

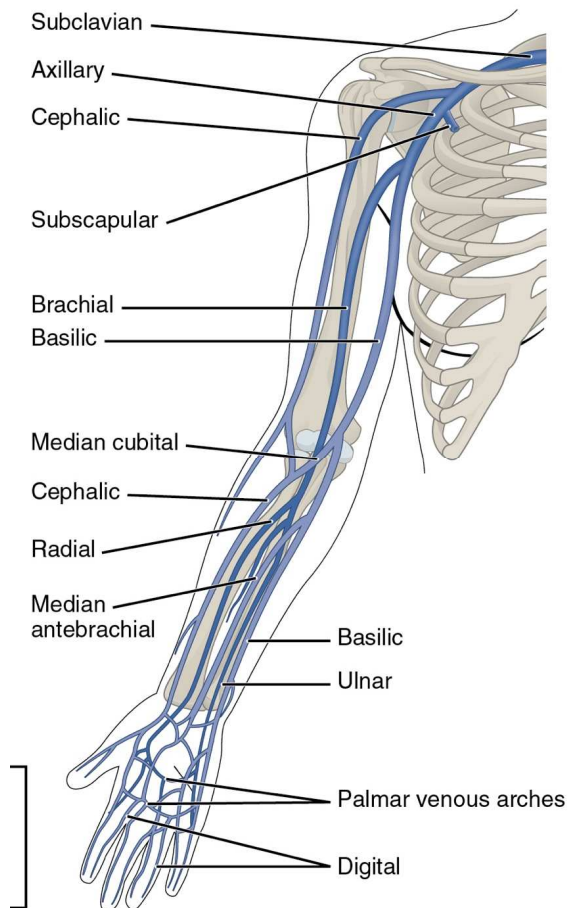
L'ED est indispensable et suffisant pour guider la création d'un AVAV

Olivier Pichot - Grenoble

Objectifs de l'ED pour la création d'un AVAV

- Assurer la création d'un AVAV
 - Efficace
 - Rapidement fonctionnel et idéalement sans geste complémentaire
 - Facilement utilisable
- Minimiser les risques de complication
 - Hyperdébit
 - Ischémie
- Préserver l'avenir en dialyse du patient
- Lui éviter tout geste invasif inutile

Examen ED des veines superficielles



■ Critères d'évaluation:

- **Calibre (minimum)**

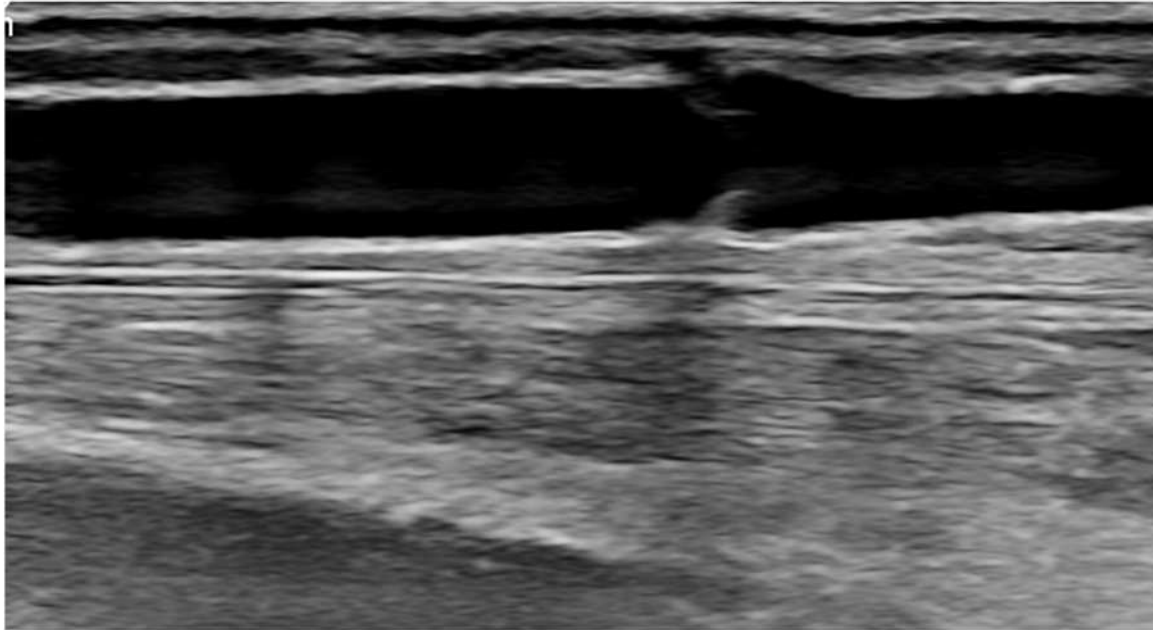
- Agénésie
- Hypoplasie
- Spasme +++

- **Variations anatomiques de trajet**

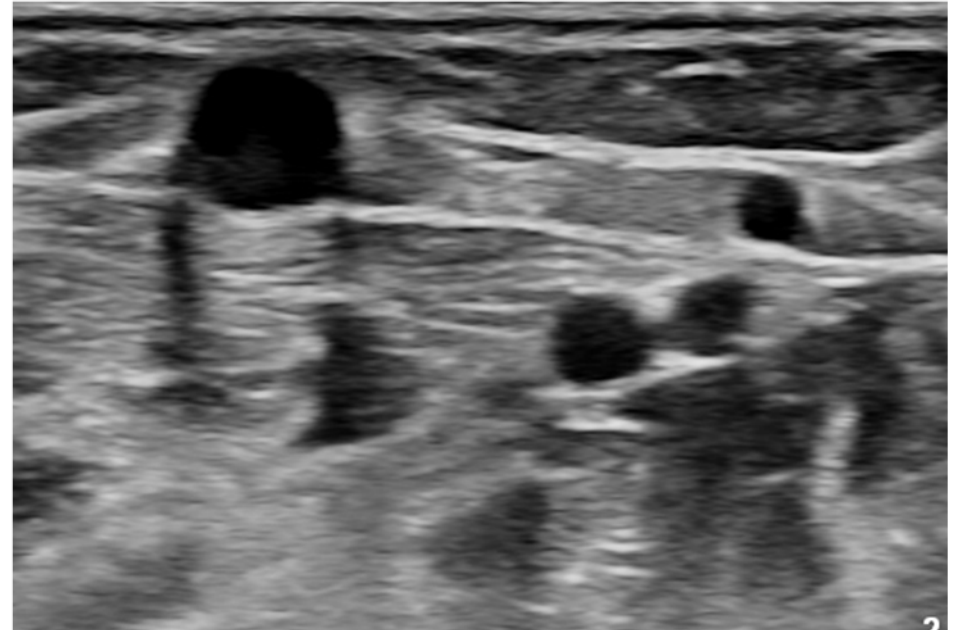
- **Paroi et lumière veineuse**

- Fibrose
- Synéchies
- Thrombose

Sondes échographiques de haute résolution

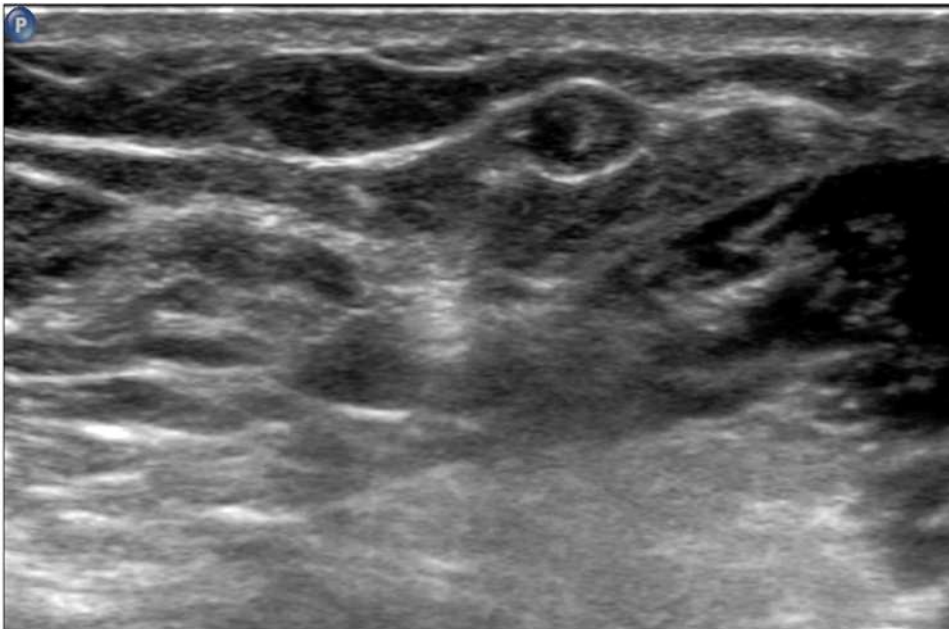


Veine céphalique avant-bras – Coupe longitudinale

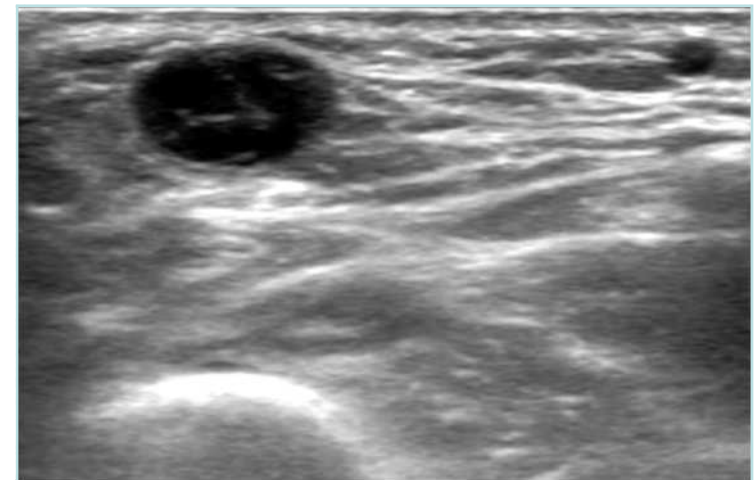
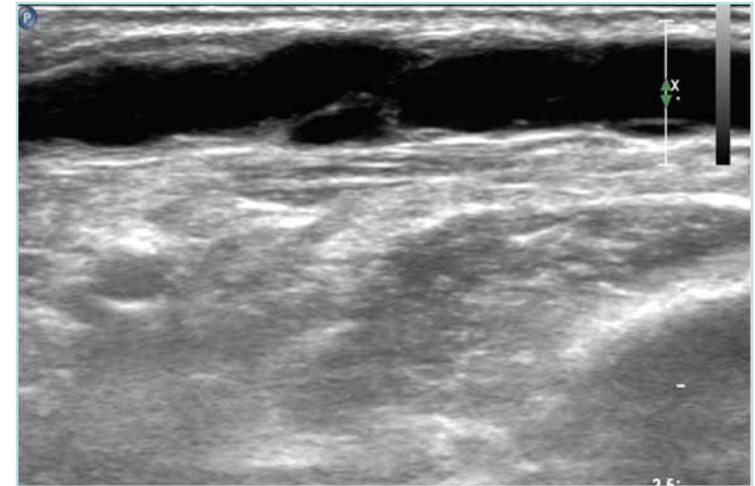


Coupe transversale au poignet

Analyse de la paroi et de la lumière veineuse

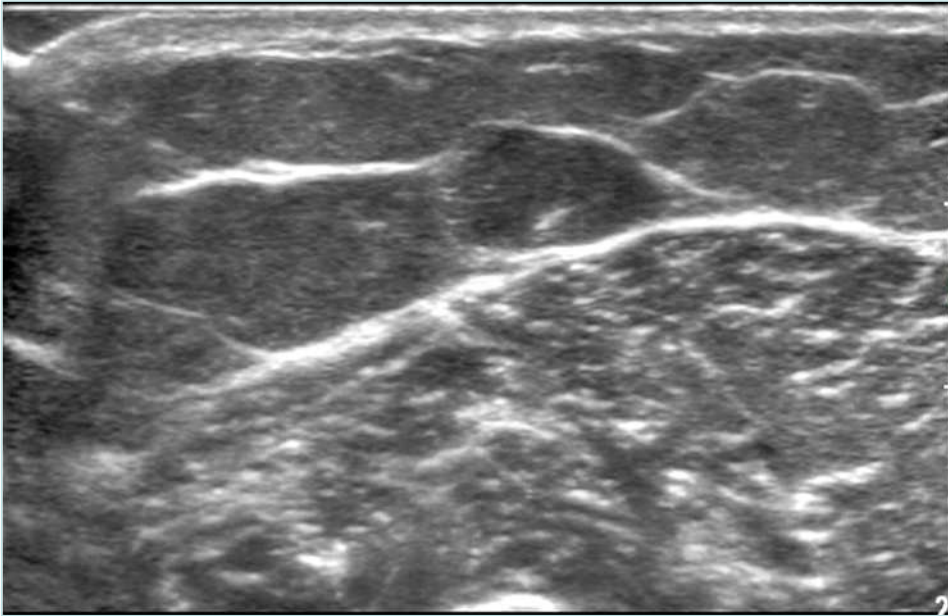


Thrombose partielle & fibrose



Synéchies post thrombotiques

Variations anatomiques



Agénésie v céphalique au bras



Hypoplasie de la racine ventrale de la v céphalique avant-bras (v). Racine dorsale dominante (d).

