Sténoses juxta-anastomotiques : qui est le coupable?

Juxta-anastomotic stenosis : who is guilty?

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CACVS 2018 Session Abords Vasculaires

Disclosure

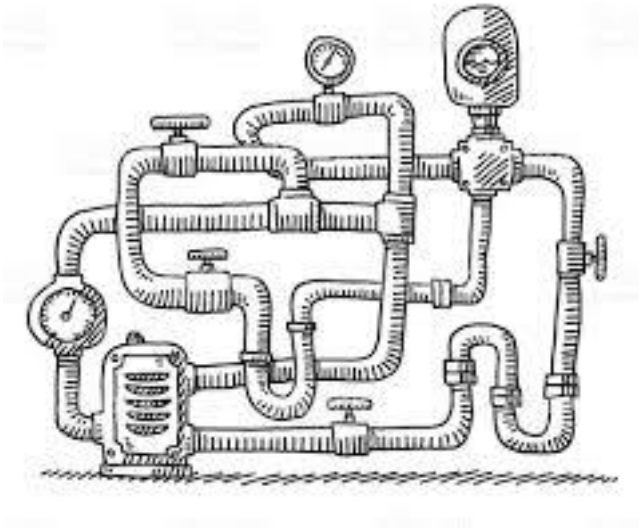
Speaker name:

Nirvana SADAGHIANLOO

- ☐ 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

Physiologie et hémodynamique des FAV :

ou pourquoi est-ce la pire intervention de chirurgie vasculaire?



La FAV chez le patient hémodialysé

Ligne de Vie

“Talon d’Achille”

Les FAV ont parmi les pires résultats de chirurgie vasculaire

Métaanalyse de 34 études

50% de perméabilité à 1 an

Patency of autogenous and polytetrafluoroethylene upper extremity arteriovenous hemodialysis accesses: A systematic review

Thomas S. Huber, MD, PhD,[a] Jeffrey W. Carter, BS,[b] Randy L. Carter, PhD,[b] and James M. Seeger, MD,[a] *Gainesville, Fla*

Huber, et al. J Vasc Surg 2003;38:1005-11

La moitié des FAV ne mature pas

Table 5. Overall success rate in achieving adequate (useable) fistulas when preoperative vascular mapping is used

	Proportion of all patients with fistula placed	Proportion of fistulas that were useable	Proportion of all patients with useable fistula	Fist prevalence in U.S., 1999
All patients	0.64	0.54	0.34	0.27
Sex				
Female	0.50	0.44	[illegible]	0.18
Male	0.74	0.60		0.35
Race				
Black	0.54	0.54		0.23
White	0.86	0.52		0.29
Age				
>65 years	0.62	0.42		0.23
<65 years	0.64	0.56		0.31
Diabetes				
Yes	0.63	0.49		0.22
No	0.65	0.59	0.38	0.30

First three columns are adapted from [13] and the last column from [16].
[a] $P < 0.001$, [b] $P = 0.02$

Femmes 44%
Patients âgés 42%
Diabétiques 49%

Increasing arteriovenous fistulas in hemodialysis patients: Problems and solutions

MICHAEL ALLON and MICHELLE L. ROBBIN

Kidney International, Vol. 62 (2002), pp. 1109–1124

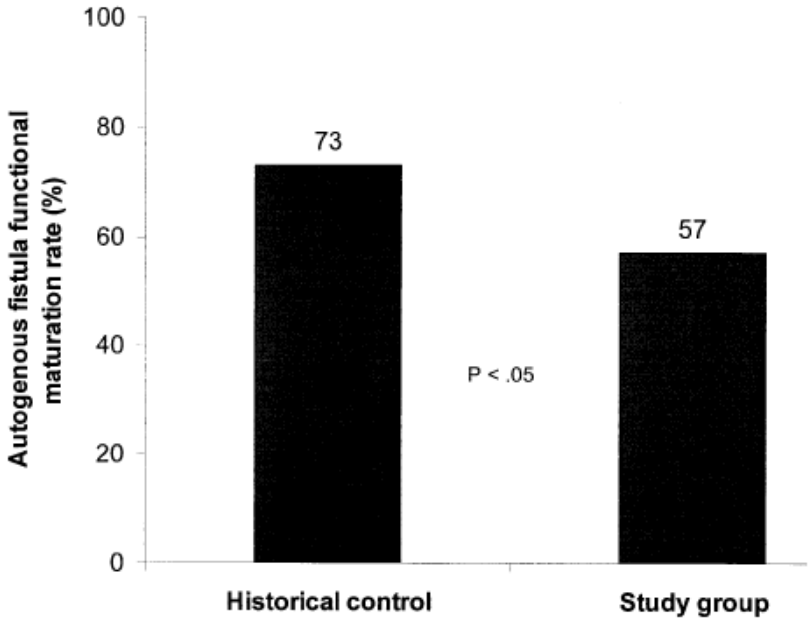
Failure of arteriovenous fistula maturation: An unintended consequence of exceeding Dialysis Outcome Quality Initiative guidelines for hemodialysis access

J Vasc Surg 2003;38:439-45.

Sheela T. Patel, MD, John Hughes, MD, and Joseph L. Mills Sr, MD, *Tucson, Ariz*

- Délai de maturation = 70 jours
- 57% de taux de maturation

La Fistula First, notamment pour les FAV distales, est régulièrement remise en cause.



