

2022 MID-ATLANTIC CONFERENCE  
10th ANNUAL CURRENT CONCEPTS IN  
**VASCULAR THERAPIES**

2022



Hilton Virginia Beach Oceanfront  
Virginia Beach, Virginia

**APRIL 28-30**



Sentara Vascular Specialists

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## Percutaneous AV Fistula

*Sid Bhende MD*

*Sentara Vascular  
Specialists*

*April 30<sup>th</sup> 2022*

# Disclosures



# Outline

- What is a surgical AV fistula?
- What is a percutaneous AV fistula?
  - Ellipsys
  - WavelinQ
- What role does percutaneous AV fistula have?
  - Data



# What is a Surgical AV Fistula?

- Direct connection made between an artery and a vein to create a dialysis access
  - Performed in the operating room
  - Anesthesia required
    - General vs Regional vs Local + sedation (MAC)
  - Different locations in arm
  - Outpatient surgery



# Options for a Surgical AV Fistula?

- Wrist
  - Radiocephalic “Brescia-Cimino”
- Antecubital Fossa
  - Brachiocephalic “Kaufman”
- Medial Upper Arm
  - Brachiobasilic “BVT”



### Radiocephalic

Cephalic vein  
Radial artery  
AVF anastomosis

### Brachiocephalic

Brachial  
Median cubital branch of cephalic vein  
Radial artery  
AVF anastomosis

### Brachiobasilic

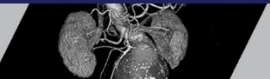
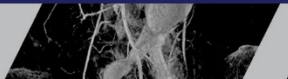
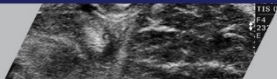
Basilic vein  
Brachial artery  
AVF anastomosis

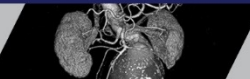
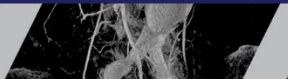
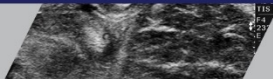












# Outline

- ~~What is a surgical AV fistula?~~
- What is a percutaneous AV fistula?
  - Ellipsys
  - WavelinQ
- What role does percutaneous AV fistula have?
  - Data



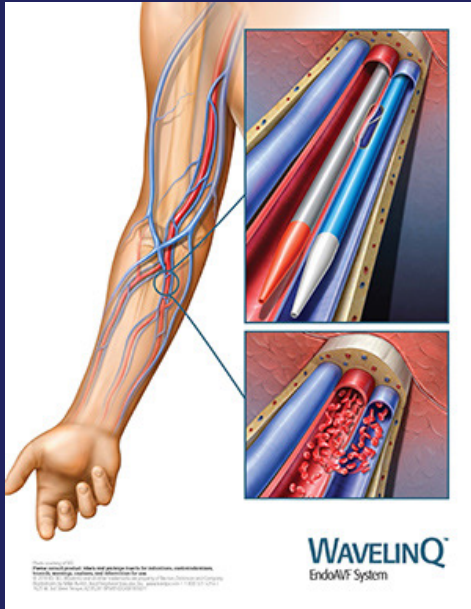
# What is a percutaneous AV Fistula?

- Direct connection made between an artery and a vein to create a dialysis access WITHOUT AN INCISION
  - No need for operating room or anesthesia
    - Angio suite
    - Moderate sedation
  - Limited to Forearm only
  - Outpatient procedure

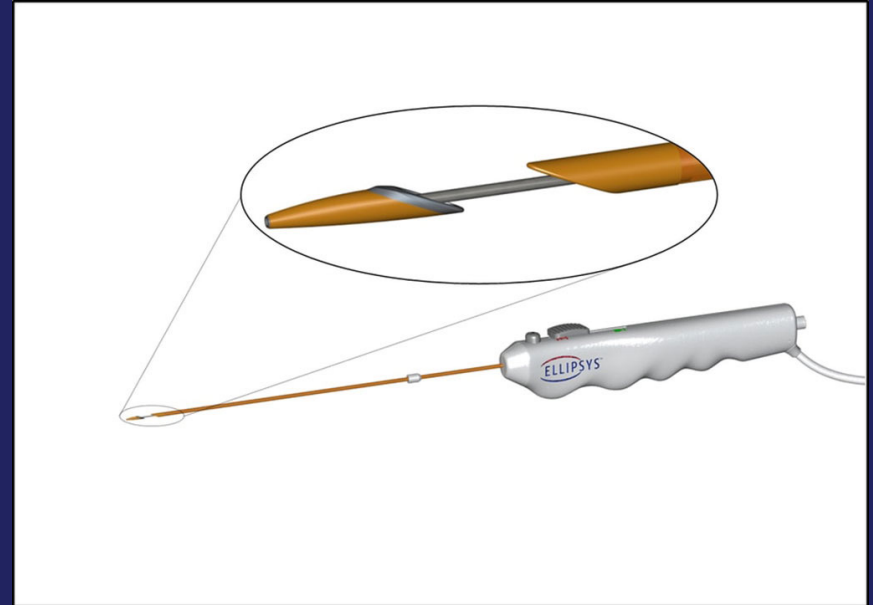


# Percutaneous AV Fistula

## BD WavelinQ



## Medtronic Ellipsys



# WavelinQ

- 4 French device
- 2-3 access sites
- Ultrasound guided artery and vein access
- Administer IV heparin
- Perform arm venogram and arteriogram (limit contrast)
- Place a catheter in artery and vein
- Confirm that catheters line up magnetically



# WavelinQ

- RF energy delivered to create the anastomosis
- Perform a arteriogram to check anastomosis and venous outflow veins (cephalic, basilic and brachial)
- Coil embolization of brachial vein to direct blood flow into superficial veins (cephalic/basilic)