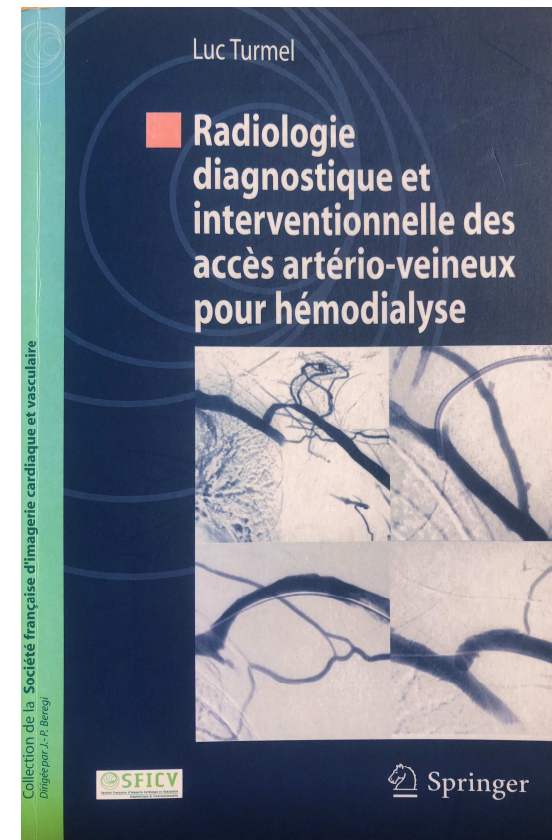
Gestion du spasme veineux

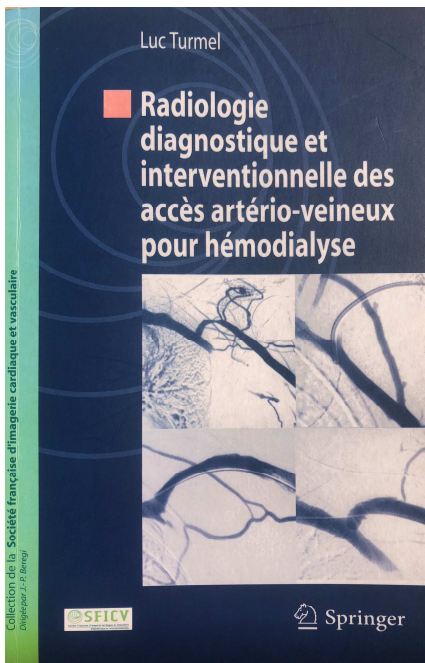
- Patient réchauffé
- En position assise
- Garrot veineux racine du bras
- Manoeuvre de percussion +++



“Oui mais l’examen écho-Doppler est un examen opérateur dépendant”

Et pas la phlébographie?





La phlébographie est un examen faussement facile à réaliser.

...le membre controlatéral ne sera pas forcément exploré, réduisant ainsi l'irradiation.

L'iode donne de bien meilleures images à l'avant-bras et au bras. Chez les patients en pré-dialyse, il est largement préférable d'utiliser le CO₂ en raison de son absence de **toxicité rénale**.

Crème anesthésiante ... **ponction d'une veine du dos de la main**... cathlon 20-22G
4 séries angiographique minimum

Si certains axes veineux ne sont pas opacifiés... **manœuvres de compressions** ...

Phlébographie CO₂masser pour chasser les bulles qui peuvent gêner l'interprétation de la série suivante.
Laisser le temps au CO₂ de se dissoudre pour éviter ... **une pause cardiaque**.
L'injection de CO₂ peut être **douloureuse**...

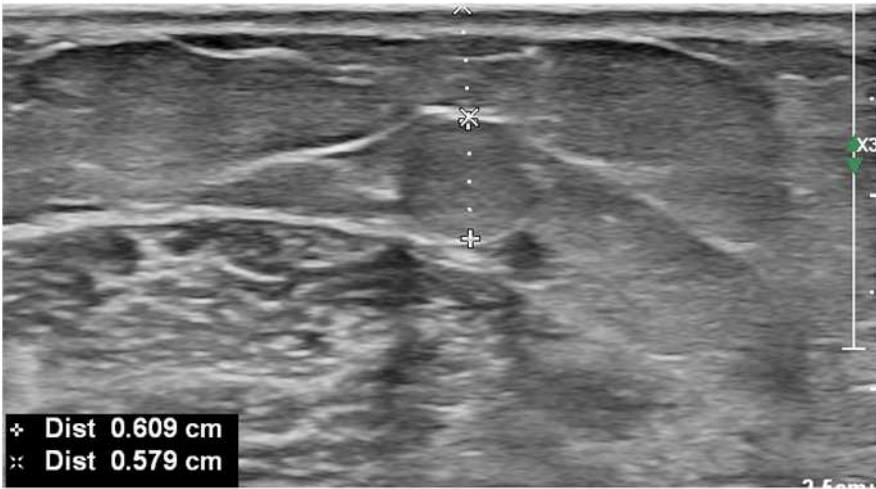
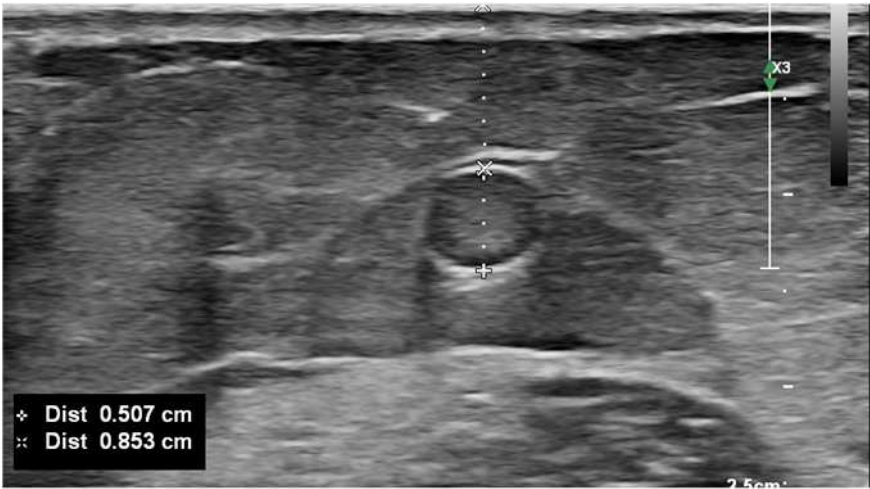
Interprétation des résultats