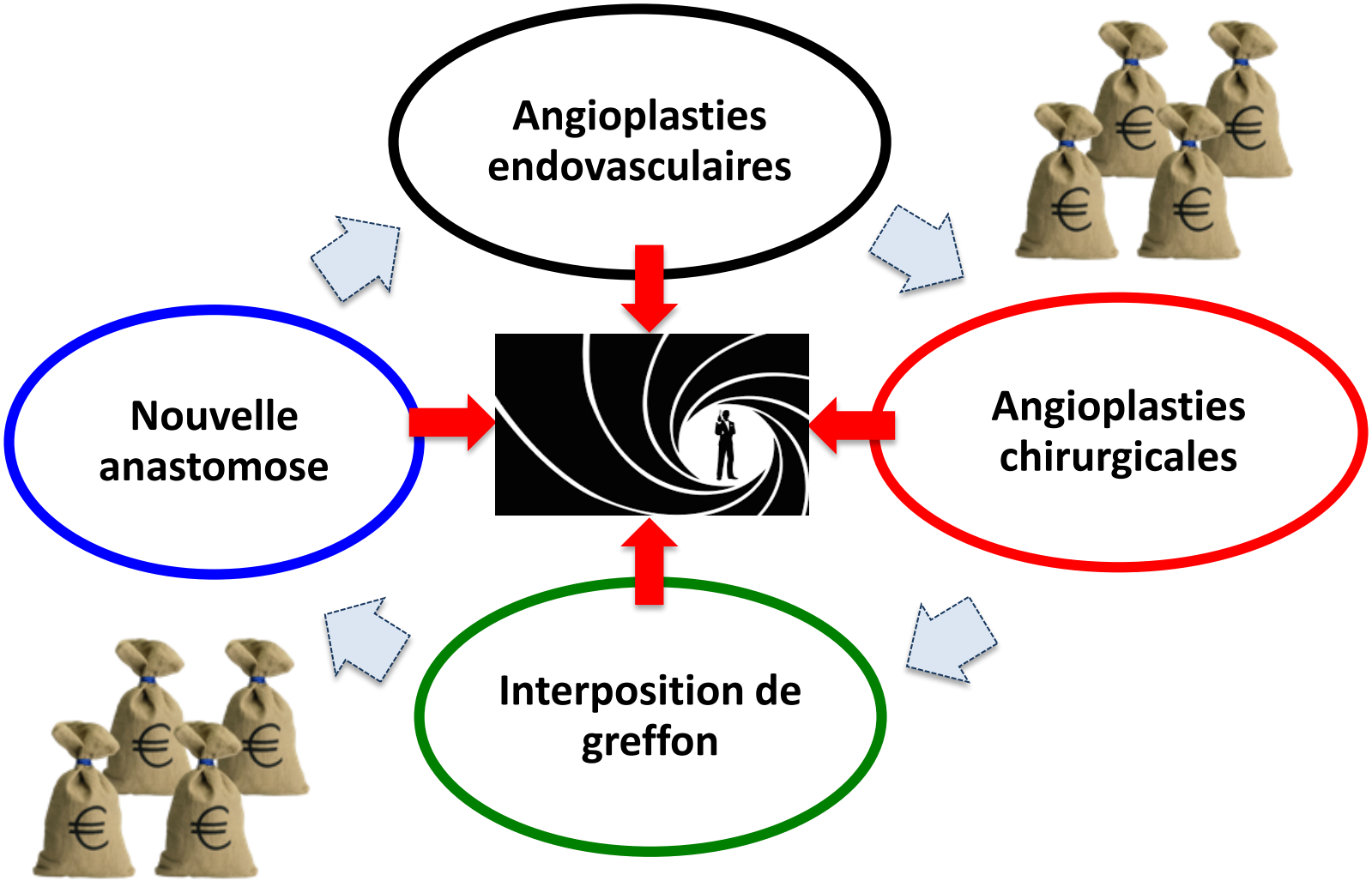
The natural history of autologous fistulas as first-time dialysis access in the KDOQI era

Andre Biuckians, MD, MPH, Eric C. Scott, MD, George H. Meier, MD, Jean M. Panneton, MD, and Marc H. Glickman, MD, *Norfolk, Va*

J Vasc Surg 2008;47:415-21.

- 80 FAV primaires
- En moyenne 5 mois avant la 1ère cannulation
- Très fort taux de non-maturation
  - 20% d'échecs primaires (abandons)
- Seuls 48% fonctionnels @ 1 an
  - Seuls 11% sans avoir subi d'intervention

