

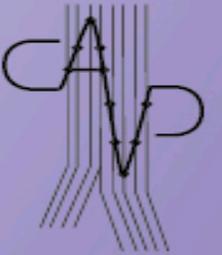


CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES
IN VASCULAR SURGERY

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MARRIOTT RIVE GAUCHE & CONFERENCE CENTER
PARIS, FRANCE

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**PERCUTANEOUS DISOBSTRUCTION OF THROMBOSED
DIALYSIS ACCESSSES: MANUAL CATHETER-DIRECTED
ASPIRATION OF THE THROMBUS**

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Disclosure

I do not have any potential conflict of interest



- Thrombosis of an arteriovenous Fistula (AVF) or graft (AVG) is **THE MOST IMPORTANT AND SERIOUS ACCESS-RELATED COMPLICATION** for dialysed patients
- Most frequent etiology for thrombosis= **STENOSIS**
- Other factors can contribute: hypotension, dehydration, compression...



- Ideal world= **NO THROMBOSIS**

→ Stenosis detection programs should be systematically applied to be able **to treat stenoses before acute thrombosis occurs.**



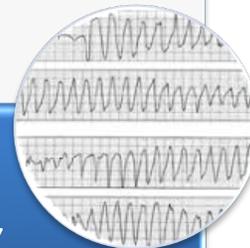
Contraindications to declotting

- **Infected Fistula**



ABSOLUTE

- Hyperkaliemia
- Fluid overload



**ABSOLUTE
& TEMPORARY**

- Immature AVF in the forearm
- Large aneurysms (> 5 cm)
- > 1 month
- Recent Surgery
- Right to left shunt?



RELATIVE



GRAFT

≠

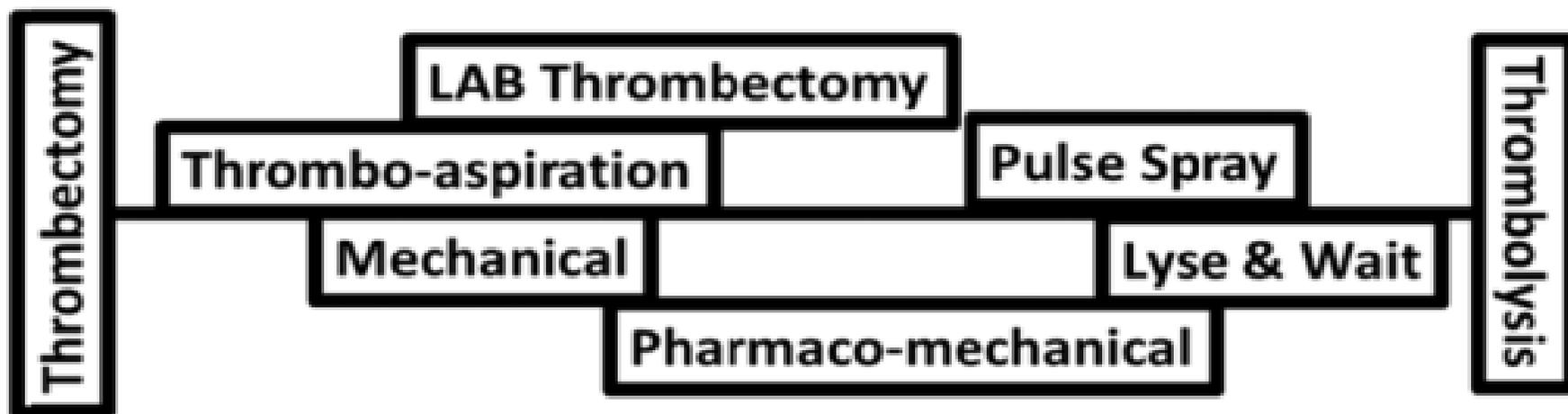
AVF

- Thick prosthetic wall easy to palpate and cannulate
- Constant diameter
- Small clot volume
- Stenosis located at the venous anastomosis

- Thin venous wall difficult to palpate and transfixed without resistance
- Anatomy irregular/ aneurysm/ collaterales
- Large volume of clot
- Underlying stenosis anywhere
- Stenosis tight and difficult to cross



