

**Controversy:**  
**Xray / ultrasound guided angioplasty**

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## **Disadvantages of the angiography**

- **X ray exposure: actually**
  - the number of frames is low (about 12 by run)
  - The amount of X ray by frame is low (limb)
  - The imaged zones are poorly sensitive to X ray
- **Renal function worsening**
  - One second-injections and diluted at 80 or 90% contrast material provide a widely sufficient contrast to obtain good quality images
  - Then, fistulography + dilatation is achieved with less than 10cc of dye. Such an amount has no effect on the renal function therefore iodine contrast material can be used without risk of renal function worsening.



## Disadvantage of the angiography

- **Allergy to iodine contrast material**
  - Mild allergies are easily prevented or treated by medications
  - Severe allergies occur in less than 0,5/10000 procedures with the current contrast material
  - Allergy is specific of a contrast material
  - Allergy to different dyes can be evaluated by cutaneous tests
  - In such cases dilatations can be performed using another iodine contrast material or using CO<sub>2</sub>.
- **Delayed reaction with Lyell syndrome is very annoying but not life threatening**

## **Disadvantages of duplex Doppler (1)**

- **Central veins are not satisfactorily visible therefore their lesions cannot be treated under ultrasound monitoring**
- **Central vein stenoses account for about 15% of all the procedure we performed on angioaccesses**



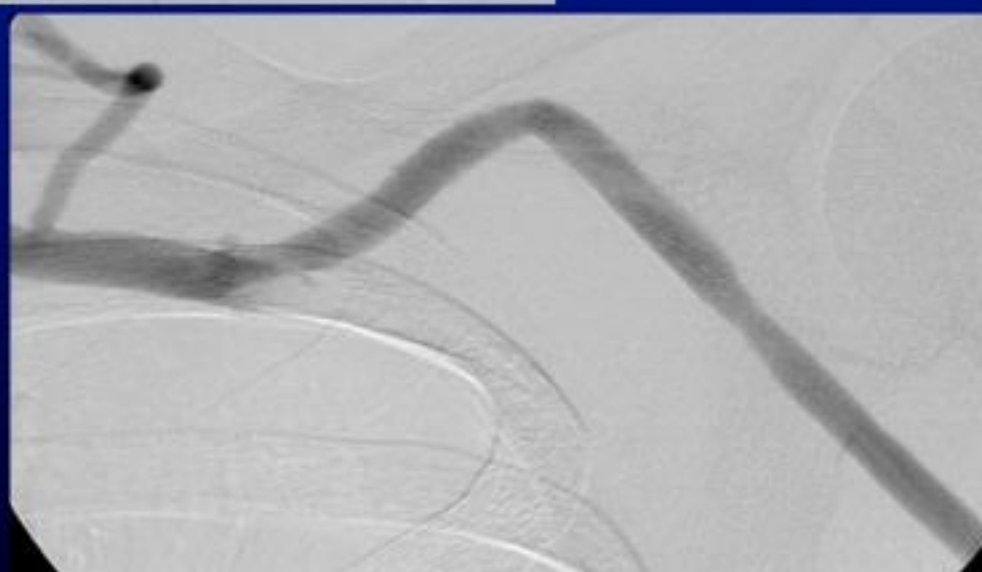
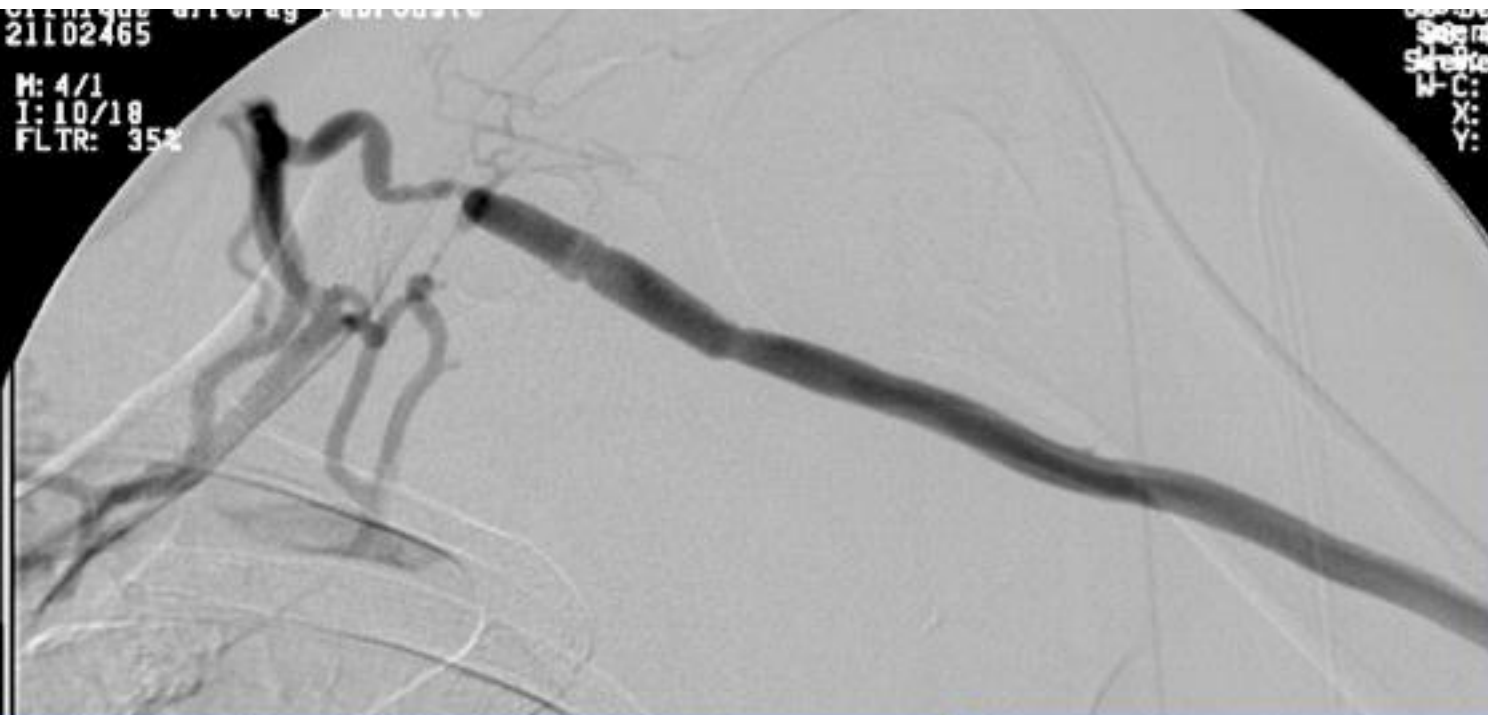
## Disadvantages of duplex Doppler (2)

- **Inability to properly steer guide wire and catheter under ultrasound monitoring**
  - No artery dilatation and particularly of forearm arteries (about 5% of the procedures we attempted)
  - No dilatation possible of complex accesses because of tortuous, bifurcated or aneurismal vein
  - No dilatation of a simply very irregular stenosis which cannot be crossed by the guide under ultrasound

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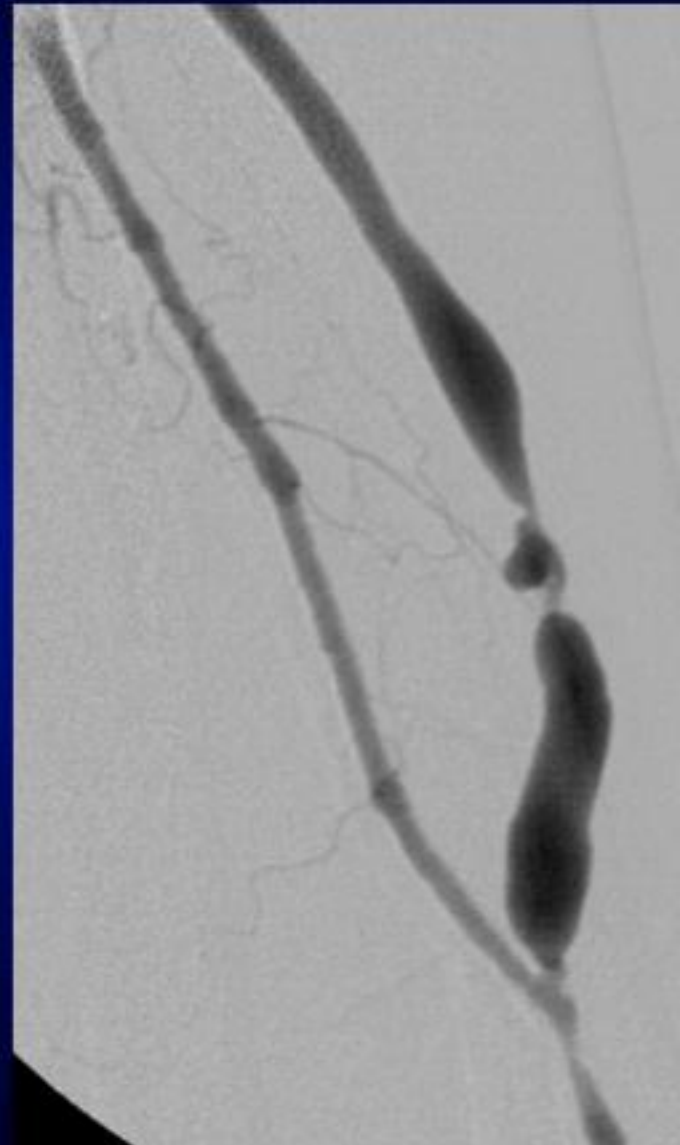
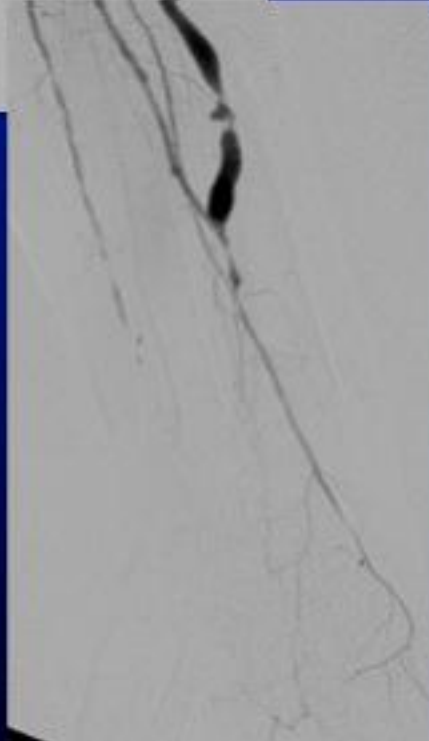
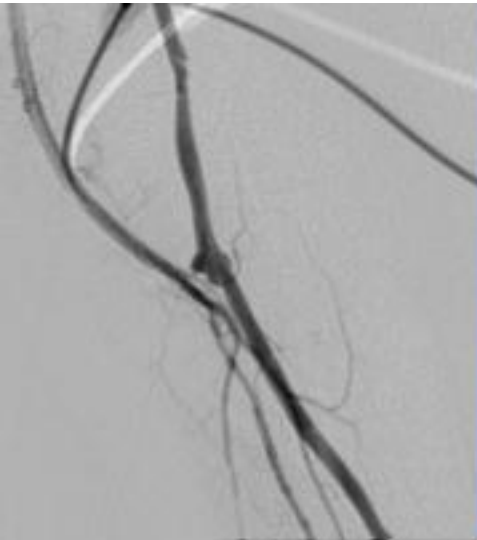
M: 4/1  
I: 10/18  
FLTR: 35%

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Sobem  
Sobem  
W-C:  
X:  
Y:

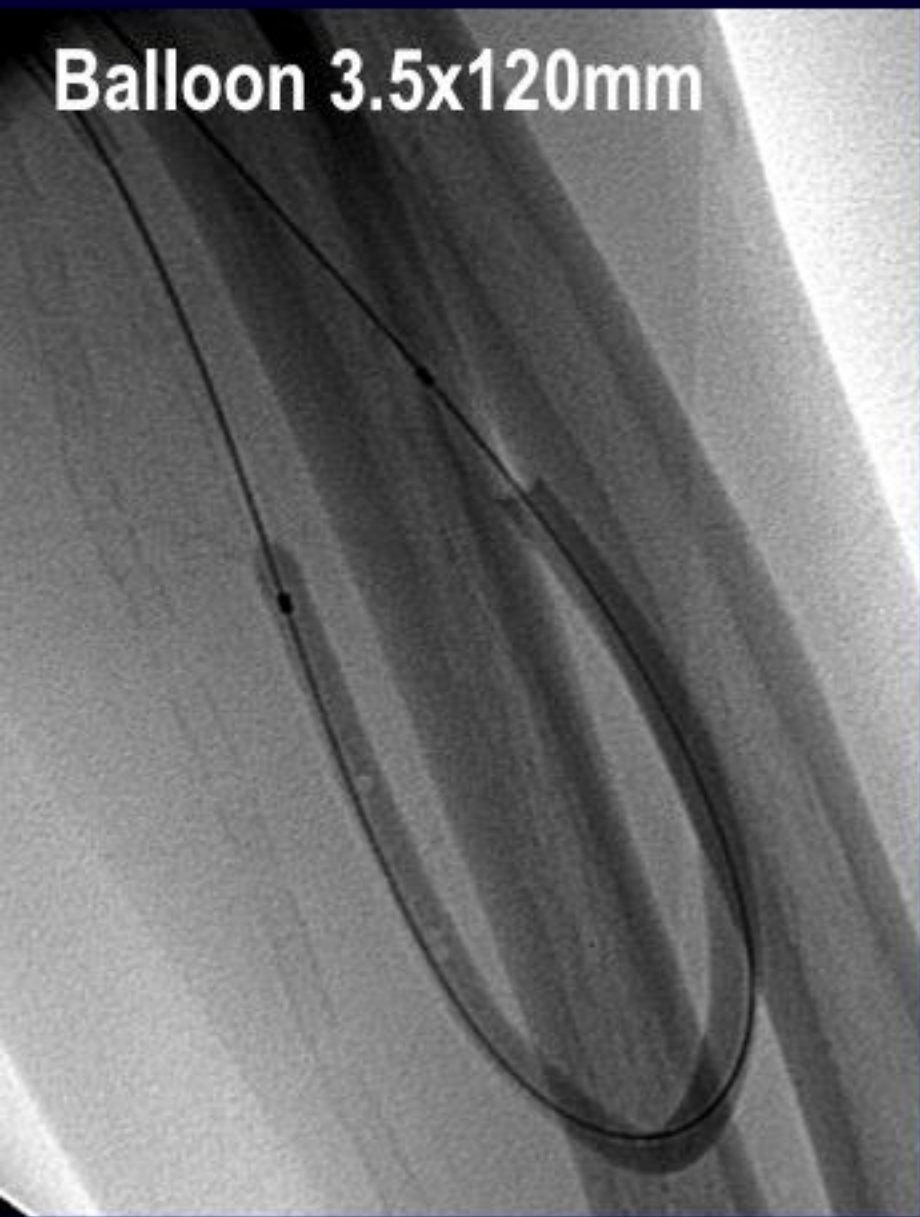


## Too low flow

Radial artery infiltrated,  
Ulnar artery occluded,  
Anastomosis stenosis,  
Access stenosis



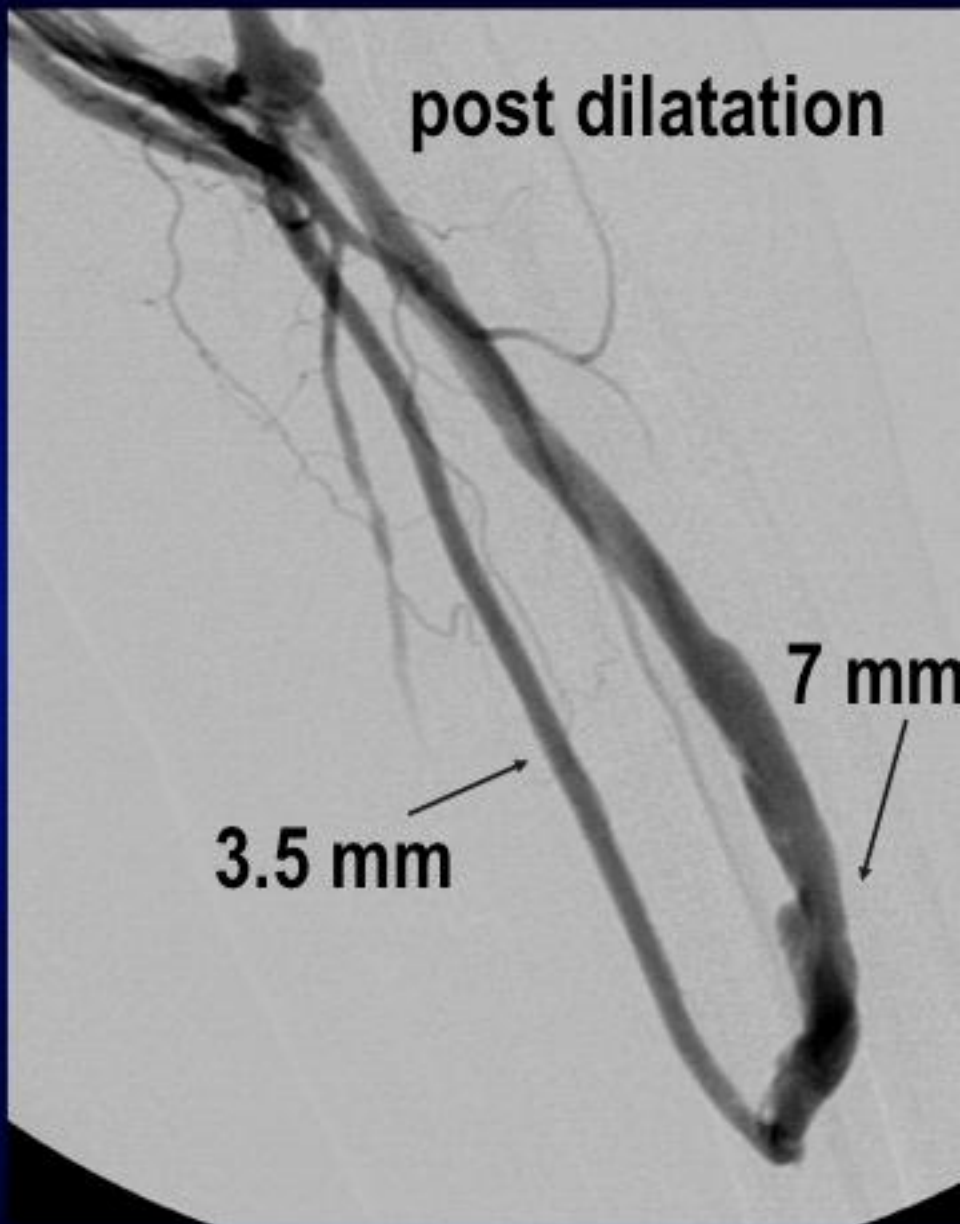
**Balloon 3.5x120mm**



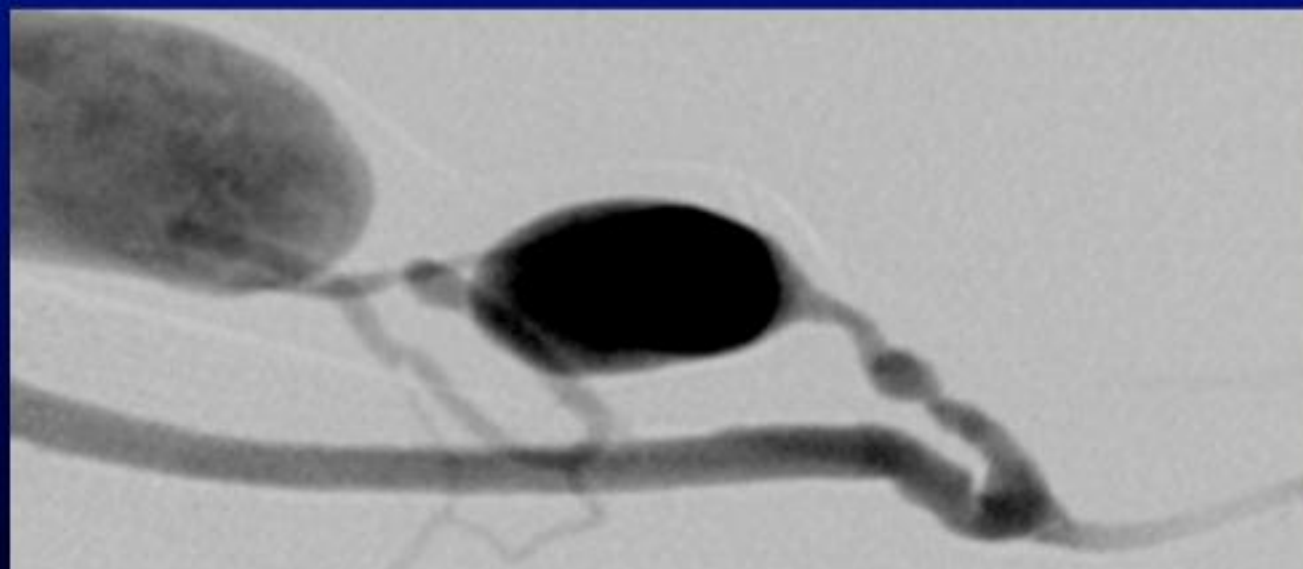
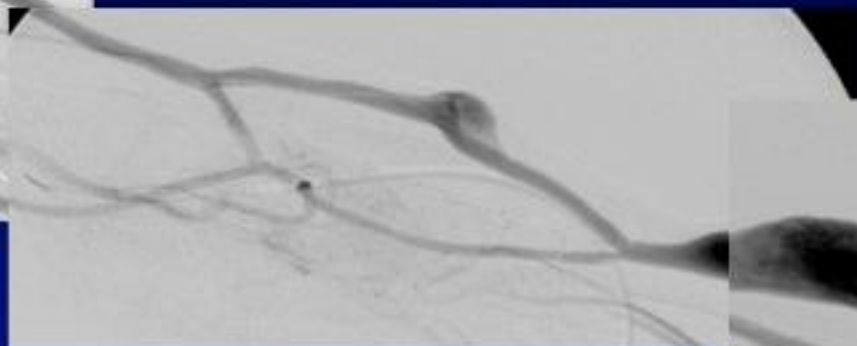
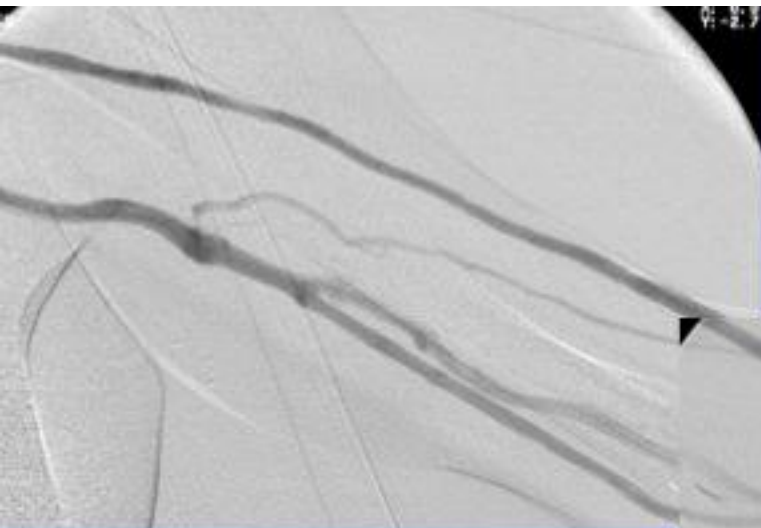
**post dilatation**