Multiples réinterventions



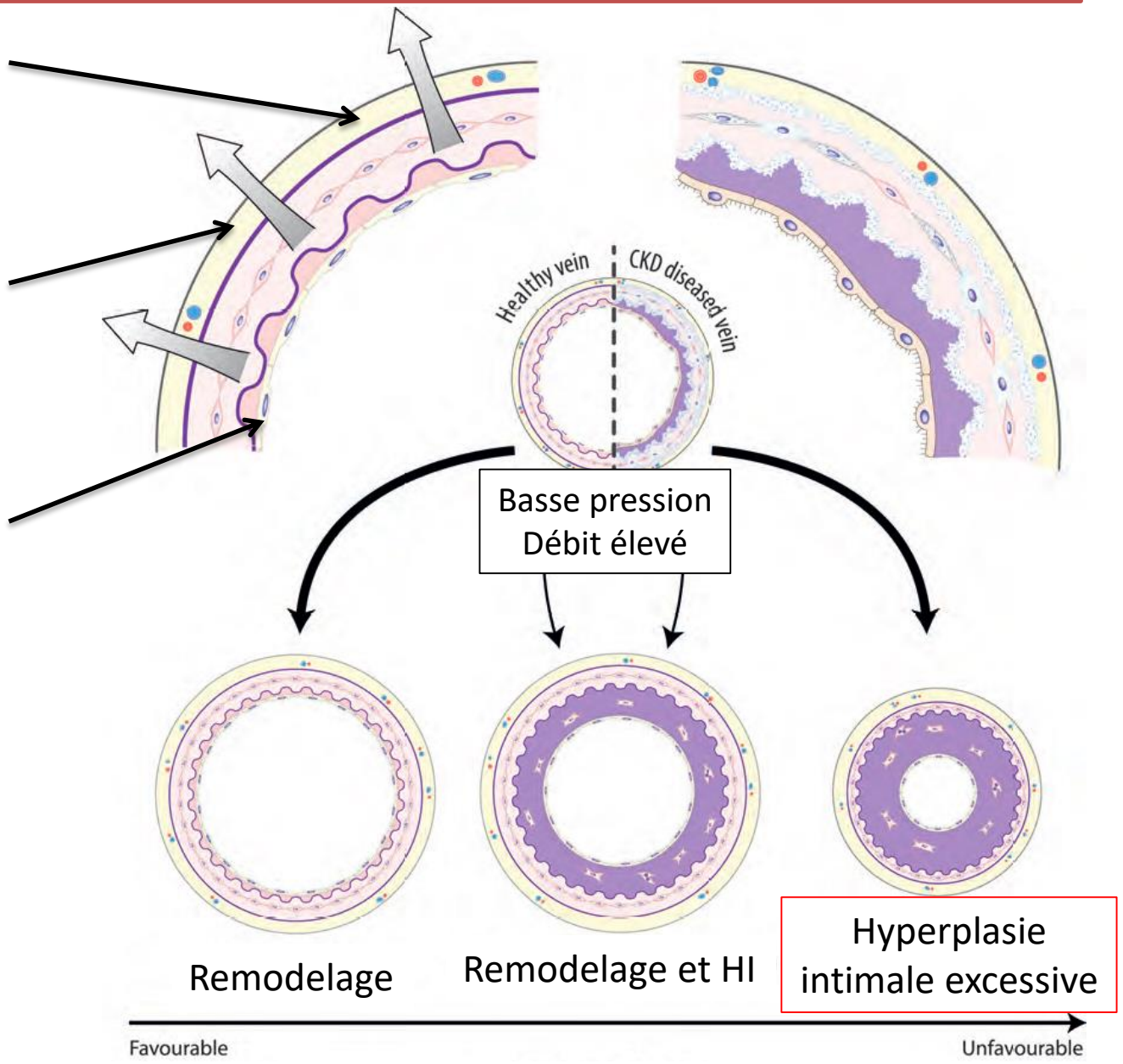
Qui est le coupable ?

Problème physiopathologique

ADVENTICE
fibroblastes,
matrice extra-cellulaire,
vasa vasorum

MEDIA
cell. musculaires lisses

INTIMA
cellules endothéliales



Adapté de: Rothuizen et al. Nephrol Dial Transplant 2013

Hyperplasie juxta-anastomotique aggressive

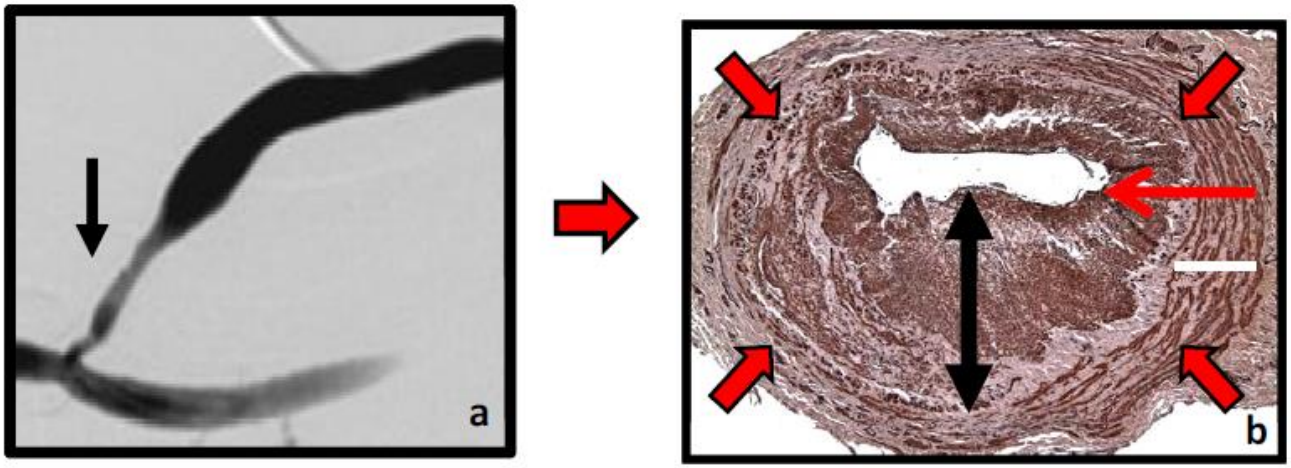


Figure 1. Arteriovenous fistula maturation failure: from radiology to histology. (a) Classic radiologic picture of AVF maturation failure, characterized by a tight peri-anastomotic stenose (arrows). (b) Tissue from the stenotic area when looked at under a microscope reveals the typical histologic picture of AVF maturation failure; an aggressive neointimal hyperplasia probably in combination with a lack of appropriate outward remodeling. Black double-headed arrow equals thickness of neointimal hyperplasia; red thin arrow, possible direction of migration of myofibroblasts and smooth muscle cells; broad red arrows, lack of appropriate outward remodeling or alternatively inward remodeling; white bar, medial thickness.