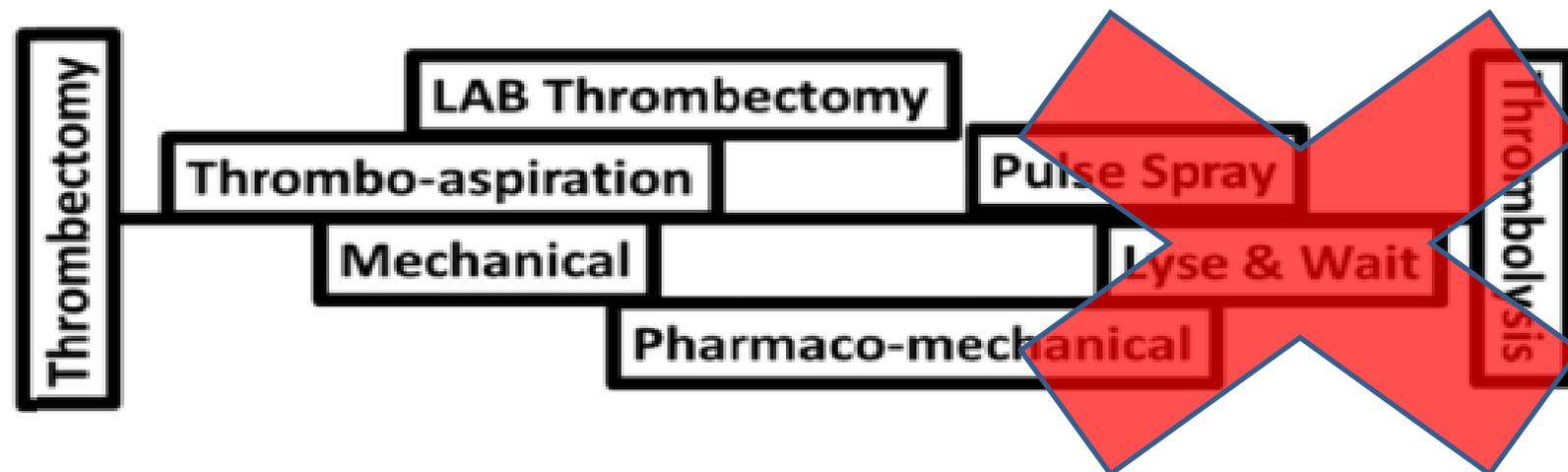
Endovascular options

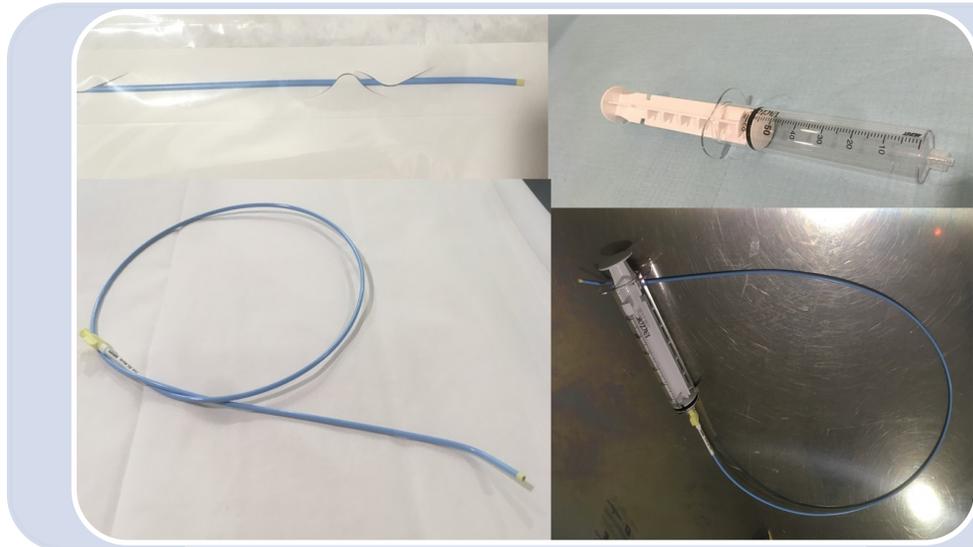


To many options= Inability to define the best treatment option to implement widely in everyday practice



- *Nowadays*: Thrombolytics are not mandatory for the successful recovery of thrombosed fistulas and grafts.
- Compared to mechanical methods, thrombolytics have additional contraindications: recent surgery, severe hypertension, cerebrovascular disease...





Thromboaspiration



Mechanical
thrombectomy



Two mandatory stages in the treatment of a thrombosed access

1

- **REMOVAL OF CLOTS** (from the venous side to the arterial side = prevention of pulmonary embolization of clots caused by the reestablishment of arterial flow)

2

- **TREATMENT OF THE CAUSE OF OBSTRUCTION**
STENOSIS/hypotension/dehydratation/mechanical compression/hypercoagulability...

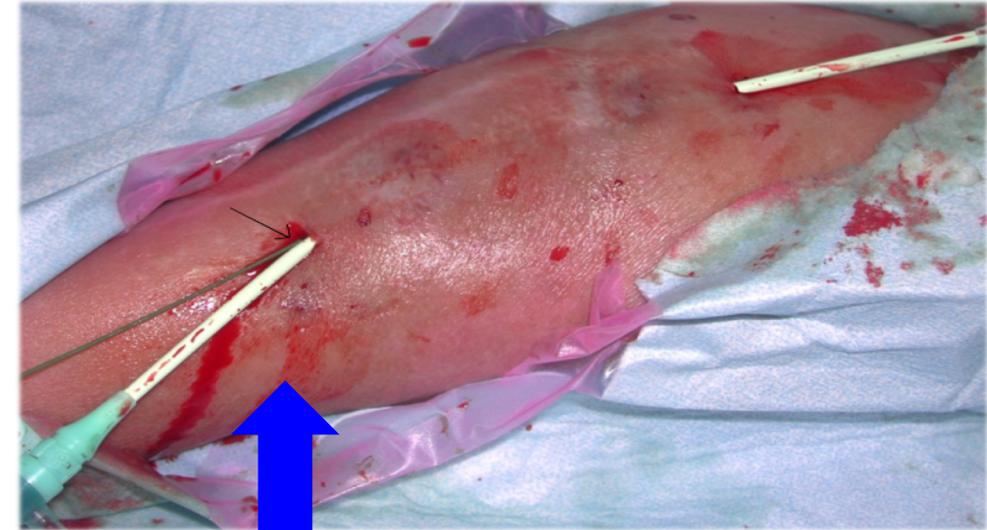


Typical case of manuel catheter-directed aspiration

- Out patient procedure
- Local anesthesia
- 3000-5000 units of heparin
- 1 G bolus intravenously of cefamandole



