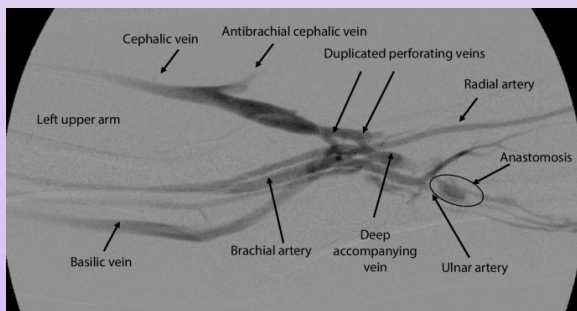


Purpose

Recent technological advancements have allowed for two endovascular approaches to arteriovenous fistula (endoAVF) creation as an alternative to surgical AVF creation for patients with end-stage renal disease and suitable vascular anatomy. While both systems utilize concomitant ulnar or radial arteries and veins, one device uses ultrasound guidance (uAVF) while the other uses ultrasound and fluoroscopic guidance (fAVF). In this study, we aim to compare the technical feasibility and procedural outcomes of endoAVF creation using uAVF or fAVF.

EndoAVF Creation Considerations

- Presence of deep communicating/perforating vein (diameter >2 mm)
- Artery diameter >2 mm (radial (Ellipsys); radial, ulnar or brachial (WavelinQ))
- Distance between vein and artery <1.5 mm (Ellipsys) or <1 mm (WavelinQ)
- Absence of stenosis or thrombosis in feeding artery or draining vein
- Evaluation of vessel flow and patency and, if appropriate, vessel mapping to determine access site is done via pre-procedural ultrasound for all endoAVF procedures.



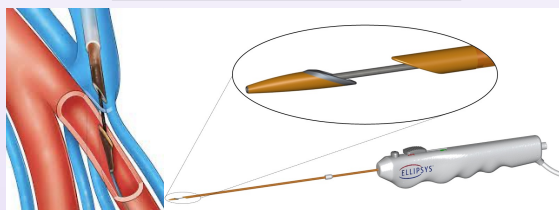
Adapted from: Steinke et al. (2019)

Figure 1. Anastomosis following successful endoAVF creation.

EndoAVFs are created in the cubital fossa area, between the ulnar, radial, or brachial artery/vein (depending on device).

Current EndoAVF Creation Devices

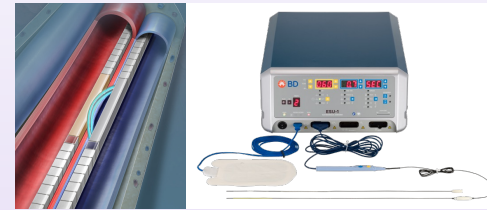
Ellipsys: Ultrasound Guided AVF



Adapted from: avenumedical.com/ellipsys/

- 1 catheter in target vein
- Entire procedure performed with duplex ultrasonographic guidance
- Emits thermal energy to form the fistula
- Success can be checked with ultrasound or angiography

WavelinQ: Fluoroscopy Guided AVF



Adapted from: wavelinq.bd.com

- 2 catheters (1 in target artery; 1 in target vein)
- Uses fluoroscopic guidance with contrast imaging to position catheters
- Align catheters via embedded magnets
- Emits radiofrequency current to form the fistula

Key Points

- There is limited existing data for endoAVF creation using ultrasound-guidance or fluoroscopy-guidance, although **both techniques appear comparable in technical success and complication rates.**
- fAVF requires **significantly less procedure time**, however, this may be outweighed by the benefit of **less radiation exposure and contrast use** when performing uAVF.
- Future studies are needed to better evaluate the **long-term clinical outcomes of uAVF and fAVF creation.**

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Results

	Ellipsys (uAVF)	WavelinQ (fAVF)
Study Characteristics		
Number of Studies (n=10)	4 (40%)	6 (60%)
Number of Patients (n=740)	220 (29.7%)	520 (70.3%)
Procedure Details		
Technical Success Rate	98.45±1.82%	97.02±2.18%
Successful EndoAVF Creation*	71.40±20.58%	70.72±24.98%
Procedure Time	91.5±40.3 min	17.25±9.54min
Most Common Complications		
Occlusions and Stenosis	17.27%	5.64%
Pseudoaneurysms	2.72%	1.97%

*Successful endoAVF creation defined as usability of endoAVF for hemodialysis. Failure of uAVF or fAVF patency most commonly led to re-intervention or resorting to surgical approach instead.