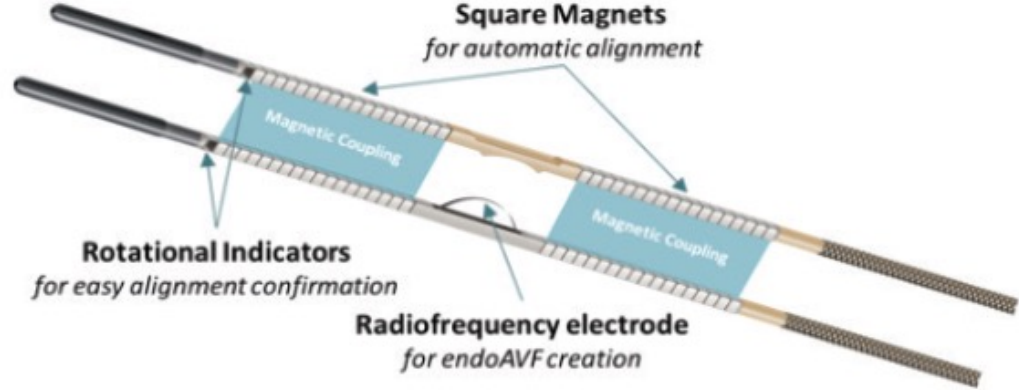




# WavelinQ Device

## WAVELINQ™ 4F EndoAVF System

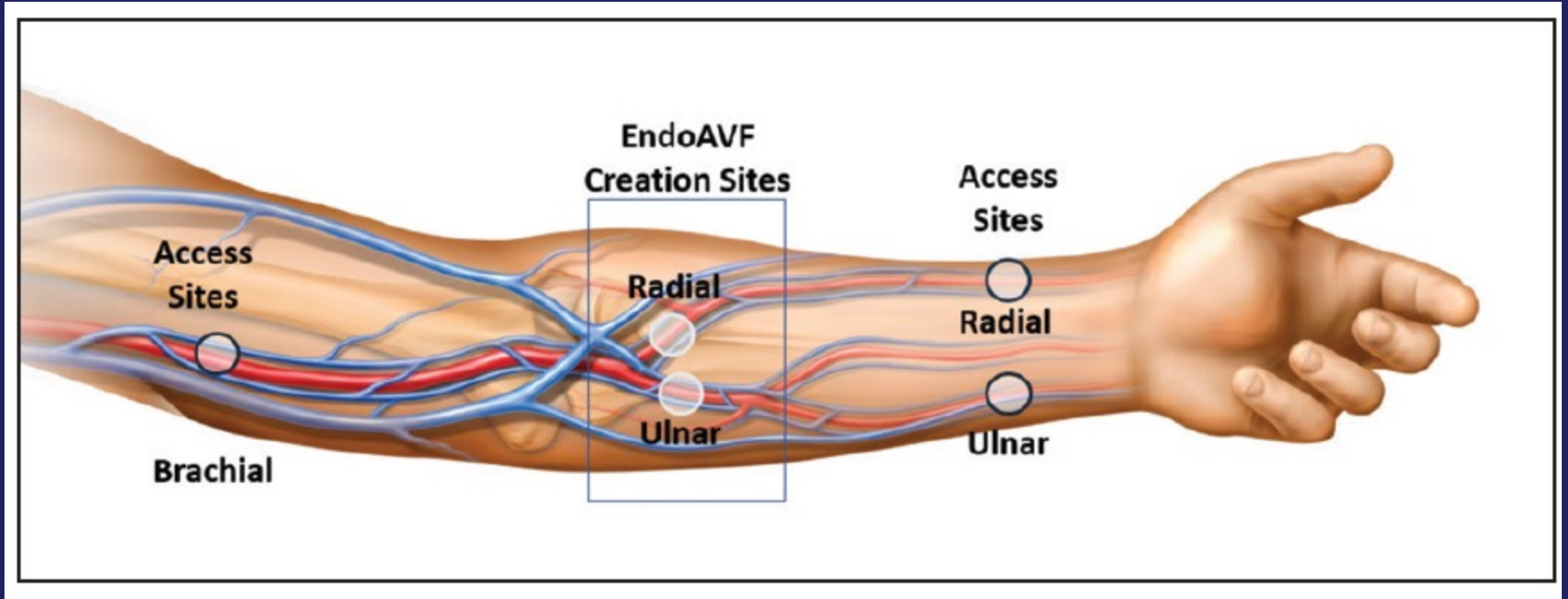
**4 Fr Rapid Exchange Catheters**  
*for vessel access and navigation*

