

Mass General Brigham

## Contemporary Outcomes of Distal Radial Artery Ligation For HAIDI

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  - Humacyte (V-012 Trial)
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### 75M w/ Wrist "Cimino" RC-AVF & Finger Ulcers



**Upper Arterial Ischemic Steal Syndrome Waveforms**

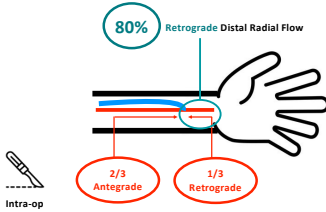
Patient	Controlled
R. 1st Finger PPG Score 50	R. 1st Finger PPG Score 50
R. 2nd Finger PPG Score 48	R. 2nd Finger PPG Score 48
R. 3rd Finger PPG Score 25	R. 3rd Finger PPG Score 25
R. 4th Finger PPG Score 22	R. 4th Finger PPG Score 17%
R. 5th Finger PPG Score 16	R. 5th Finger PPG Score 10%

### 75M w/ Wrist "Cimino" RC-AVF & Finger Ulcers



- Further work-up?
- Ligate AVF?
- Proximalization?
- Banding?
- DRAL?
- Is there retrograde flow in distal radial? If so, how much?

### Flow Distribution of RC-AVF

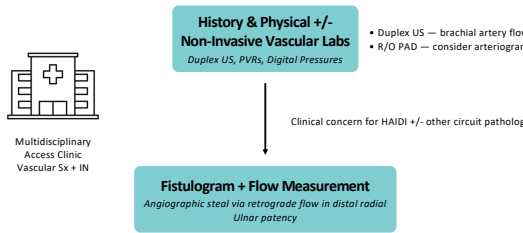


**80% Retrograde Distal Radial Flow**

**Intra-op**  
 2/3 Antegrade  
 1/3 Retrograde

Sivanesan, How, Bakran. *Nephrol Dial Transplant.* 1998;13:3108-3110.

### Approach to Hand Symptoms in Forearm Accesses

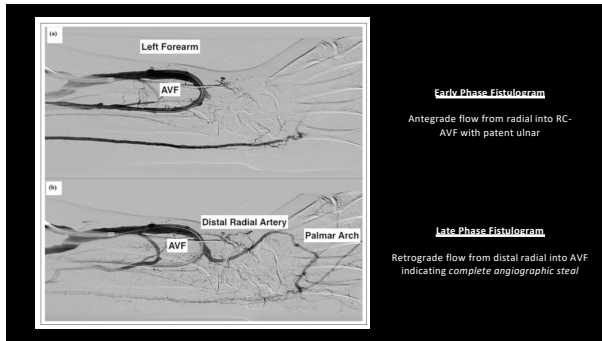


**History & Physical +/- Non-Invasive Vascular Labs**  
 Duplex US, PVRs, Digital Pressures

- Duplex US — brachial artery flow
- R/O PAD — consider arteriogram

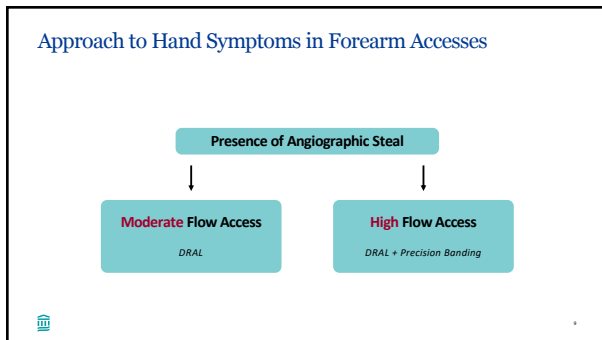
Clinical concern for HAIDI +/- other circuit pathology

**Fistulogram + Flow Measurement**  
 Angiographic steal via retrograde flow in distal radial  
 Ulnar patency



### Intravascular Flow Measurement

- Transonic ReoCath flowmeter using thermodilution flow volume technology
- 10cc saline injected through antegrade or retrograde catheter
- Helps determine if DRAL + precision banding should be considered



### Precision Banding

- Intravascular flow measurement pre-banding
- 2-0 double looped Prolene tied over 3 mm or 4 mm mandril
- Intravascular flow measurement post-banding

Soo Hoo, Scully, Sharma, Patterson, Walsh, Voiculescu, Belkin, Menard, Ozaki, Hentschel. J Vasc Access. 2023;24(6):1260-1267

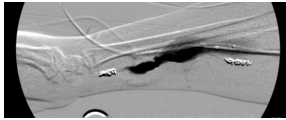


### 68F w/ Distal Forearm RC-AVF & Hand Ulcers

- Failed prior distal radial artery coil at outside institution
- Persistent angiographic steal from distal radial artery
- High flow AVF: 1600 cc/min

