

*Forearm fistula for every body?
Yes, the radiologist will finish the job!*

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Infirmierie Protestante
Lyon Caluire*



Disclosure

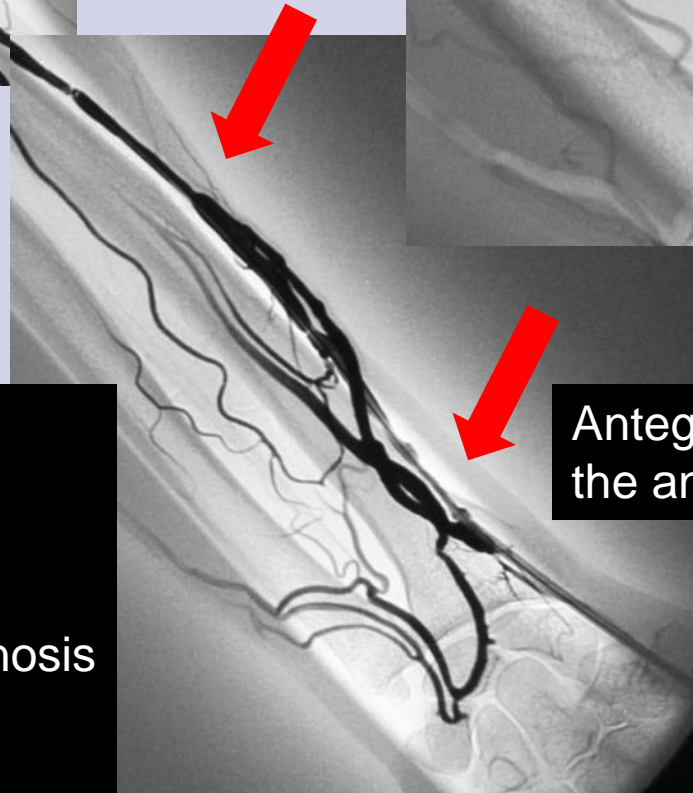
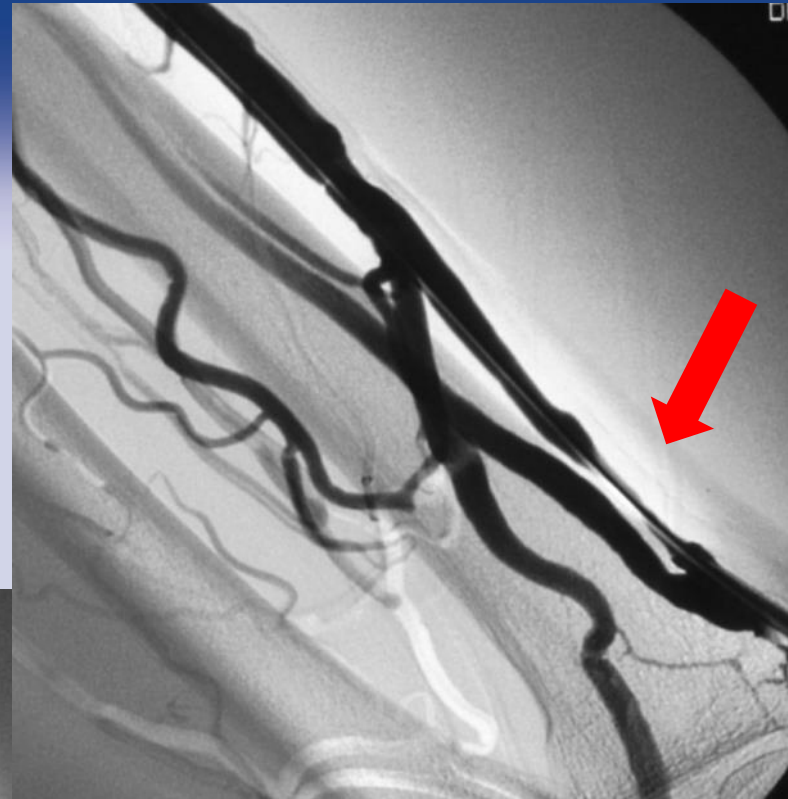
Speaker name:

ERIC BRESSON

- I have the following potential conflicts of interest to report:
 - Consulting
 - Employment in industry
 - Shareholder in a healthcare company
 - Owner of a healthcare company
 - Other(s)
- I do not have any potential conflict of interest

- Forearm native fistula is definitely the best vascular access:
 - ❑ *Less complication*
 - ❑ *Longest secondary patency*
- Creating a forearm native AVF becomes more and more difficult:
 - ❑ *Ageing population*
 - ❑ *Increasing cardiovascular risk factors*
 - ❑ *Increasing incidence of diabetic patients*
- Non-maturing forearm native AVF become more frequent

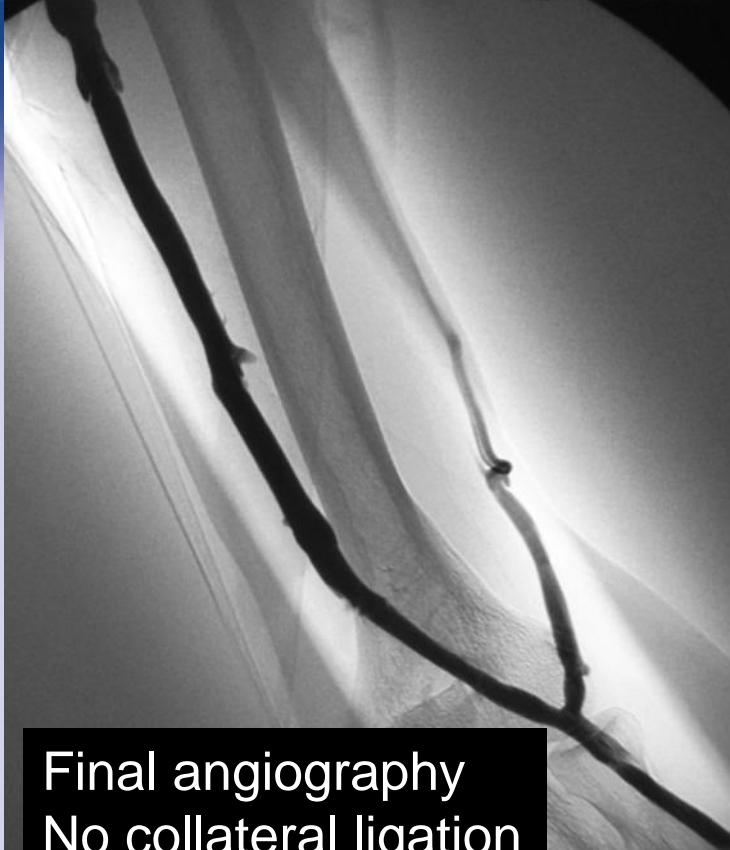
- A non-maturing AVF 6 weeks after creation always presents an underlying stenosis
 - ❑ *One or several focal significant arterial or venous stenosis*
 - ❑ *Underdeveloped calcified artery*
 - ❑ *Extensive venous fibrosis*
- Rapid duplex ultrasonography confirms inadequate access blood flow and stenosis location
- The majority of these stenosis can be treated by angioplasty with 97% success rate
- Thrombosed non-matured and never used AVF are usually impossible to declot



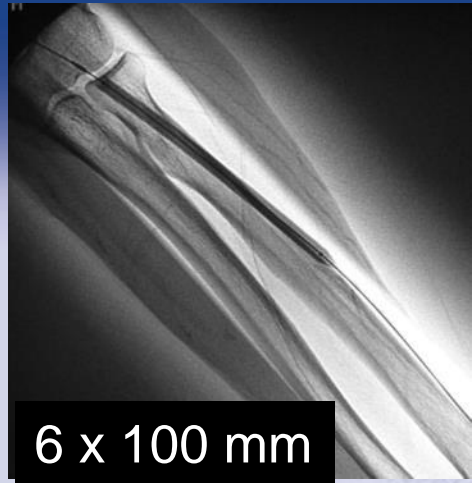
Antegrade cannulation from the anastomotic chamber

74 yo man
Non-mature 6 weeks AVF

US: flow rate 350ml/min
Juxta-anastomotic venous stenosis
and extensive venous fibrosis