Balloon-Assisted Maturation (BAM) of the Arteriovenous Fistula: The Good, the Bad, and the Ugly

Prabir Roy-Chaudhury, MD, PhD,[*,†] *Timmy Lee, MD,*[*,†] *Ben Woodle,*[*] *Davinder Wadehra, MD,*[*] *Begoña Campos-Naciff, PhD,*[*] *and Rino Munda, MD*[‡]

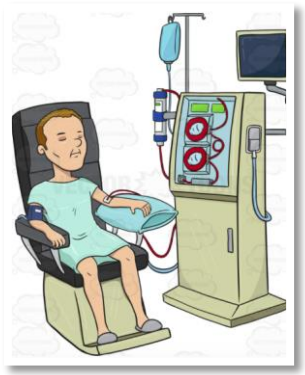
Seminars in Nephrology, Vol 32, No 6, November 2012, pp 558-563

1. Le patient …

Diabète

IRC

Hypertension



Dialyse

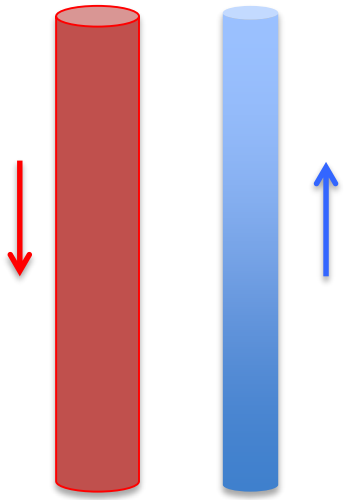
Inflammation chronique
Stress oxydatif
Calcifications

Parois vasculaires rigides
Perte de compliance
Hyperplasie intimale

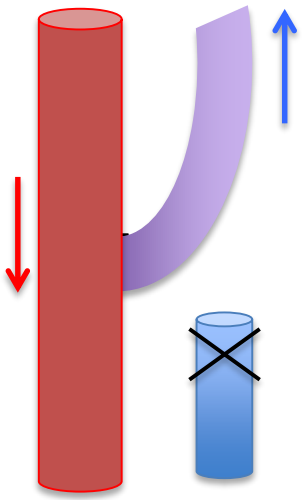
2. Le principe de la FAV

GUILTY

100-150 ml/min



Débit élevé
Basse pression



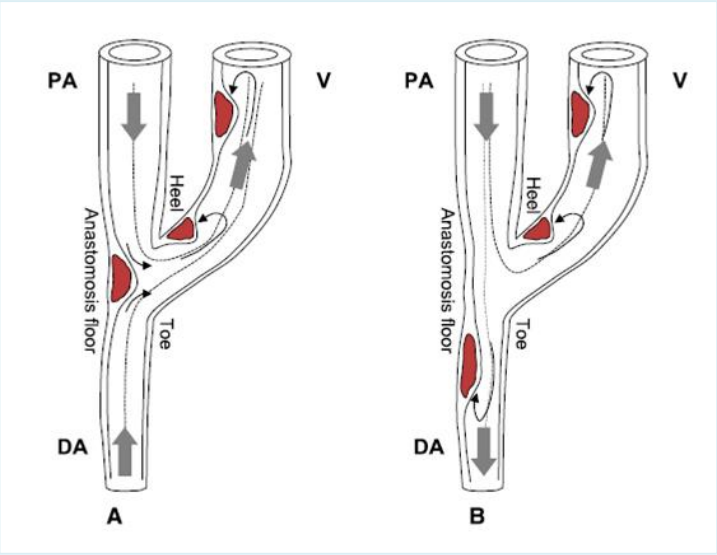
600-1500ml/min

MONTAGE NON PHYSIOLOGIQUE

3. La géométrie de la FAV

GUILTY

Zones propices aux sténoses :



Remuzzi et al. CJASN 2013

Paramètres du flux :

Forces de cisaillement basses
Oscillations importantes
Vitesses maximales basses

↓

Dysfonction endothéliale
Hyperplasie intimale

↓

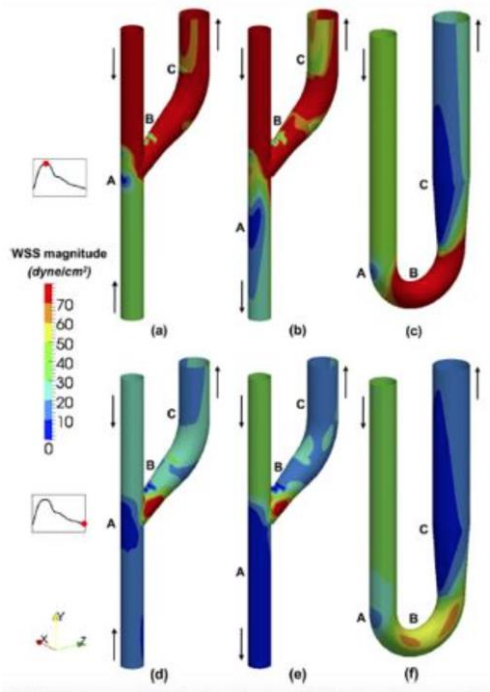
Sténoses

3. La géométrie de la FAV

GUILTY

Type d'anastomose :

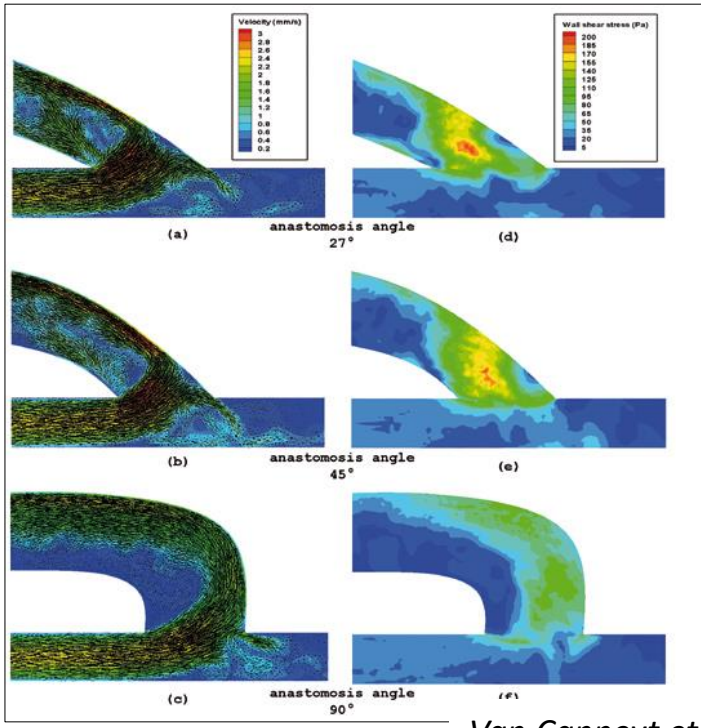
Latéro-terminale
Avec flux rétrograde
Termino-terminale