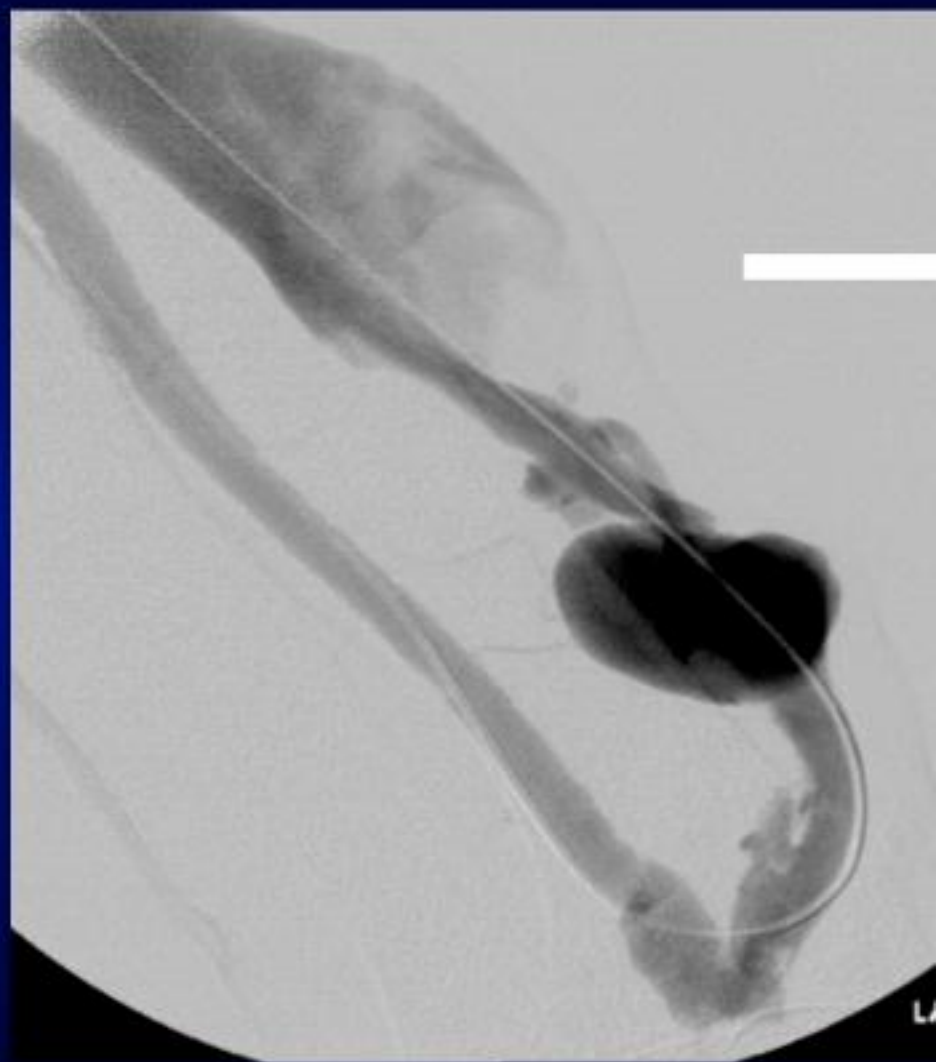
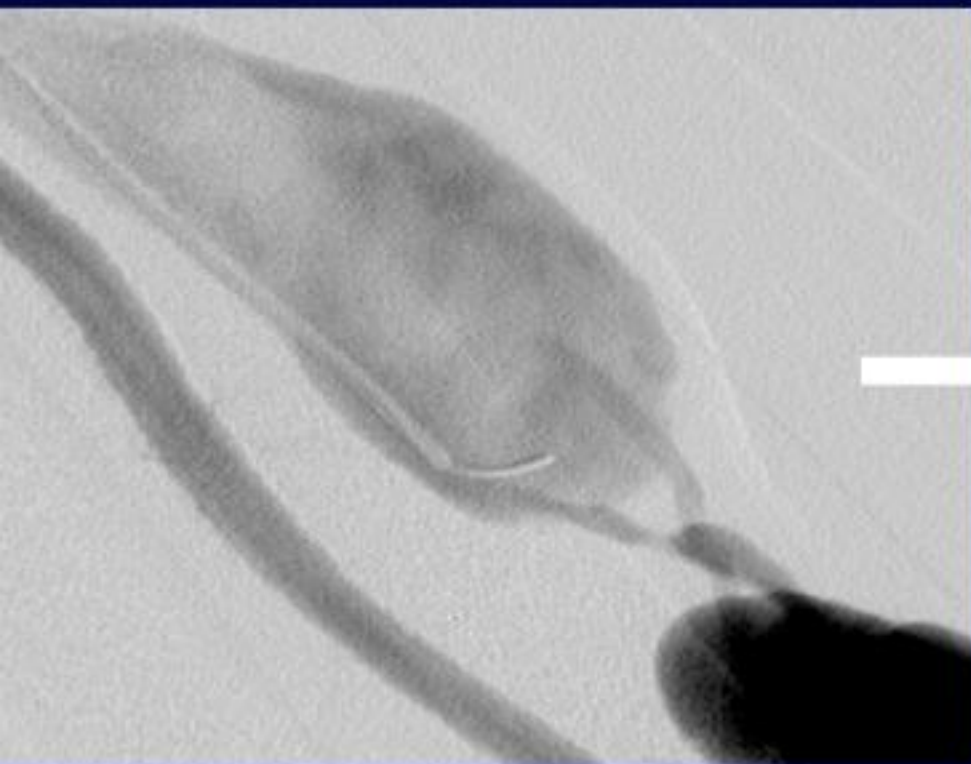
**3.5 mm**

**7 mm**









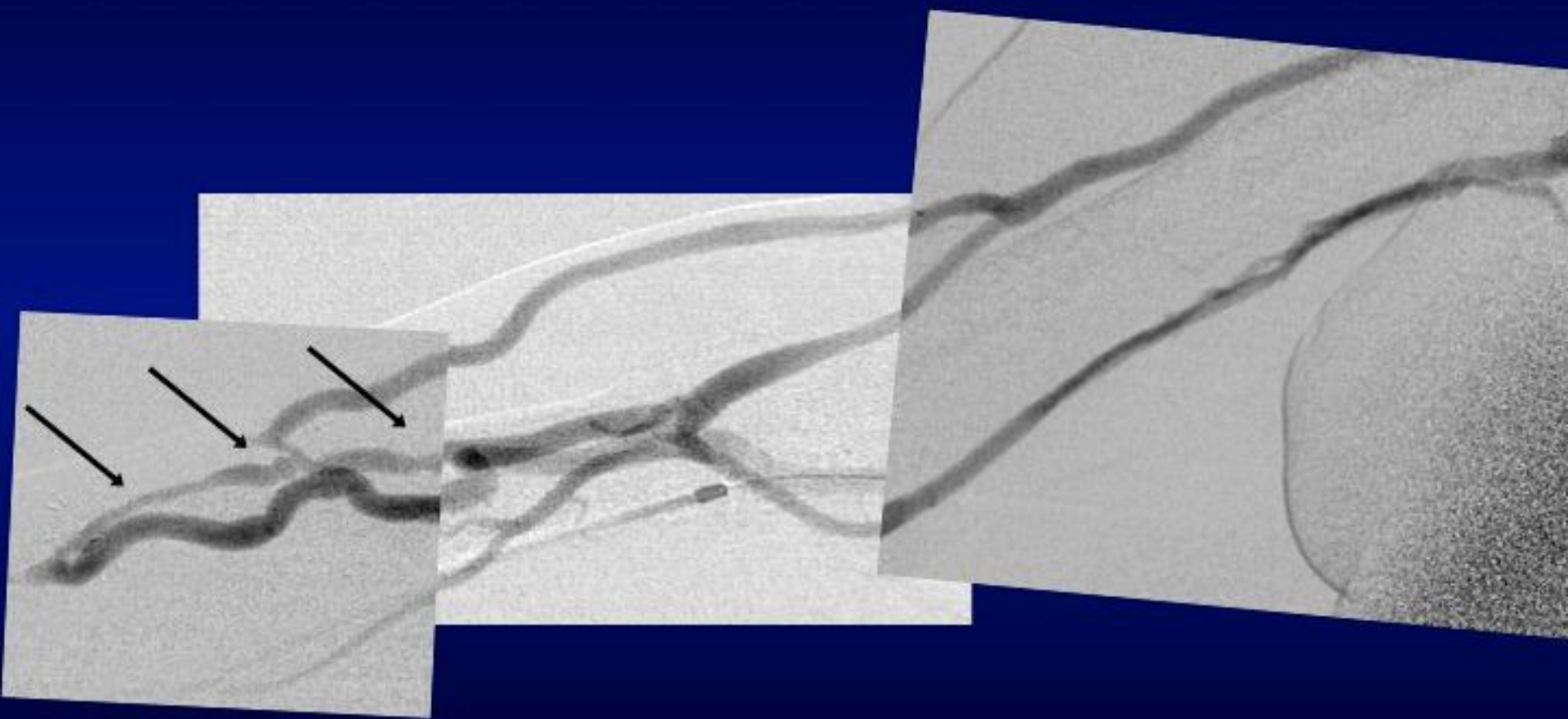
## Disadvantages of duplex Doppler (3)