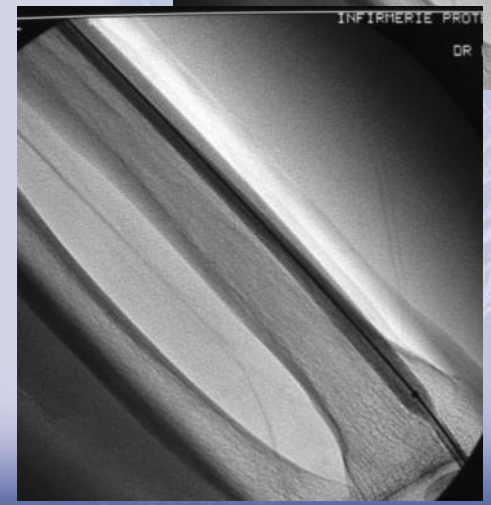
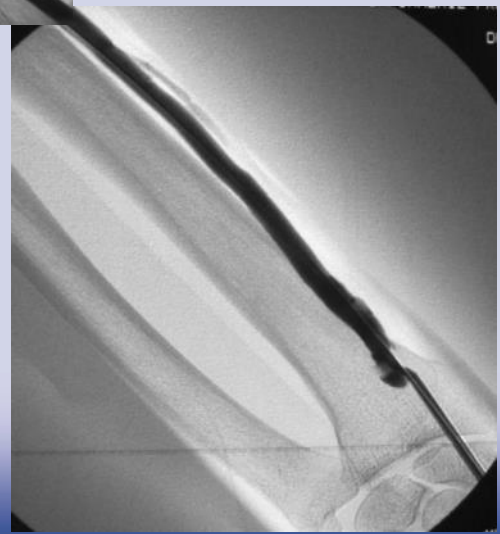
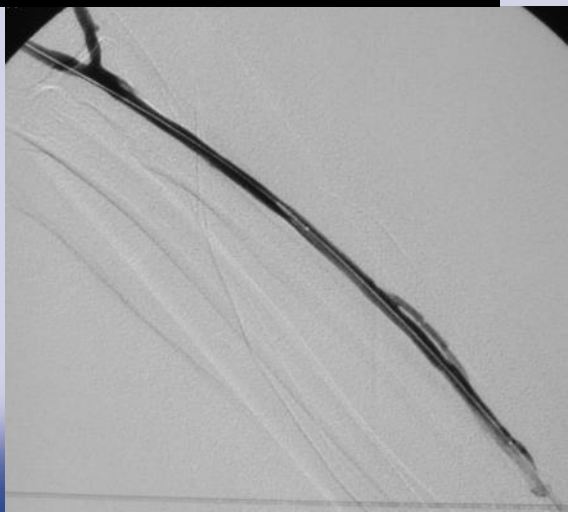
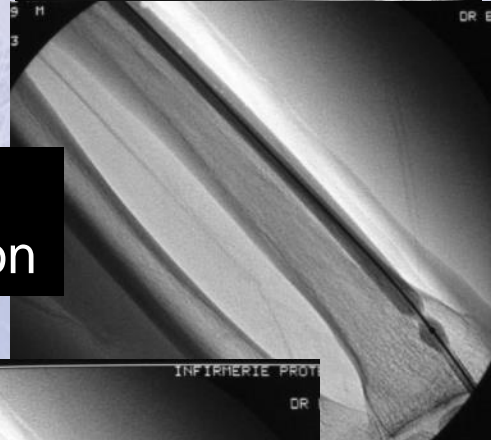
Final angiography
No collateral ligation



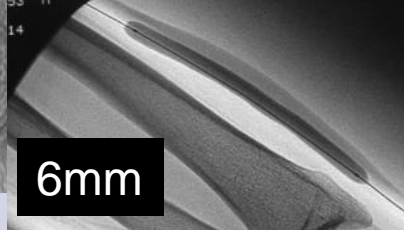
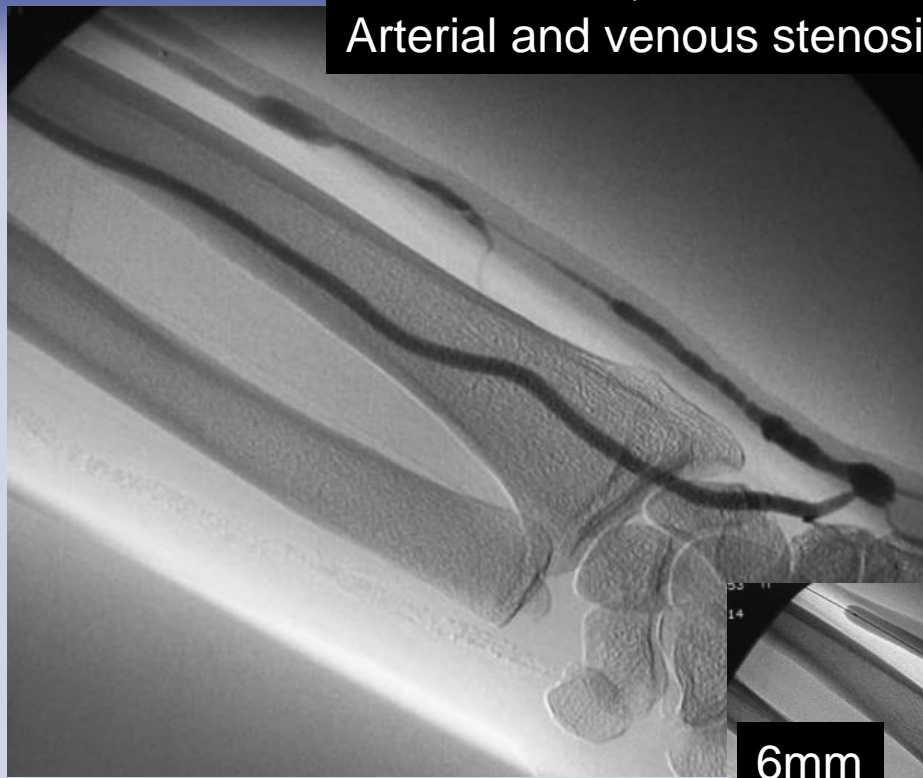
6 x 100 mm



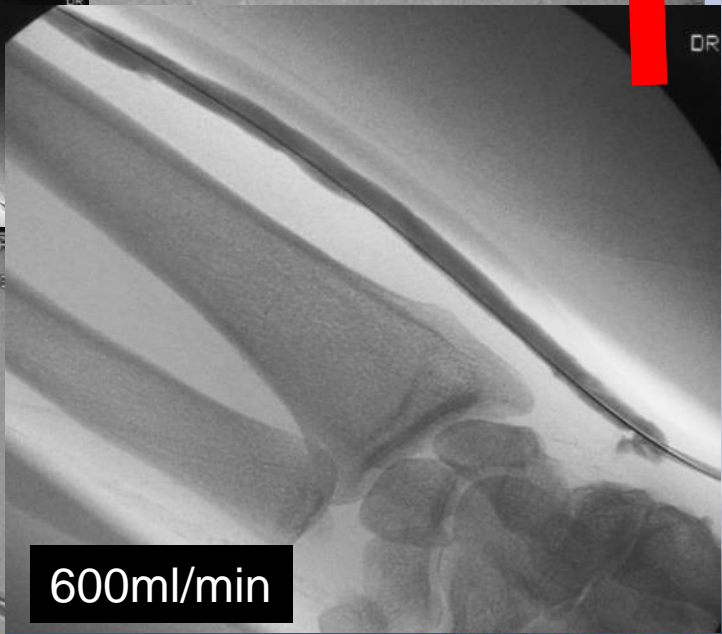
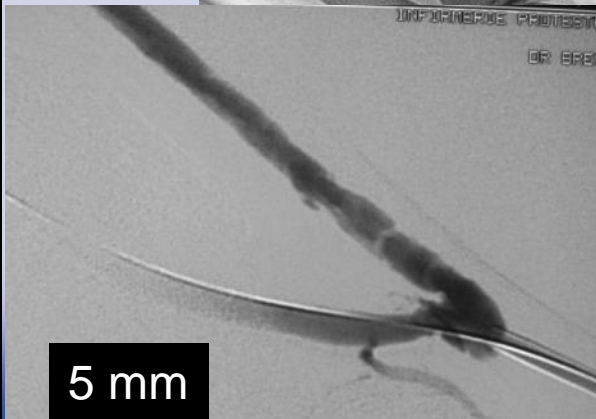
700ml/min at 15 days
6-mm vein fits for cannulation