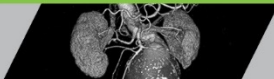
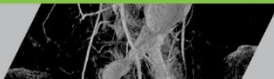
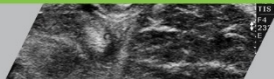
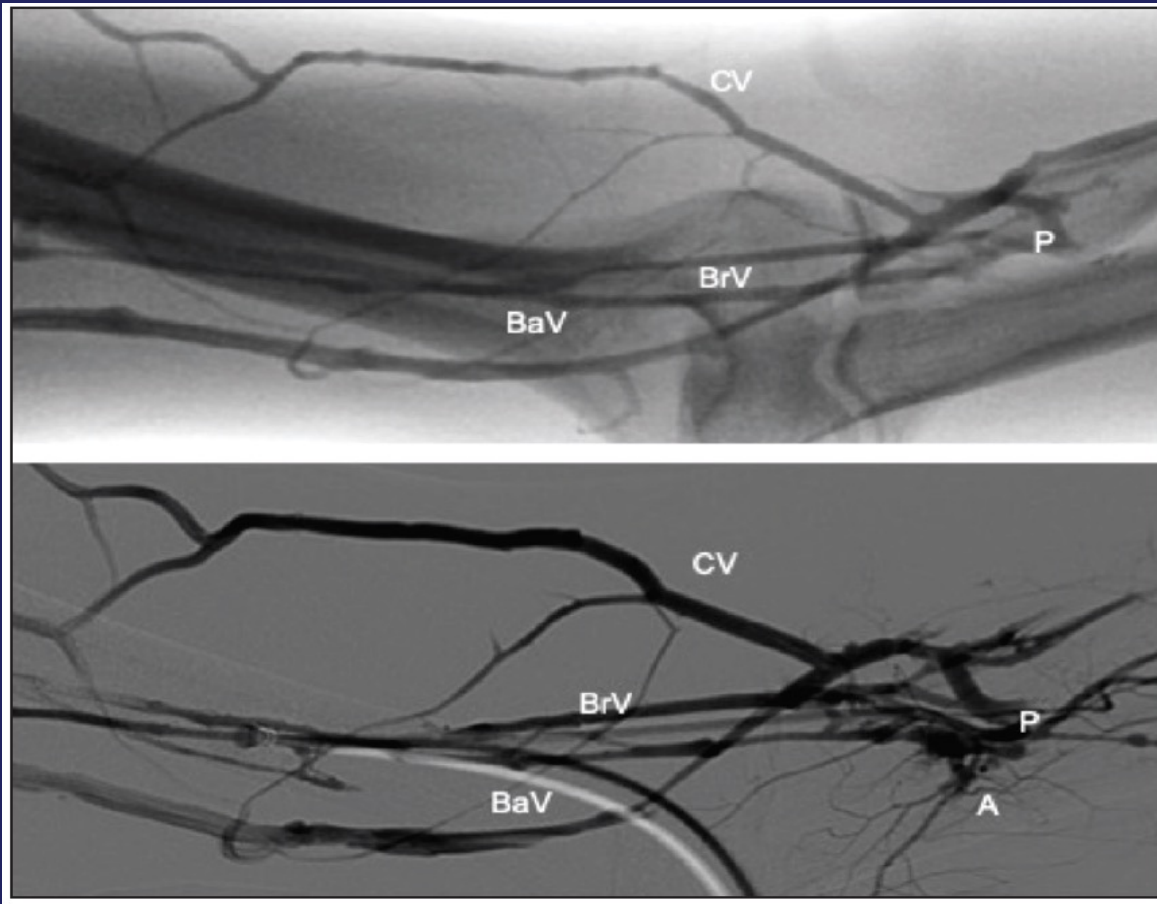


**RF Generator**

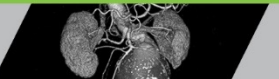
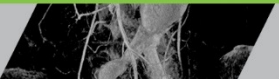
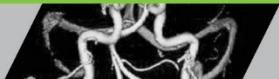
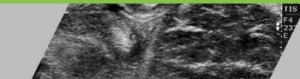
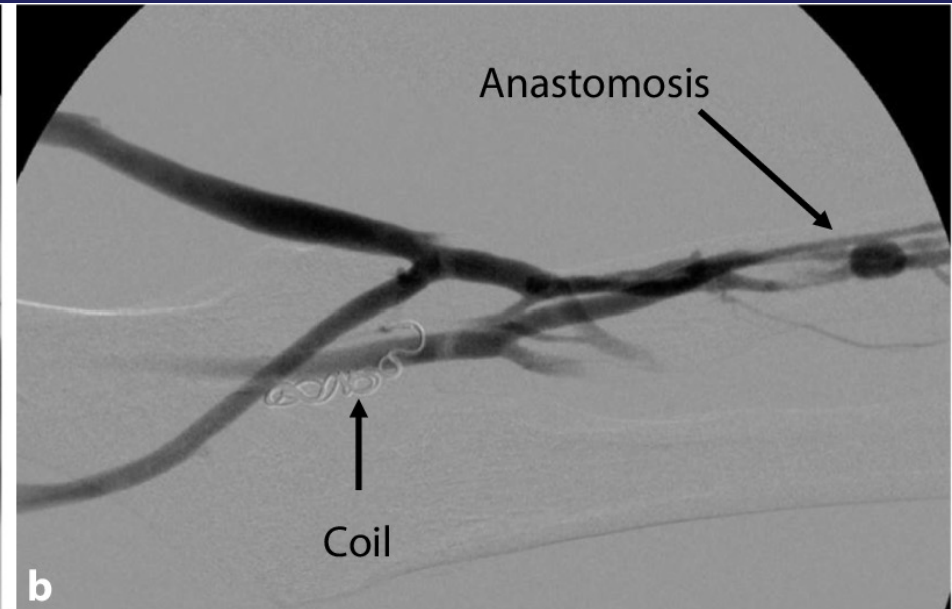
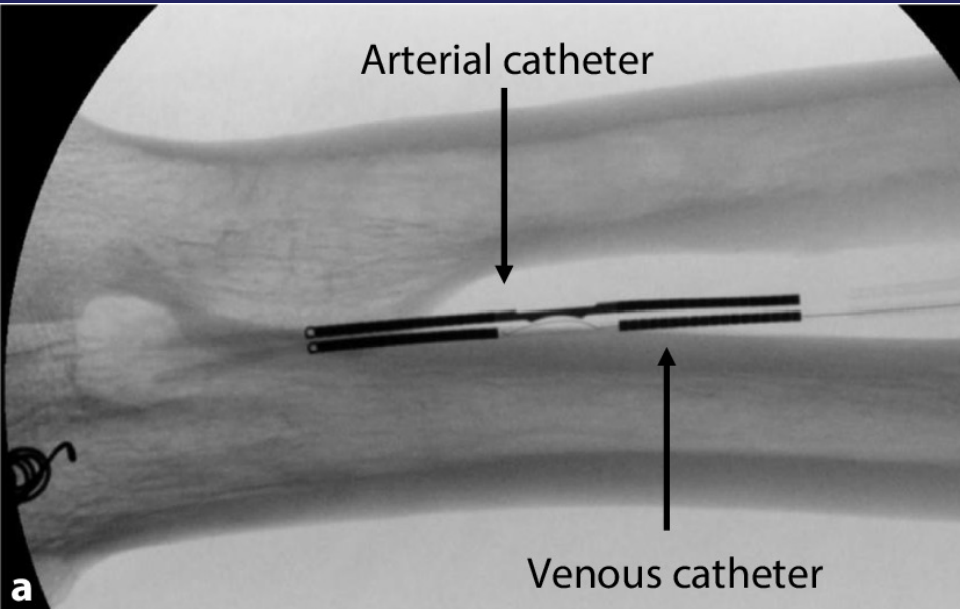