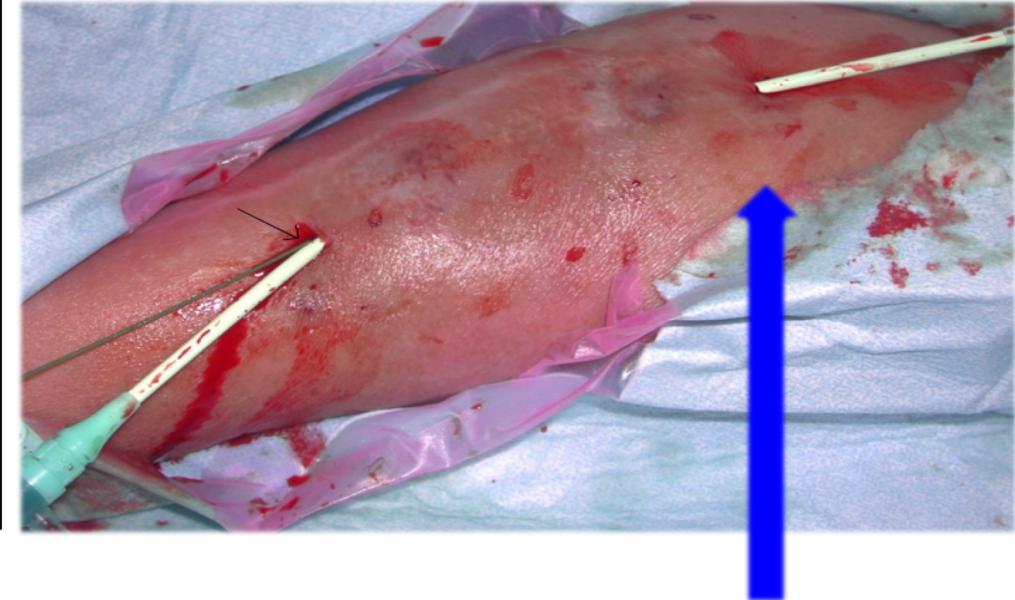
Initial sheath is placed a few centimeters from the anastomosis using an antegrade approach (= to treat the venous outflow)



- A 5 F catheter is pushed over a guide wire up to the superior vena cava and then pulled back while contrast medium is injected under fluoroscopy in order to localise the central extension of the thrombosis

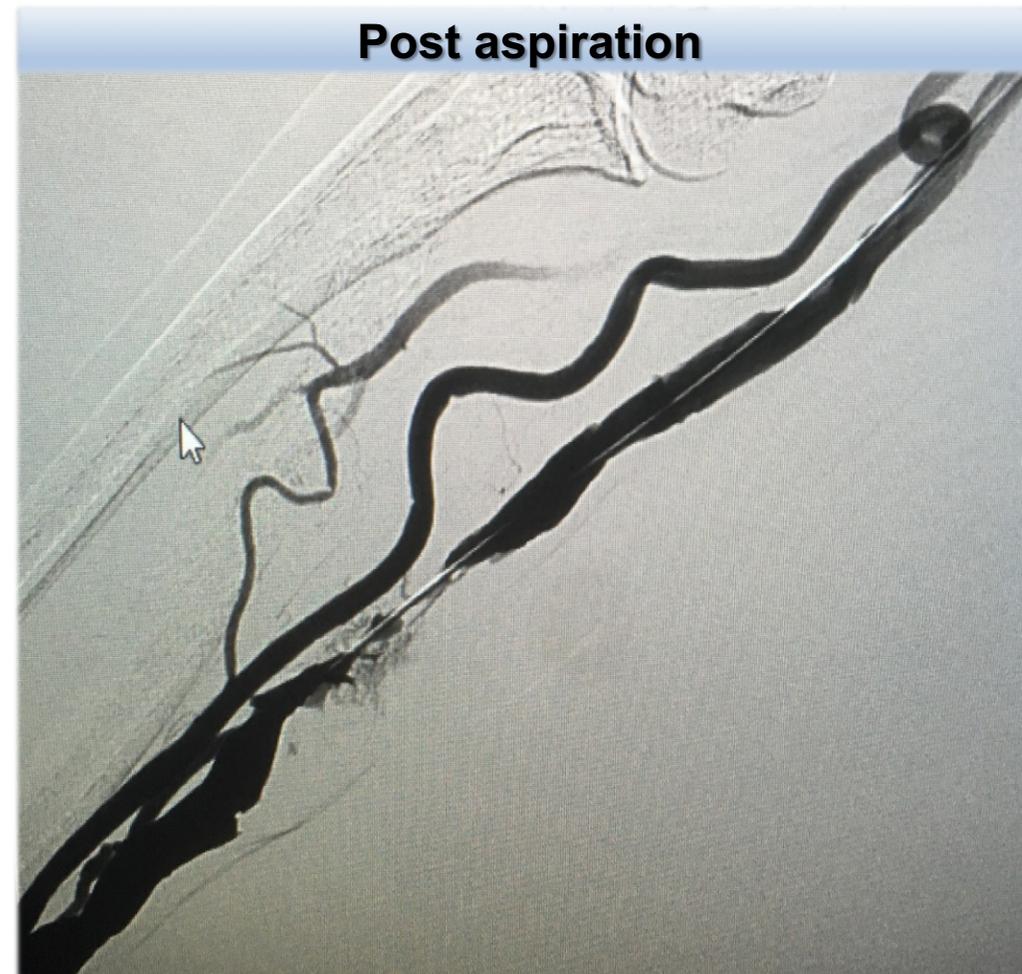


Second introducer is placed using a retrograde approach some centimeters downstream from the first one in the direction of the arterial inflow