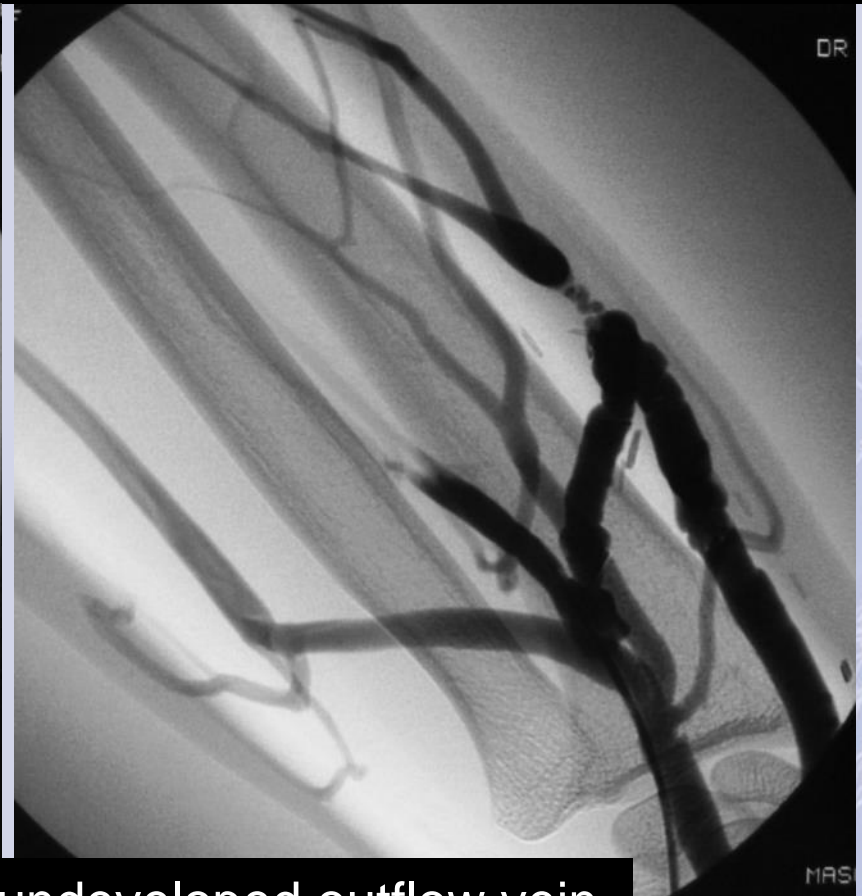
65 yo man, GFR: 10ml/min
Snuffbox AVF, 160ml/min at 6w
Arterial and venous stenosis



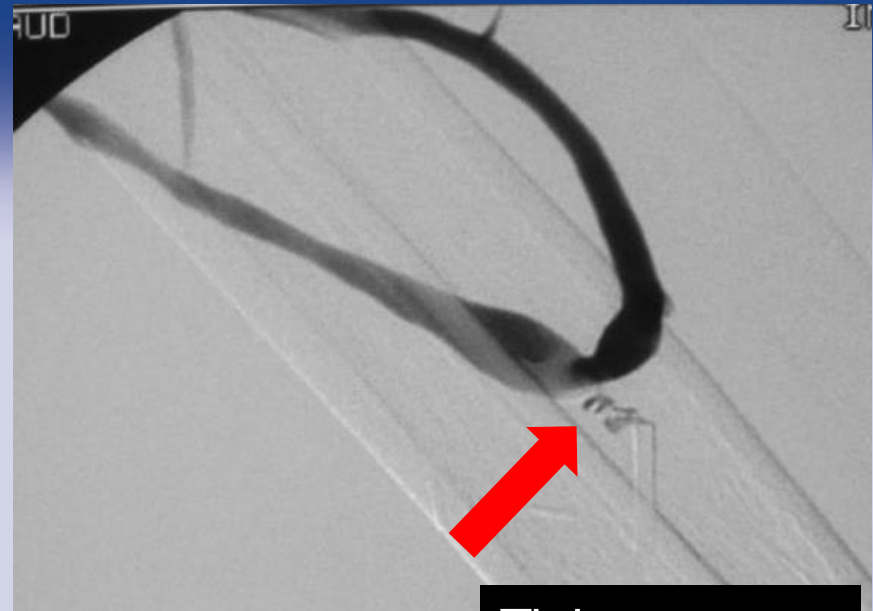
Antegrade cannulation
from anastomotic
chamber
Angioplasty
with 5cc of iodine
Creatinin level
unchanged



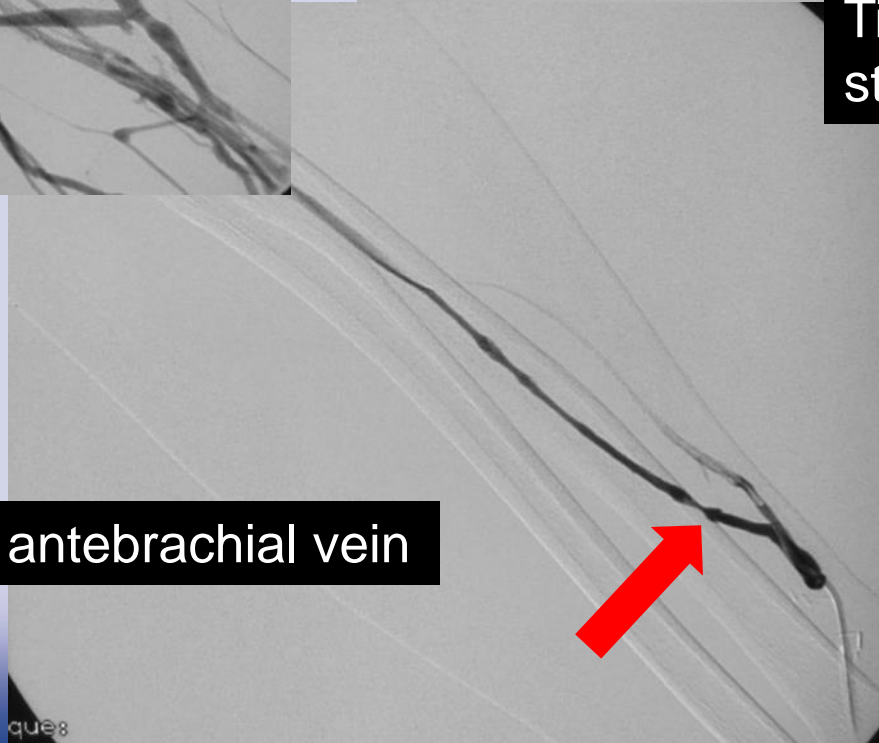
Black 29 yo woman, BMI30, 6 weeks non-mature radio-cephalic AVF
Many collaterals developed on the hand and the forearm but no suitable vein for cannulation



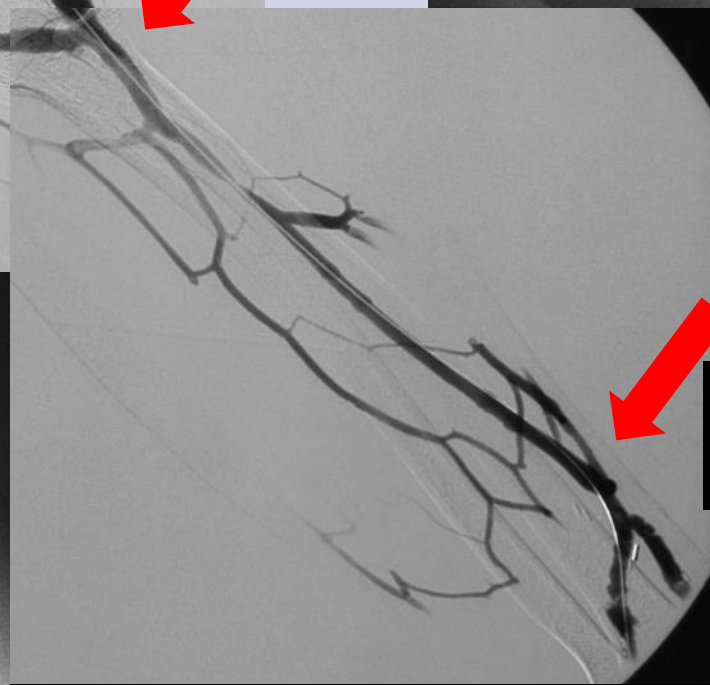
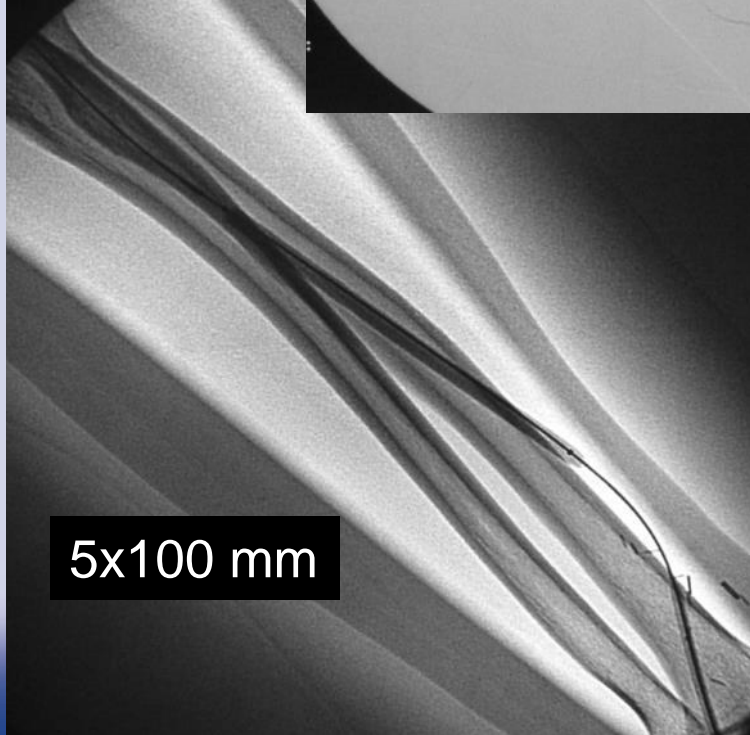
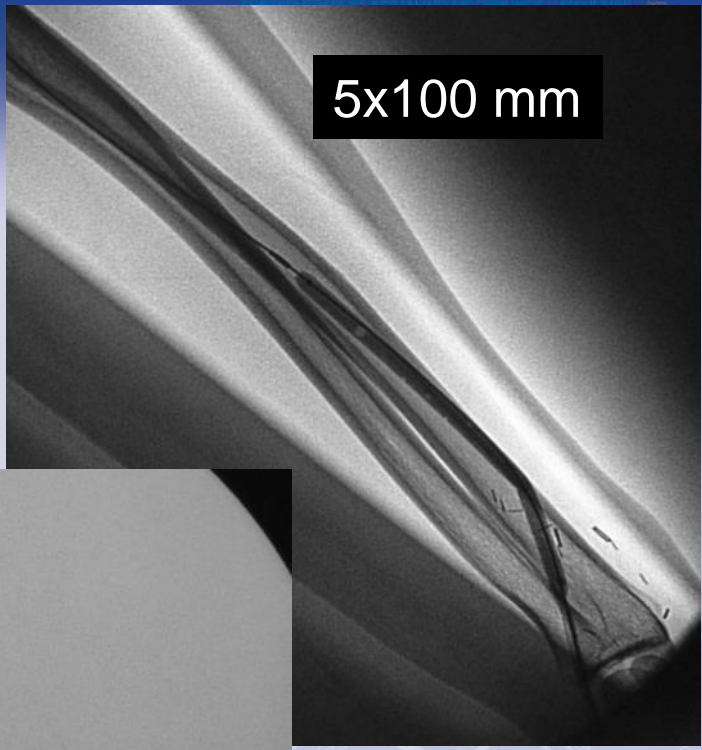
US: swingpoint venous stenosis and undeveloped outflow vein
Flow rate: 250ml/min
Ultrasound guided anastomotic chamber cannulation