# WavelinQ Device

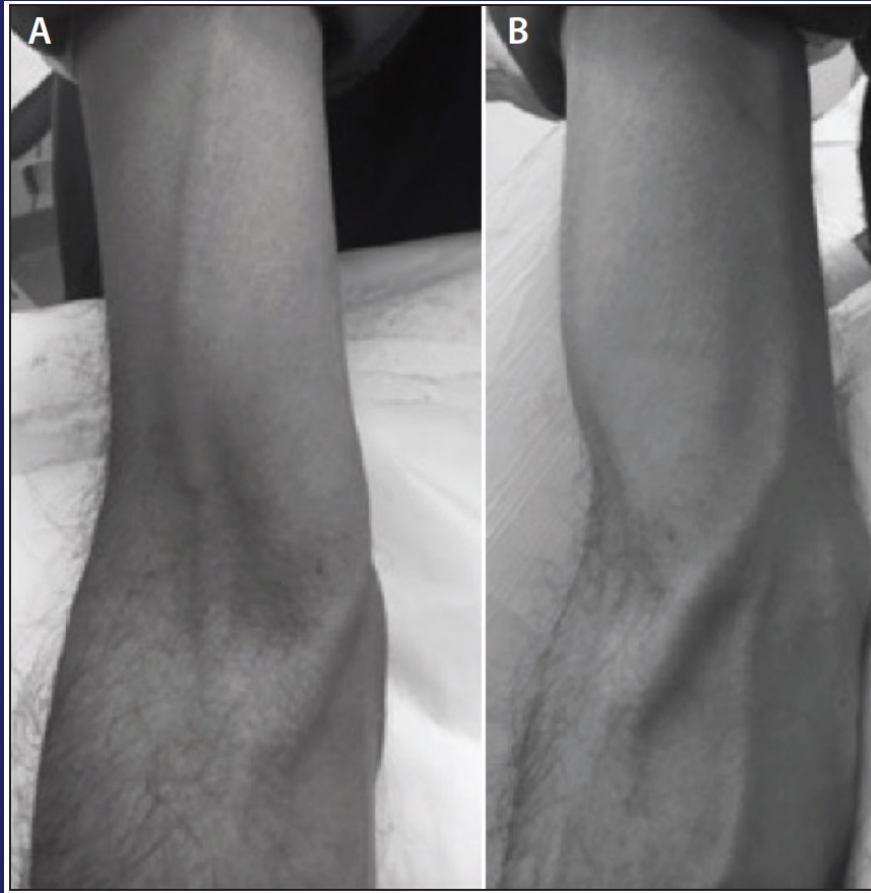




# WavelinQ Device



Split flow  
fistula

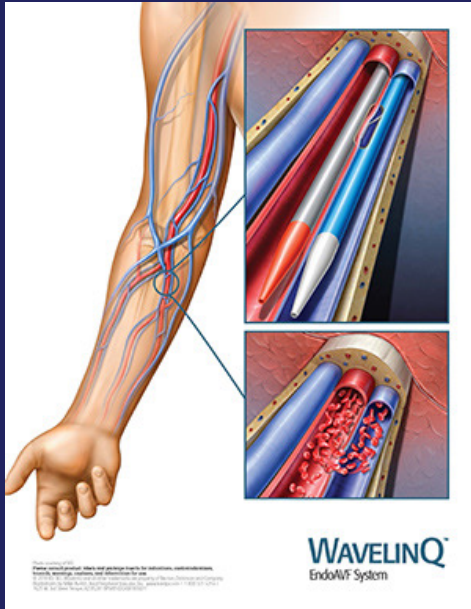


Single flow  
fistula

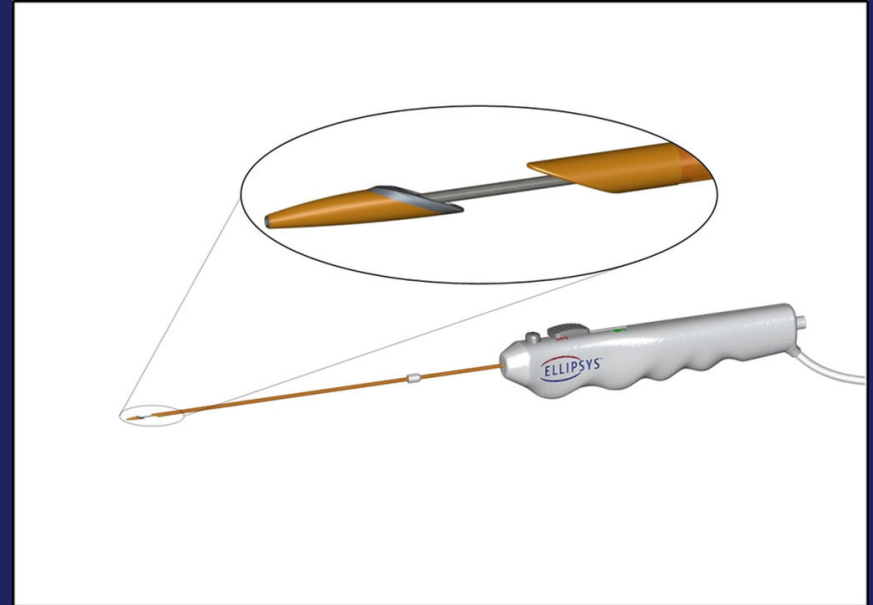


# Percutaneous AV Fistula

## BD WavelinQ



## Medtronic Ellipsys



# Ellipsys

- 6 French device
- Single access site
- Ultrasound guided cephalic vein access into the proximal radial artery
  - No contrast, No fluoroscopy
- Administer IV heparin
- Place catheter through vein crossing into artery