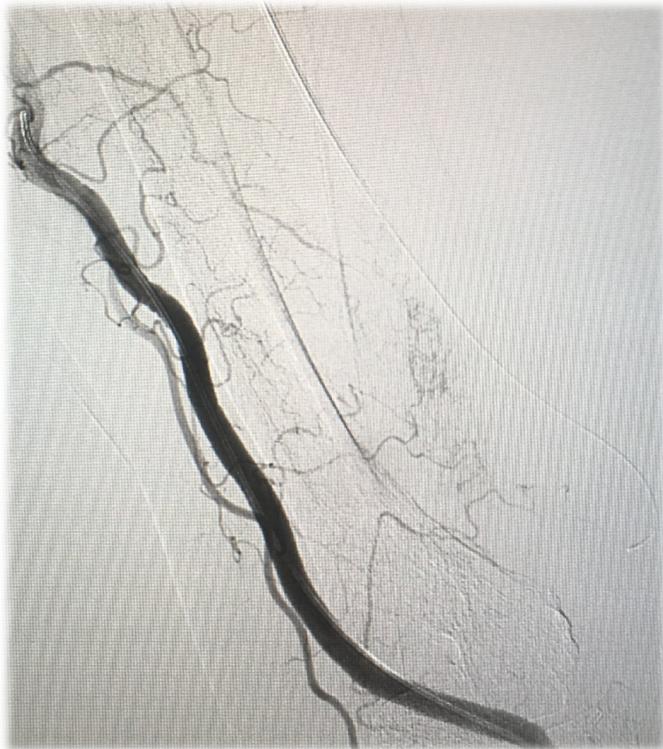
- A wire is pushed through the anastomosis.
 - (vertebral or internal mammary type catheter++)

- Only antegrade approach or retrograde approach can be sometime be enough



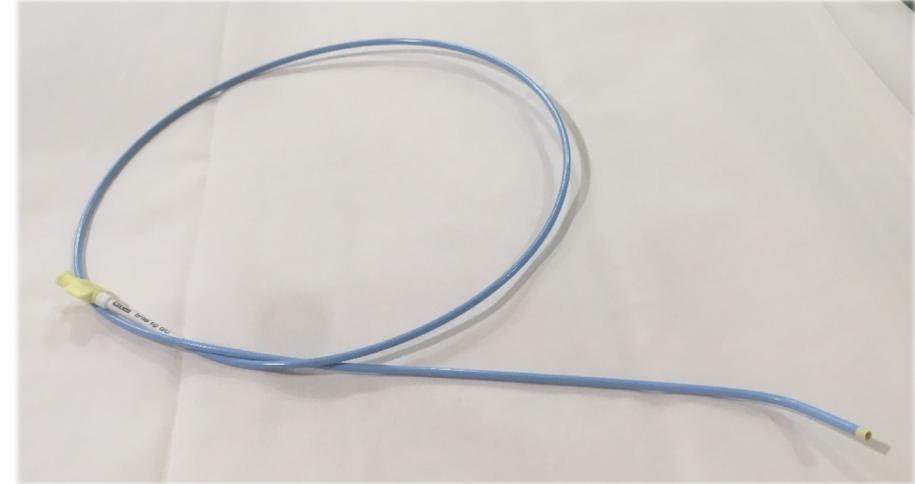


- Brachial or radial artery ponction can be helpfull :
 - To opacify or catheterize the feeding artery, or the post anastomosis segment when retrogarde approach is unsuccessful

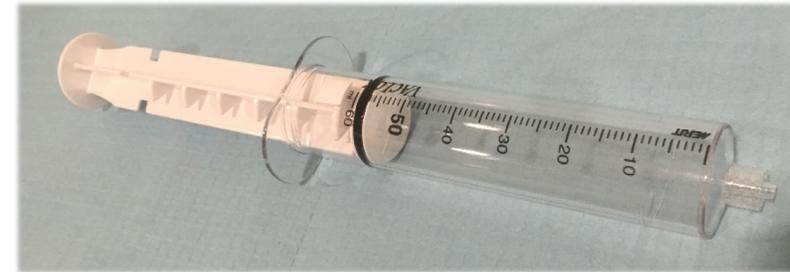
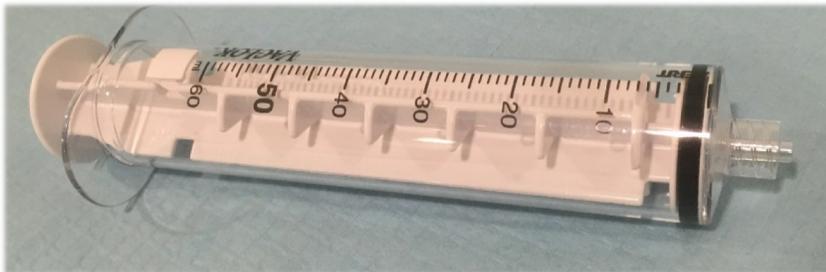




- A slightly angled 8F or 9F catheteris pushed through the introducer sheath over a guide wire to make contact with thrombus



- Manual aspiration is created through a Luer Lock 50cc syringe while pulling back the catheter with back and forth movement



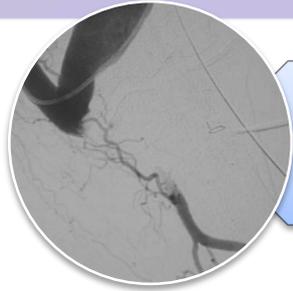
- Syringe and catheter are flushed



- The procedure is repeated as long as clots remains
- Large, aneurysmal or curved vessels: interest of angled catheter
- Wall adherent thrombi can be difficult to detach (arterial plug).



