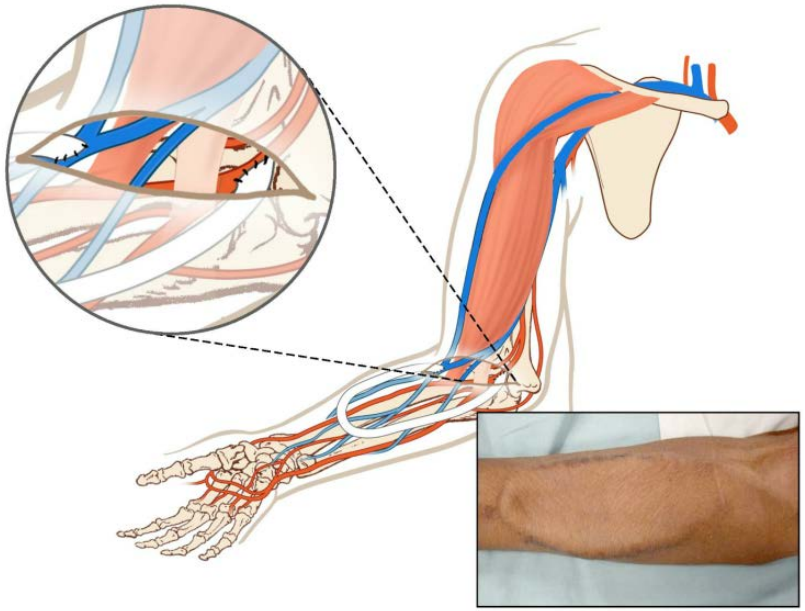


Radiograph of fistula

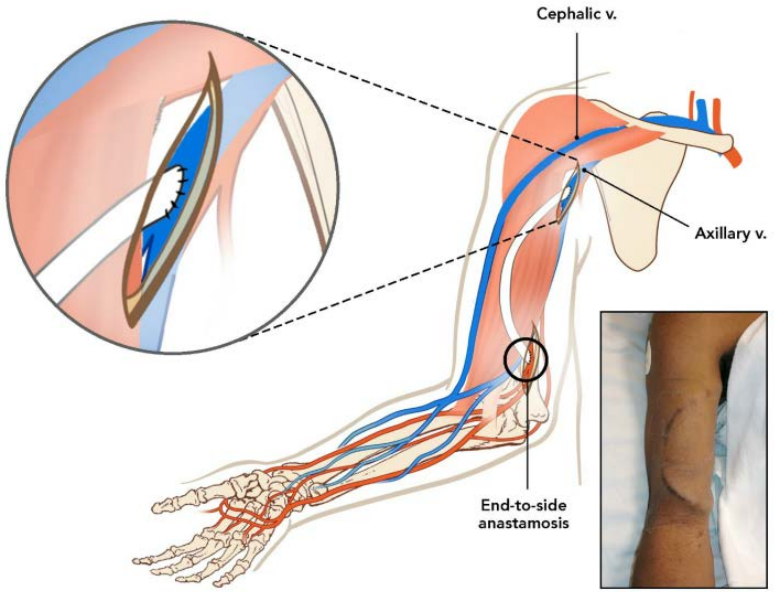


Arteriovenous Graft

Forearm Loop Arteriovenous Graft



Upper Arm Arteriovenous Graft

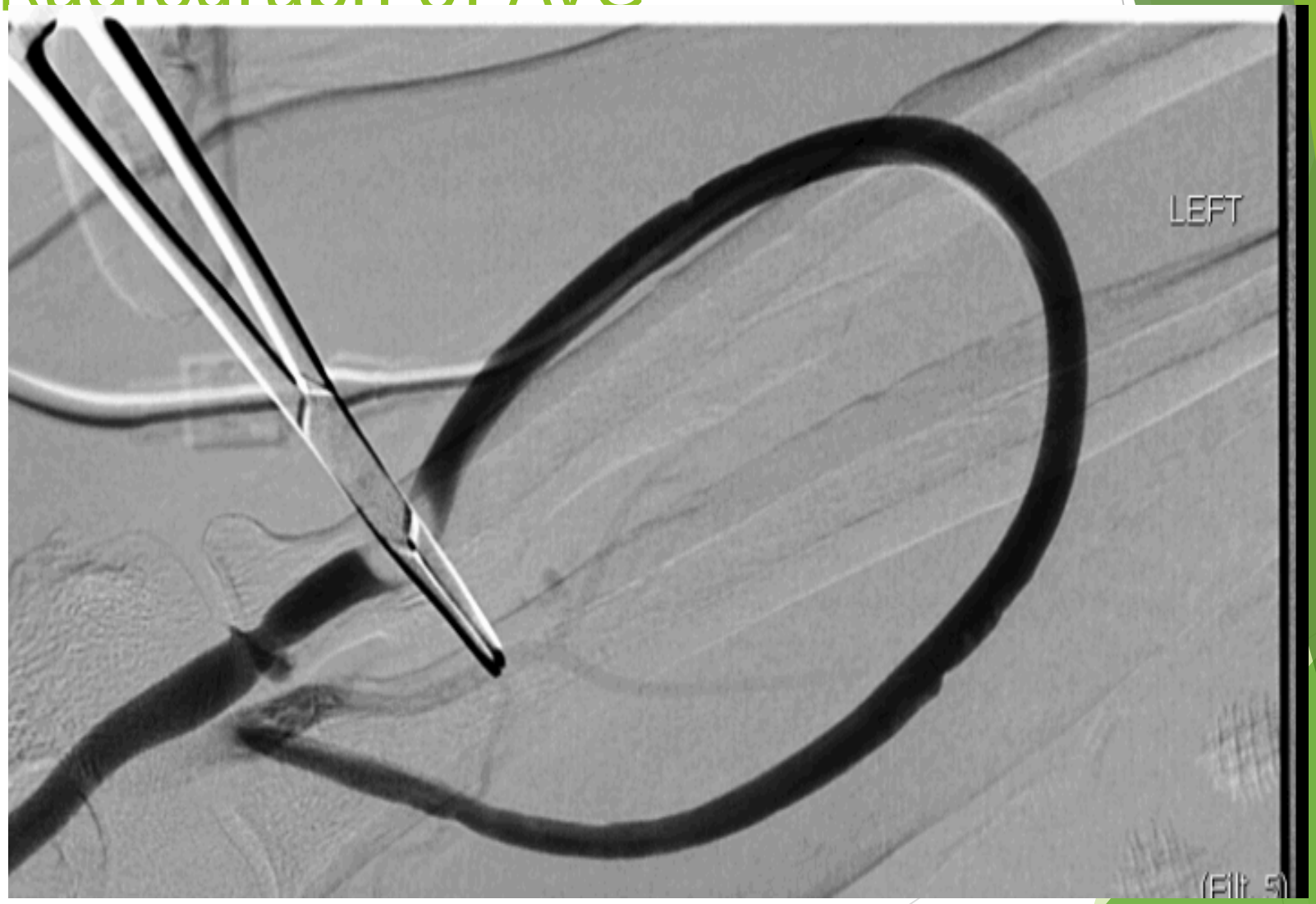


A graft that surgically creates an artificial/superficial bridge between artery and vein to allow for easy cannulation

Arteriovenous Graft

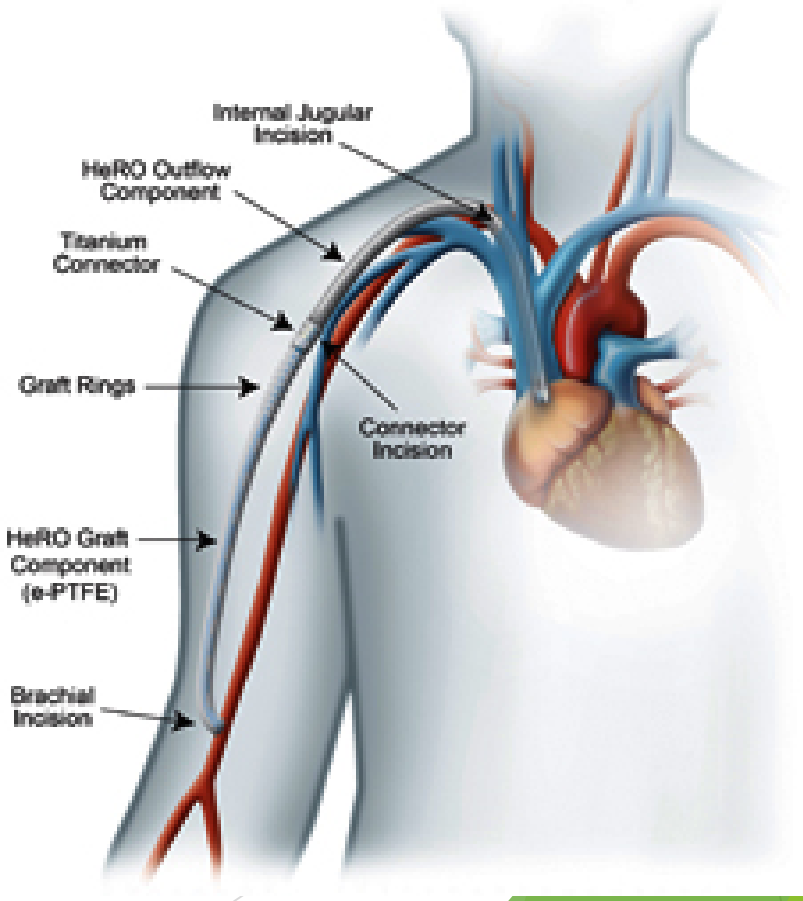
- Most common materials for construction:
  - Polytetrafluethylene or PTFE
  - Bovine carotid or mesenteric vein
  - Ovine collagen with mesh
  - Saphenous vein
  - Polyurethane
  - Silicon
  - Dacron