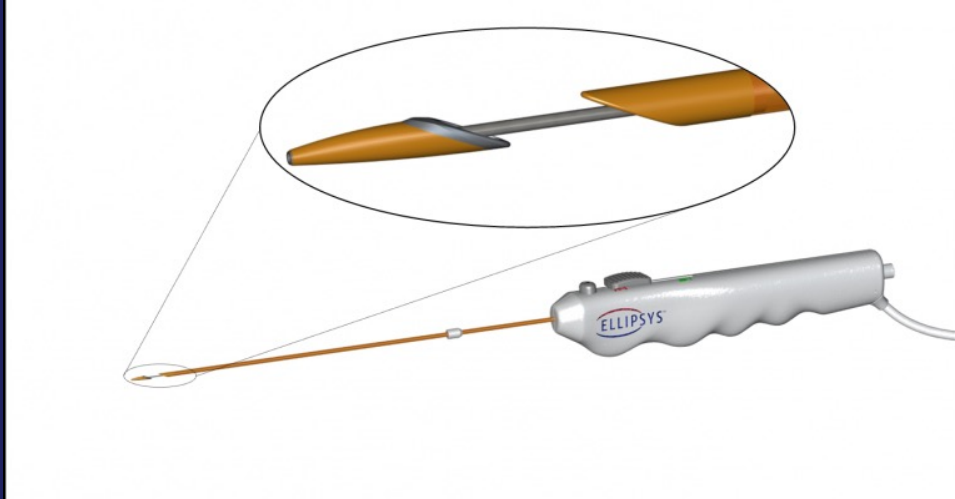


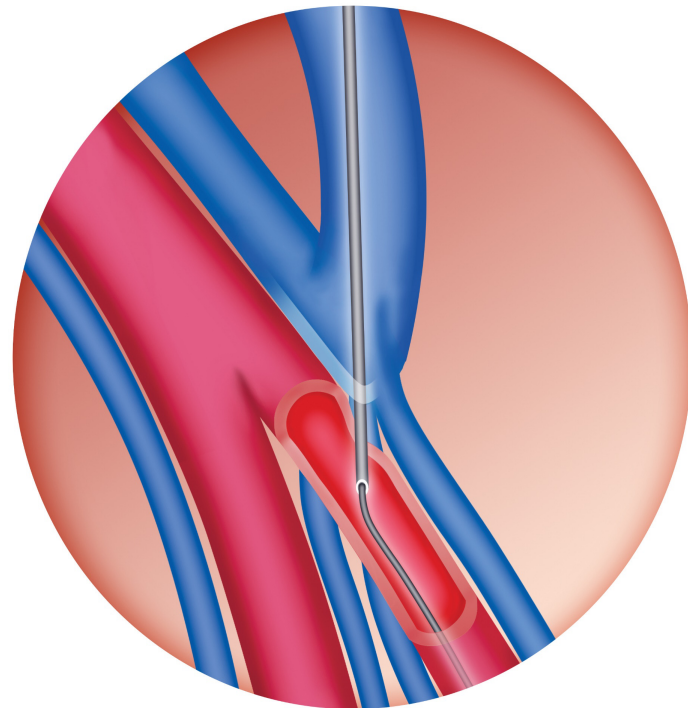
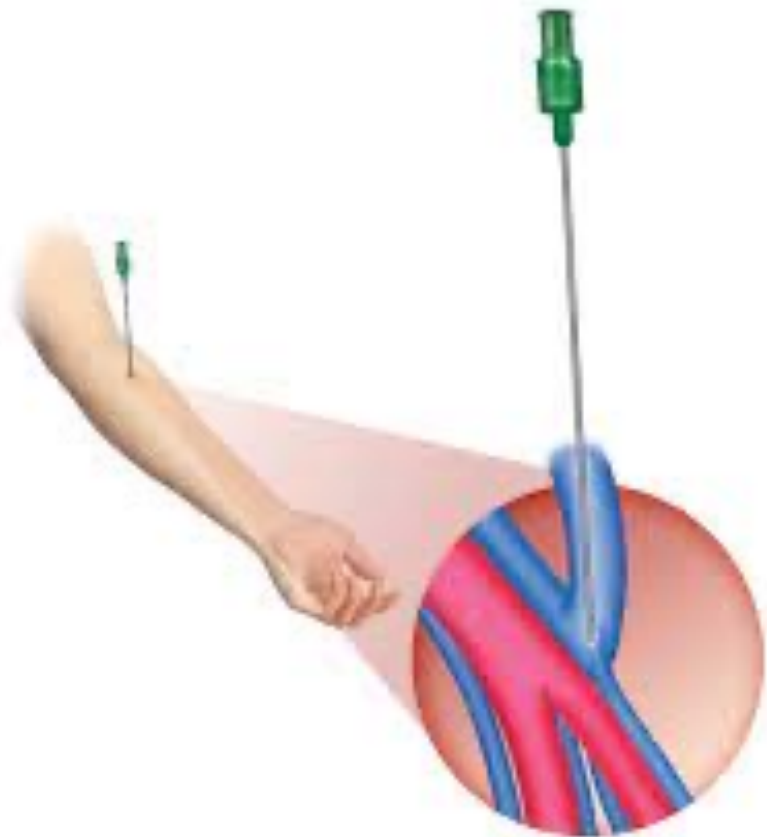
# Ellipsys