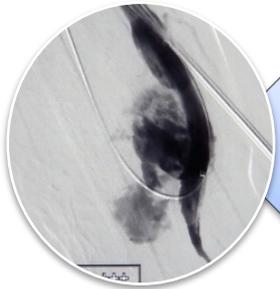
- Once all clots have been removed from the venous outflow, similar manoeuvres have to be performed in the direction of the arterial inflow
- Once the thrombi were removed, unmasked underlying stenosis are dilated
- Final compression/purse-string suturing



Arterial emboli



Symptomatic pulmonary embolism



Complications of dilatation

- Rupture, hematoma, pseudoaneurysm...



Blood depletion requiring transfusion



Duration of procedure from initial puncture to completion of compression

| | |
|---|----------------|
| Turmel and al. | 123 min |
| Our experience (2016-2018) =105 patients | 89 min |

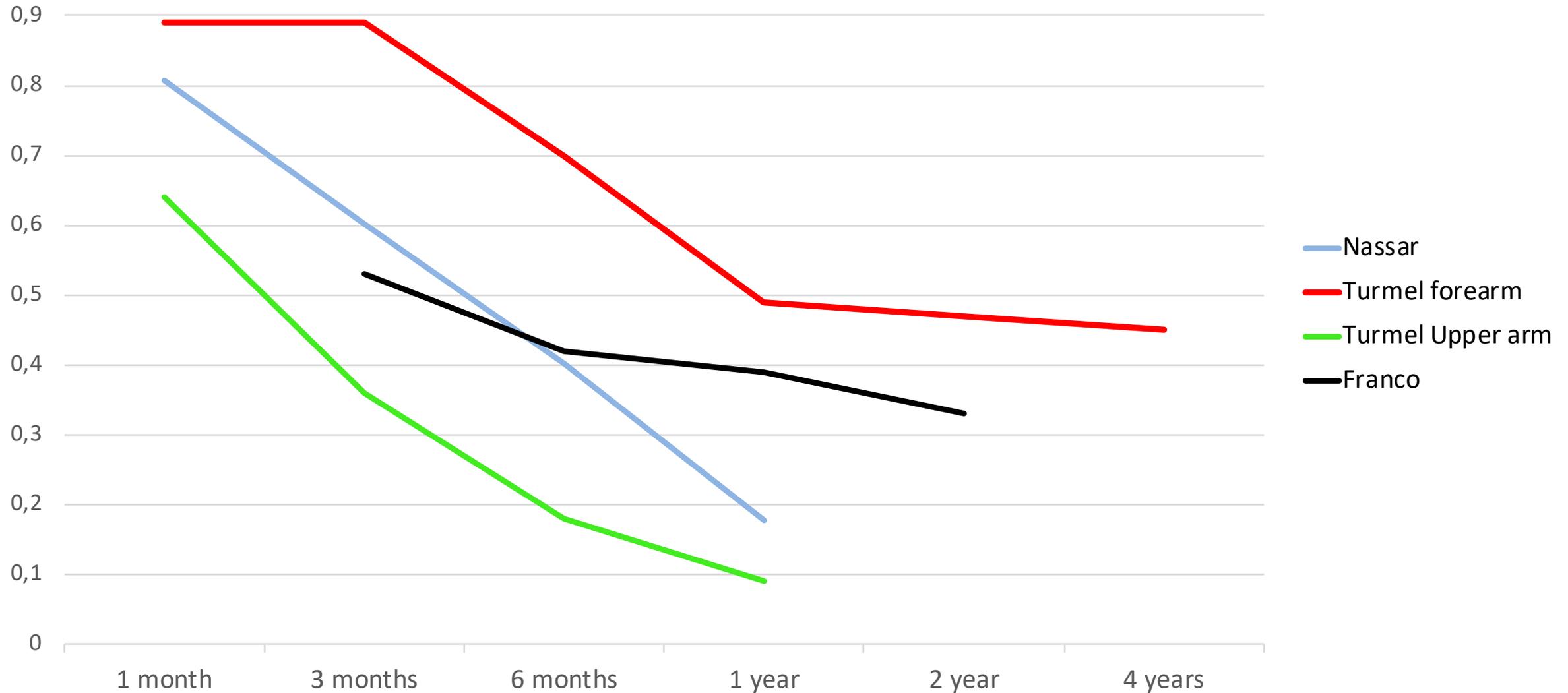


Immediate success rate

| Liang | Turmel (2000) | | | Nassar (2014) |
|---------|---------------|-----------|-------|---------------|
| Forearm | Forearm | Upper arm | Graft | |
| 90% | 93% | 76% | 99% | 91% |