Radiograph of AVG



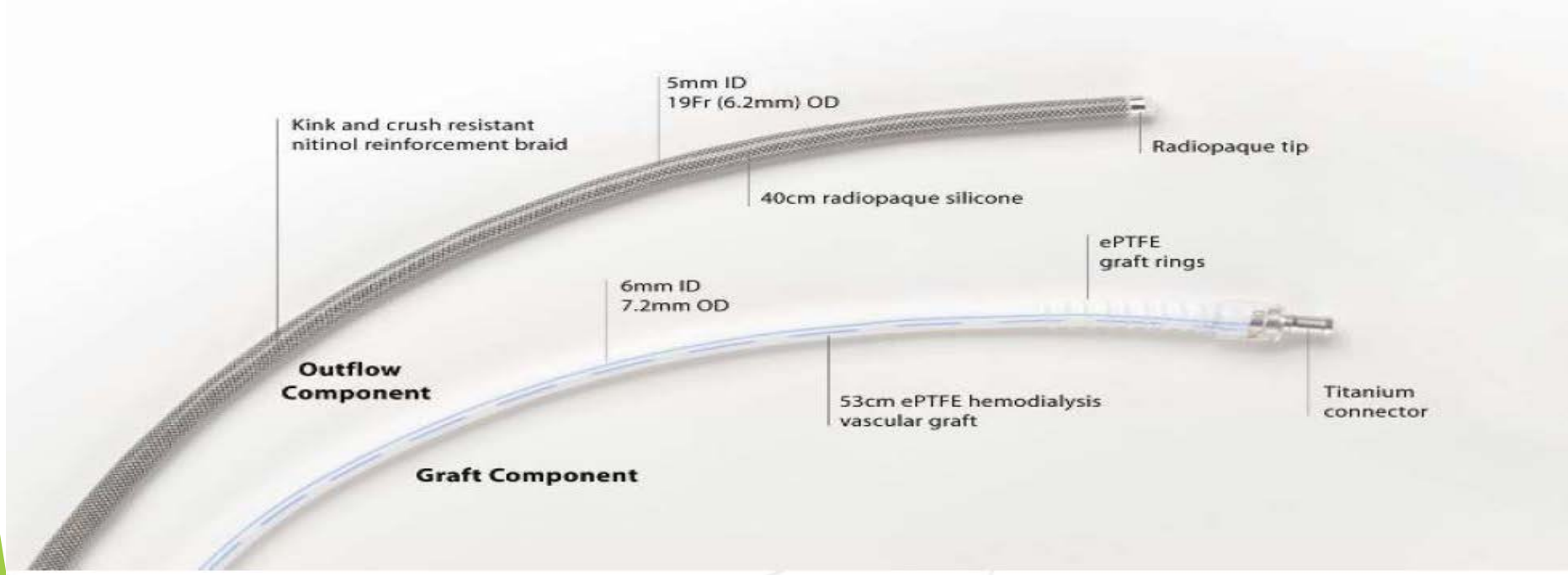
Hemodialysis Reliable Outflow Graft (HeRO)

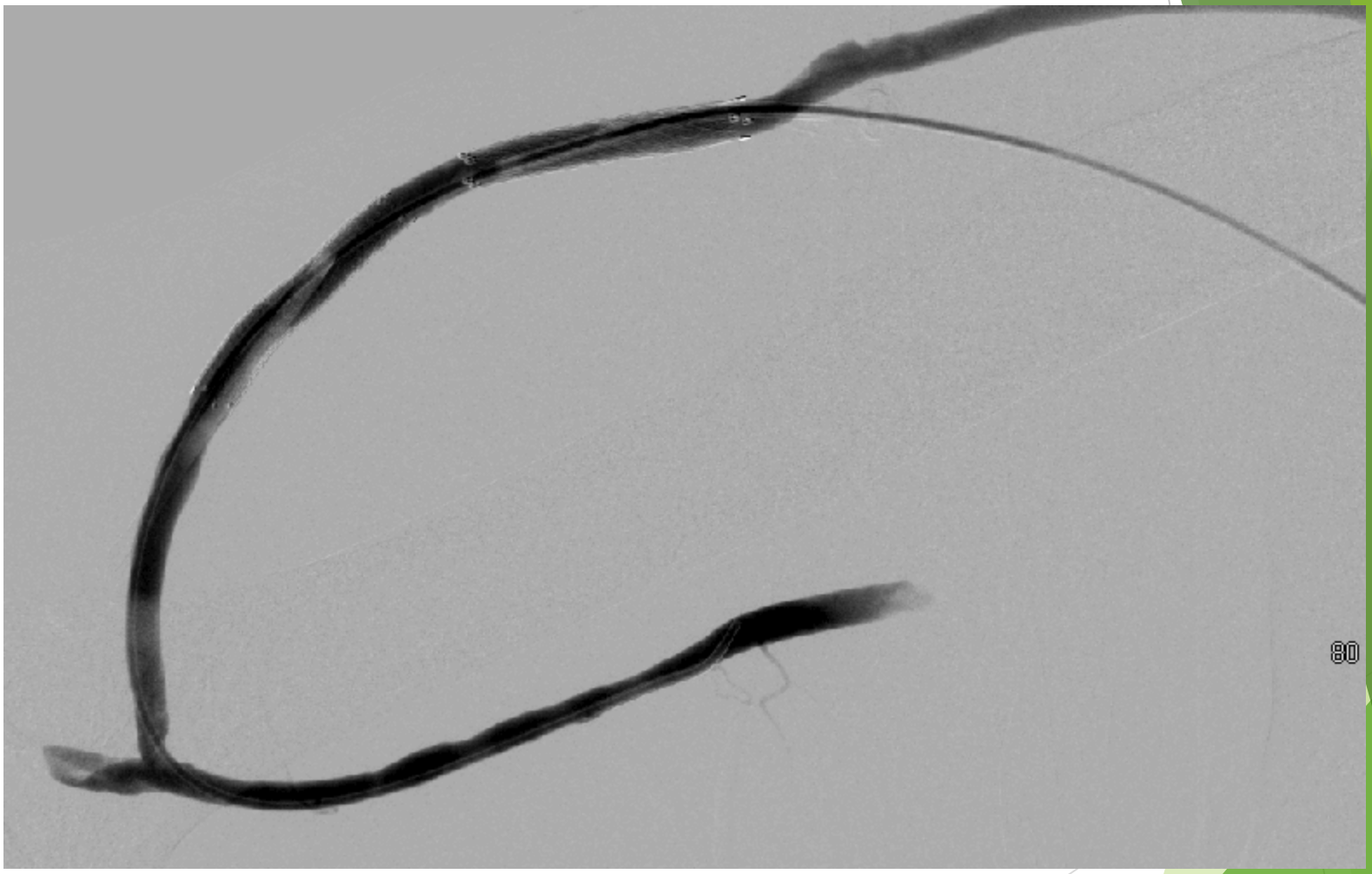
- Device is a hybrid between AV graft and dialysis catheter to be used in patient's whom venous access sites suitable for traditional fistulas and grafts have been exhausted