Ene-Iordache et al. NDT 2012

Angle anastomotique :

Favorable autour de 30°-45°



Van Canneyt et al. JVA 2010

3. La géométrie de la FAV

GUILTY

Torsions, swings :

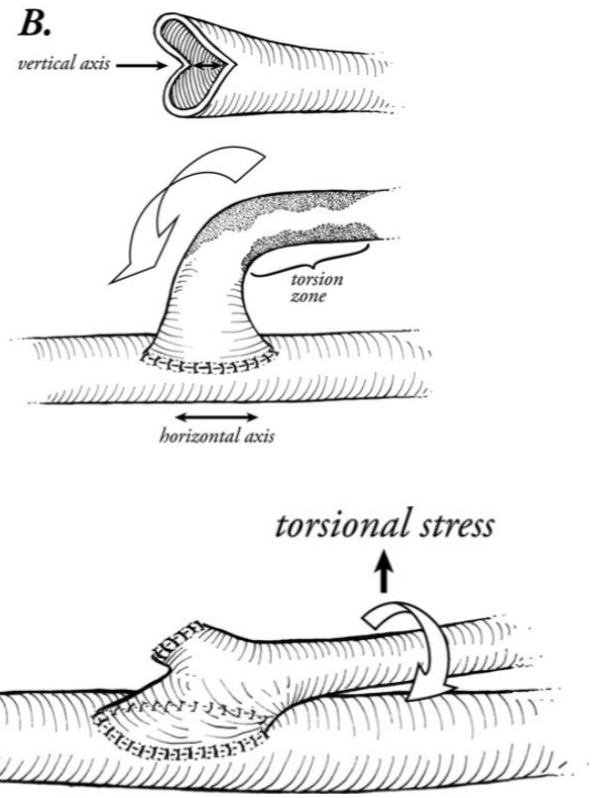
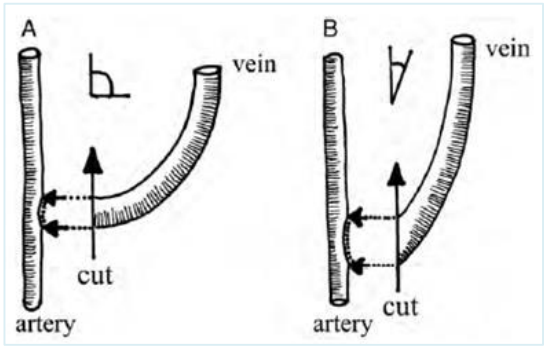


Fig 2. Torsional component with side-to-side "SLOT."

Taille de l'anastomose :



Tous ces facteurs modifient les paramètres du flux au contact de l'intima et donc l'évolution de la paroi.

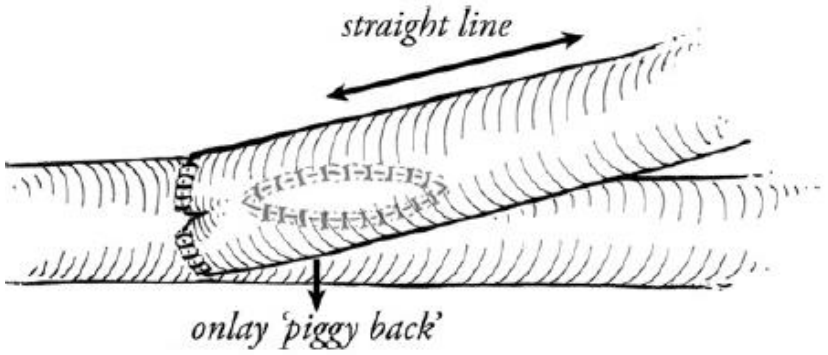
3. La géométrie de la FAV

Peut-on s'améliorer ? **OUI**

A novel technique of vascular anastomosis to prevent juxta-anastomotic stenosis following arteriovenous fistula creation

Ankit Bharat, MD, Mathew Jaenicke, and Surendra Shenoy, MD, PhD, *St. Louis, Mo*

J Vasc Surg 2012;55:274-80.



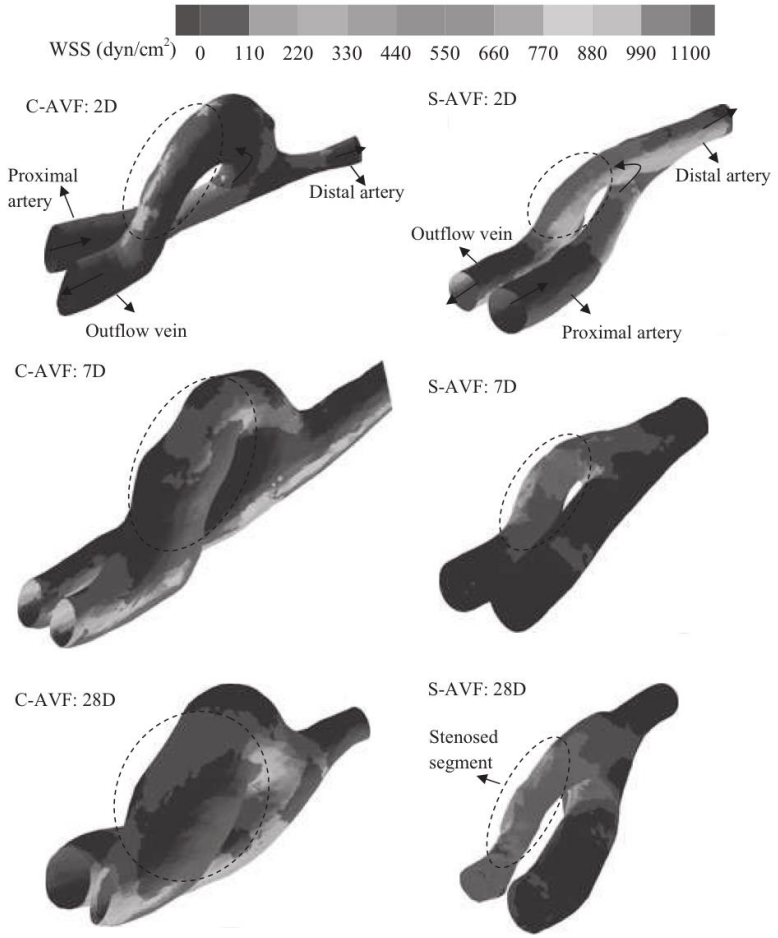
Piggyback (pSLOT)