- On doit se garder de dire qu'une veine à l'avant-bras **non opacifiée** est thrombosée.
- On doit être très prudent sur **l'estimation du diamètre** des veines..
- La veine basilique au coude et au bras peut être **confondue** avec la veine humérale profonde.
- En pratique la plupart des phlébographies sont pathologiques et dans le pire des cas on n'opacifie plus que des veines profondes

De manière globale, la phlébographie est moins fiable que l'échographie pour l'appréciation du réseau veineux périphérique

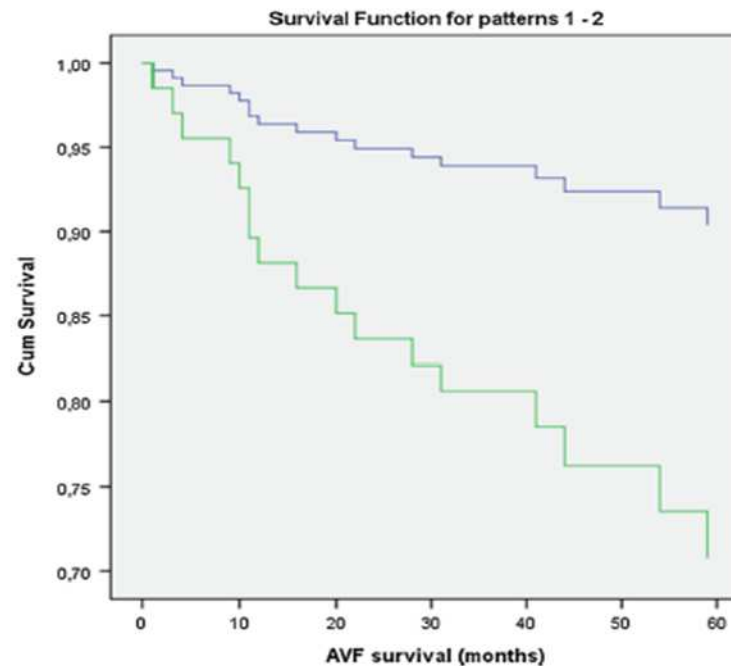


Etude des tissus mous



Qualité de la paroi artérielle

Fig. 2 Effect of calcification in AVF-blood vessels on AVF survival (Cox proportional analysis, censored for death and transplantation)

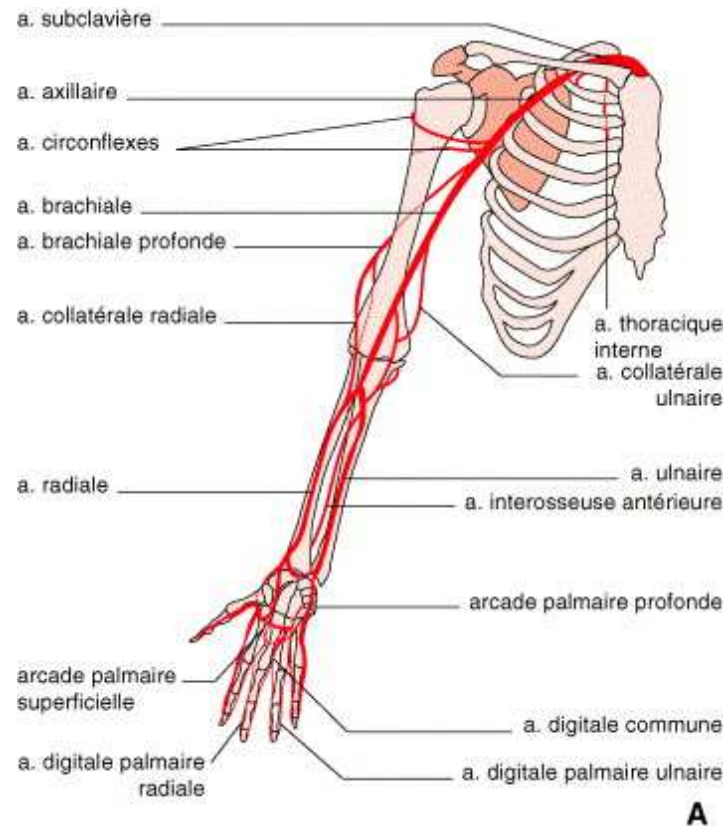


No of patients with functional AVF	Beginning of study	After 5 years follow-up
Group w/o VA calcification	36	32
Group with VA calcification	54	41

Jankovic A et al. Calcification in arteriovenous fistula blood vessels may predict arteriovenous fistula failure: a 5-year follow-up study. Int Urol Nephrol 2017



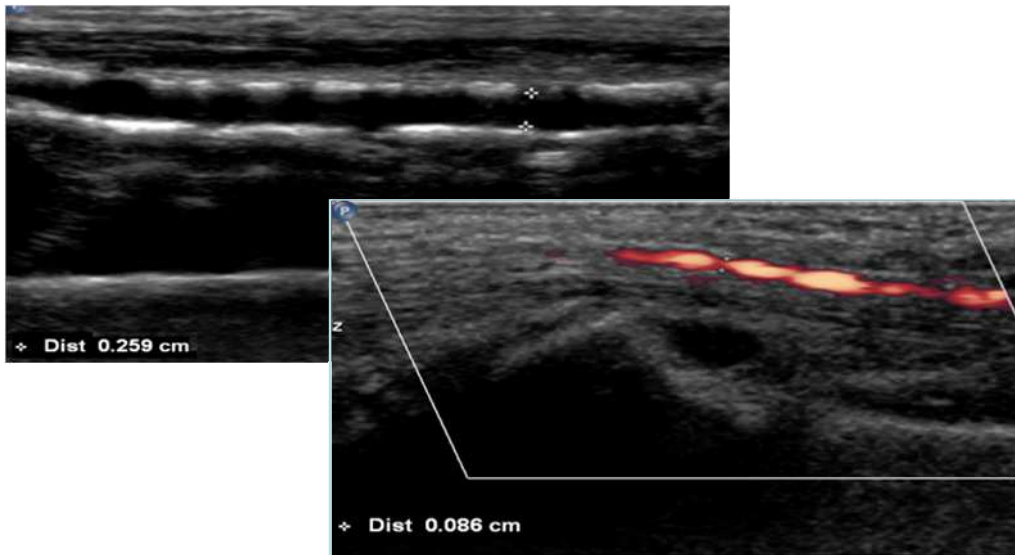
Examen ED de l'arbre artériel



Critères d'évaluation:

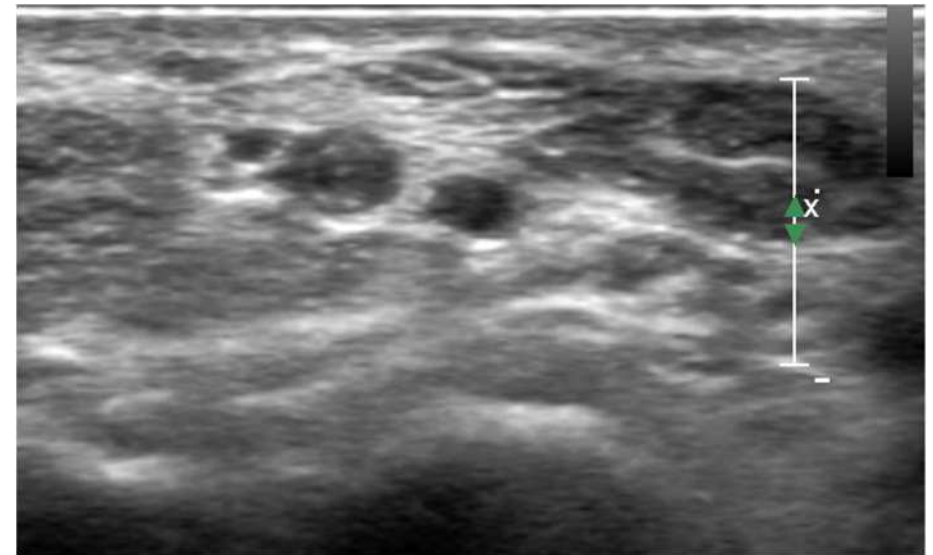
- **Calibre**
- **Variations anatomiques**
- **Perméabilité et qualité du spectre Doppler**
- **Lésions:**
 - Thrombose
 - Sténose
 - Athéromatose
- **Compressibilité**

Bilan ED artériel pré FAV



Lésions athéromateuses des artères radiales : 15.6 %

- *Bilatérales*: 10.0 %
- *Unilatérales*: 5.6 %



Thrombose des artères radiales: 2.3 %

Thrombose des artères ulnaires: 6.4 %

- *Bilatérale*: 3.7 %
- *Unilatérales*: 2.7 %



Evaluation du risque ischémique

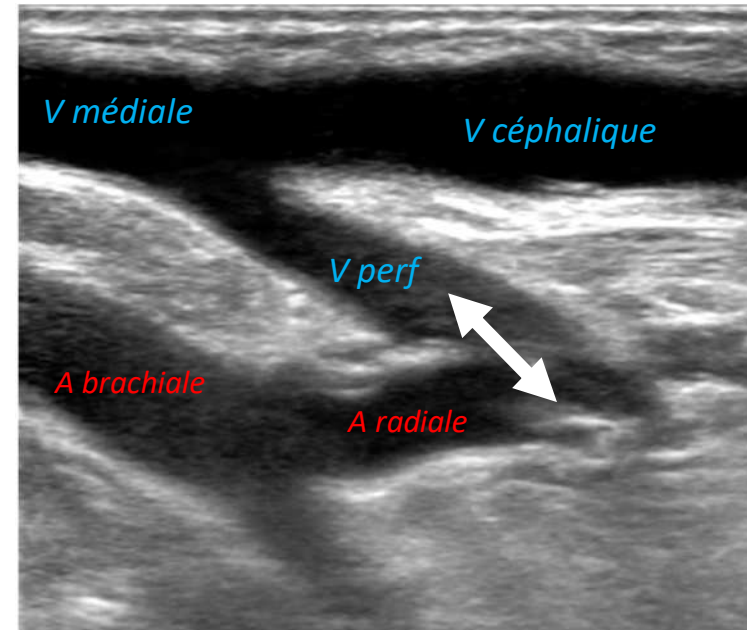
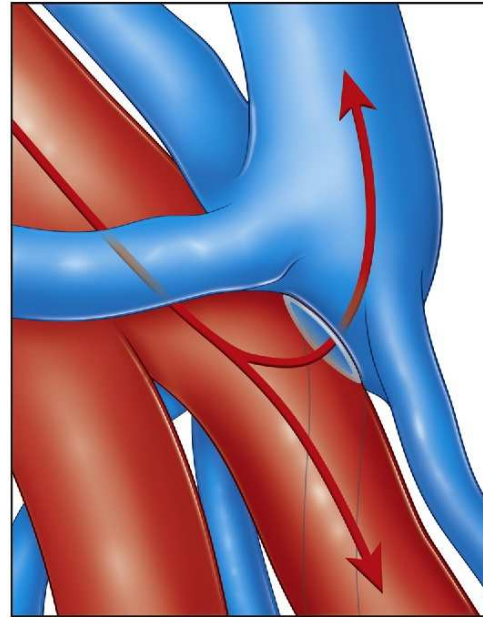
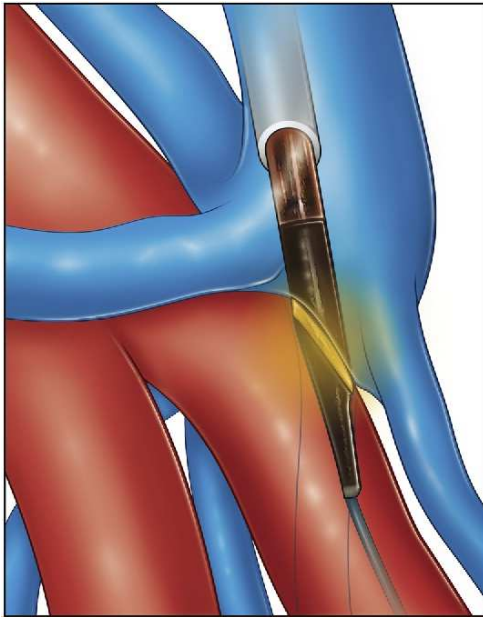


- Spectre doppler pathologique
- Pression digitale < 80 mmHg
- Δ Pression brachio digital > 30 mmHg
- Index digito-brachial < 0,6





Fistules percutanées (*Ellipsys*TM)