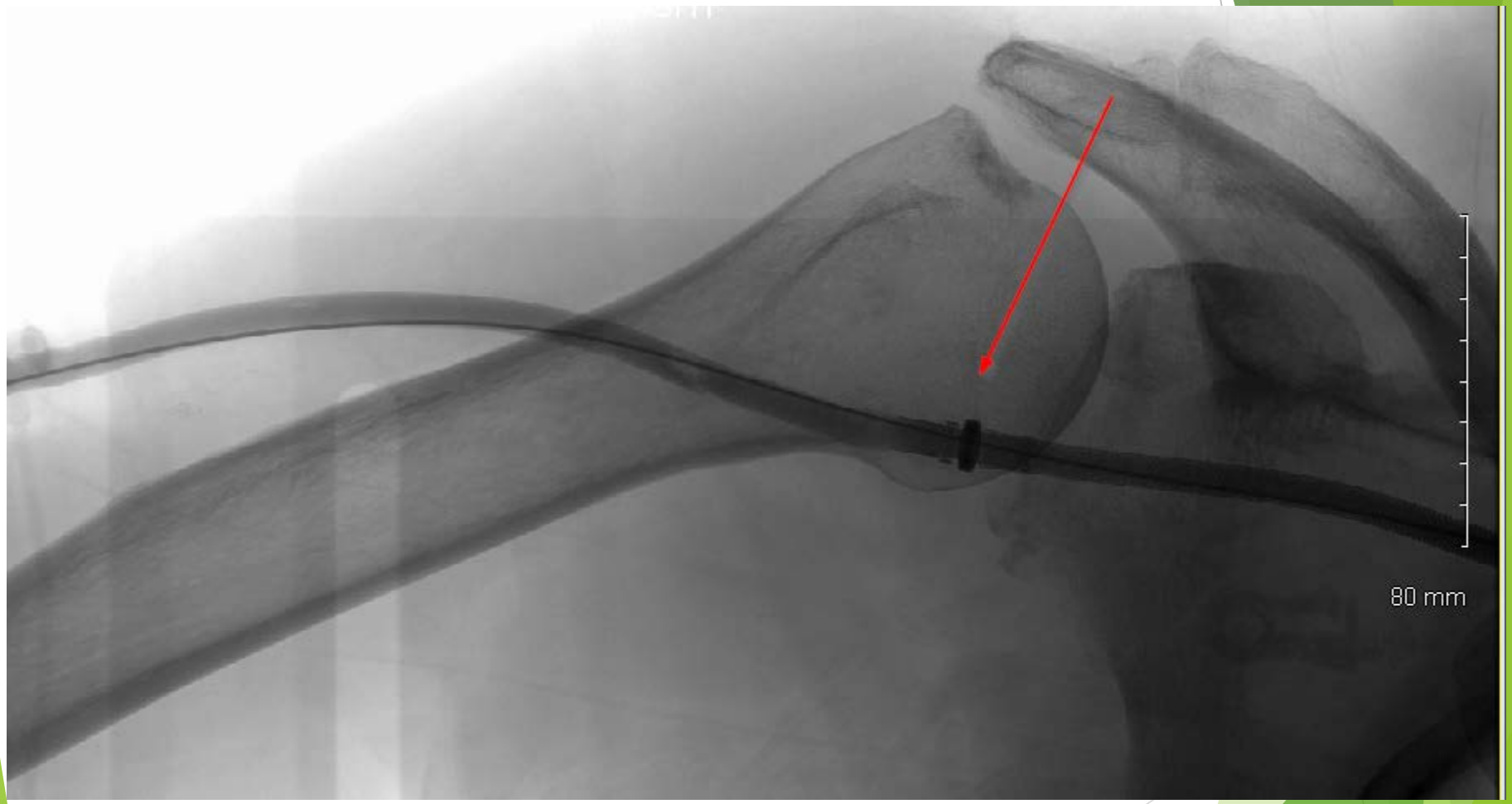


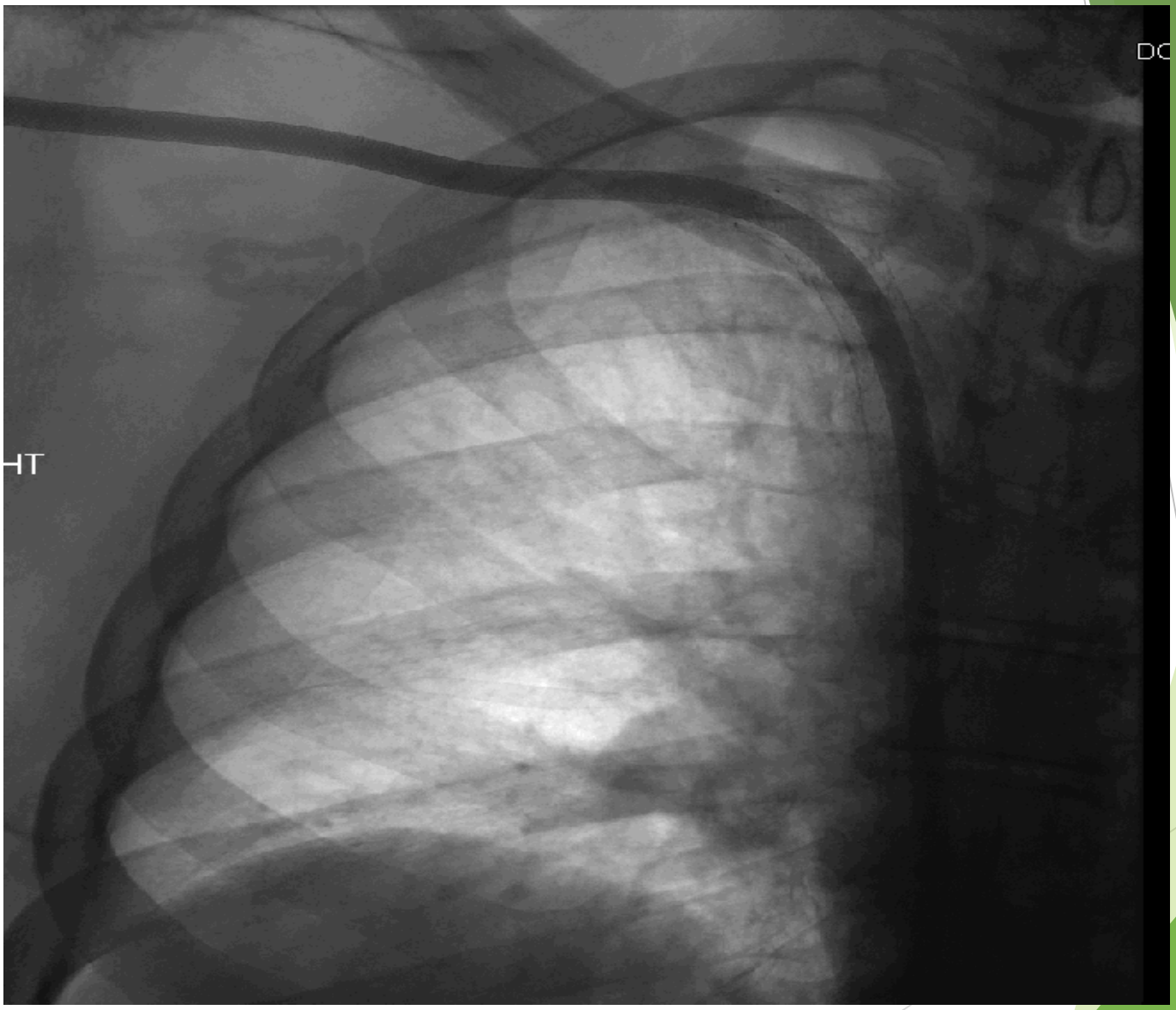
HeRO graft

- 6mm inner diameter expanded polytetrafluorothylene (PTFE) graft attached to 5mm inner diameter nitinol-




80


80 mm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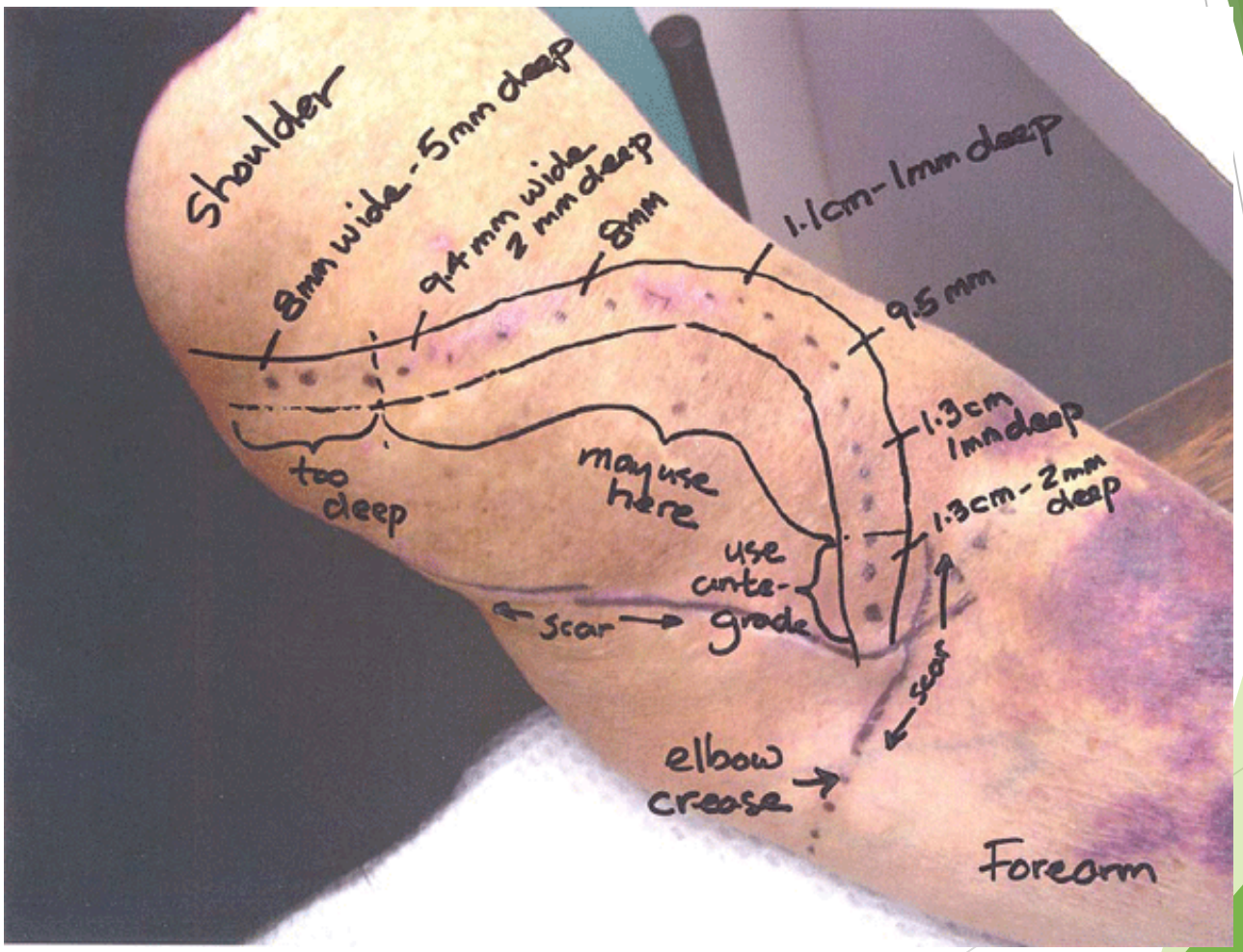
Problems

- Infection
- Cannulation problems/pain
- Body image
- Thrombus of Fistula or graft
- Maturation issues
- Stenosis