Tight tortuous stenosis

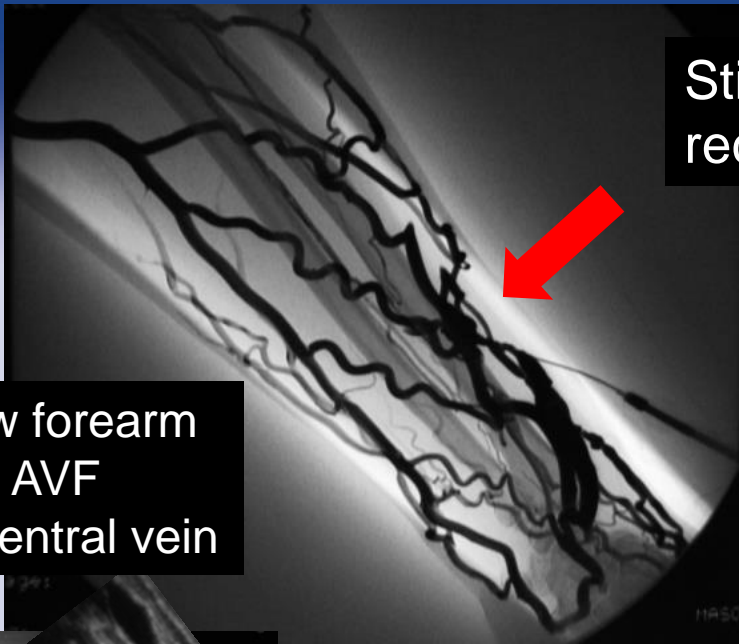


Undeveloped cephalic antebrachial vein

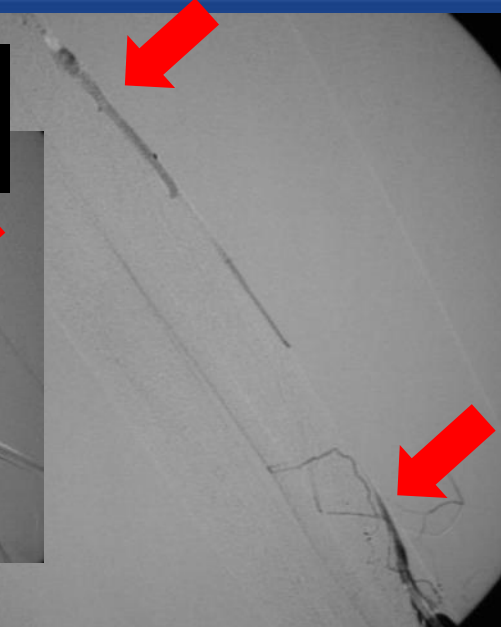
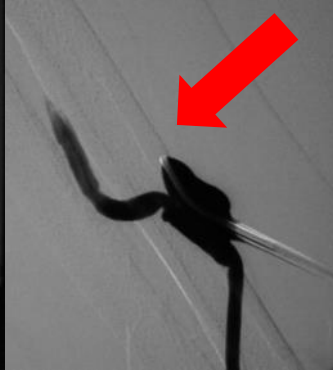


1l/min at 15 days
8-mm vein

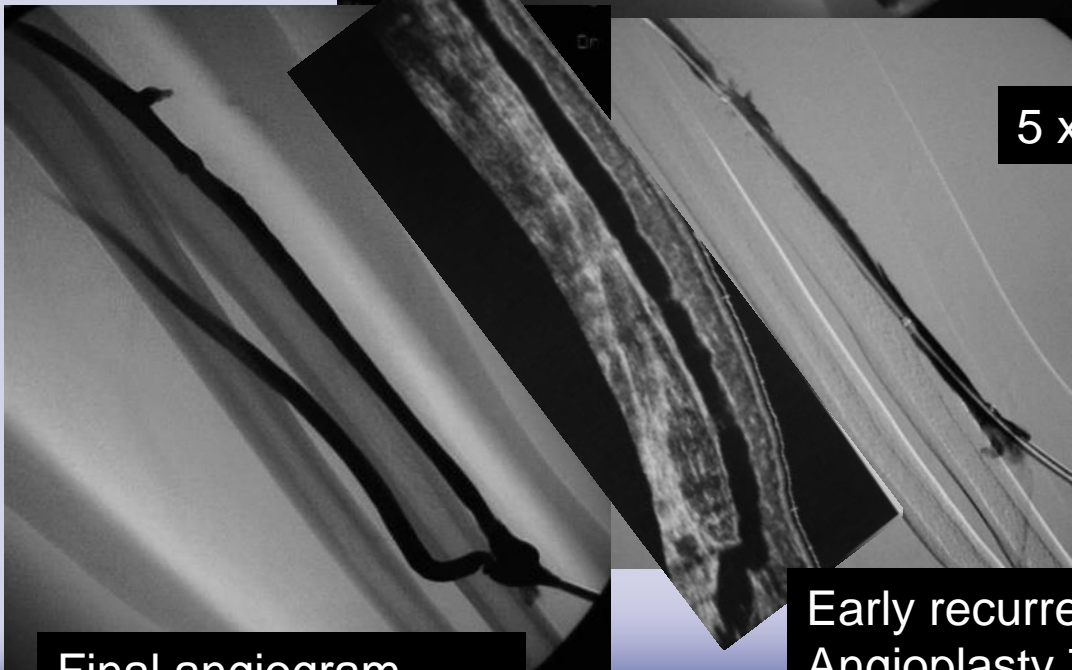
cannulation 1 month later
1l/min at two years without reccurent stenosis
10 to 15 mm vein