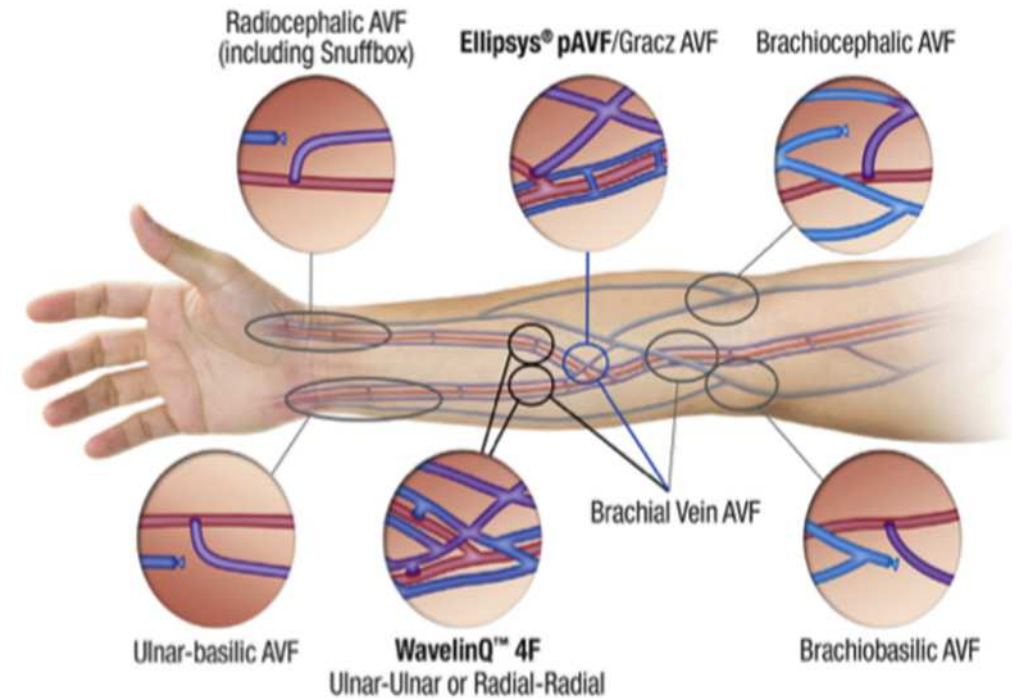
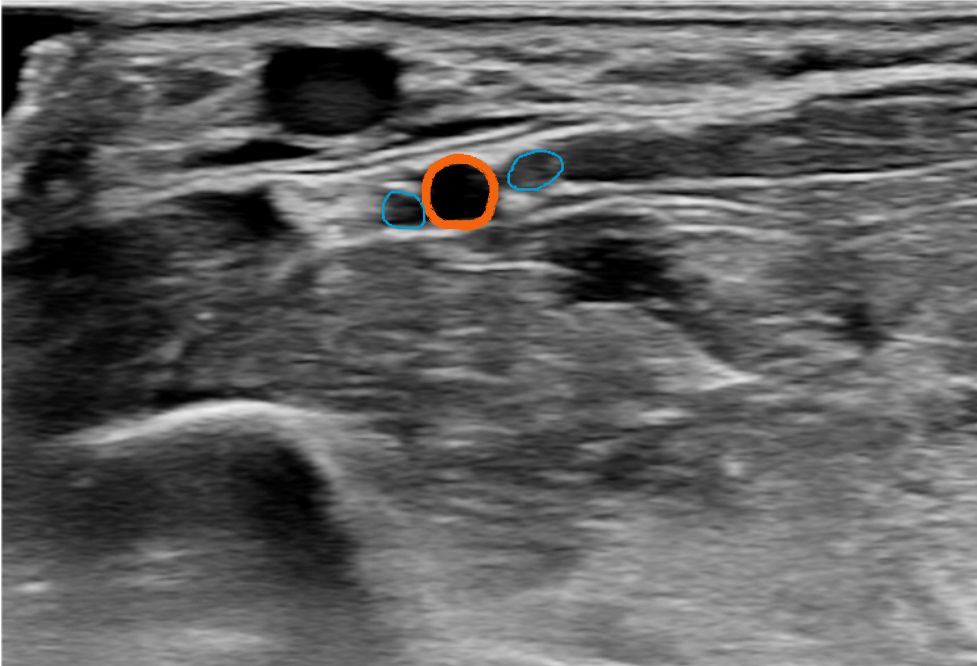
Critères d'éligibilité:

- Au moins une veine médiale céphalique ou basilique
- Perforante du pli du coude
- Artère radiale > 2 mm
- Espace artère - veine < 1.5mm

Franco G et al. Feasibility for arteriovenous fistula creation with Ellipsys[®]. J Vasc Access. 2020



Fistules percutanées (*WaveLinQ™*)



Critères d'éligibilité:

- Artère et veine radiale > 2 mm
- Ou artère et veine ulnaire > 2 mm
- Au moins une veine médiale céphalique ou basilique
- Perforante du pli du coude

Quid des veines centrales ?

■ Examen écho-Doppler systématique

- Antécédents de cathétérisme (CVC, pace maker, picc line, ...)
- Signes cliniques d'un obstacle des veines centrales

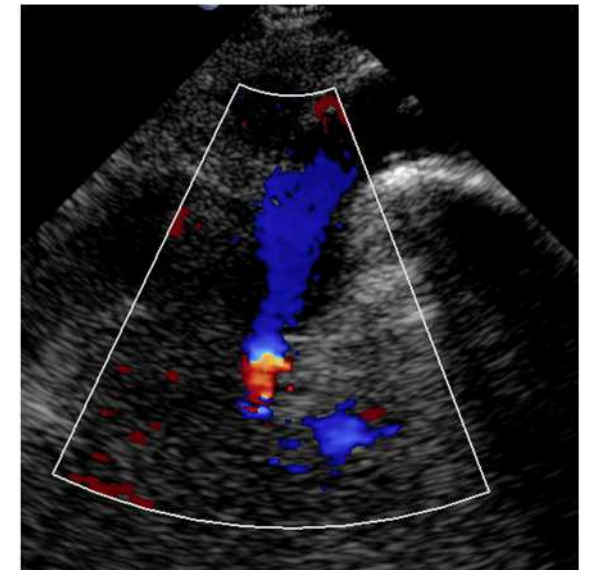
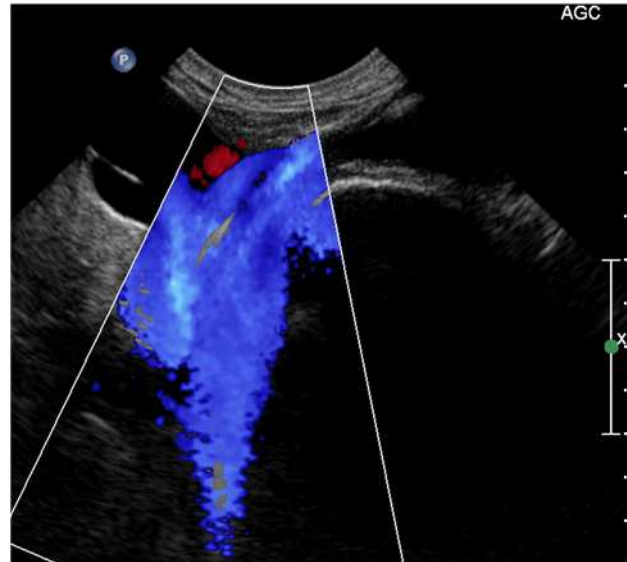
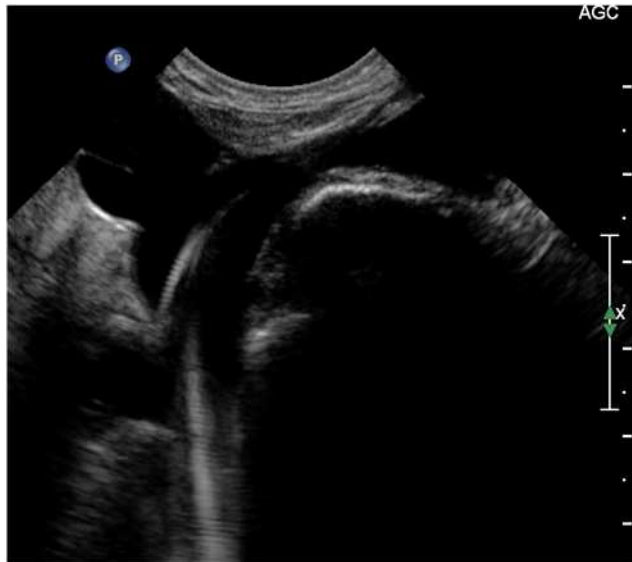