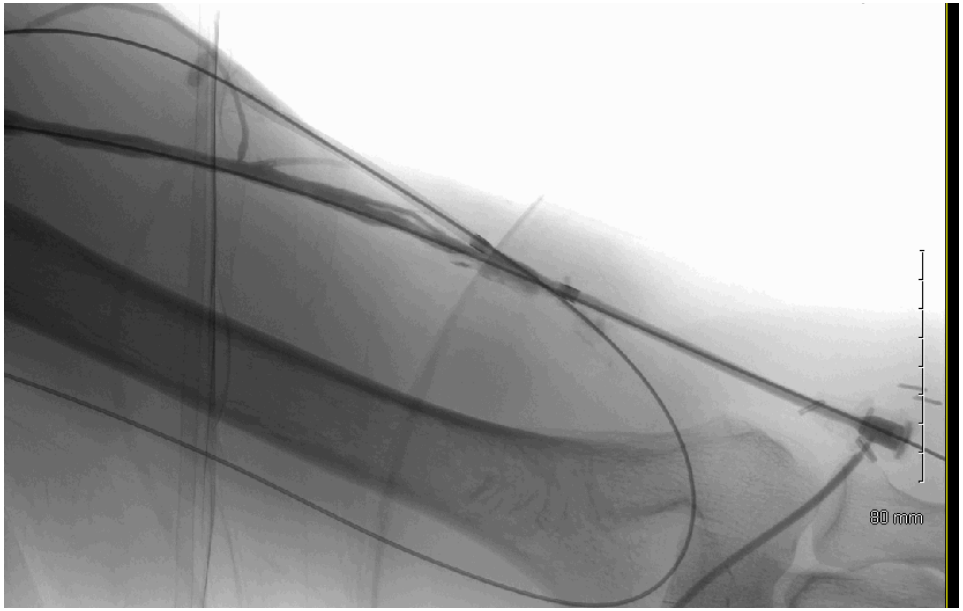
Infection

Cannulation Issues

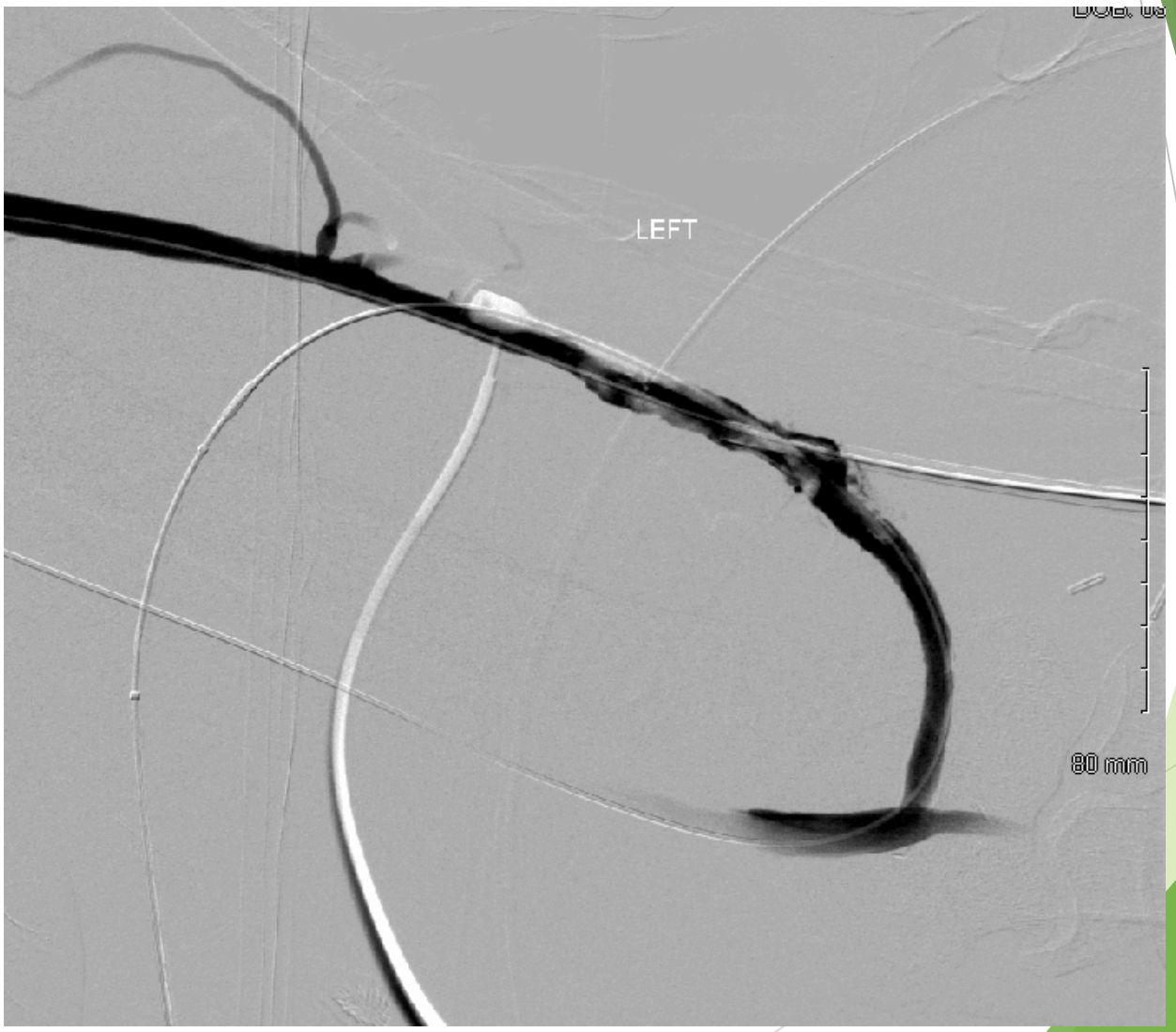


Body Image

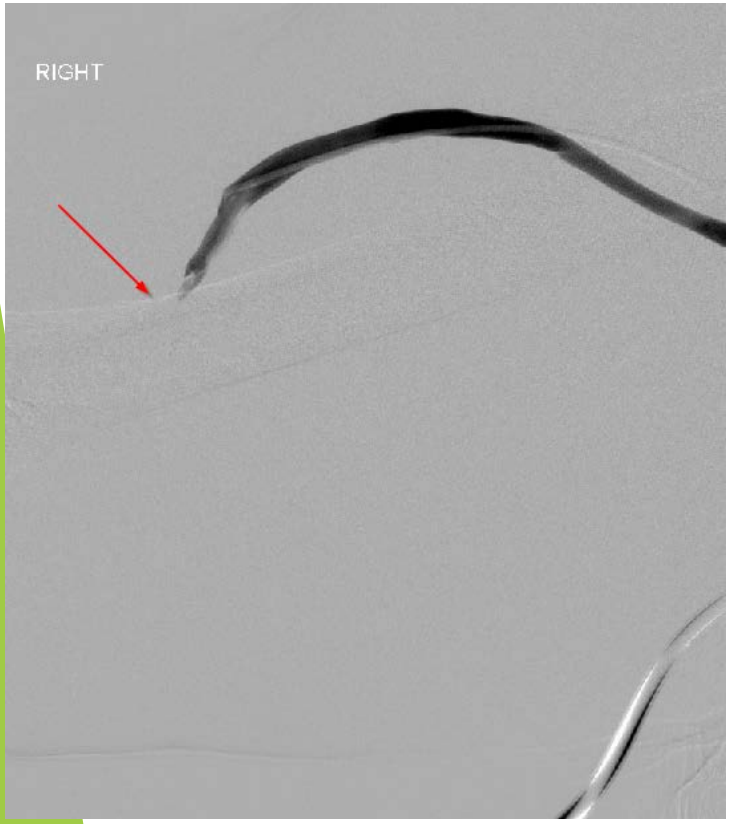
Clotted Fistula



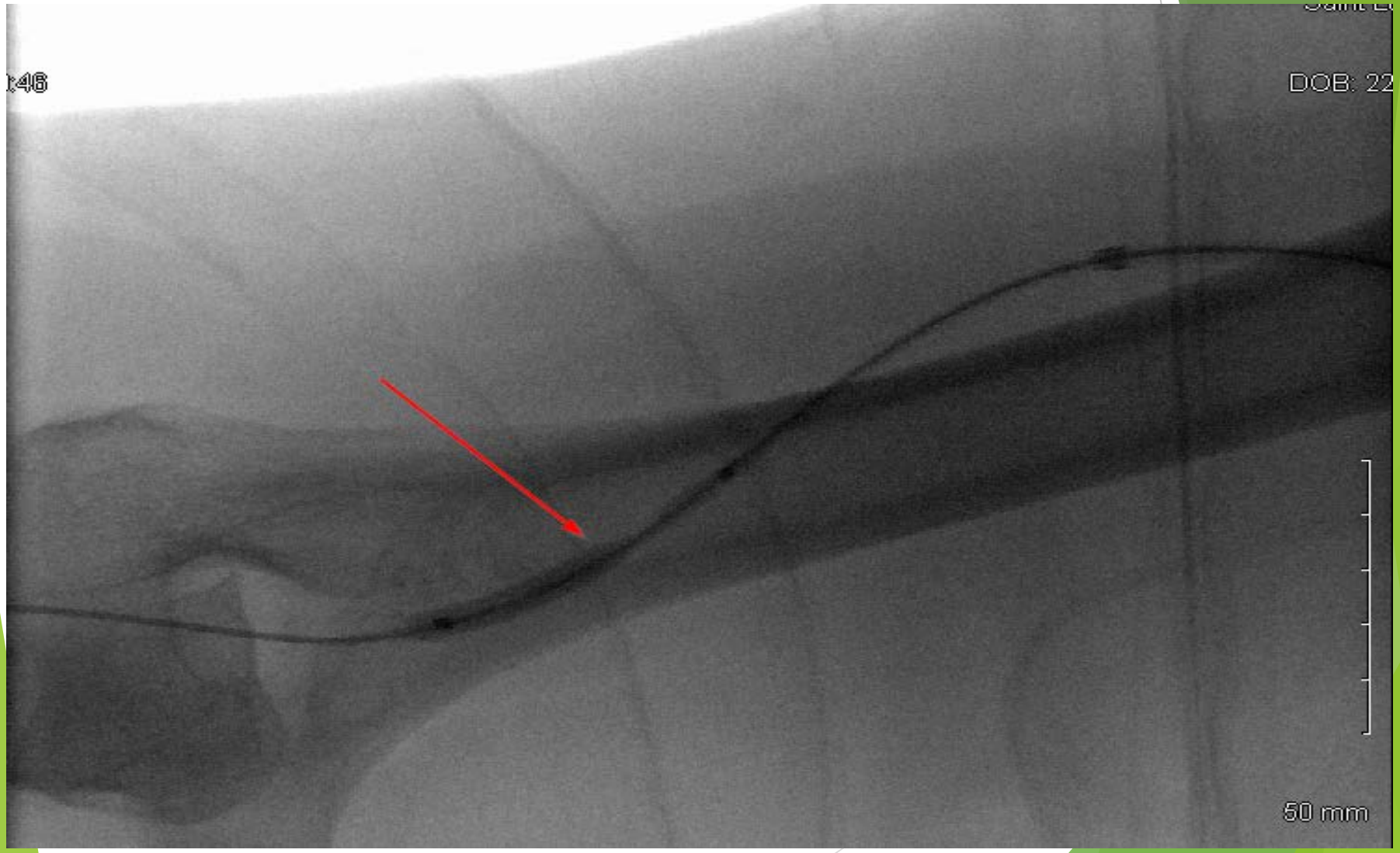
Clotted fistula-open



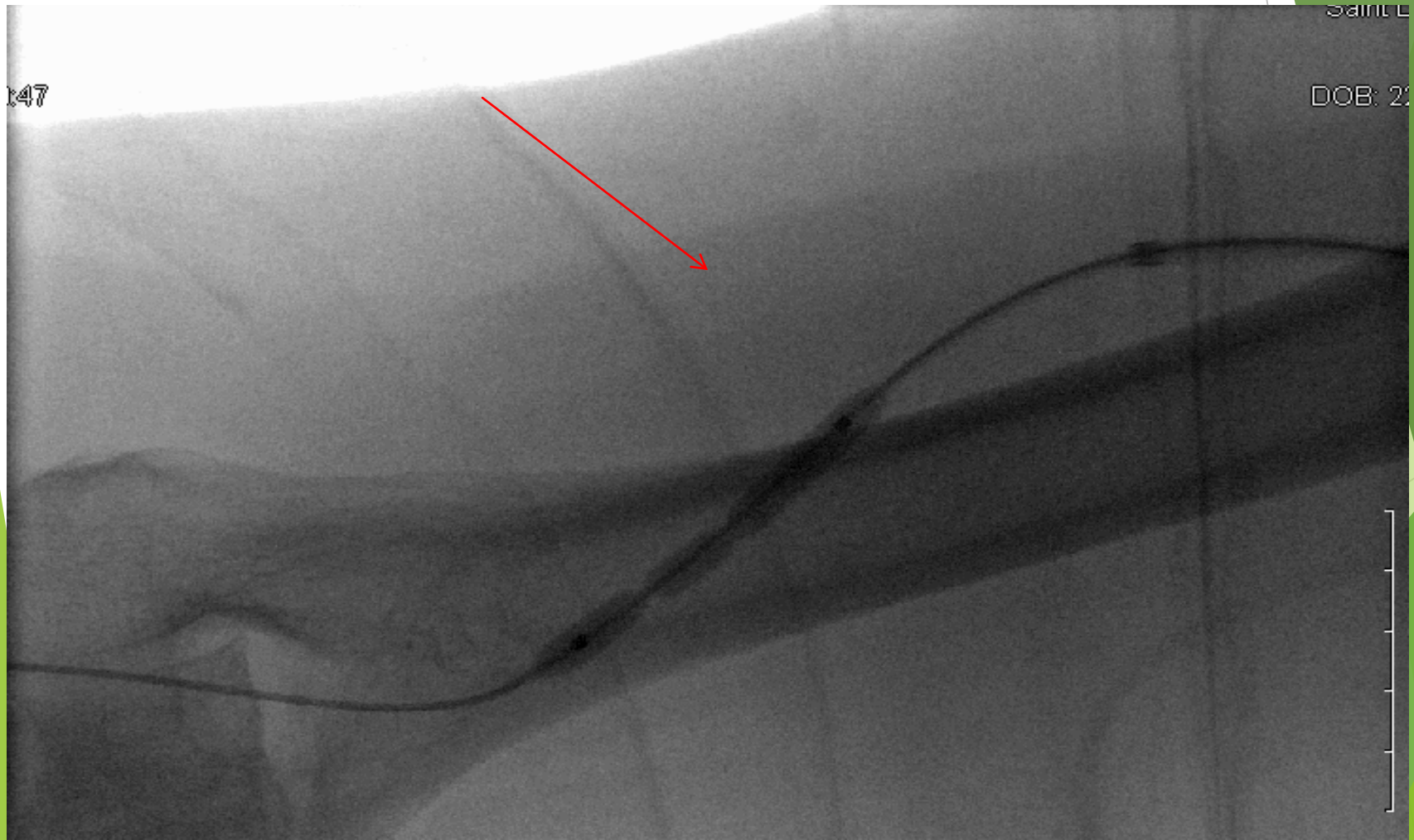
Maturation



