

**EndoVascular Mechanical Thrombectomy is Obviating The Need For Thrombolytics In ALL: What Devices Are Available And What Are Their Advantages And Limitations**  
 Patrick Muck Good Samaritan Hospital Cincinnati Ohio, USA

**Disclosures**

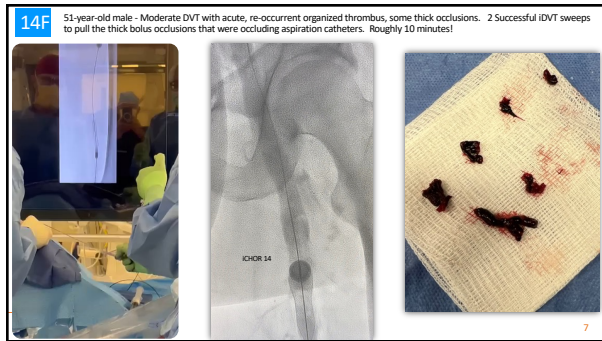
- PEN, ICHOR & BD Speaker's Bureau

**Aspirex™ Catheter Overview**

**6 & 8F Aspirex™ Thrombectomy System Catheter Design**

**iCHOR Arterial (7F) and Venous (14F) Vascular Systems 1,2,3**

**7F iSWEEP Arterial Clot Removal Procedure**



**pvasc** designed with **DROP ZONE™ TECHNOLOGY**

**#DoTheDropZone with ALL CLOT TYPES**

The **pvasc™** Thrombectomy System is designed for the safe removal of proximal and embolic flow-limiting arterial and venous vasculature.

Product Name	Product Code	Nominal Diameter (mm)	Working Length (cm)	Full Stroke Length (cm)	No. of Drop Zones	Recommended Max. Vessel Diameter (mm)	Max. Weight (g)
pvasc 4.0 x 30	VP-4030-F280	4.0	30	39	2	2.0 ± 0.5	0.07
pvasc 4.5 x 37	VP-4537-F280	4.5	37	57	2	2.0 ± 0.5	0.07
pvasc 4.5 x 46	VP-4546-F280	4.5	46	66	3	2.0 ± 0.5	0.07
pvasc 6.0 x 44	VP-6044-F360	6.0	44	65	3	3.5 ± 0.6	0.27

**#DoTheDropZone with ALL CLOT TYPES**

VESALIO

**pvasc** designed with **DROP ZONE™ TECHNOLOGY**

**#DoTheDropZone with ALL CLOT TYPES**  
**BREATHE LIFE BACK into Vascular Pathways**

**TRAP**  
Capturing clot is a science. Our proprietary Drop Zones™ trap clots and make them stick to the device structure. Multiple Drop Zones™ mean multiple entry points, supercharging efficiency for a fast and effective procedure.

**MAINTAIN**  
The closed distal basket of pvasc is designed to guard against emboli escape into distal vascular territories.

**REMOVE**  
pvasc is designed to be effective with all clot types:  
• embolus, hard thrombus  
• friable thrombus  
• soft, friable clot  
inspiring confidence in every case.

Approached for use in both arterial and venous territories.  
Atrumatic, heliographic design for enhanced visibility and safety.  
Self-retracting distal structure optimized for wall apposition.  
Drop Zones for all-type clot capture.  
Flow Restoration Zone for immediate distal reperfusion as deployment.  
Multiple sizes to adapt to vascular anatomy.  
Low Profile™ with 0.07 inch outer diameter for easy navigation.  
Does not require contraindications.

**POPULITRAL ARTERY BLOCKAGE**

**RECANALIZATION EFFECT**

**SCAN TO SEE PVASC 3D ANIMATION**

**Artix** Thrombectomy System from Inari Medical  
Recently FDA-cleared for arterial thrombectomy

- ✓ Treatment range: 3-6 mm vessels, 4-8 mm vessels
- ✓ Mechanical + aspiration devices removing acute to chronic thrombus
- ✓ Low profile 8Fr sheath 7Fr access profile
- ✓ Proximal flow restriction covered funnel catheter
- ✓ Over-the-wire system complete access and precise control
- ✓ Blood return ability minimizes procedural blood loss

Thin-Walled Sheath, Funnel Catheter, Mechanical Thrombectomy Device, Aspiration Catheter, FlowCover® Blood Return System

**Lightning Bolt 7 Catheter Technology: High Power, Low Profile**

**MaxID Technology**  
Maximized ID, Minimized OD

Lightning Bolt 7 Catheter: 0.082 in. ID, 0.086 in. OD  
8 F Catheter Design: 0.082 in. ID, 0.086 in. OD

214 in. O.D. difference with our 8F catheter

Lightning Bolt 7 Catheter is 93% the size of our 8 F Catheter Design\*

**TORQ Tip**  
TORQ Tip Shape for Circumferential Sweep

**Atrumatic Laser-Cut Hypotube Design**

**Lightning BOLT**

**Lightning BOLT**

Continuous vacuum

Optimized catheter size

Now we have an algorithm designed for **ACCELERATED** Arterial Clot Removal

### Designed for Accelerated, Endovascular Thrombus Removal

**Bolt Mode**  
Modulated aspiration designed to rapidly remove thrombus and restore flow

**MaxID Technology**  
Maximum ID, Minimized OD

**Dual Clot Detection Algorithms**  
Pressure differential and flow-based algorithms designed for:  
- Quicker clot detection  
- Quicker patient flow detection to reduce potential blood loss