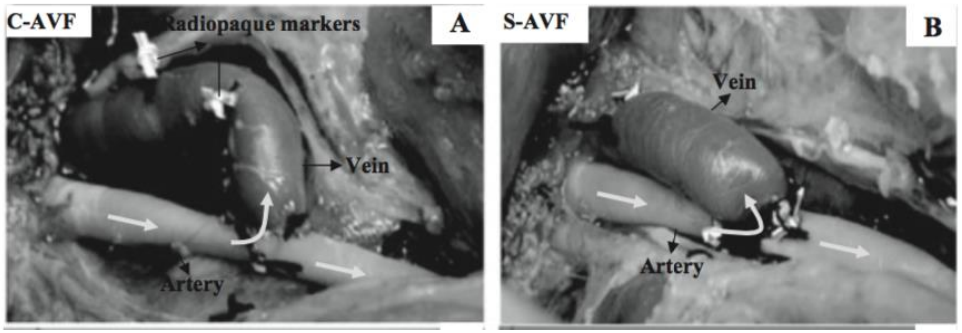
12% de sténose juxta-anastomotique à 1 an

Piggyback (pSLOT) provoquerait un flux "circulaire" dans la veine = moins de turbulence

3. La géométrie de la FAV

Mais… PAS VRAIMENT…



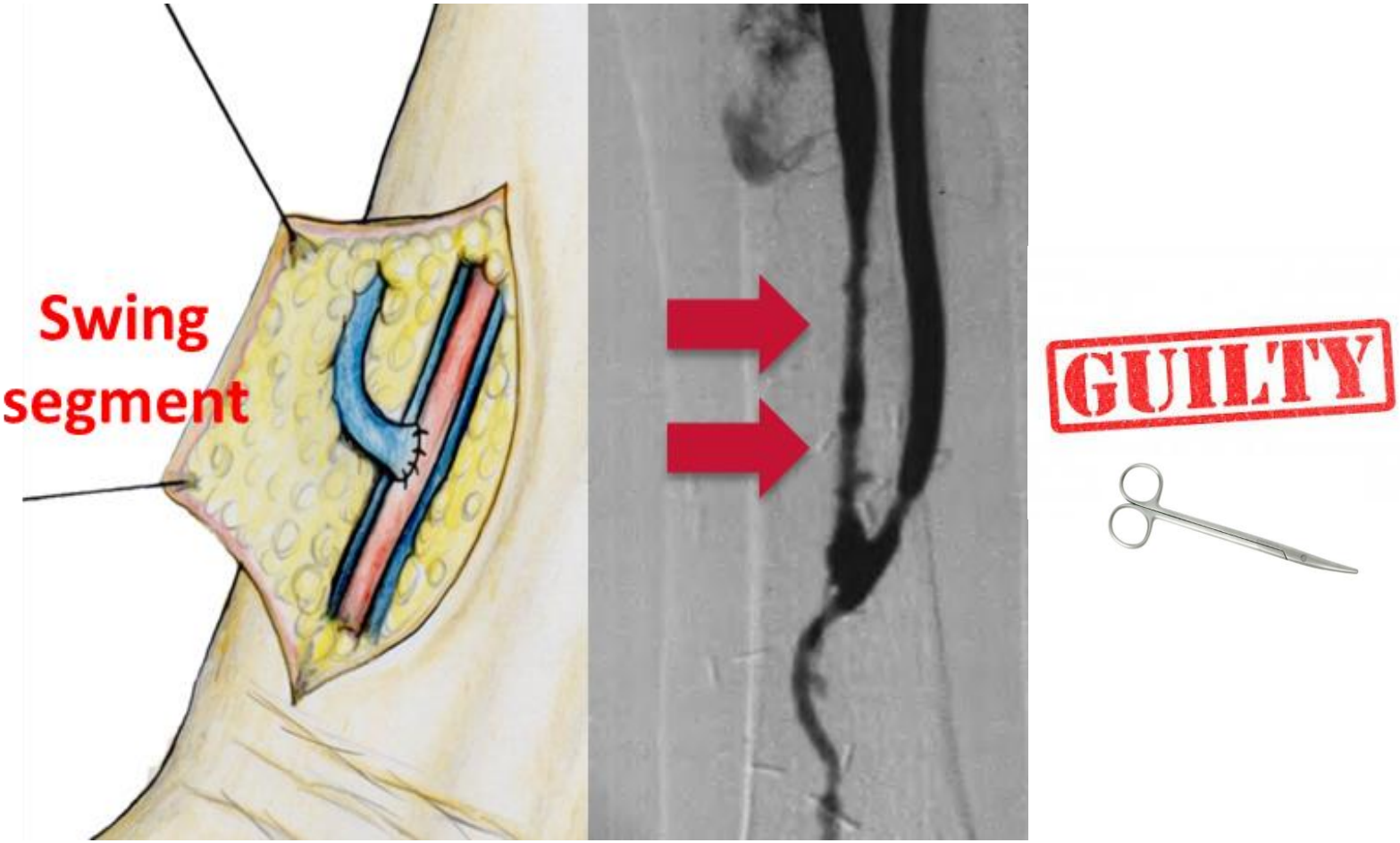


La position de la FAV une fois en charge n'est pas forcément celle souhaitée.