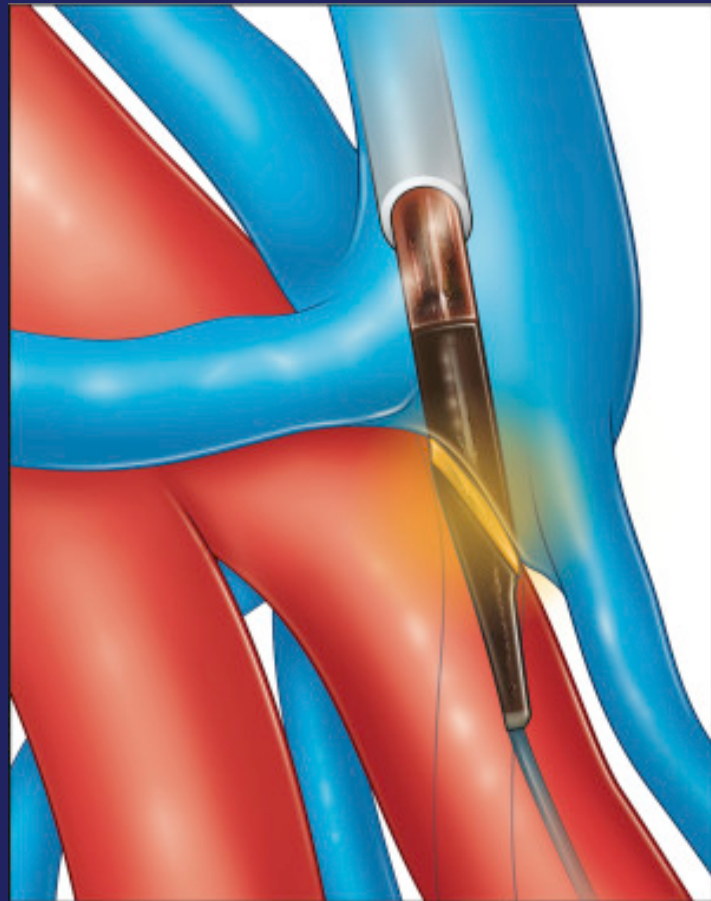
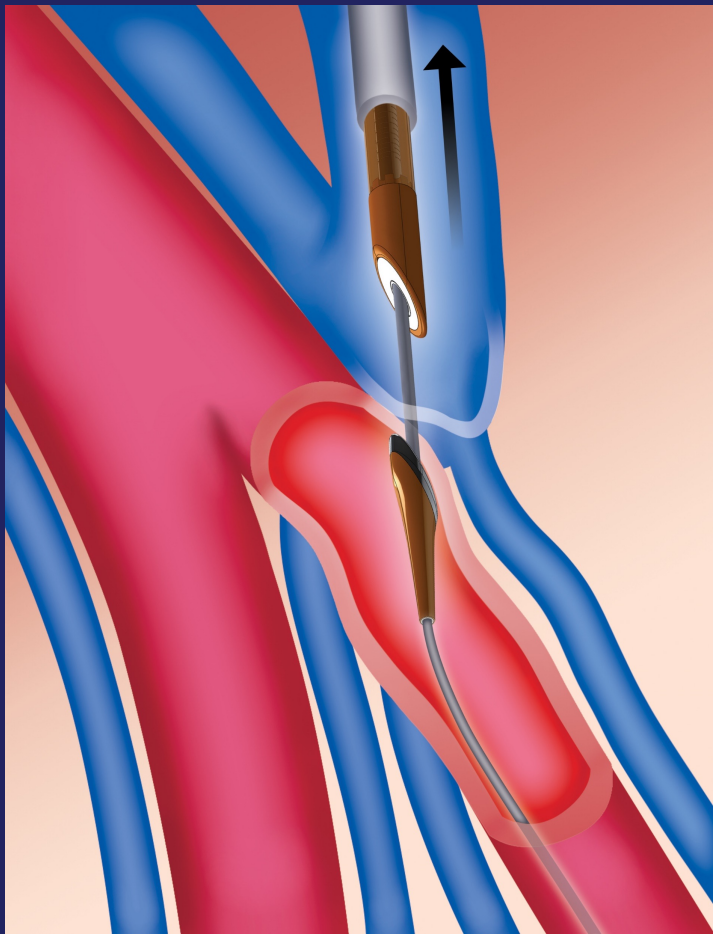
- Thermal energy delivered to create the anastomosis
- Mandatory PTA of anastomosis with 5mm
- On table fistula duplex to check fistula flow

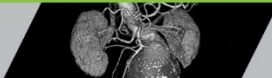
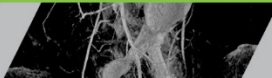
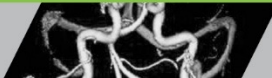
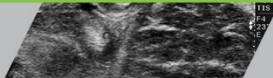
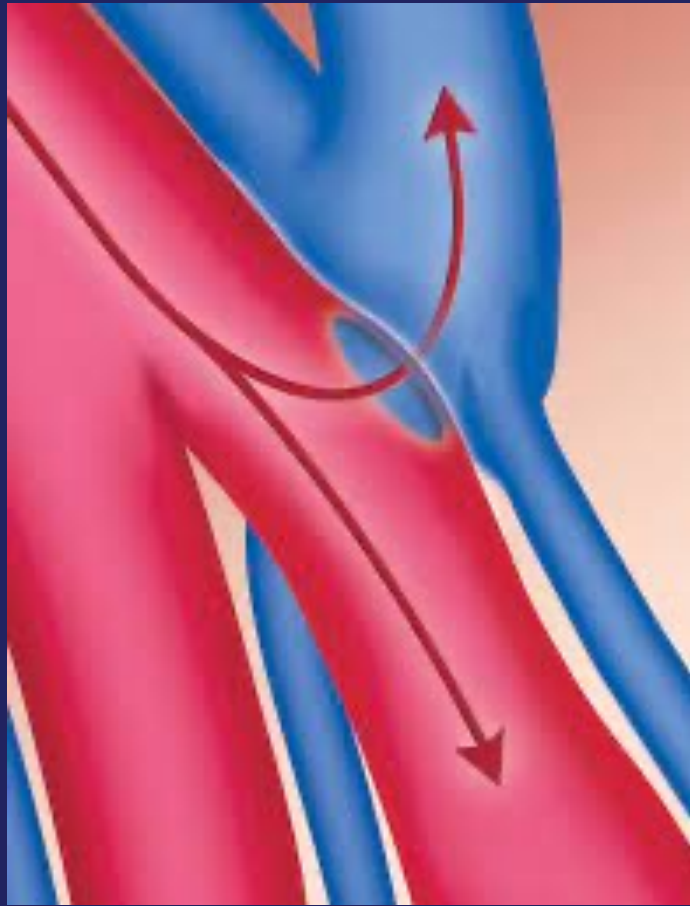