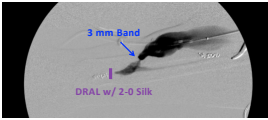
### 68F w/ Distal Forearm RC-AVF & Hand Ulcers

**Pre-DRAL & Banding**



Intraop Flow Volume: **1400 cc/min**

**Post-DRAL & Banding**

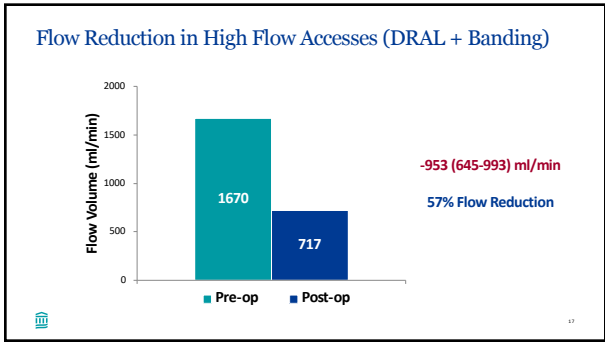
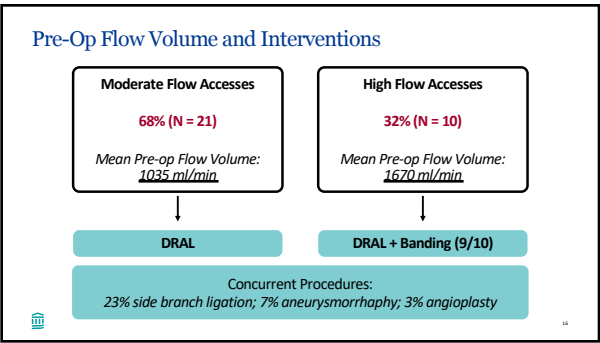
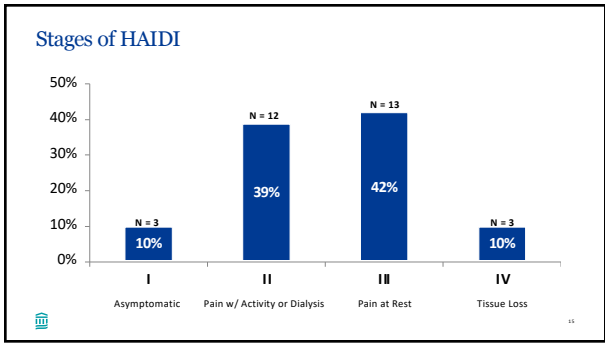


Intraop Flow Volume: **710 cc/min**

**Ulcer Healed  
Pain Resolved**

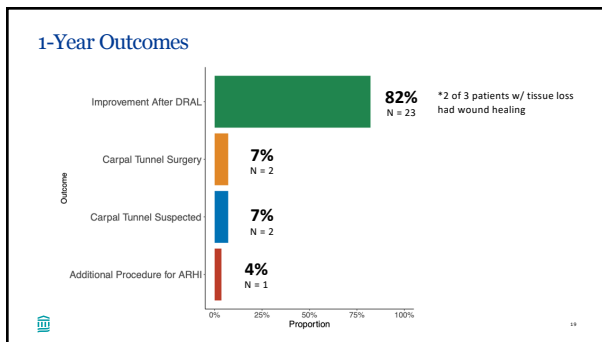
### DRAL Patients

Characteristic	Total (N = 31)
Age, mean (SD), y	60 (14)
Male	68%
ESKD	81%
Access type	
RC AVF — Sunuffbox	7%
RC AVF — Wrist	74%
RC AVF — Mid-forearm	10%
AVG — Straight forearm	7%
Radial Basilic AVF	3%



### 30-Day Outcomes

Outcomes	Total (N = 31)
Infection	0
Bleeding	0
Fistula thrombosis	1 (3%)



### Summary

- DRAL for HAIID is safe & can improve ischemic symptoms in most (>80%) of patients with forearm accesses while salvaging access function
- Precision banding with DRAL can serve as a useful adjunct in select patients with HAIID
  - Consider in those with high flow (>1.5L/min) forearm accesses
- Carpal tunnel syndrome should be considered in the differential diagnosis
  - Cause of hand symptoms in ~15% of patients with forearm accesses
  - Vascular lab studies can be helpful in differentiating ischemic vs. neurogenic symptoms
- With a growing prevalence of ESKD, the ability to maintain forearm accesses while preserving upper arm options is paramount