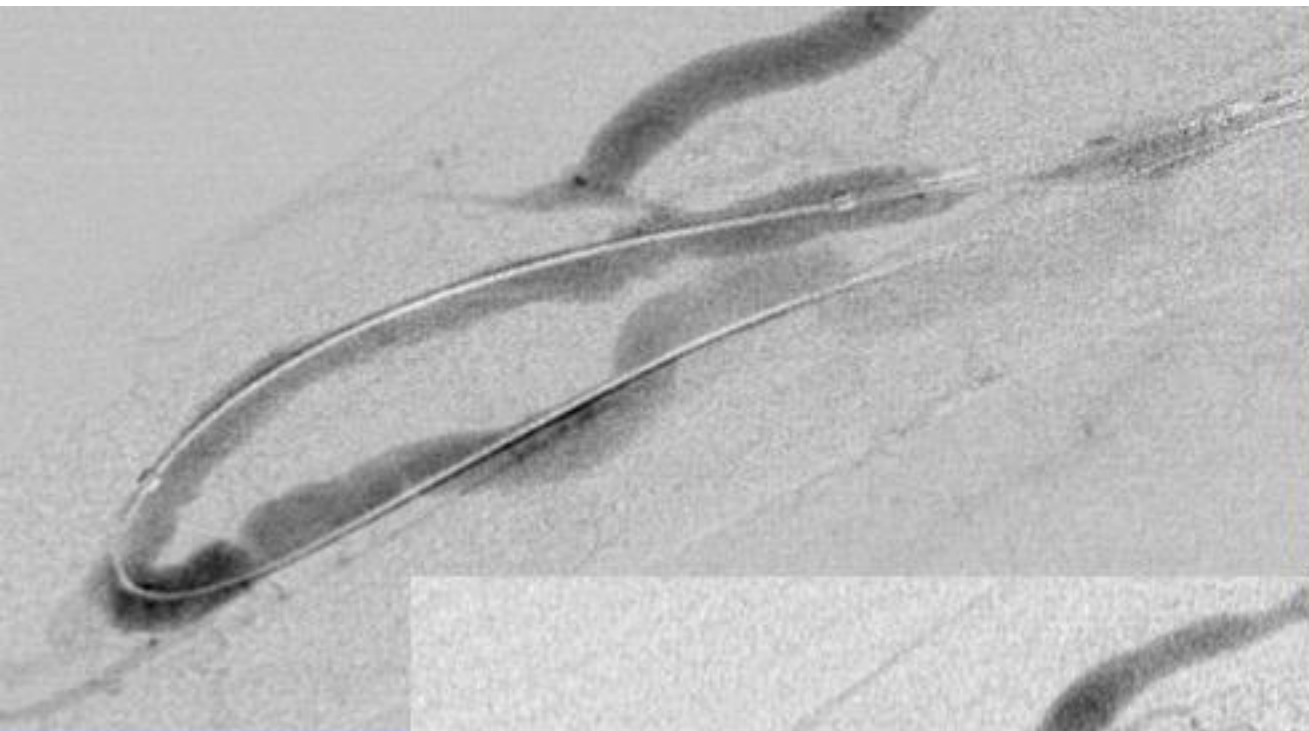
- **Restricted field of view.**

- Venous lesions longer than 10 cm are frequent, they cannot be safely dilated under ultrasound monitoring
- Access thromboses represent about 10% of the procedures we performed on angioaccesses : the clotted segment of the access is usually very long and dec clotting is technically difficult. In order to save as much accesses as possible dec clotting should not be attempted under ultrasound

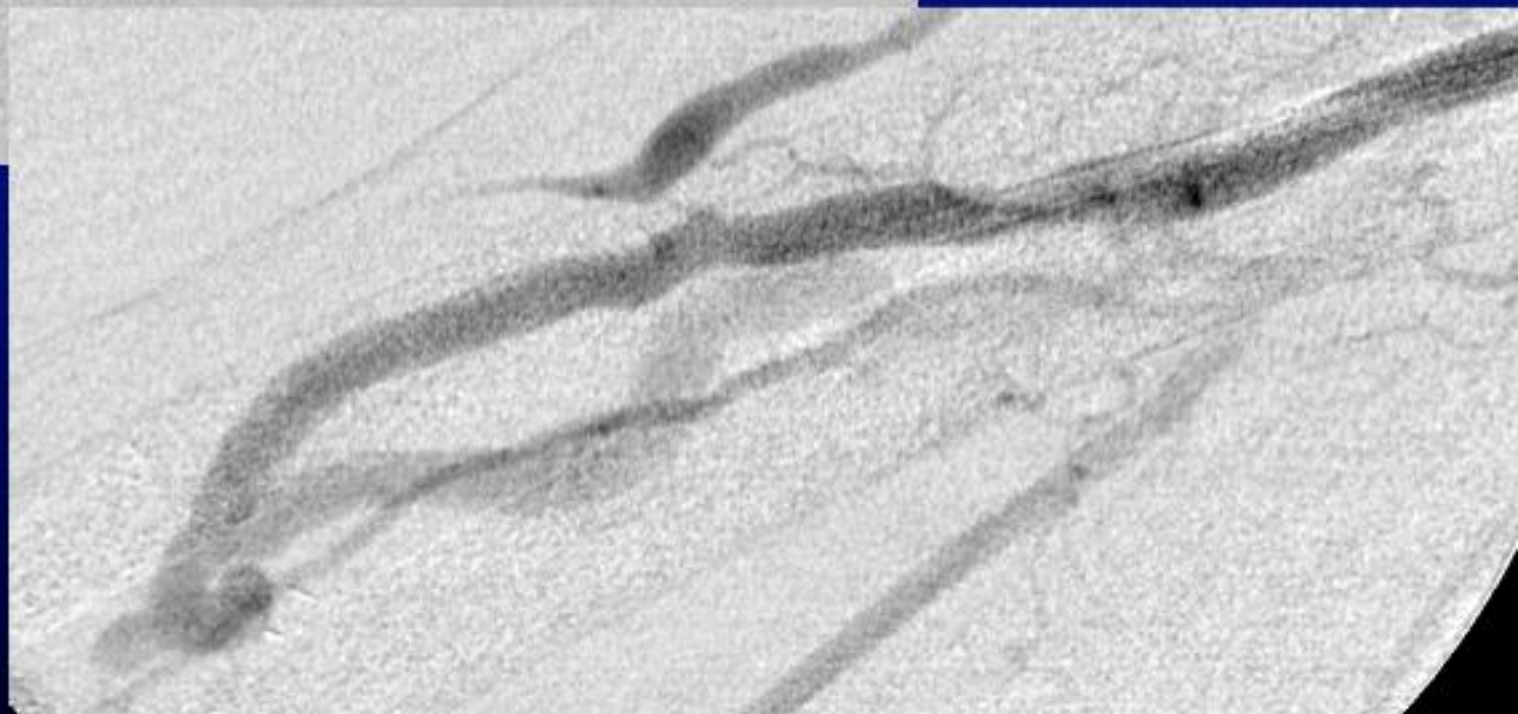


## Long stenosis of a radiocephalic fistula





- Total amount of contrast used for the procedure = 6,5cc

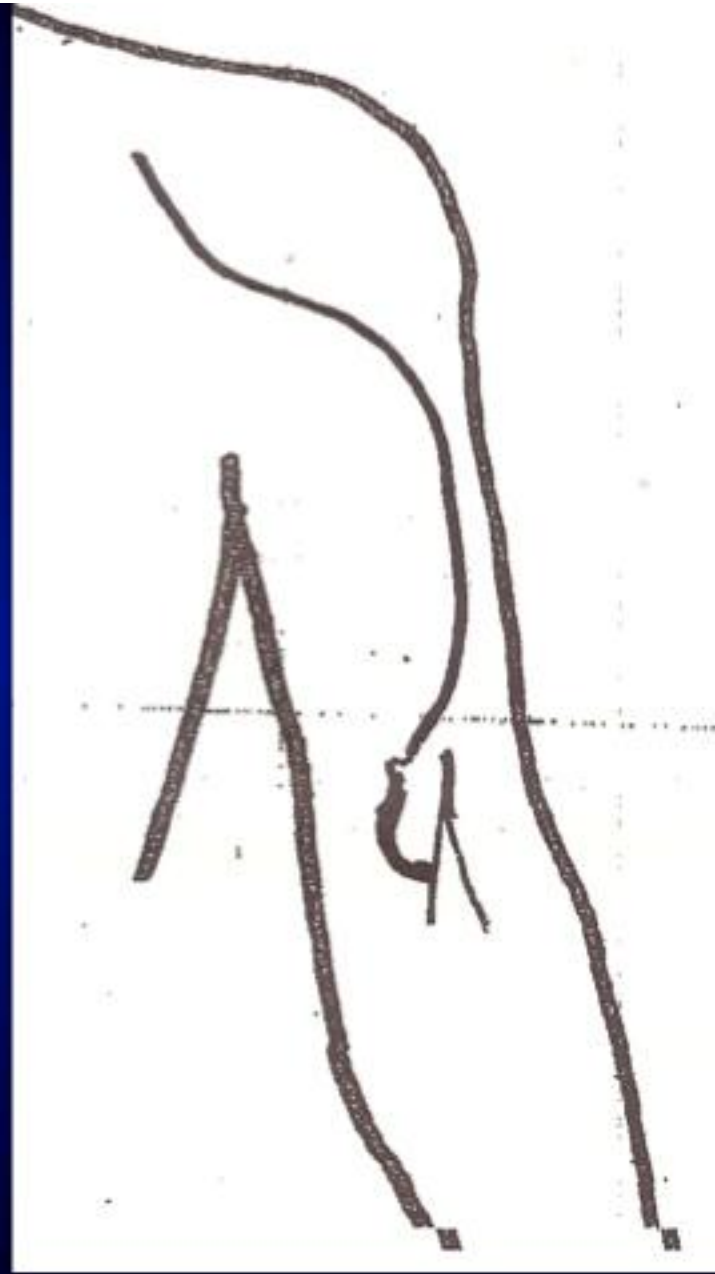


## Disadvantages of duplex Doppler (4)

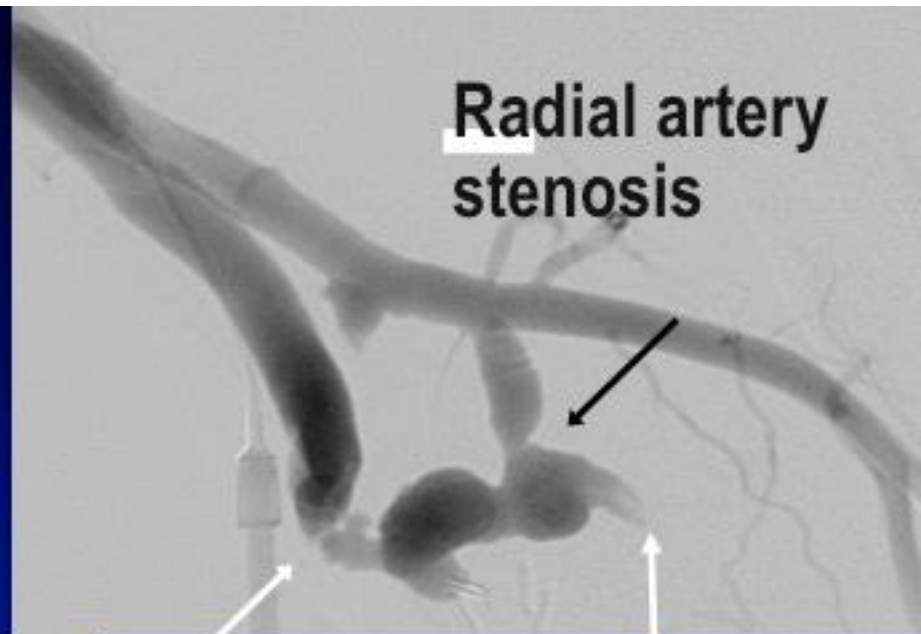
- After duplex Doppler, even in experienced hands vagueness of statement are very frequent and inaccuracies are not rare.
- This often lead to wrong indications



- 62 year-old man
- Dysfunctioning high radiocephalic fistula with insufficient access flow
- Duplex doppler:
  - Flow 540ml/min
  - “normally patent anastomosis on the proximal radial artery. At the rerouting level, when the vein is running through the aponevrosis a tight stenosis is identified with an aspect of kink”