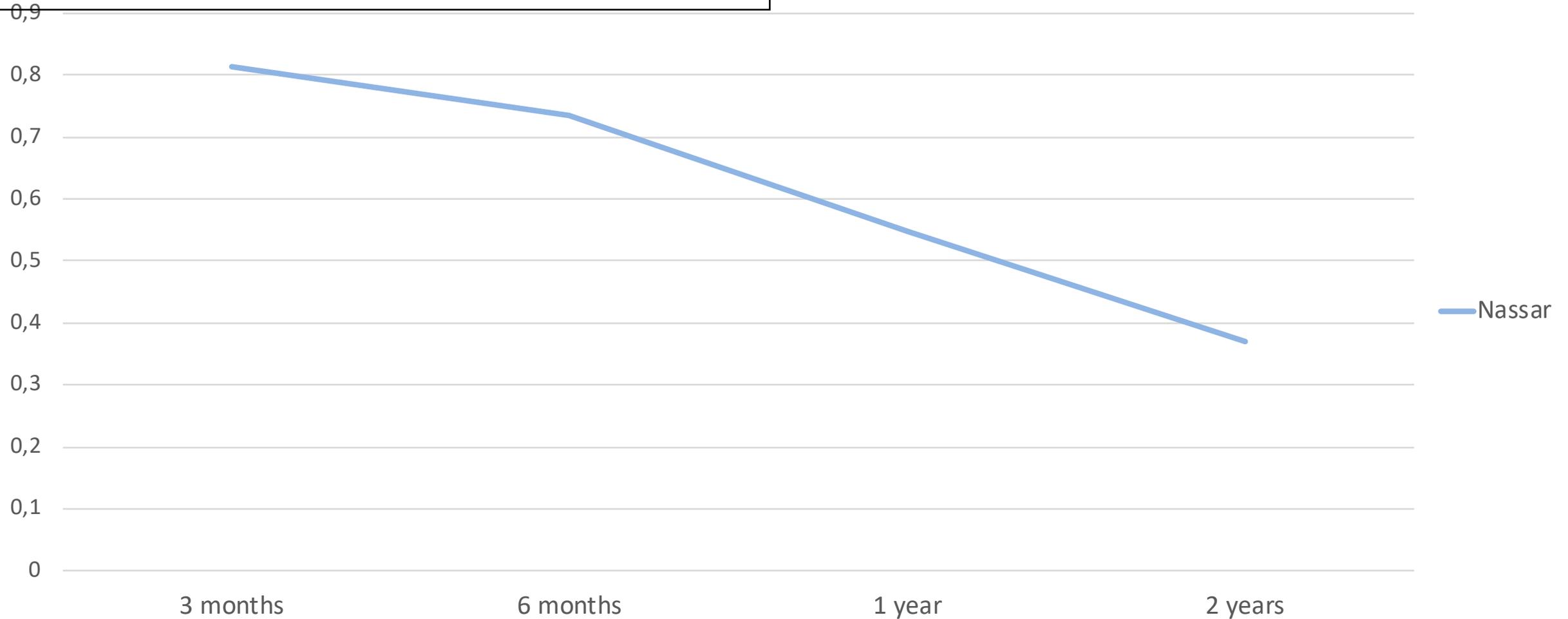


Primary patency rate





Assisted primary patency rate



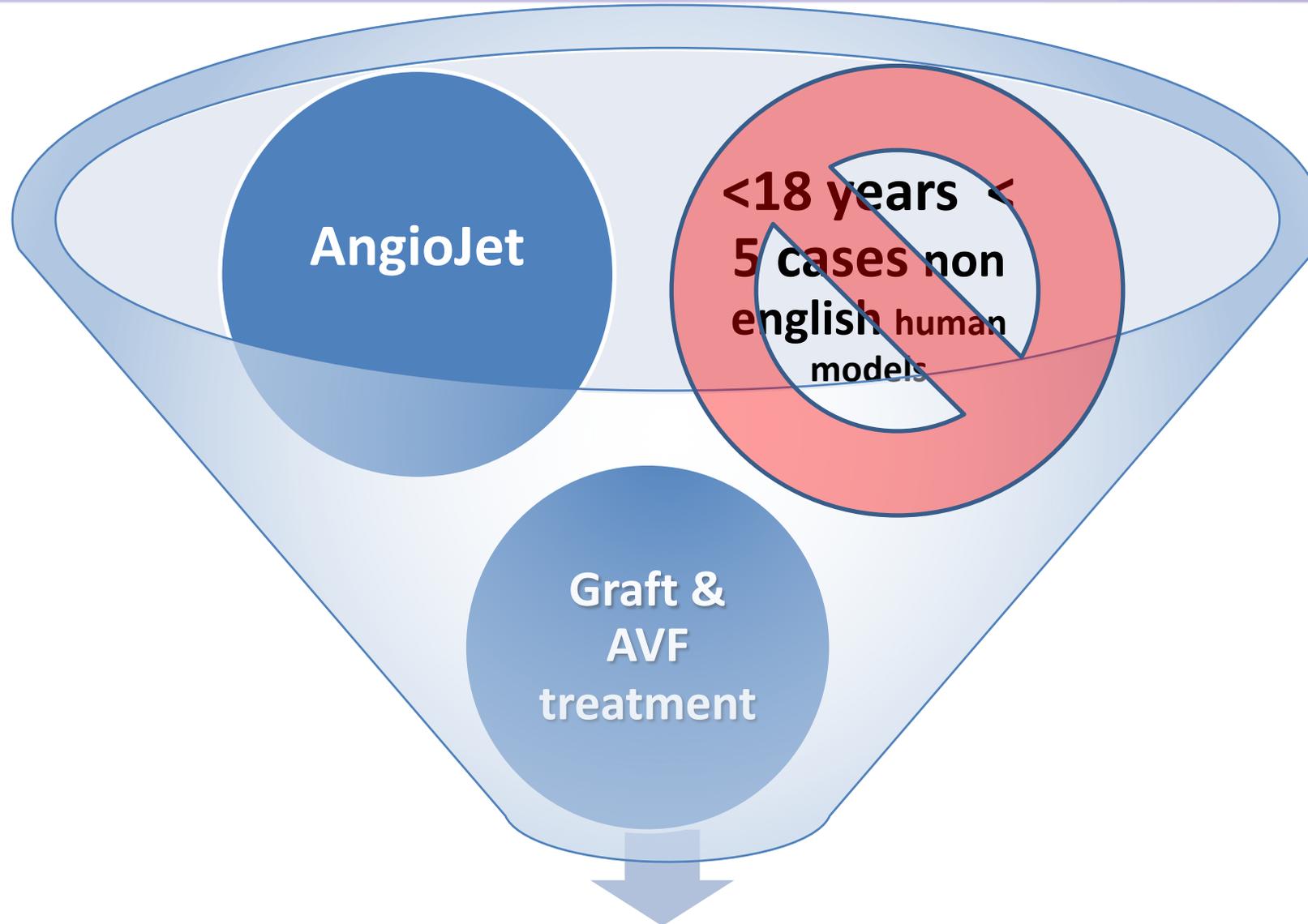


- **Why don't we need an other technical procedure?**



- Quality of the current evidence is poor
- For example, what about AngioJet and literature?

Chan. Safety and efficacy of the Angiojet device in the treatment of thrombosed arteriovenous fistula and grafts. A systematic review. The journal of vascular access 1-9, 2018.



Only 10 articles! =836 patients (432 grafts/234 AVF)



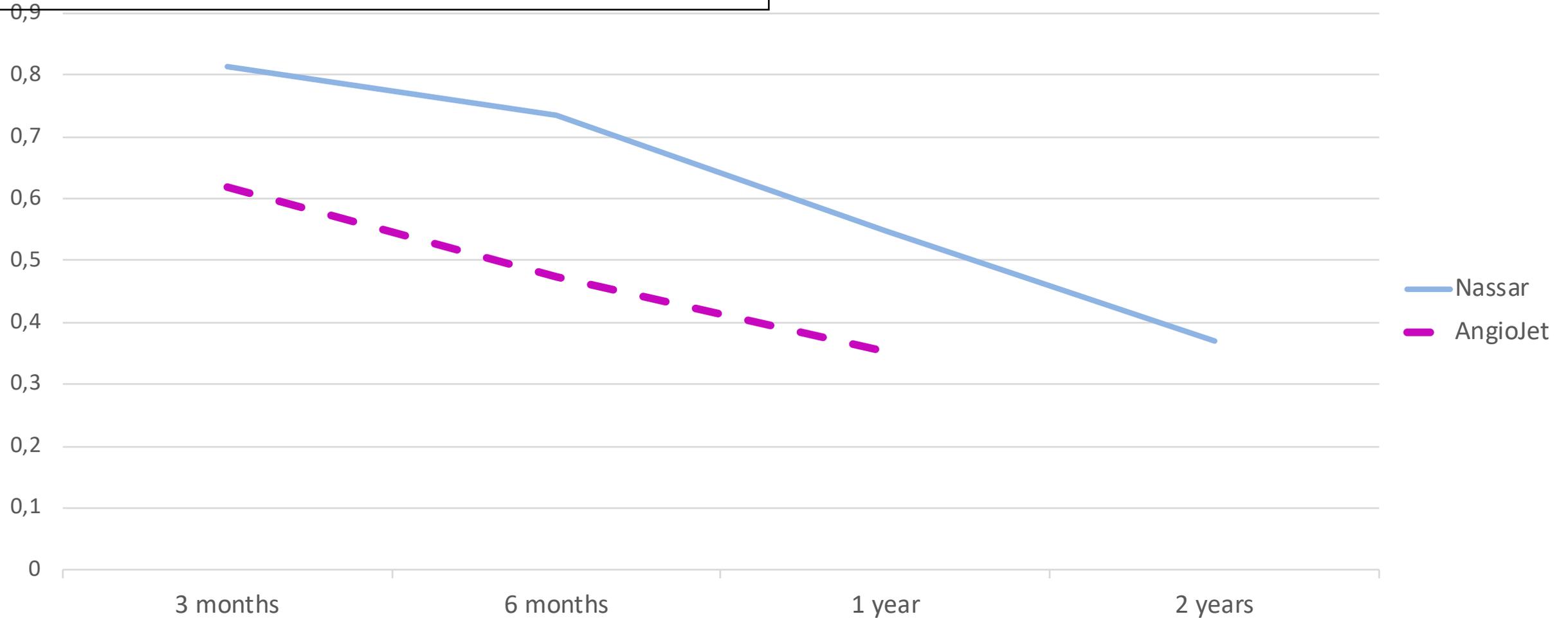
Thrombectomy \leq Thromboaspiration

Primary patency rate





Assisted primary patency rate





Long term primary patency rate (1 year)

| | |
|---------------------------------|--|
| Manual thromboaspiration | 60% AVF/24% graft |
| Angiojet | 30,5% |
| Thrombolysis | 24% |
| Castaneda Brush catheter | 50% |
| Amplatz/ Hydrolyser | 27% |
| Embolectomy balloon | 18% |
| Surgery | 51-84% (higher morbidity, complication and length of hospital day) |



Because Time is money.....

| Smits | | | Hossein | | Turmel | Our recent experience |
|--------------------|-------------------|------------|-----------------|------------|--------------------------|-----------------------|
| Cragg Brush | Hydrolyser | PTD | Angiojet | PTD | Thromboaspiration | |
| 118 min | 132 min | 119 min | 88 min | 52 min | 123 min | 89 min |

Hossein and al. Expert Rev Med. Devices 10(1), 27-31 (2013)

Smits and al. Nephrol Dial Transplant , (2002) 17: 467-473



Because money
is money.....