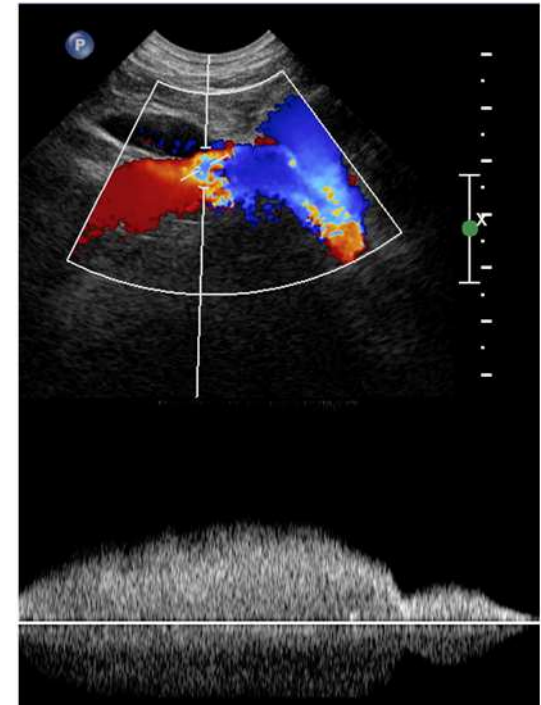
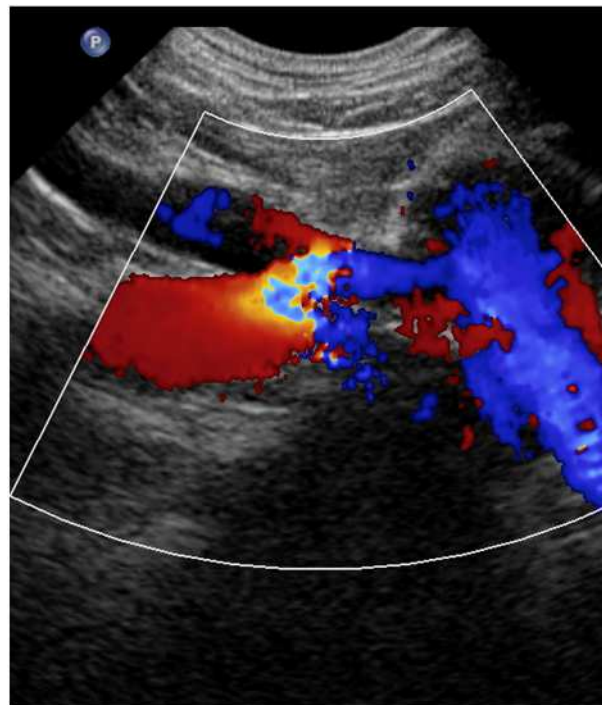
Jugulaires internes, sub-clavières, TVBC droit

- Visualisation directe

- Signes ED

- Des séquelles anatomiques de thrombose (fibrose pariétale, synéchies, etc...)
- Des signes hémodynamiques directs et indirects de sténose ou d'obstruction

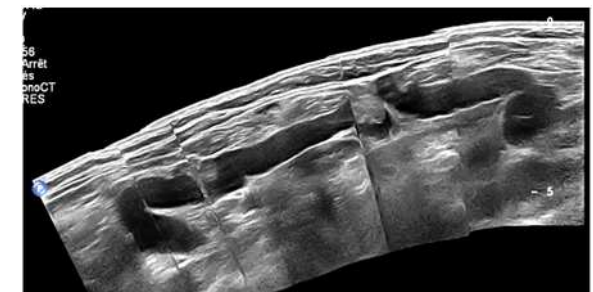
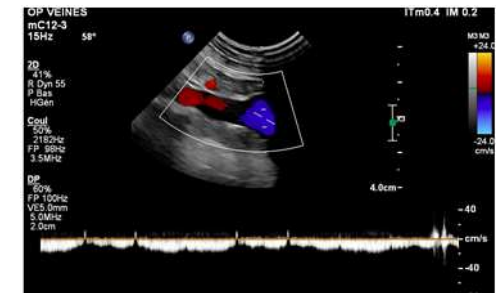
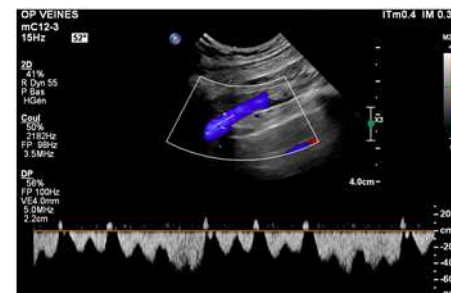
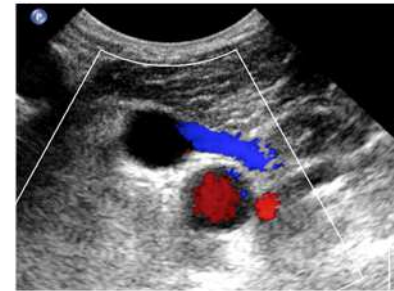