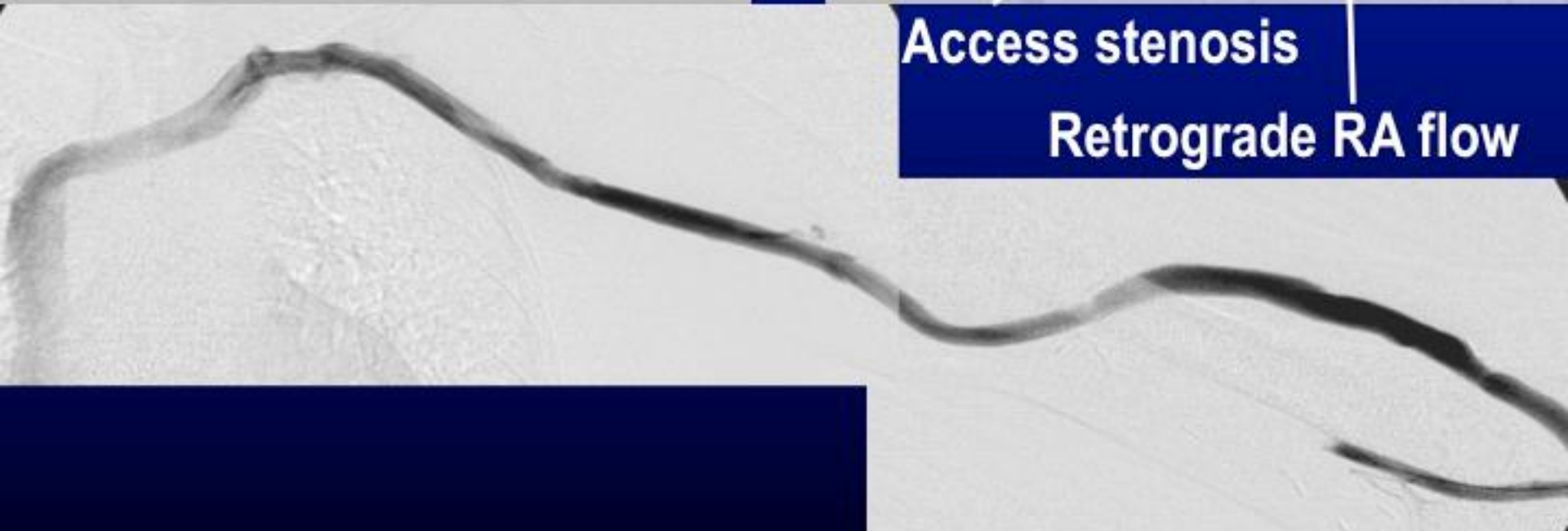
- On clinical examination, before the puncture for the angiogram, absence of increase in pressure on the first centimeters of the fistula
- => fistulography performed through an arterial puncture instead of a venous one close to the anastomosis



**Radial artery  
stenosis**

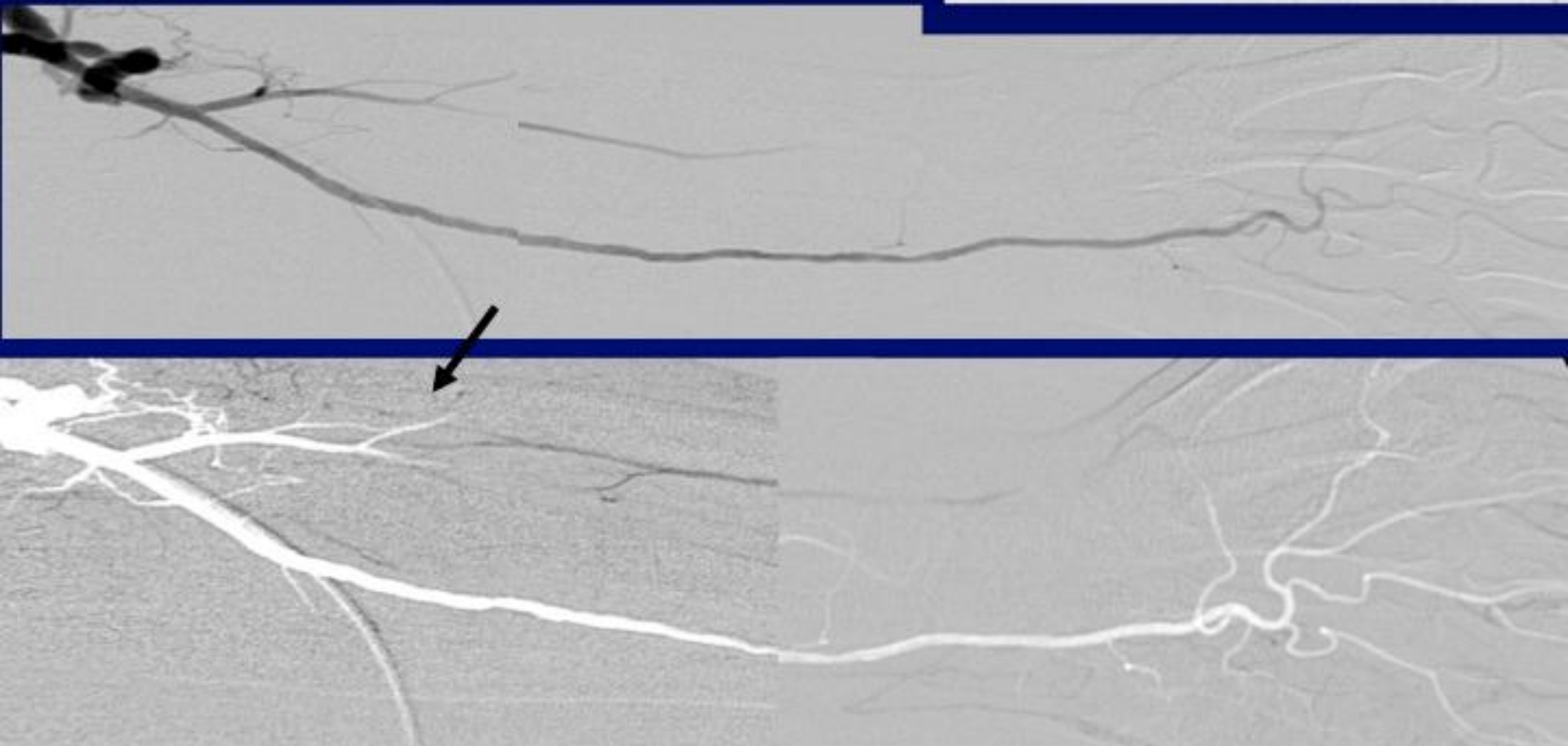
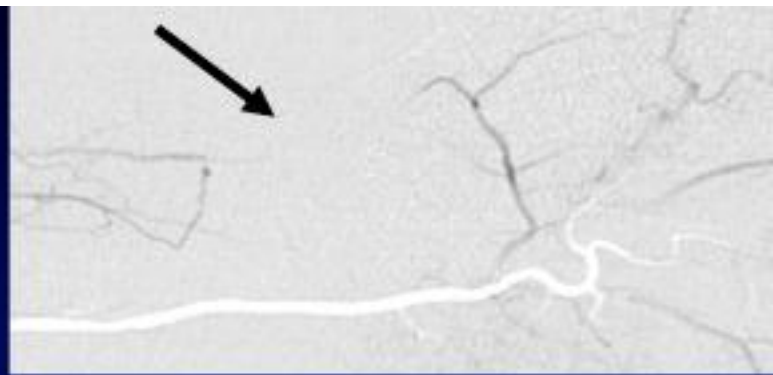
**Access stenosis**