Stiff guidewire
recanalisation



Non-mature 6 w forearm
Brescia Cimino AVF
Thrombosed central vein



5 x 100mm

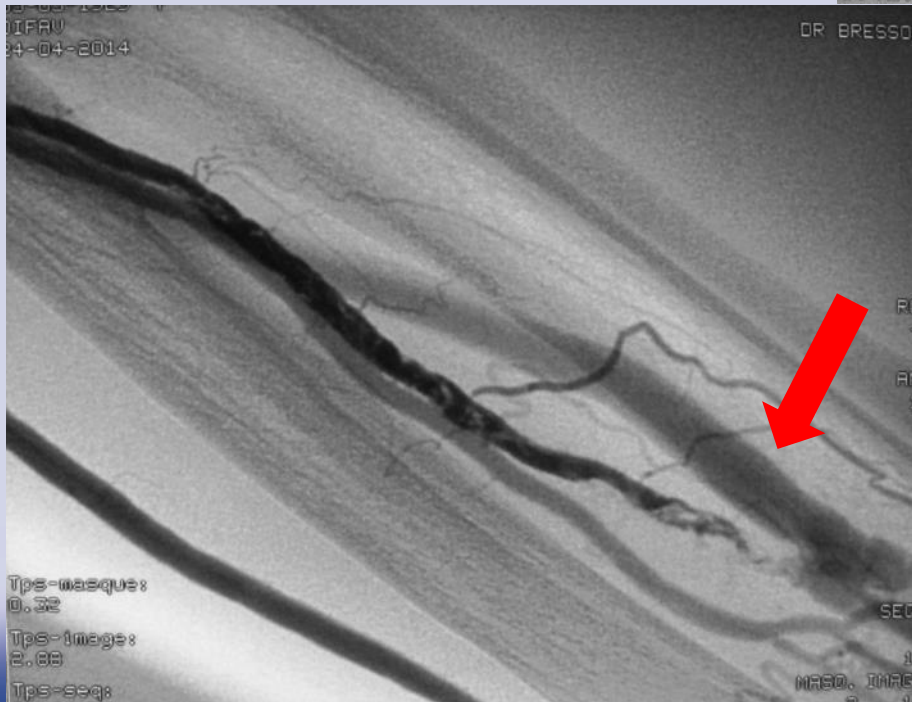
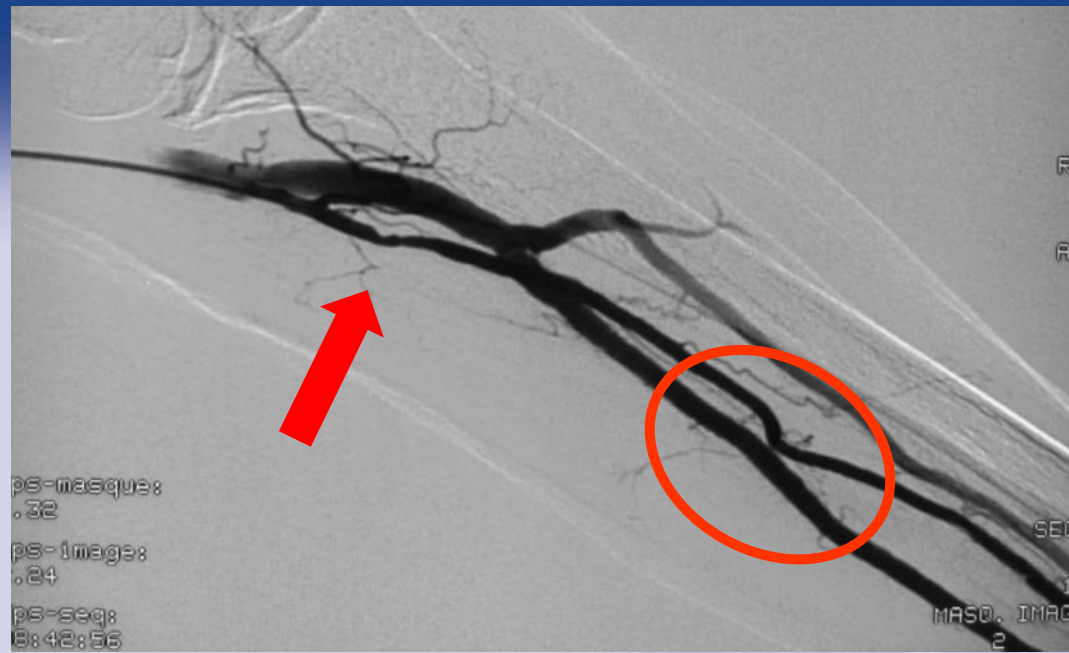
Final angiogram
No collateral ligation!

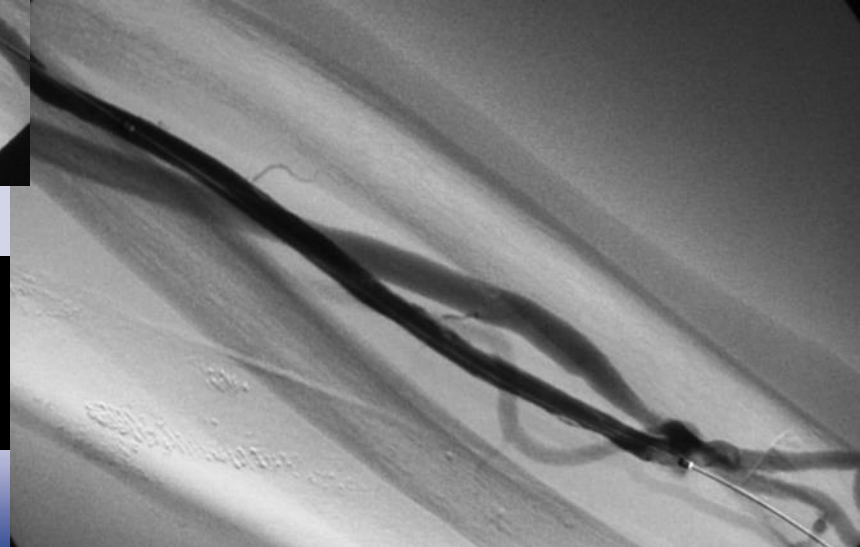
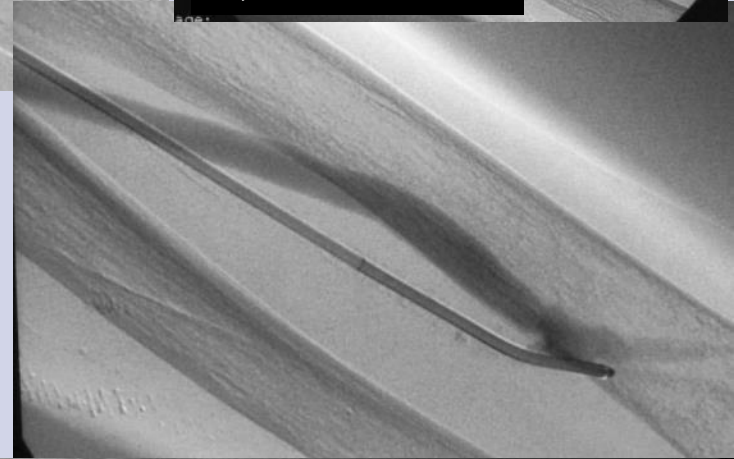
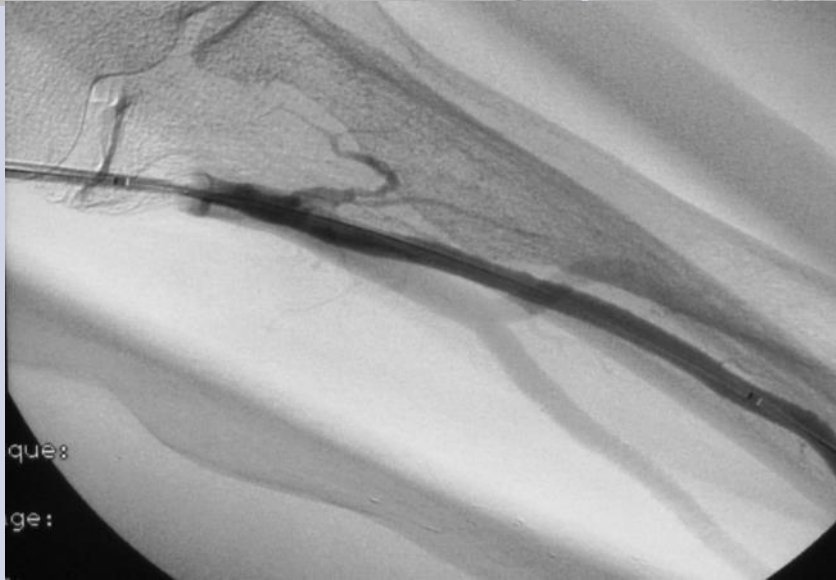
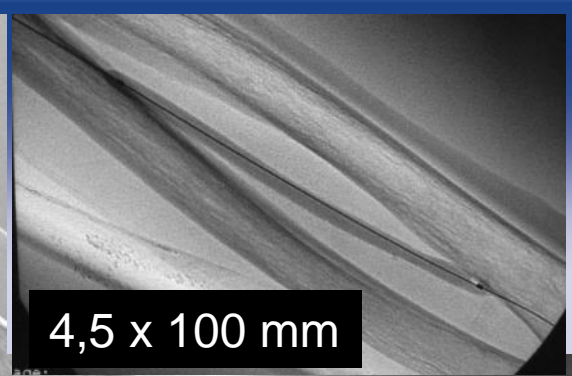
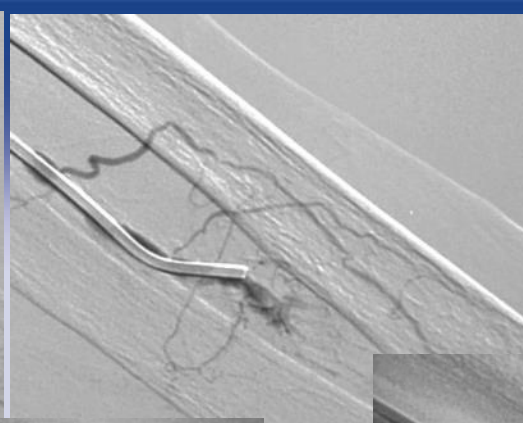
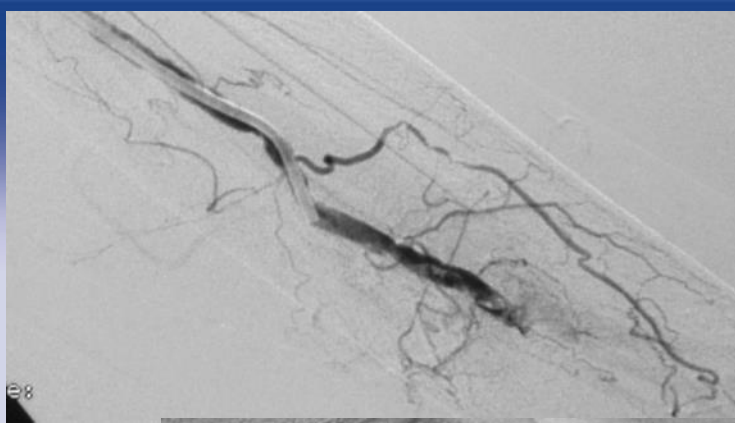
Early recurrence 3 months
Angioplasty 7mm
flow rate: 1,1l/min at 2 years