Thromboaspiration

Thrombectomy

Syringue and
aspiration catheter

**Thrombectomy
device**

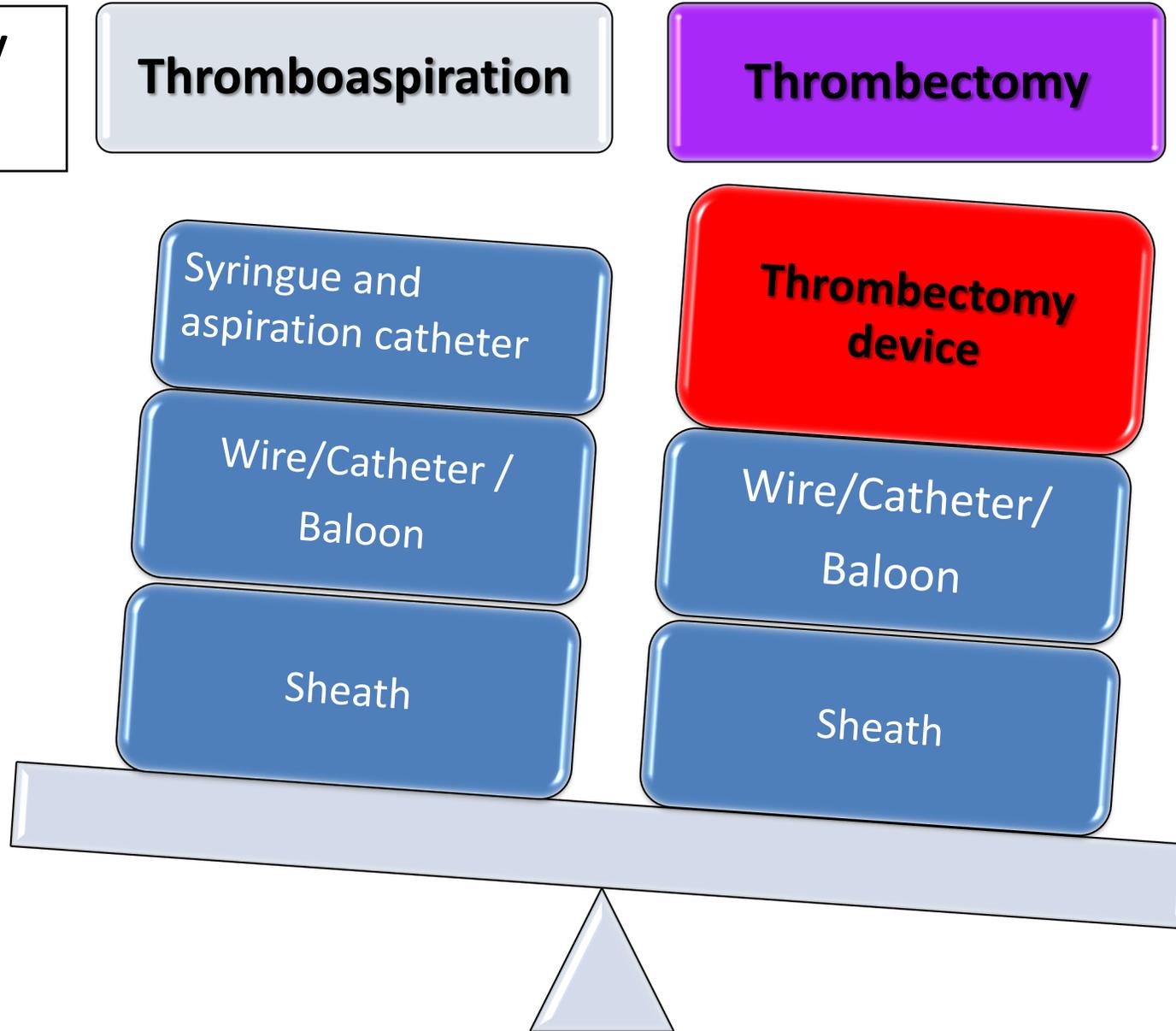
Wire/Catheter /
Baloon

Wire/Catheter/
Baloon

Sheath

Sheath

+ 1000 €
At least...





CONCLUSION

- **Nobody likes to treat thrombosed dialysis accesses**
- **Thrombosis is due to an underlying stenosis in 99% thrombosed autogenous fistulas, 85% of thrombosed prosthetic grafts= we can avoid it!**
- **The best strategy is to detect and treat stenosis before acute thrombosis**



CONCLUSION 2

- **Real challenge is to find the true lumen of the vessel and to catheterise the underlying stenosis**
- **Manual Catheter –directed aspiration of the thrombus is an efficient therapeutic**
- **Thrombectomy is efficient to, but it is an expensive luxury**
- **Not better, Not really faster, no strong evidence proof.**



Merci de votre attention

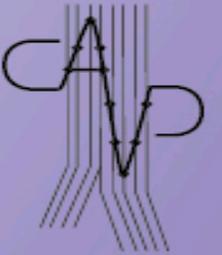


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