**Retrograde RA flow**





**Radial artery occluded on 2  
locations => no feeding of the  
fistula by the distal radial artery**

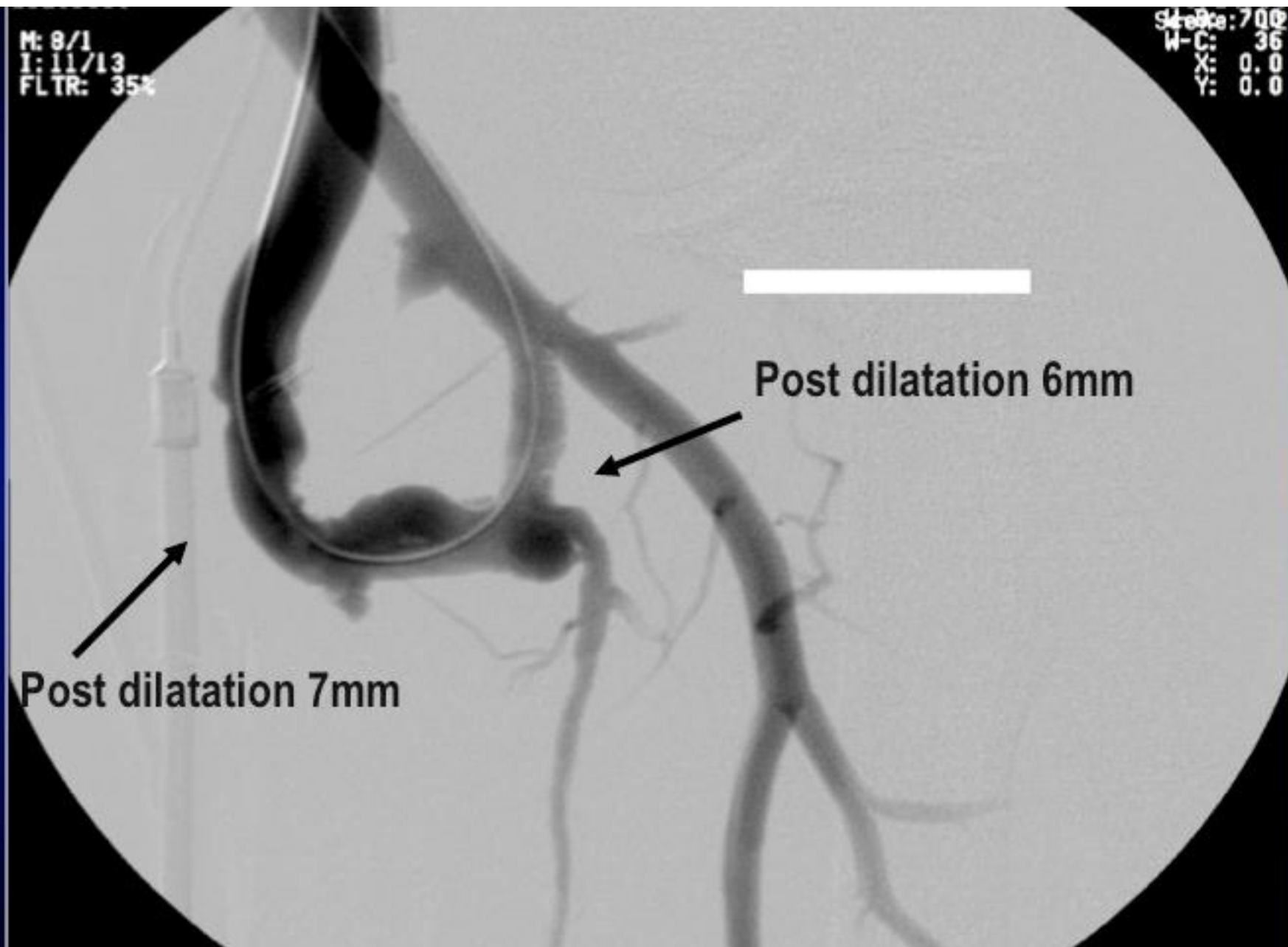


M: 8/1  
I: 11/13  
FLTR: 35%

Size: 700  
W-C: 36  
X: 0.0  
Y: 0.0

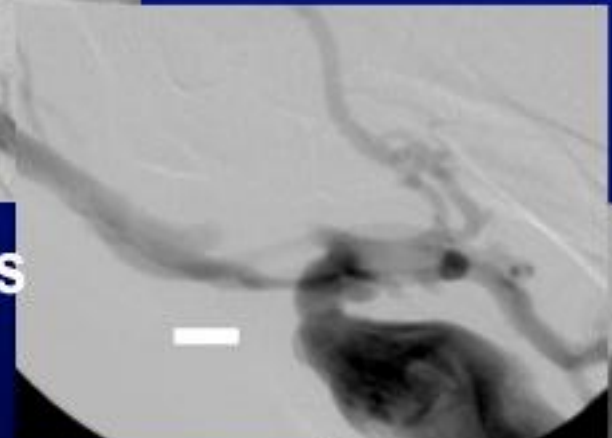
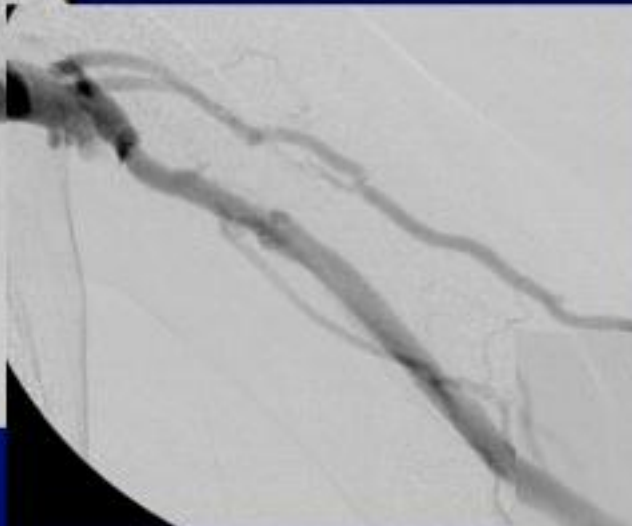
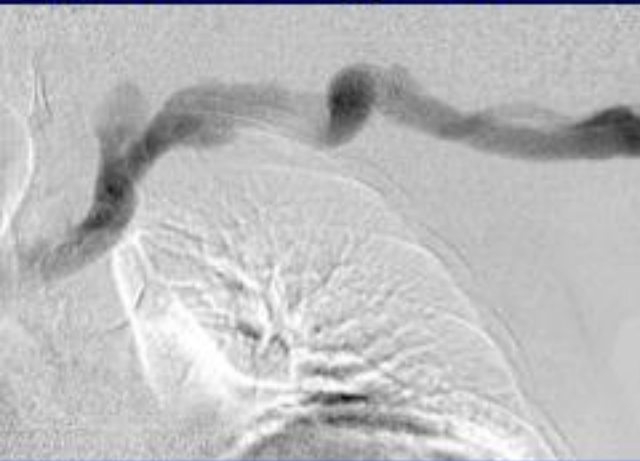
Post dilatation 7mm

Post dilatation 6mm



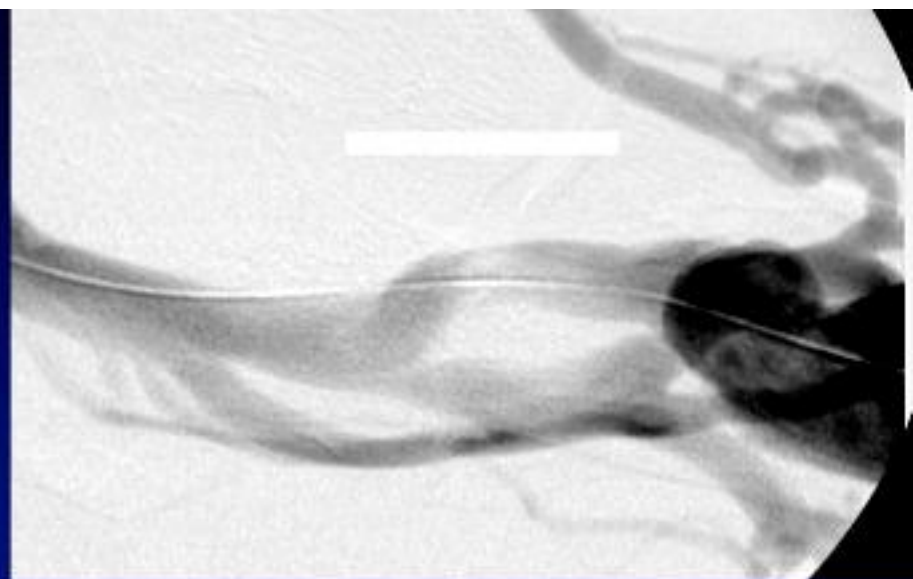
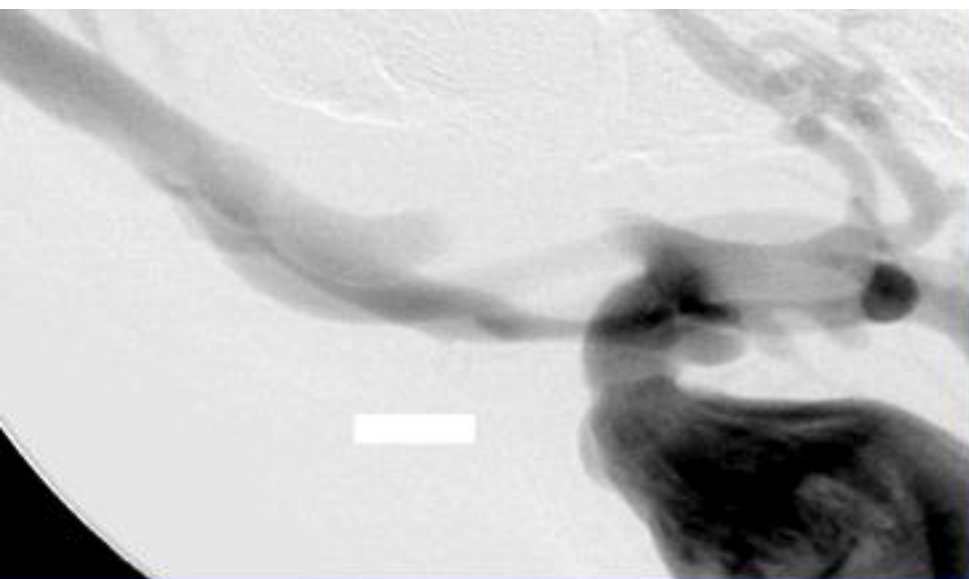
**Radiocephalic fistula, too high venous pressure**

**Ultrasonography : occlusion of the fistula which drain through a perforating vein**

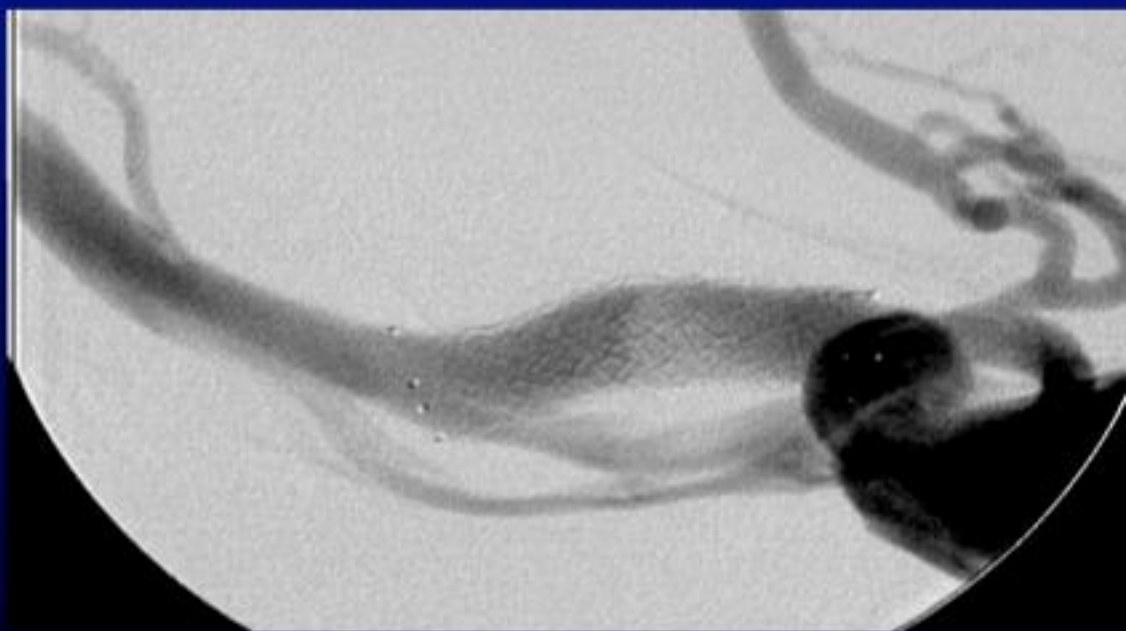


**Angiography shows the short venous occlusion and allows to choose the most appropriate treatment**

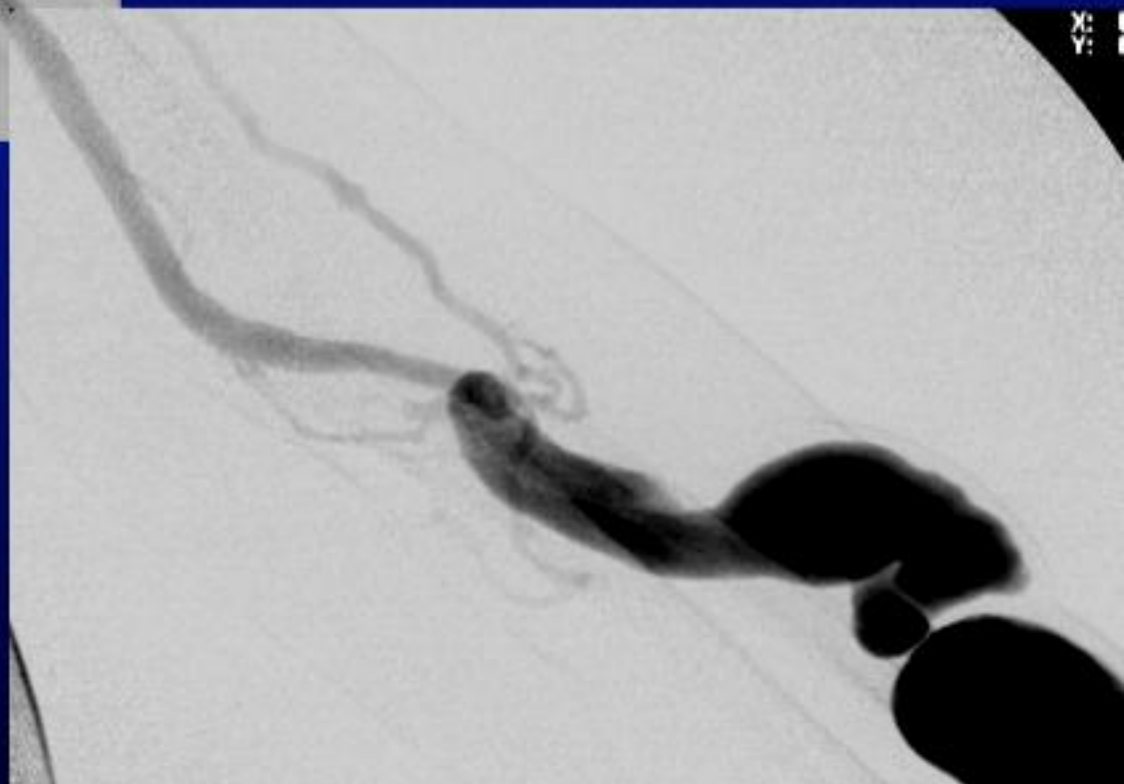
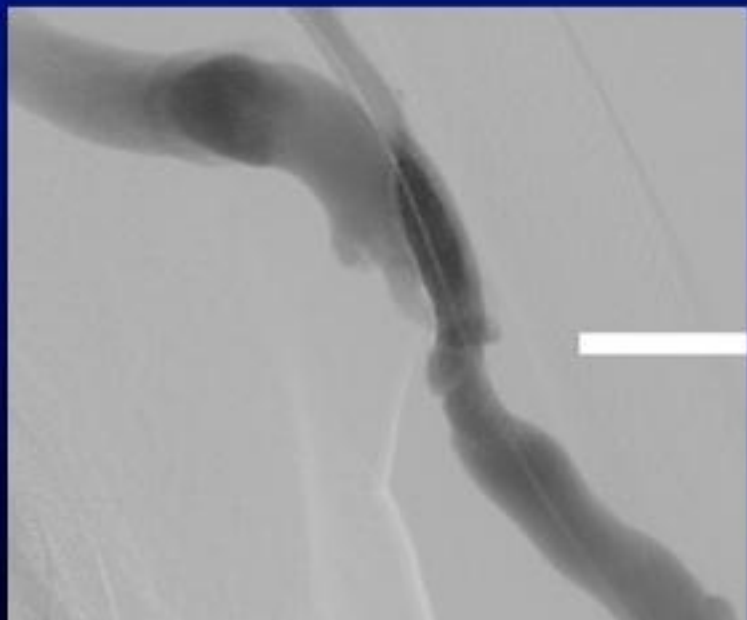
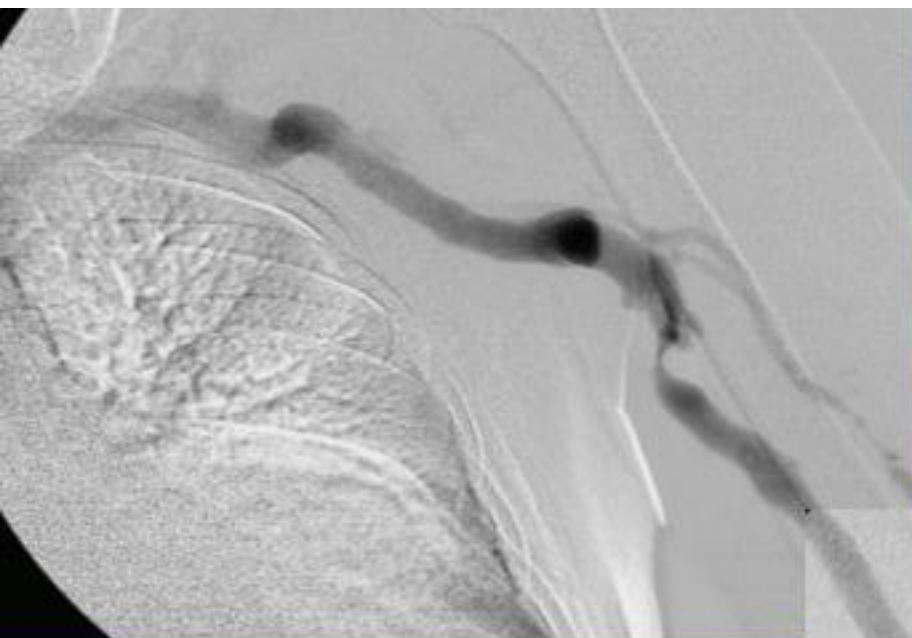