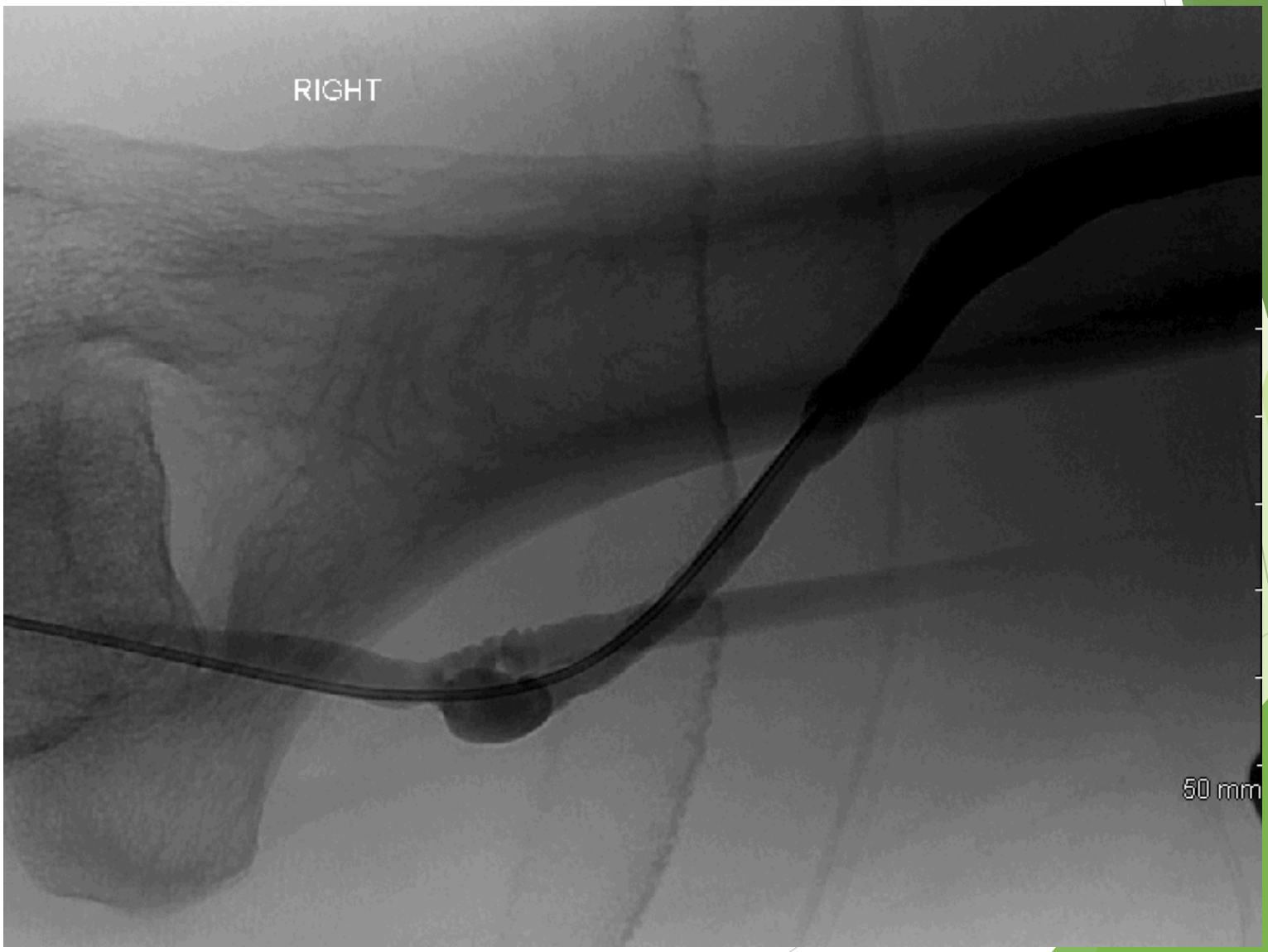
Angioplasty



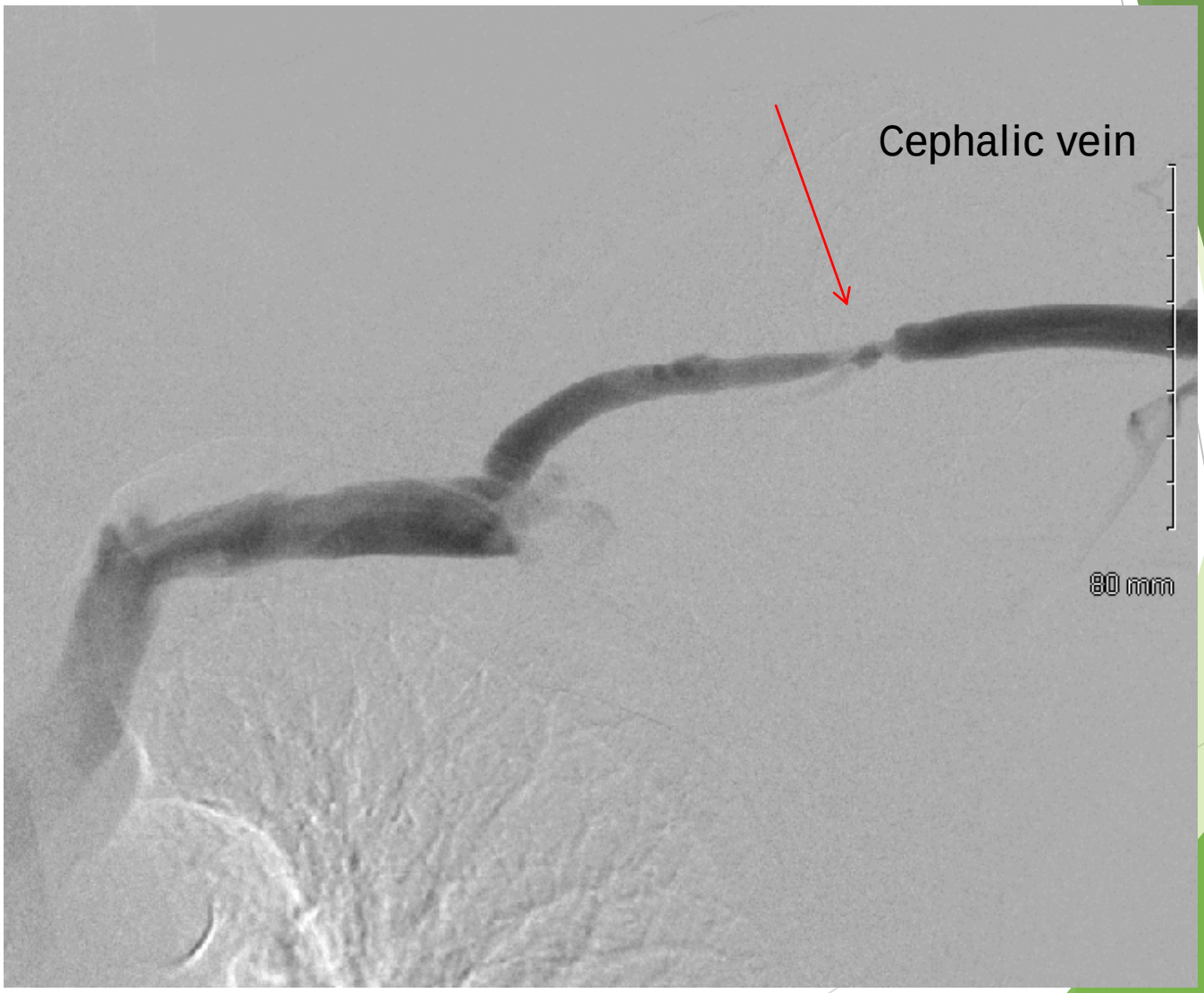
Anginoplasty



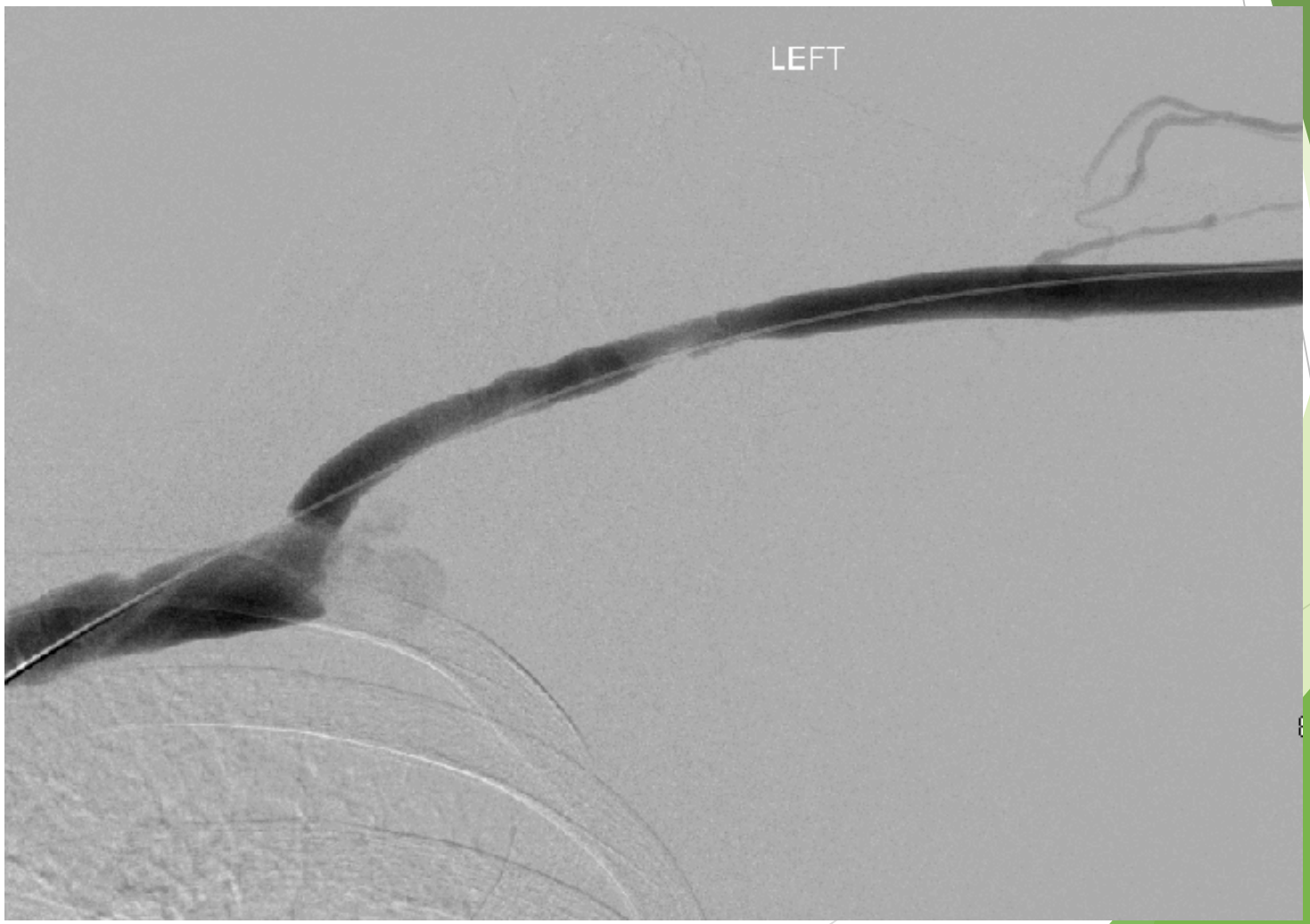
Fistula open, maturation



Stenosis-outflow

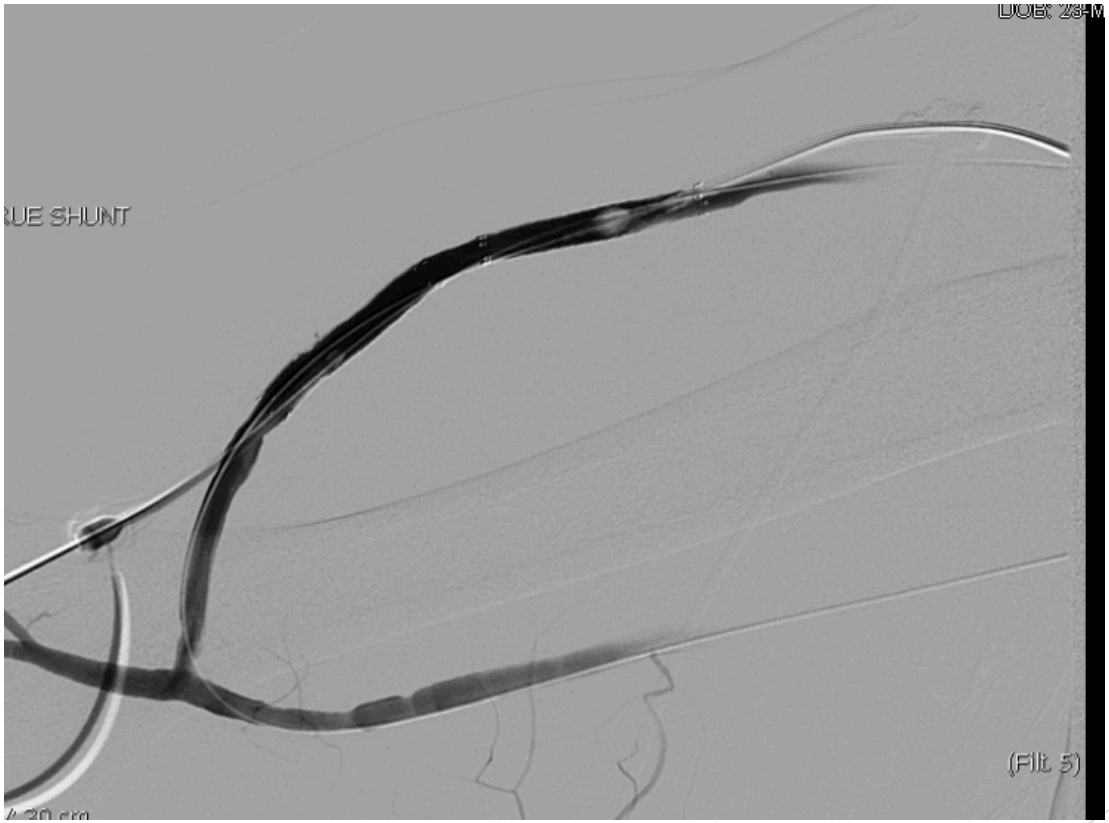


After angioplasty



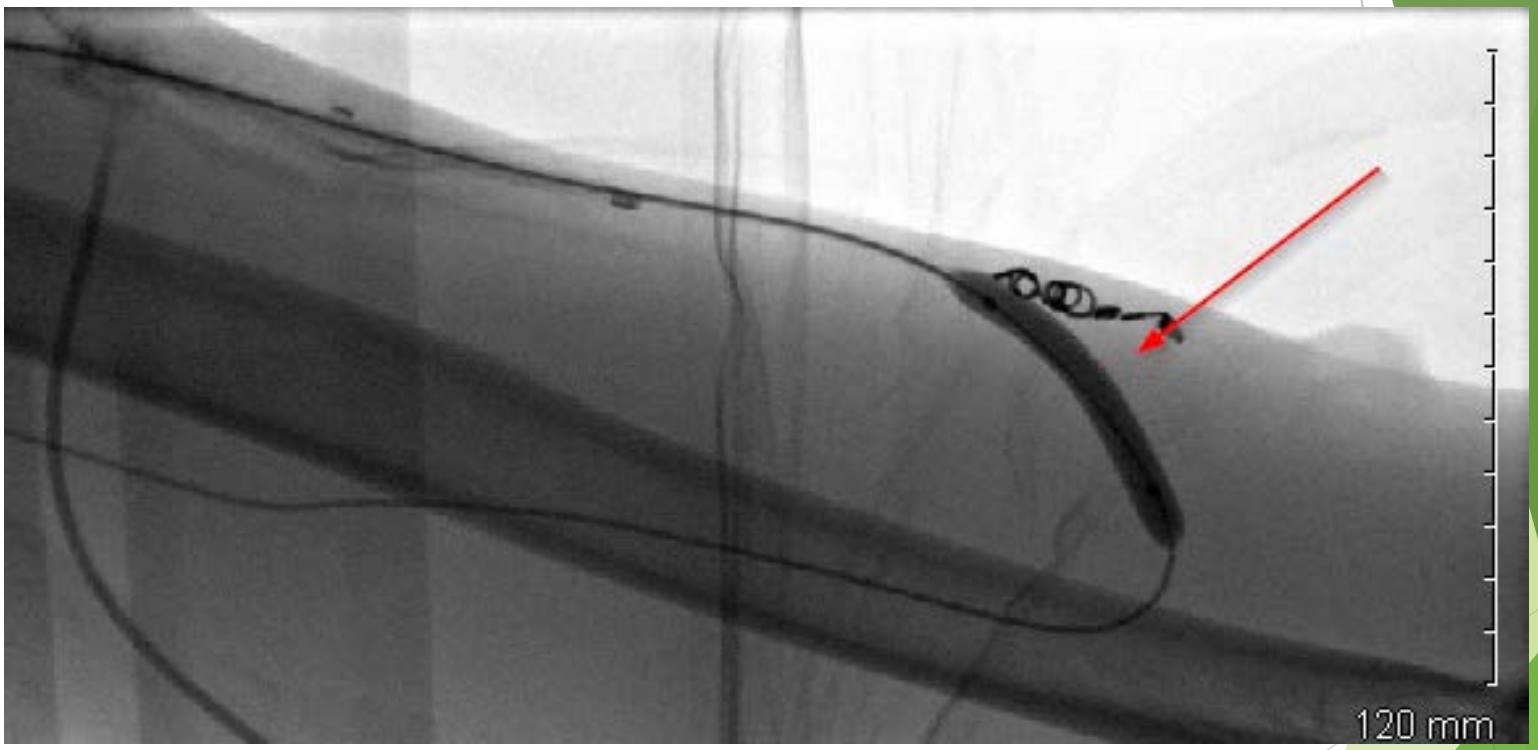
Clotted HeRO graft

After declot