85 yo woman, radio-cephalic AVF
Non-mature at 6 weeks

US: flow rate 160ml/min
Calcified undeveloped radial
artery with several focal stenosis
Healthy vein

Angiography from antegrade
brachial artery cannulation



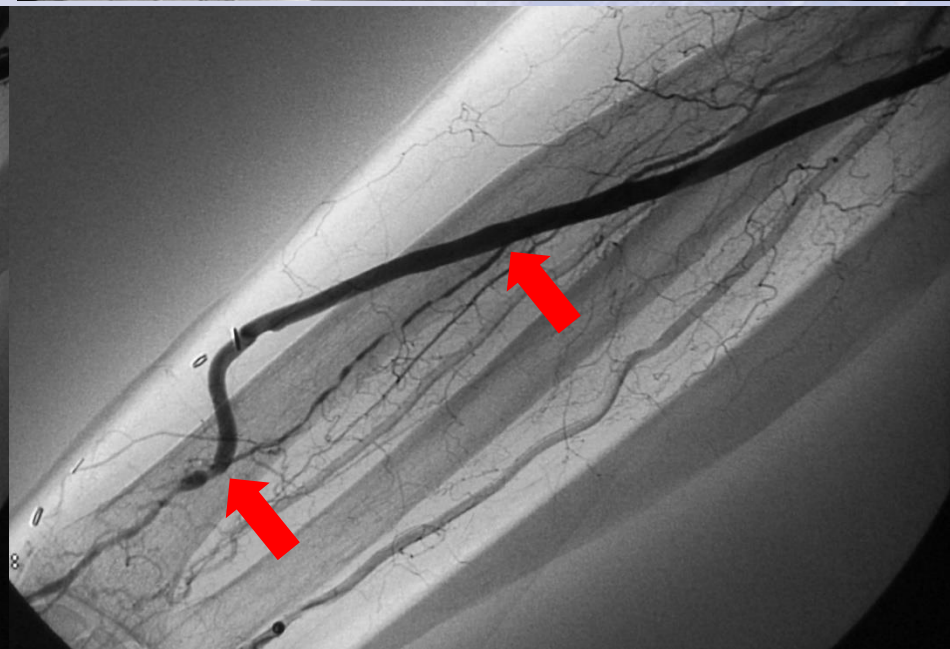
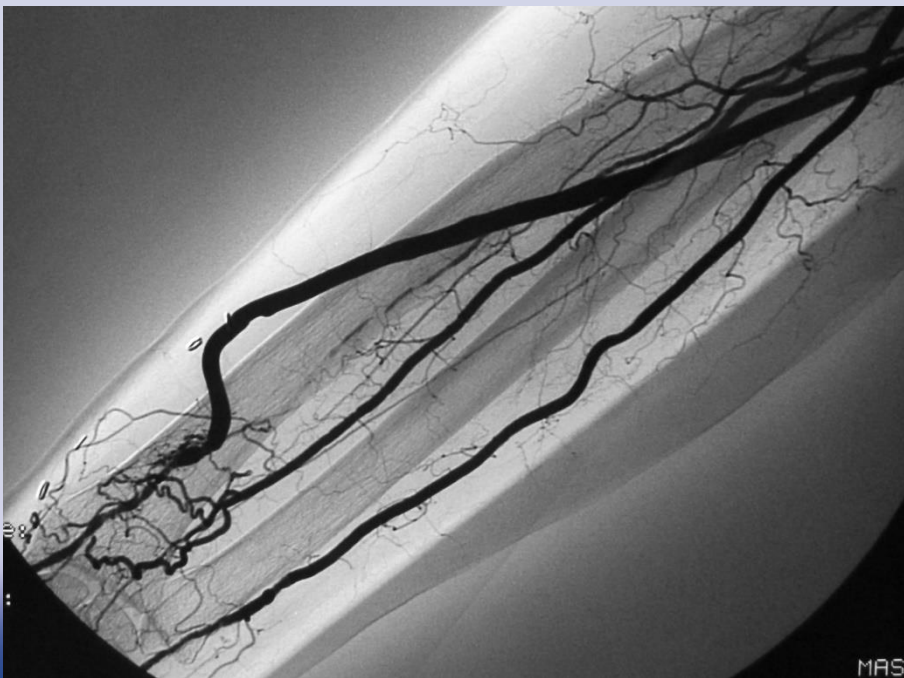
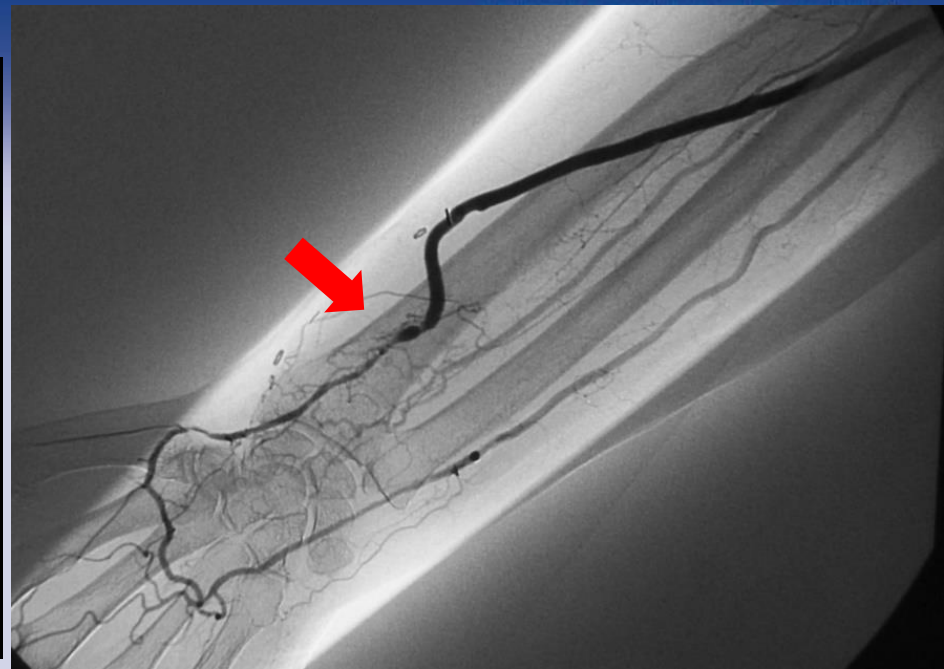


Recanalisation from an antegrade approach
Whole radial artery angioplasty to 4,5 mm
700ml/min at 3 weeks, vein easily cannulated