**Such a recanalisation  
somewhat technically  
difficult cannot be  
securely achieved  
under monitoring by  
ultrasound**



**20 months later the high venous pressure recurs. The stent is normally patent, a stenosis of the basilic vein is dilated**



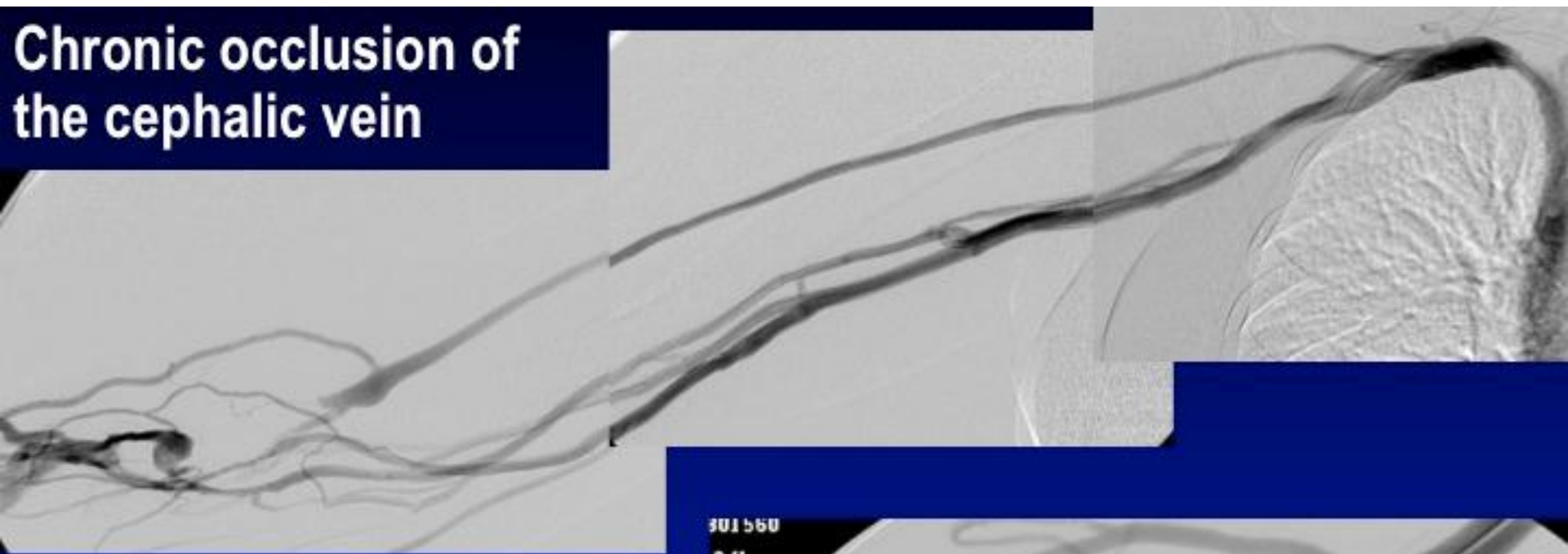
## Disadvantages of duplex Doppler (5)

- **Inability to manage complications**

- Ruptures require sometimes a very precise deployment of a stent (cephalic arch for example) which is not possible under ultrasound
- The rupture of the balloon catheter with a detachment of a part of the catheter requires angiography for its removal
- Extensive thrombosis during the angioplasty requires manual aspiration embolectomy which should be performed under fluoroscopy



**Chronic occlusion of  
the cephalic vein**



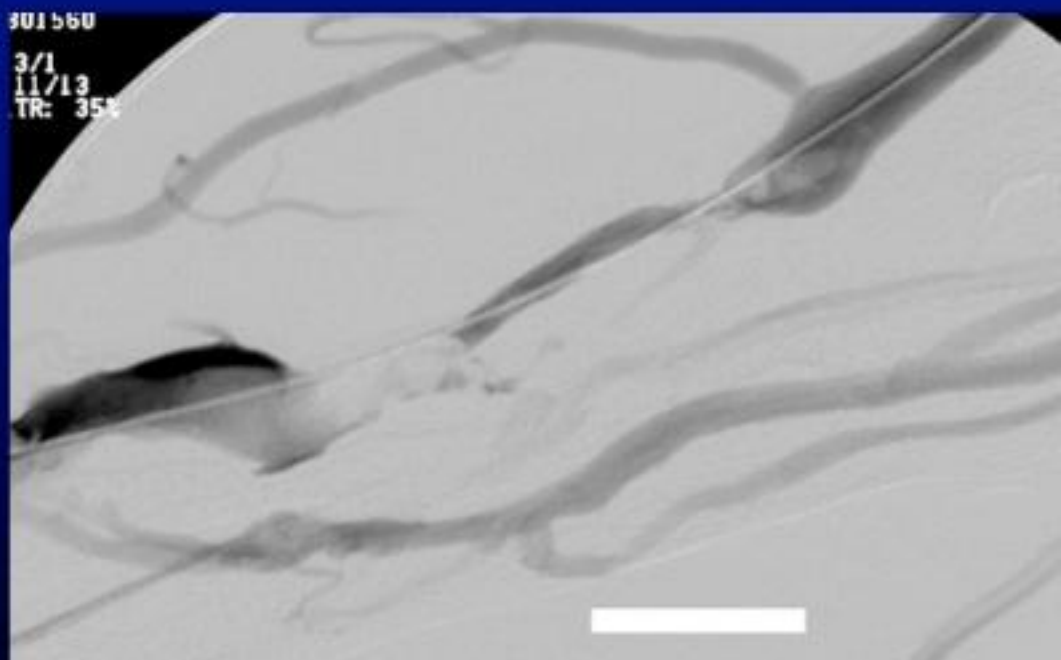
**After dilatation:  
extensive thrombosis**