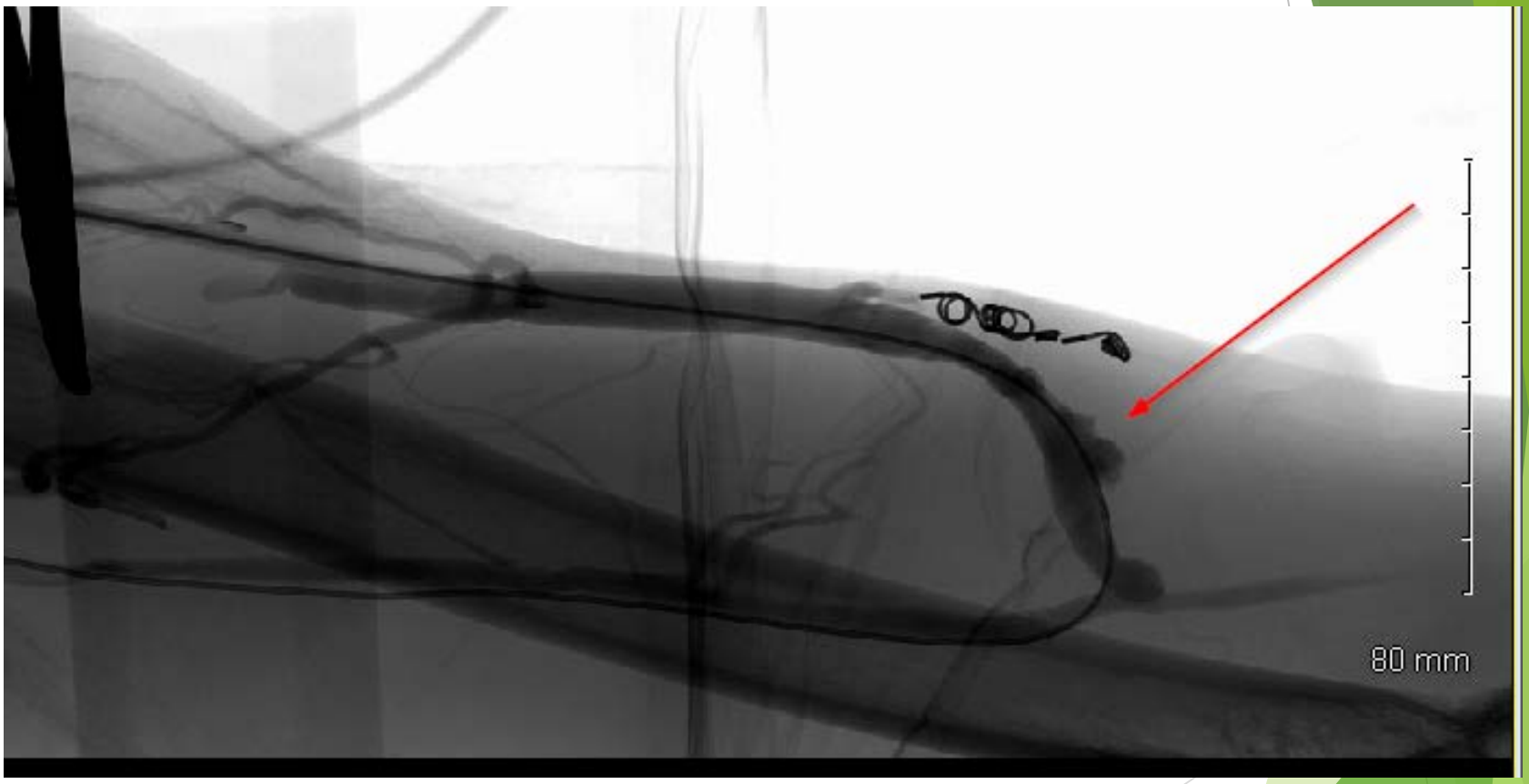


Angioplasty of fistula with Rupture

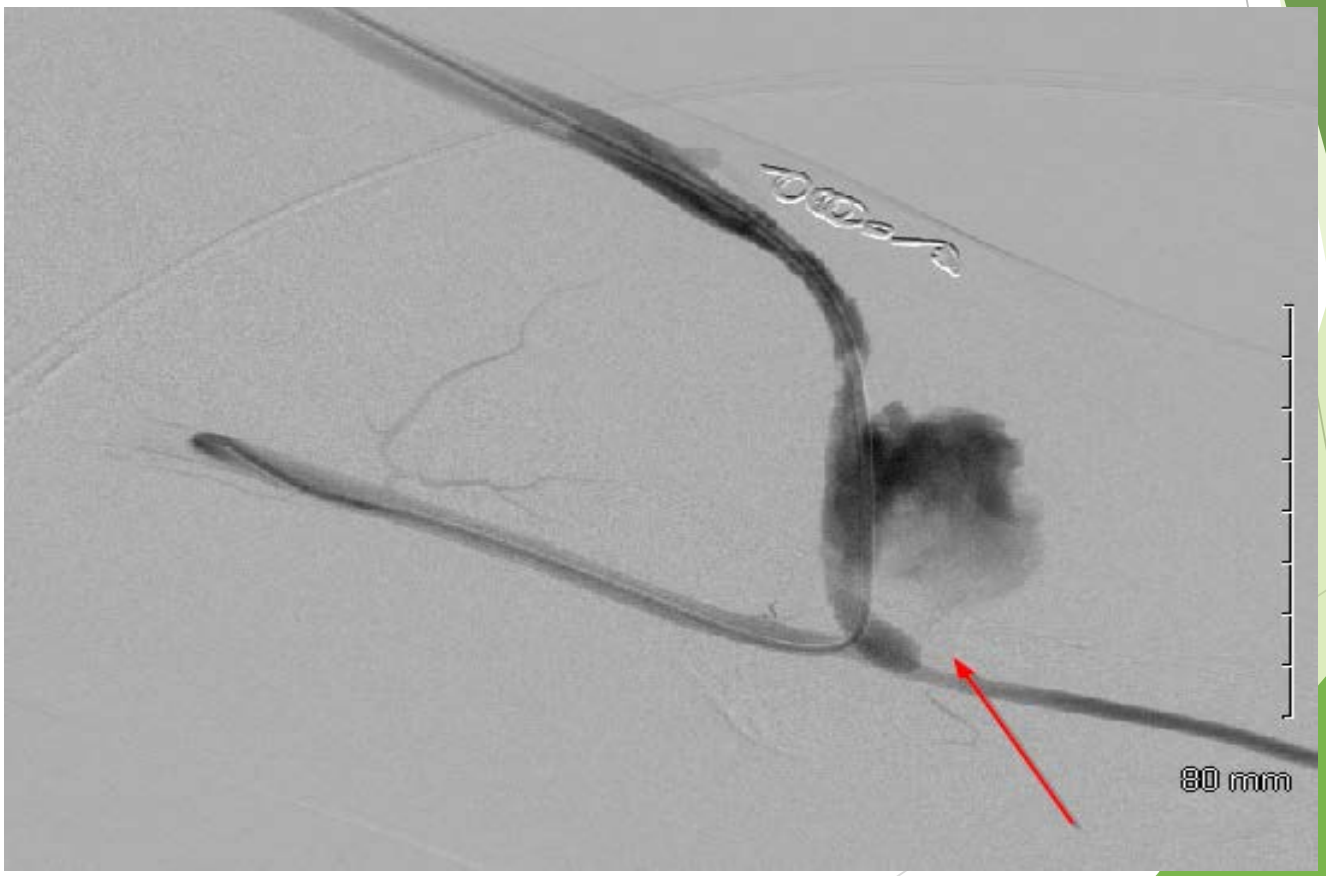
Angioplasty near anastomosis



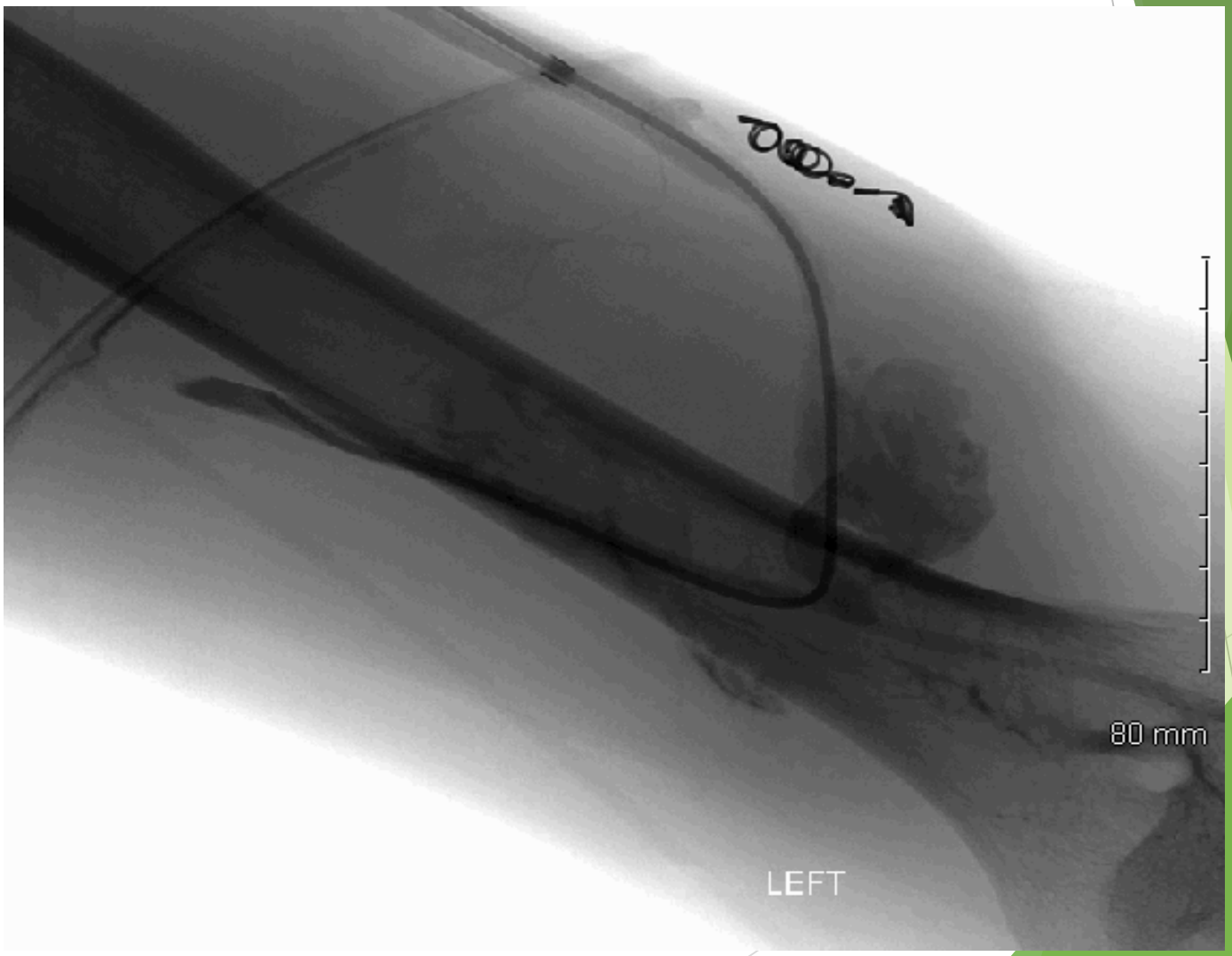
End Run after angioplasty



Rupture of fistula-DSA

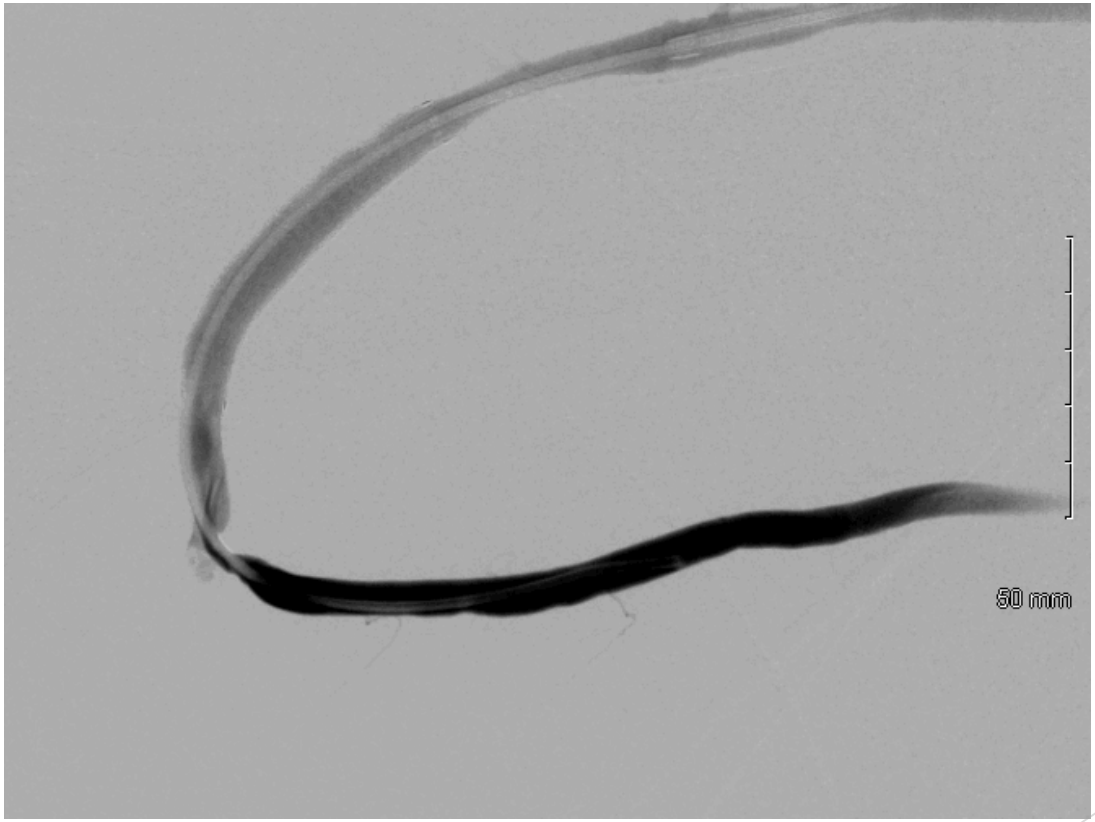


Rupture of fistula-Native



Aneurysm

Aneurysm with stent



Resistance to permanent access

- Previous negative experience
- Pain
- Age
- Waiting for transplant
- MD said OK to CVC
- Get on/off machine faster
- Body image
- Told they would regain function

Conculsion

- Get patient's a fistula before they need it
- Avoid any kind of central venous catheter for risk of infection
- Teach patient and family about the care of their access
- Reconginize what may be wrong from the information from patient or dialysis
- Watch for the unexpected and be ready for anything


DON'T
PANIC


Questions

References

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