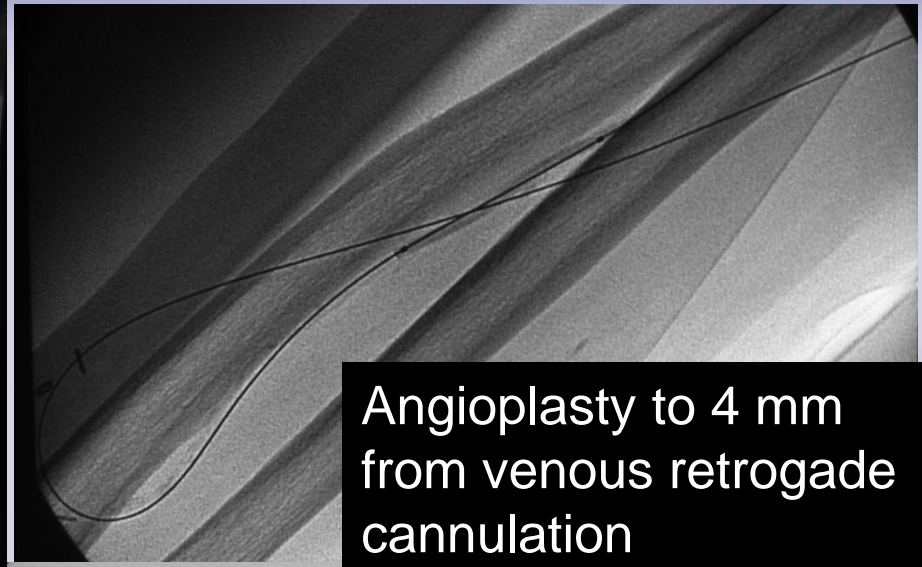
83 yo diabetic woman
non-maturing radio-cephalic AVF

Flow rate: 150 ml/min at 6 weeks
Thrombosed proximal radial artery
Healthy vein

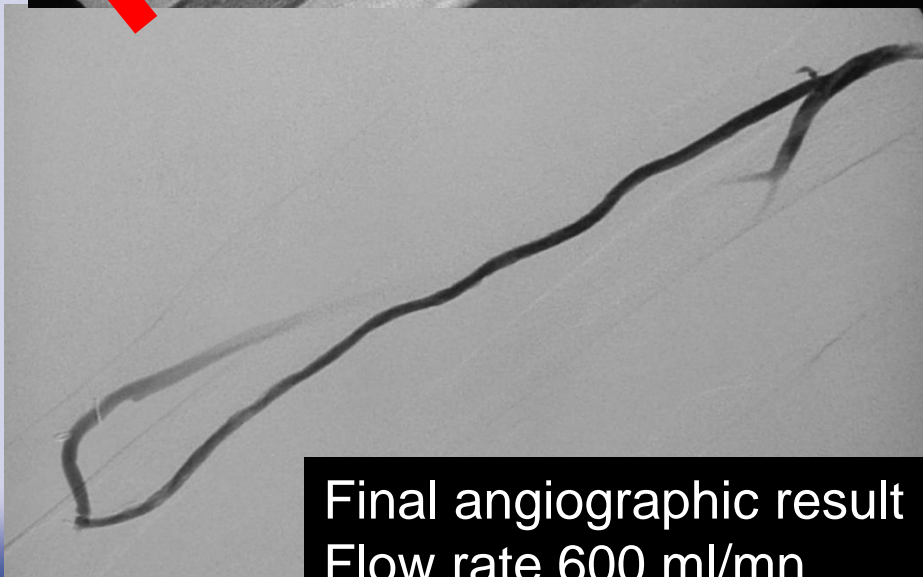
Angiography from brachial artery
cannulation



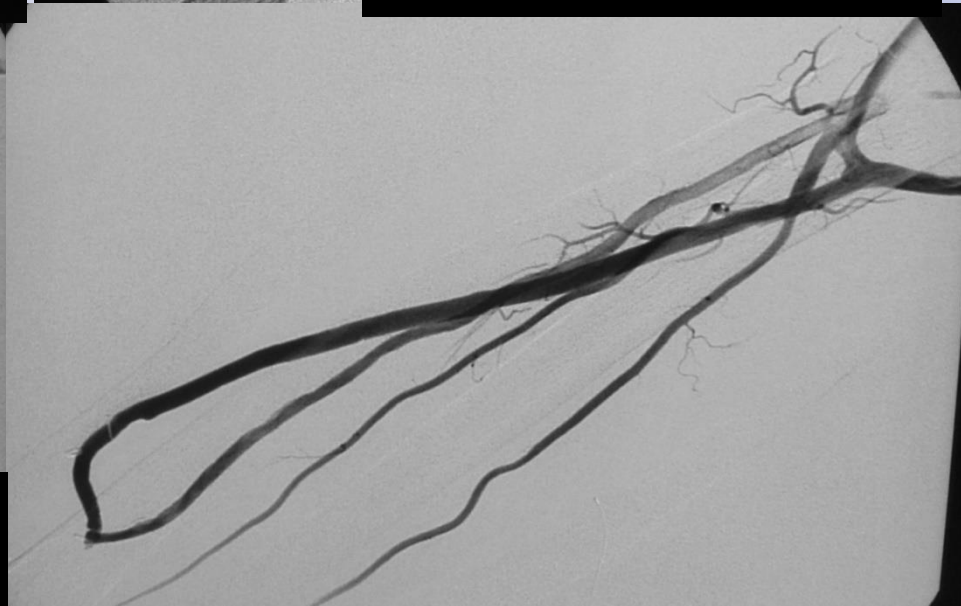
MAS



Angioplasty to 4 mm from venous retrograde cannulation



Final angiographic result
Flow rate 600 ml/mn



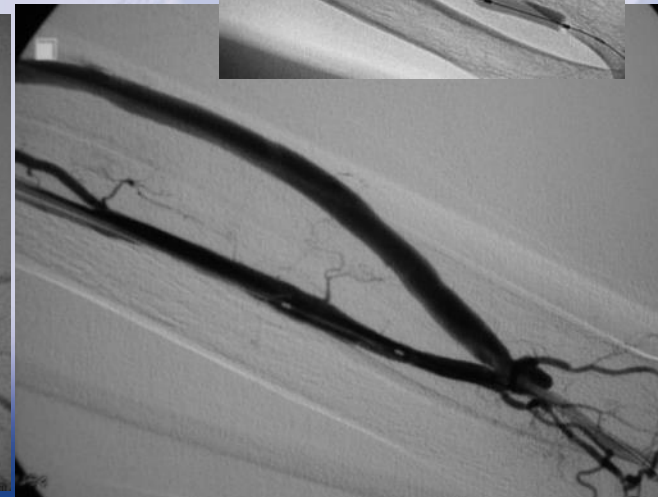
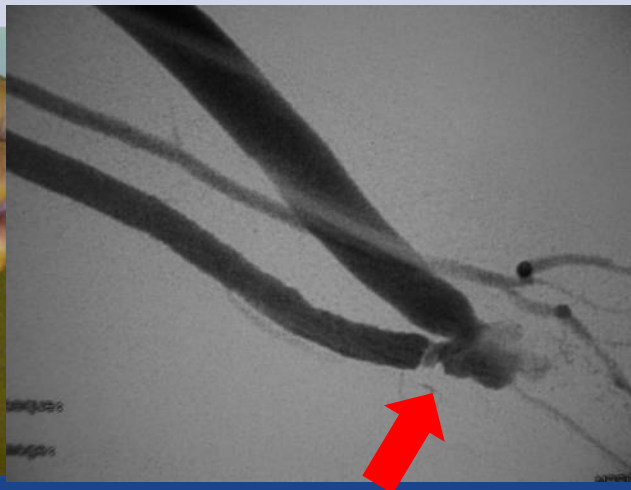
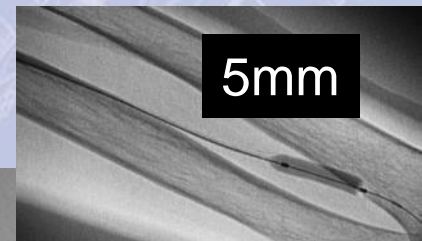
Technical challenge

- Reading fistulograms
 - Interventionist experience
 - excellent quality imaging tools
- Working on little thin vessels
 - Ultrasound guidance puncture/navigation
 - Balloon appropriate sizing
- Preserving residual renal function
 - Diluted iodine
 - Ultrasound guidance



Contraindications

- Pure anastomotic stenosis for which surgical revision gives better results if it lives a sufficient segment of vein for cannulation
- Anastomotic stenosis on fistulas of less than 6 weeks because of the risk of disruption
- Infection
- Delayed healing, without infection?