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3/1

11/13

TR: 35%

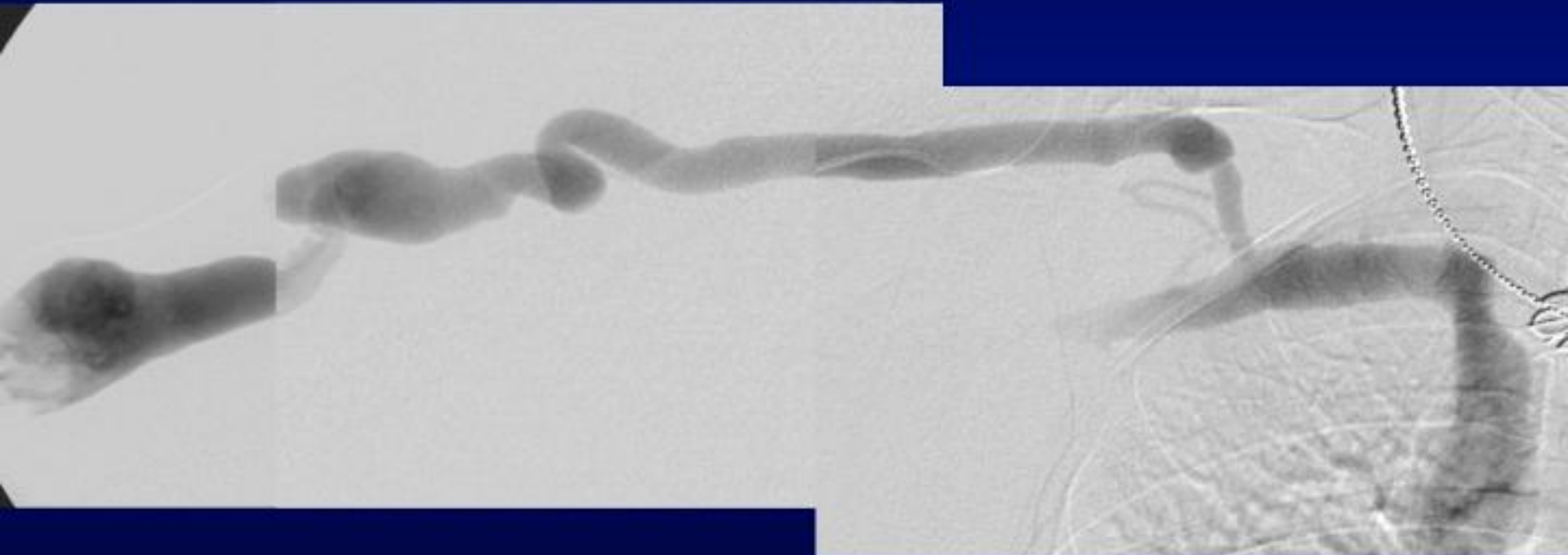


•thromboaspiration

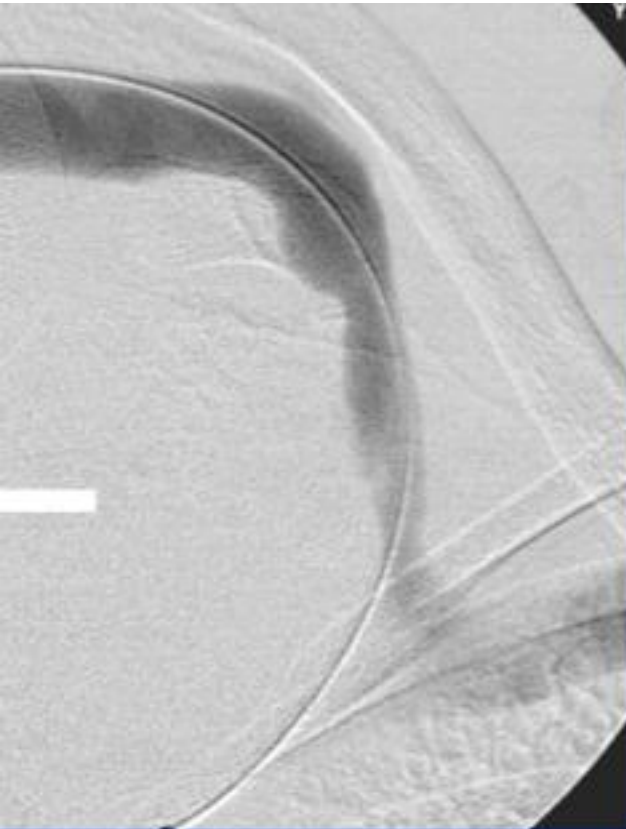
•After aspiration

50mm  
Stroke  
W-0  
X

**Brachiocephalic fistula : Access flow 1,2l/min**  
**Venous pressure that is too high**



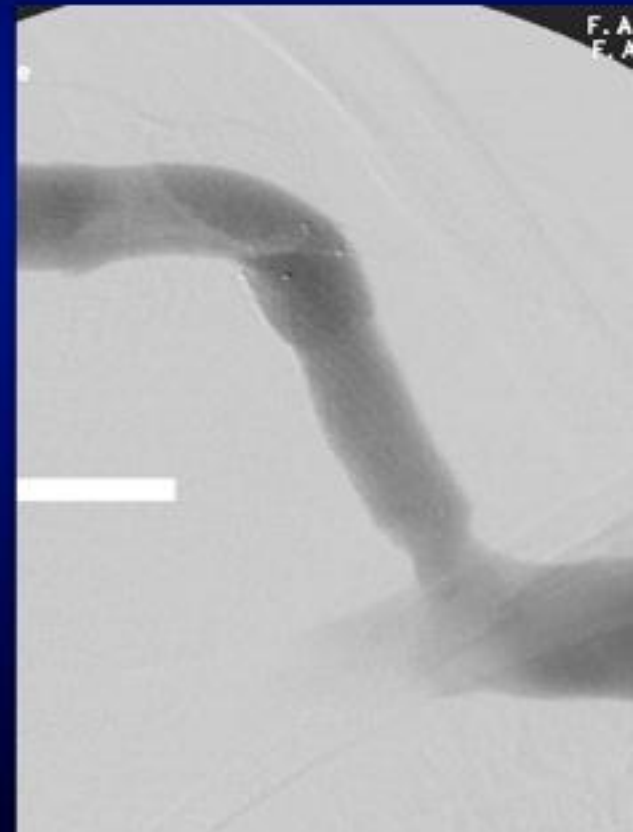




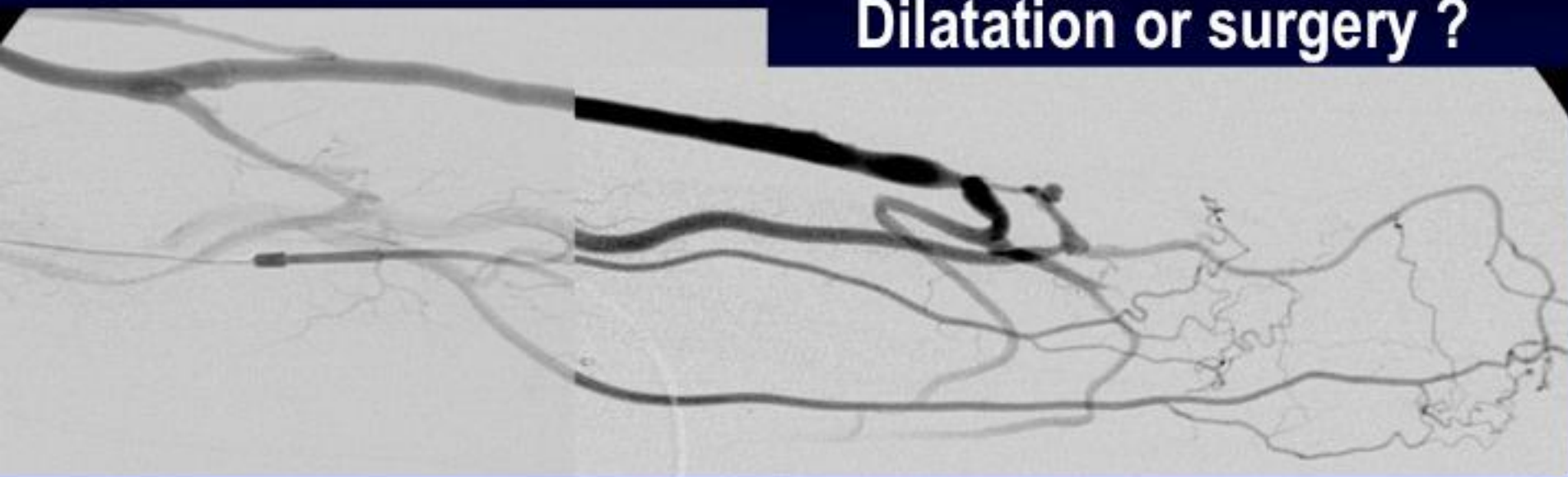
**Dilatation complicated of rupture.**  
**Despite repeated prolonged inflations**  
**the bleeding remains**



**Implantation of a**  
**stent without**  
**protrusion into the**  
**subclavian**



## Dilatation or surgery ?



**Indication of dilatation of a stenosis close to the inflow on a distal fistula is controversial. To surgically redo the anastomosis is followed by a lower rate of lesion recurrence\* than after angioplasty. One dilatation of such a stenosis is rational but not repeated dilatations in case of early restenosis**

**\*N. Tessitore Clin J Am Soc Nephrol 1: 448-454, 2006**



## **Conclusion (1)**

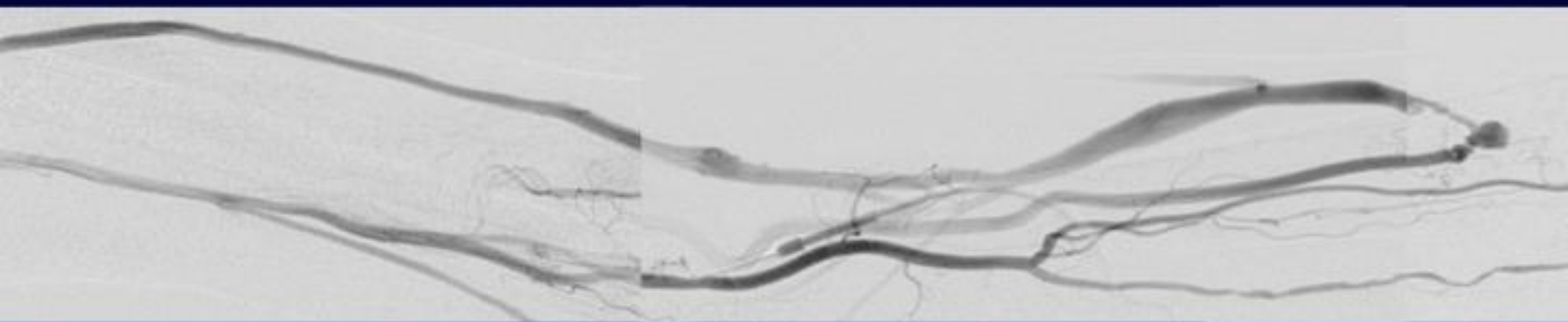
- **In many access lesions the use of ultrasound for guiding the dilatation could not even be envisaged. In the other cases ultrasound guided compared with fluorography guided angioplasty provides:**
  - less precise indications and sometime wrong indications**
  - less immediate success rate**
  - less abilities to treat complications of dilatation**



## **Conclusion (2)**

- **The life of patients treated by hemodialysis depends on their angioaccess. Angioplasty is an invasive examination which carries some risks.**
- **When an access is dysfunctional all should be done to salvage the access with the maximum chances of success and the best long-term patency. This is not the case when the procedure is ultrasound guided.**

## Dilatation versus surgery ?

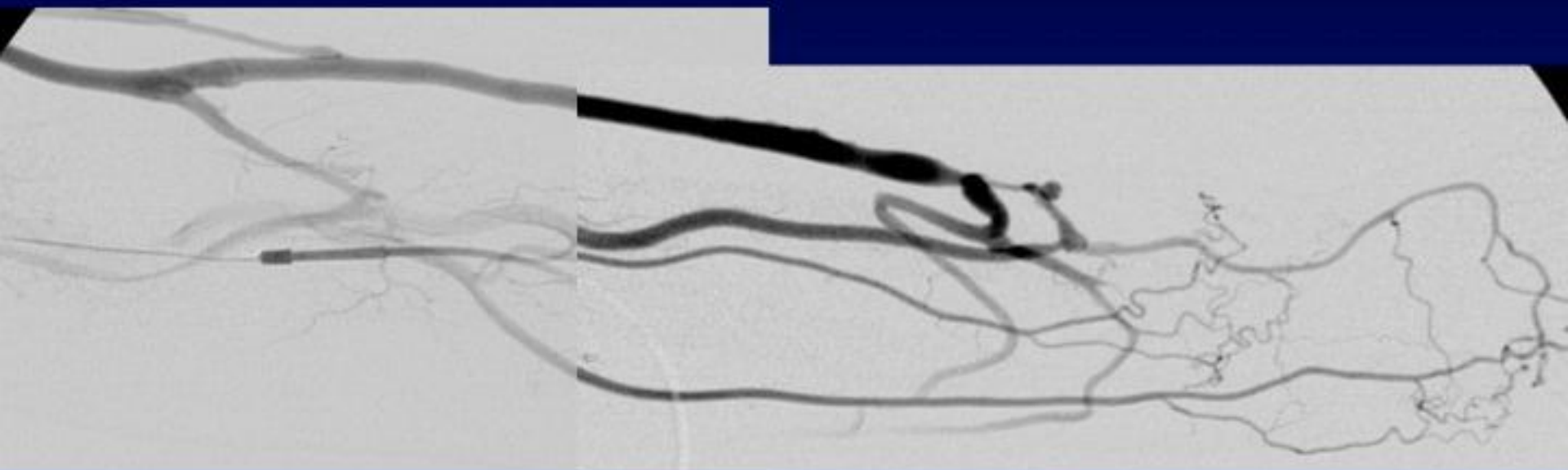


Indication of dilatation of a stenosis close to the inflow on a distal fistula is controversial. To surgically redo the anastomosis is followed by a lower rate of lesion recurrence\* than after angioplasty. One dilatation of such a stenosis is rational but not repeated dilatations in case of early restenosis

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**65 year-old man radiocephalic avf created for 16 months, used for 8 months. Low flow: 240ml/min**



**Indication of surgical treatment: to redo the anastomosis is followed by a lower rate of lesion recurrence\* than after angioplasty**

**\*N. Tessitore Clin J Am Soc Nephrol 1: 448-454, 2006**