# Ellipsys

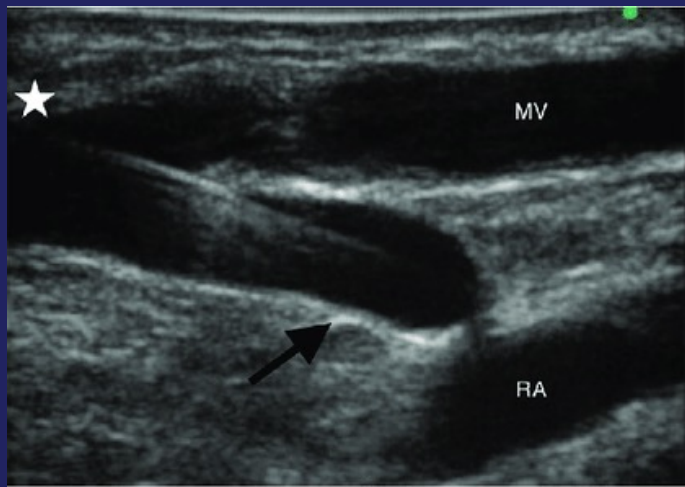




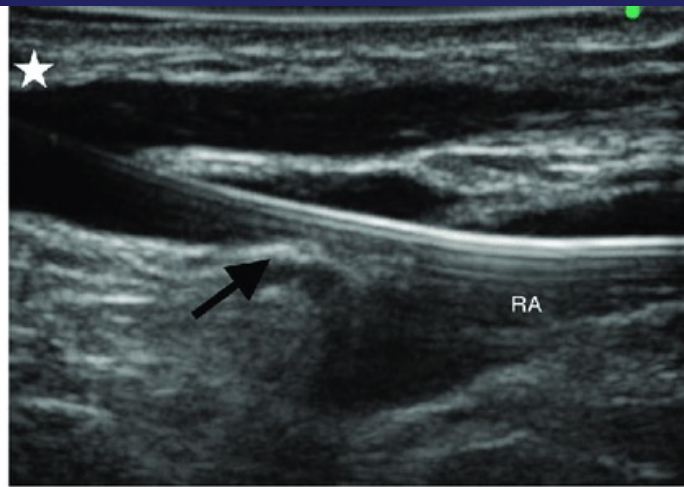




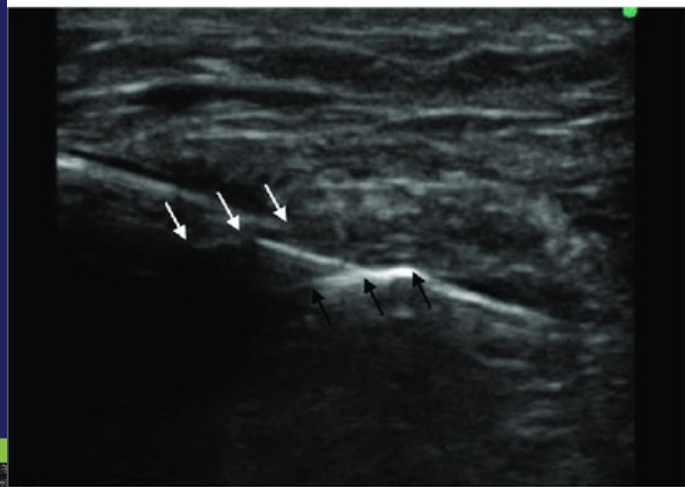




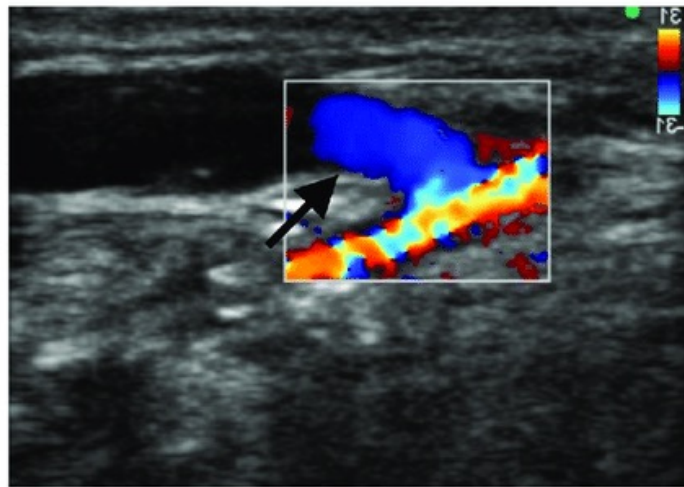
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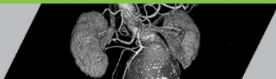
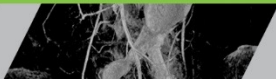
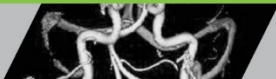
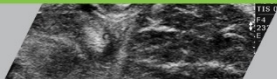
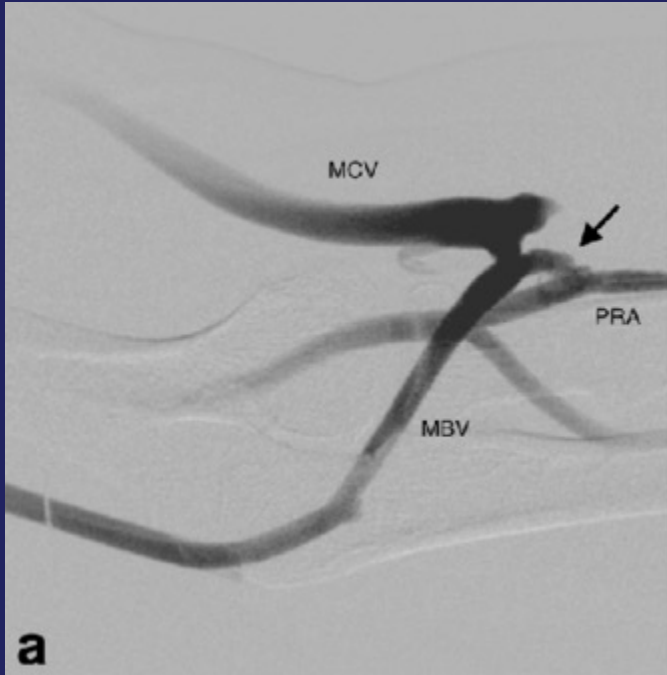
b.