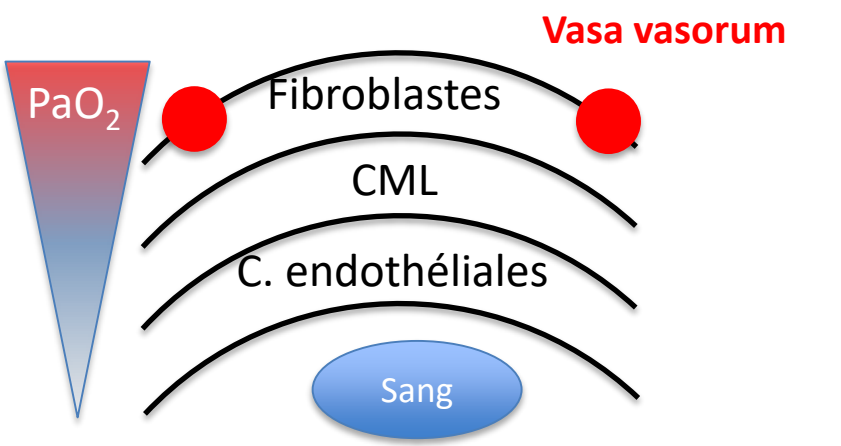
Les vaisseaux évoluent en diamètre et en longueur de manière peu prévisible.

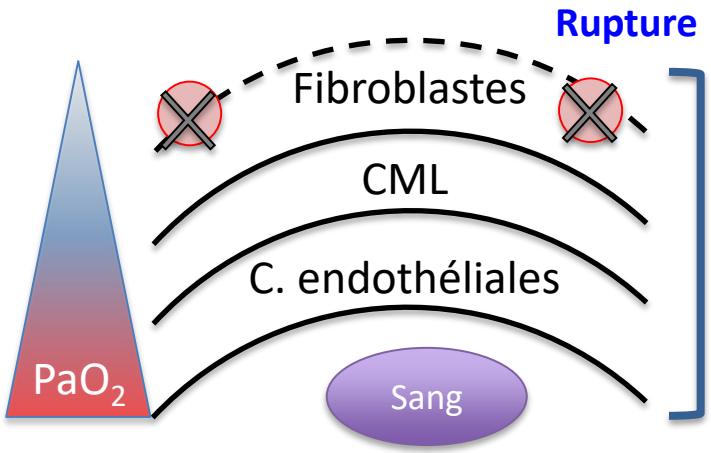
4. L’ischémie-reperfusion pariétale

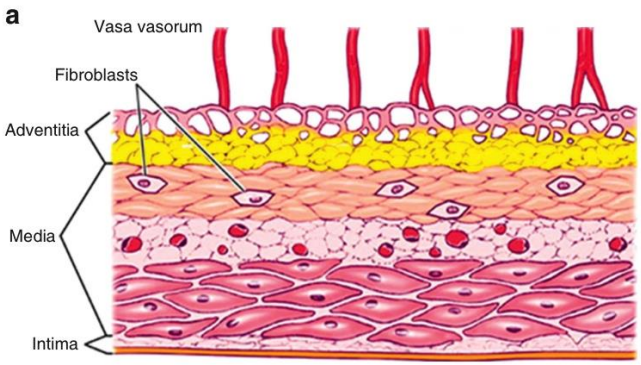
La sténose juxta-anastomotique coïncide avec le segment détourné … et donc DISSÉQUÉ.