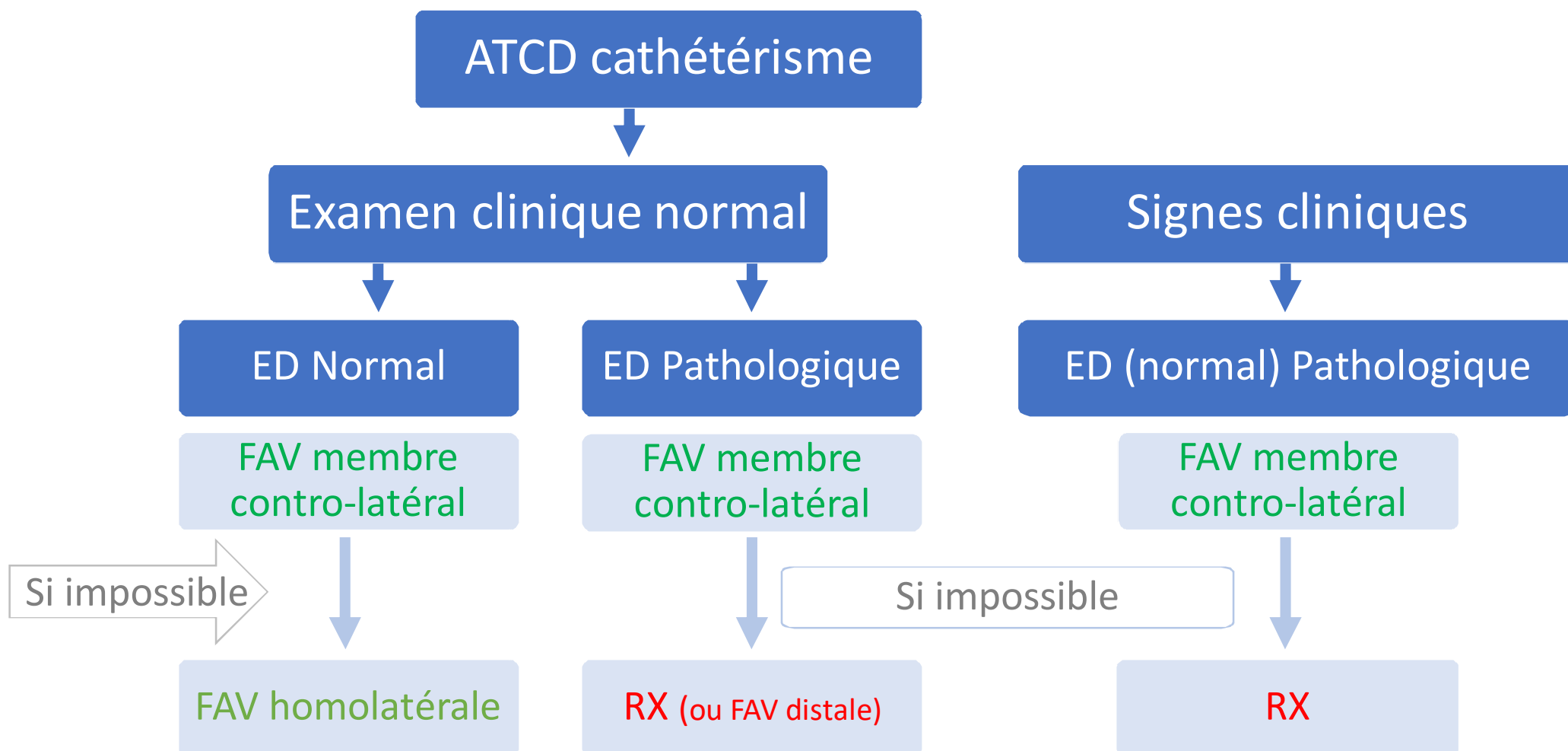
Sténose de la terminaison de la veine sub-clavière ghe

TVBC gauche & VCS

- **Visualisation directe limitée**
- **Signes ED indirects:**
 - **Veine jugulaire interne**
 - Distension
 - Inversion du flux
 - **Veine sub-clavière**
 - Distension
 - Diminution modulation respiratoire
 - **Collatéralité veineuse**



Phlébographie? Angioplastie préventive?



Recommendation 8	Class	Level	Refs
Pre-operative ultrasonography of bilateral upper extremity arteries and veins is recommended in all patients when planning the creation of a vascular access.	I	A	106,107,109

4. PRE-OPERATIVE IMAGING

4.1. Pre-operative assessment

Besides a detailed pre-operative history and physical examination, non-invasive ultrasound imaging plays an important role in VA selection. Pre-operative duplex ultrasound (DUS) enhances the success of creation and the outcome of autogenous AVFs.¹⁰⁶ In a randomised trial, a primary failure rate of 25% without pre-operative DUS was observed in comparison with a failure rate of 6% with DUS.¹⁰⁷ Ultrasound venous mapping allows a precise evaluation of the depth of vascular structures¹⁰⁸ and detects VA sites that may be missed by clinical examination alone. Similar results were shown in a meta-analysis.¹⁰⁹

DUS assessment can measure arterial diameters and flow as well as reveal stenotic segments especially where physical tests (poor radial pulse, unsuitable forearm veins) suggest impaired arterial inflow.¹¹⁰

In addition, DUS identifies patients with inadequate vessels in specific VA locations. In a study of 211 consecutive patients DUS found that 50% of them had inadequate arterial inflow for distal RCAVF creation.¹¹¹

DUS provides helpful information before AVF construction such as internal vessel diameters and internal venous lesions.¹¹² Currently, a minimum pre-operative

implantation.⁴⁸ Furthermore DUS provides important information for the planning of potential future AVF superficialisation.

Digital subtraction angiography (DSA) is helpful in only a small group of selected patients with significant peripheral vascular disease and suspected proximal arterial stenosis. The pre-operative endovascular approach allows identification and treatment in one procedure. However, the risk of potential contrast induced nephropathy must be carefully considered if iodinated contrast is used.¹¹³

CE-MRA enables accurate pre-operative detection of upper extremity arterial and venous stenosis and occlusions.^{114,115} However, contrast enhanced magnetic resonance angiography (CE-MRA) is not recommended, since use of gadolinium is associated with the potential risk of a nephrogenic systemic fibrosis, especially in patients with severely impaired renal function.^{116,117} Promising preliminary results for the pre-operative visualisation of arterial and venous vascular structures with non-contrast enhanced MRA (NCE-MRA) are available.¹¹⁸

In patients with a history of previous CVCs additional pre-operative imaging of the central veins should be performed, e.g. venography or intravascular ultrasound.^{48,119}

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Je persiste et signe:

*Oui, l'ED est indispensable et suffisant
pour guider la création d'un AVAV,
...et ce pour le seul bénéfice des
patients!*

Merci encore à vous tous de partager ce point de vue



Cartographie des membres supérieurs

- **Les diamètres**
 - Artères distales
 - Veines superficielles
- **Les trajets veineux**
- **Les variations anatomiques artérielles**
- **Les éventuelles pathologies observées**
 - Artérielles
 - Veineuses