Résultats

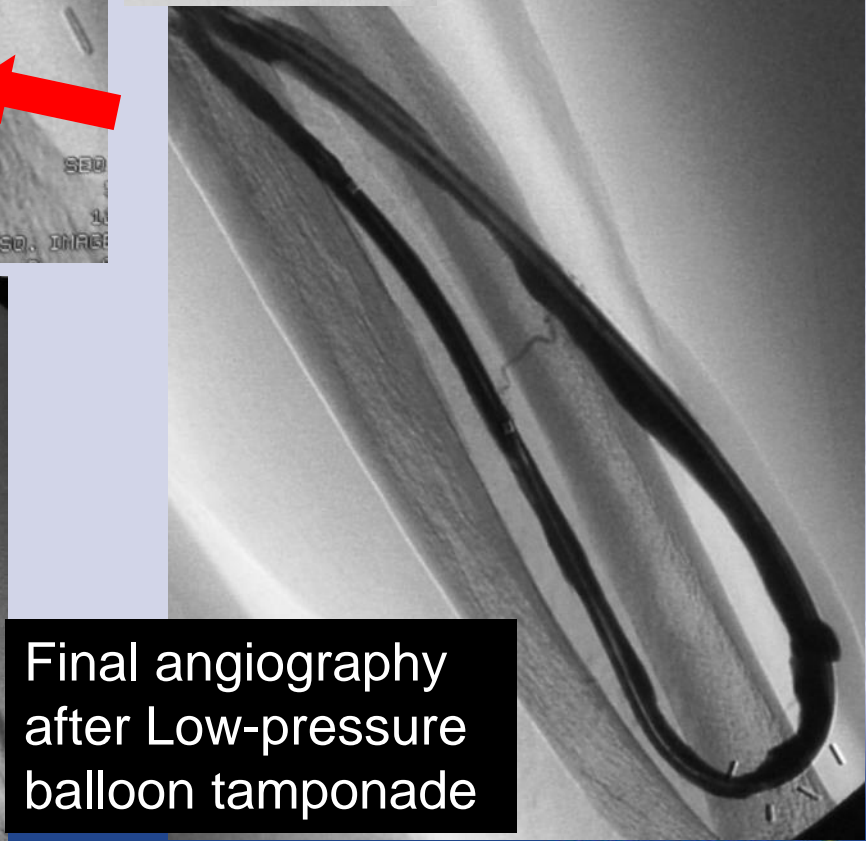
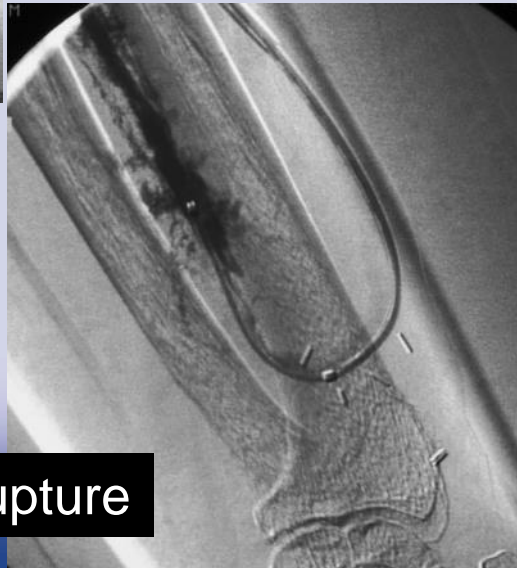
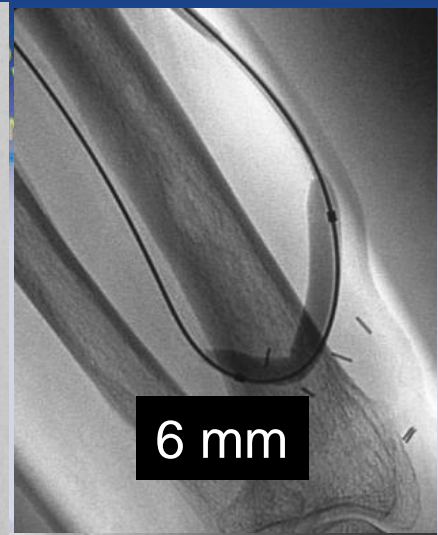
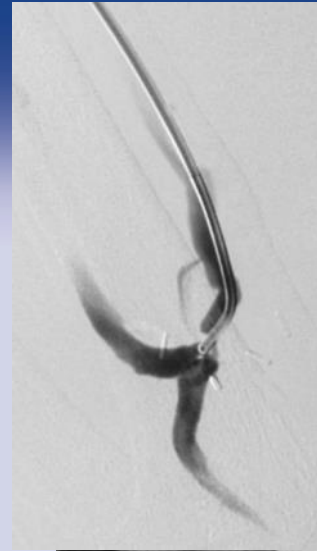
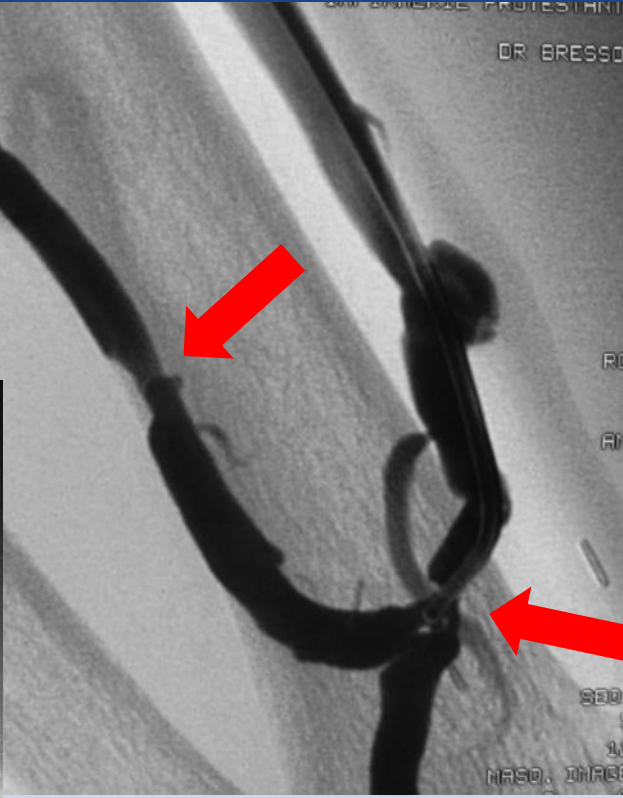
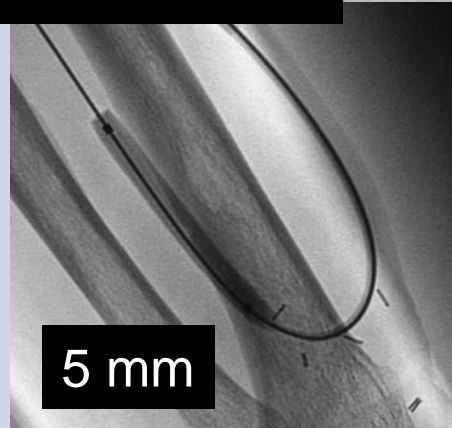
- Technical success 91 to 98%
- Primary patency
 - ❑ 30 to 40% one year PP for venous ± arterial stenosis
 - ❑ 60% one year PP for pure arterial stenosis
- Secondary patency > 80% at one year
 - Turmel-Rodrigues et coll. Salvage of immature forearm fistulas for haemodialysis by interventional radiology. NDT 2001; 16: 2365-2371
 - Raynaud A et coll. Low-flow maturation failure of distal accesses: Treatment by angioplasty of forearm arteries. J Vasc Surg 2009;49: 995-999.
 - Turmel-Rodrigues et coll. Percutaneous dilatation of the radial artery in non maturing autogenous radial-cephalic fistulas for haemodialysis. NDT 2009; 24: 3782-3788
 - Turmel-Rodrigues . Mechanical enhancement of AVF maturation. J Vasc Access 2014; 15: S55-S59

Complications

- Thrombosis: 0 to 4%
- Acute rupture: 8 to 17%
 - Low pressure prolonged balloon tamponade
 - 0 to 6% needing stents
- Delayed rupture: pseudoaneurysm formation
 - Surgical revision
 - Covered stent
- Steal syndrom: 4 to 7%
 - Vascular risk factors
 - Check hand vascularisation during procedure



7 weeks non-maturing AVF
Arterial and anastomotic stenosis



Ultrasound at 4 to 6 weeks
NON-MATURING AVF

Short anastomotic
stenosis

Arterial failure

Venous failure

SURGERY

Underdeveloped
artery

Focal stenosis

Outflow stenosis

Juxta-anastomotic
stenosis

ANGIOPLASTY

inadequate

Close
monitoring

US control 15 days

suitable

Conclusions

- Close follow up after forearm fistula creation
 - ❑ Systematic clinical examination at one month
 - ❑ Rapid ultrasound screening of the non-maturing one
- Aggressive and multidisciplinary treatment strategy
 - ❑ Rapid angioplasty before thrombosis occurs
 - ❑ repeated procedures/Surgical revision
- Over 80% one year patency rate after endovascular interventions in experienced hands without compromising a proximal anastomosis
- Promote attempting creation of native forearm fistulas even with poor condition vessels and the radiologist will finish the job!



THANK YOU!