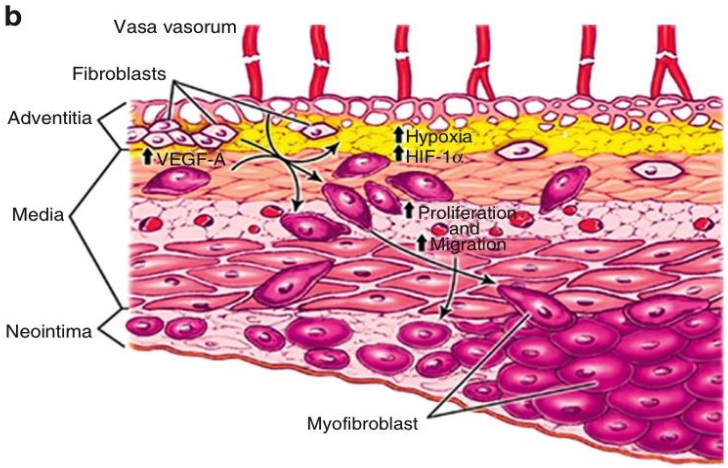


4. L'ischémie-reperfusion pariétale







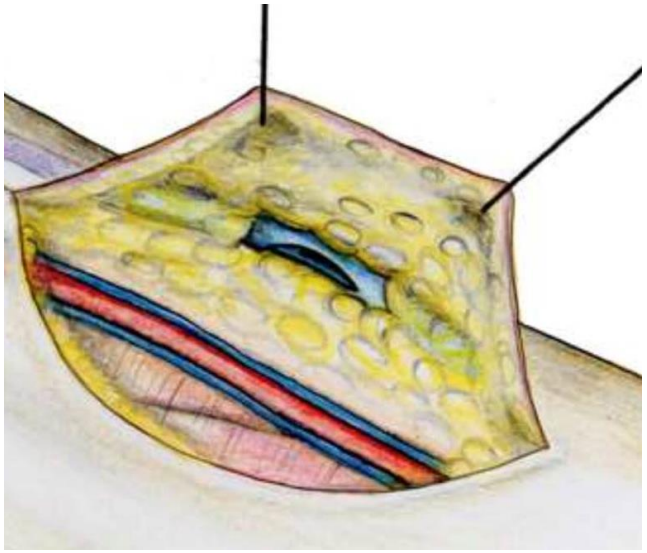


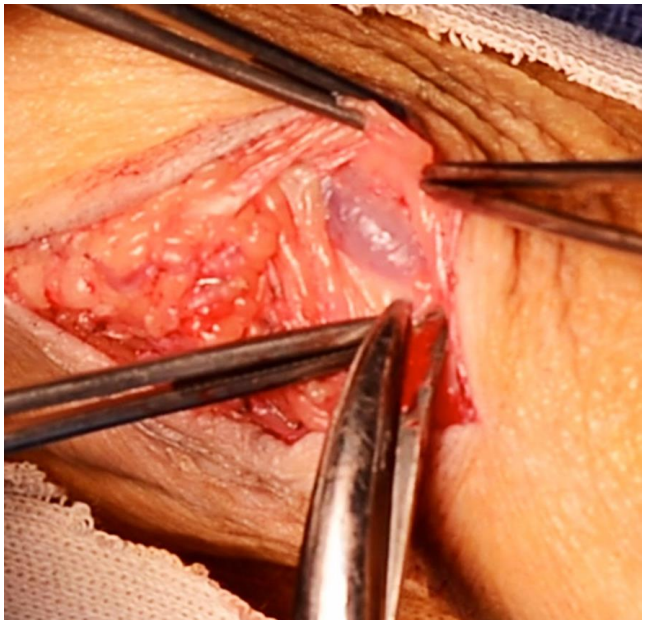
Comment s'améliorer?

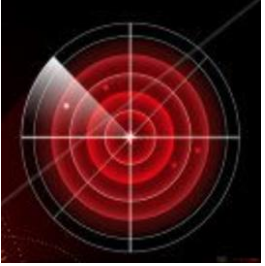
Dissection minimale

BUT : PRESERVER LA VEINE

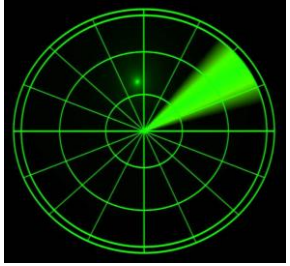
1. **Pas de dissection circonférentielle**
2. Seule la **face antéro-interne** est disséquée
3. Seule **la longueur nécessaire à l'anastomose**
4. **Pas de clamp, pas de lacs** sur la veine (garrot)







RADAR



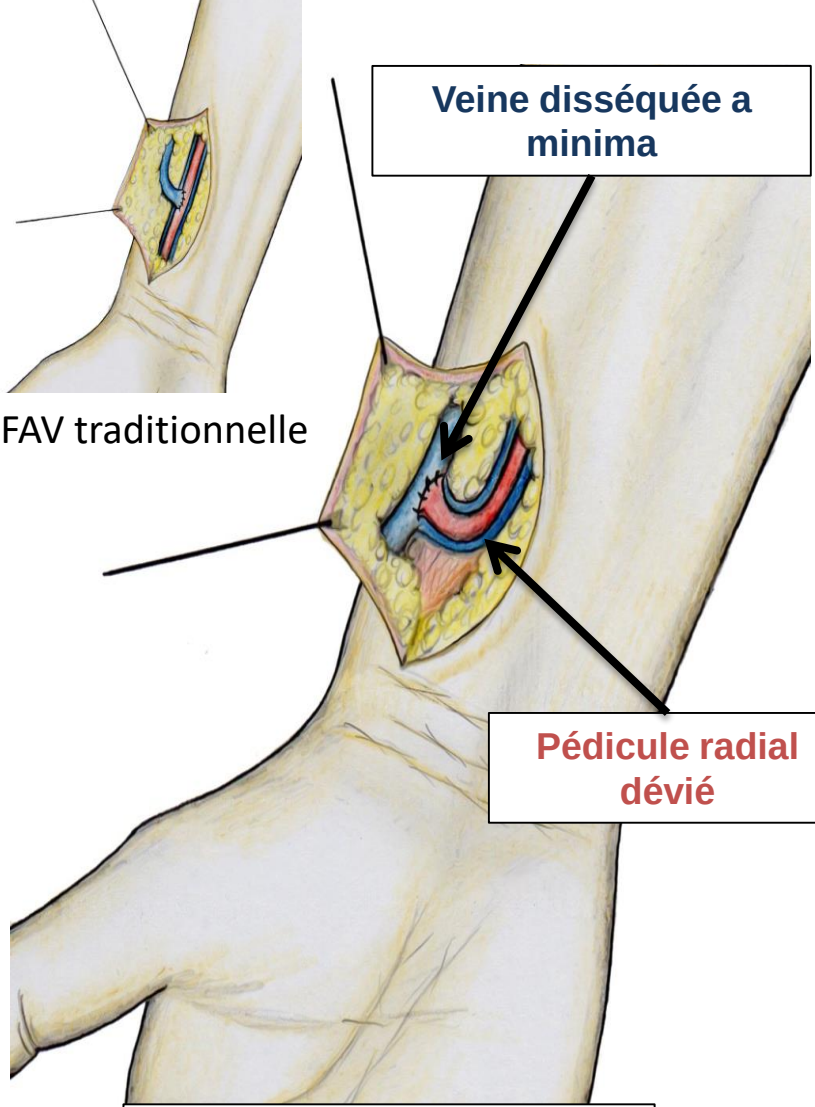
Si la veine ne va pas à l'artère…

… l'artère rejoins la veine.

BUT : éviter les sténoses juxta-anastomotiques

Principes :

1. Disséquer la veine a minima
2. Amener l'artère à la veine en formant une boucle harmonieuse



Chez le malade hémodialysé, tout est propice à l'échec des FAV.

Persévérer dans l'amélioration des techniques:

- **PATIENT** : Choisir les meilleurs vaisseaux
- **GEOMETRIE** : Penser le montage « parfait »
- **DISSECTION** : Disséquer *a minima*