c.



d.





	<b>ELLIPSYS</b>	<b>WAVELINQ</b>
Sheath size	6 French sheath	4 French sheath
Access site	Single	2-3 access sites
Location of AVF	Forearm - Superficial fistula (PRA-PV)	Forearm - Deep fistula (RA-RV or UA-UV)
Anesthesia	Moderate sedation	Moderate sedation
Fluoroscopy	No	Yes
Contrast	No	Yes
Post AVF angioplasty	Yes	No



# Outline

- ~~What is a surgical AV fistula?~~
- ~~What is a percutaneous AV fistula?~~
  - ~~Ellipsys~~
  - ~~WavelinQ~~
- What role does percutaneous AV fistula have?
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# Comparison of Outcomes of Percutaneous Arteriovenous Fistulae Creation by Ellipsys and WavelinQ Devices

Robert Shahverdyan, MD, Gerald Beathard, MD, PhD, Nasir Mushtaq, PhD, MBBS, MPH, Terry F. Litchfield, Peter R. Nelson, MD, MS, and William C. Jennings, MD  
JVIR 2020

RESULTS	ELLIPSYS	WAVELINQ
Technical Success	100%	97%
Median procedure time	14 min	63 min
Median time to cannulation	60 days	90 days



# Comparison of Outcomes of Percutaneous Arteriovenous Fistulae Creation by Ellipsys and WavelinQ Devices

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JVIR 2020

## Conclusion:

Both percutaneous AVF were created with high technical success. Ellipsys demonstrated shorter procedure times without need for fluoroscopy or contrast

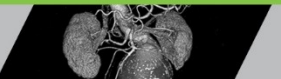
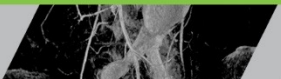
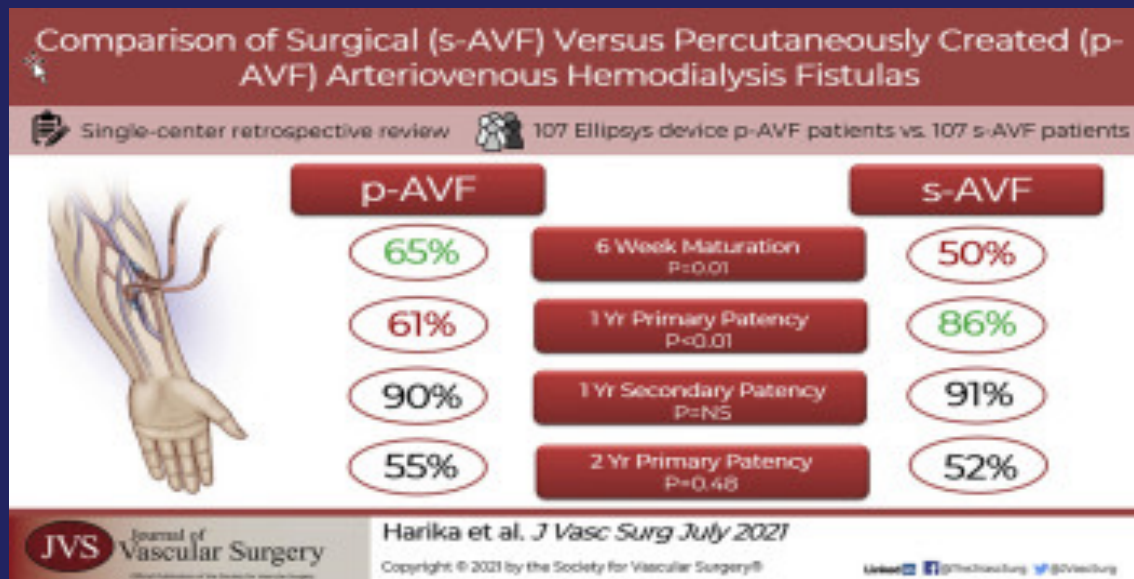


# Comparison of surgical versus percutaneously created arteriovenous hemodialysis fistulas

[Ghazi Harika, MD](#), [Alexandros Mallios, MD](#), [Mahmoud Allouache, MD](#), [Alessandro Costanzo, MD](#),

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JVS July 2021



# Comparison of surgical versus percutaneously created arteriovenous hemodialysis fistulas

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JVS July 2021

## Conclusion:

Fistulas created percutaneously with the Ellipsys system showed superior maturation rates and similar patency with s-AVFs. Larger, prospective, randomized multicenter studies are needed to confirm these findings.



# Take Home Points

- Percutaneous AV fistula **WILL NOT** replace surgical AV fistula
- Option to consider if patient has a failed radiocephalic fistula or no options for wrist fistula
- Convincing data is lacking currently
- In need of a large volume randomized controlled trial





# Thank You