### The Most Powerful & Advanced Arterial Thrombectomy Device

**Bolt Mode**

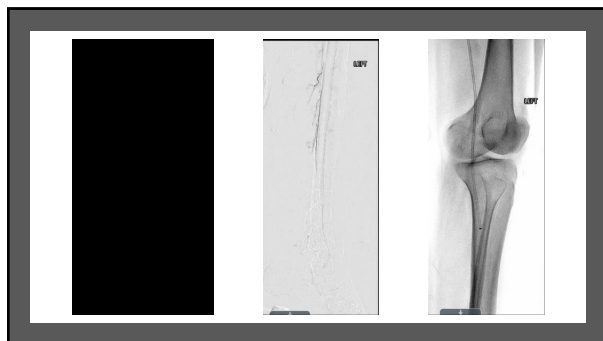
Modulated Aspiration Designed to Rapidly Remove Thrombus and Restore Flow

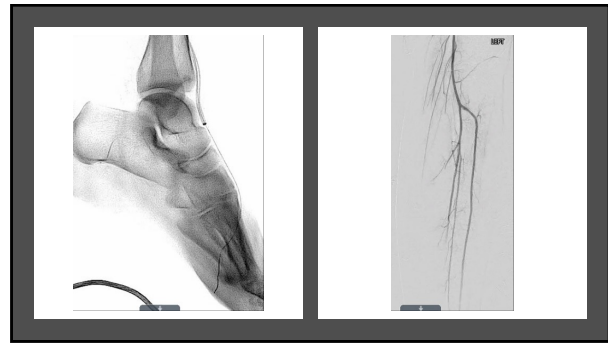
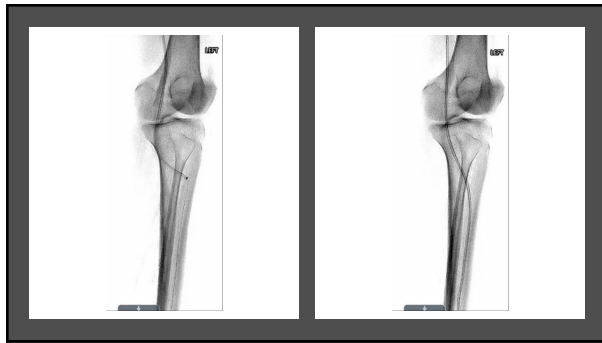
Friction builds between large thrombi and the catheter when under continuous aspiration

**Bolt Mode** modulates between full aspiration and ambient pressure to break the friction and ingest clot

### Rutherford 2 B!

- Post procedure the patient developed worsening pain, numbness, unable to move toes or flex at the ankle





### New Options are Here

**OCCLUDED Rt Iliac Stent Tx w/ @PenVascular Lightning 7 - EBL 125cc, Case Time 43 min. Thank you PEN engineer! #LowProfile #Lightning7 #IntelligentAspiration**

*Thomas S. Hakola, MD, Alex Probst, MD, Victor Wenzel, MD, David Bowen, MD, Jonathan M. Rappaport, MD, David J. Cooper, MD, Alan M. Daniels, MD, Brian E. Black, MD, Frank R. Allen, MD, and Jigar Chugh, MD, for the STRIDE study group. New York, NY: American Society of Interventional Radiology, 2023. doi:10.1016/j.vascu.2023.11.001*

### Upper Extremity As Well?

### Data Supports Frontline Thrombus Removal with Indigo

**ARTICLE HIGHLIGHTS**

**Type of Research:** Multicenter prospective non-randomized cohort study

**Key Findings:** Aspiration thrombectomy in 119 participants with lower extremity acute limb ischemia resulted in 30-day target limb salvage rates of 96.2%. Rates of periprocedural major bleed was 4.2% and device-related serious adverse events was 0.8%. Immediately after the procedure, flow (Thrombolysis in Myocardial Infarction 2/3) was restored in 96.3% of patients.

**Take Home Message:** Mechanical aspiration thrombectomy may provide a beneficial treatment option for patients with lower extremity acute limb ischemia, with high rates of safety and efficacy.

### Safety and efficacy of mechanical aspiration thrombectomy for patients with acute lower extremity ischemia

Thomas S. Hakola, MD, Alex Probst, MD, Victor Wenzel, MD, David Bowen, MD, Jonathan M. Rappaport, MD, David J. Cooper, MD, Alan M. Daniels, MD, Brian E. Black, MD, Frank R. Allen, MD, and Jigar Chugh, MD, for the STRIDE study group. New York, NY: American Society of Interventional Radiology, 2023. doi:10.1016/j.vascu.2023.11.001

**ABSTRACT**

**Objective:** Acute limb ischemia (ALI) is associated with high rates of amputation and permanent disability and mortality. The objective of this study is to report on the safety and efficacy of aspiration thrombectomy using the Indigo aspiration thrombectomy system with lower extremity ALI.

**Methods:** The STRIDE study was an international, multicenter, prospective study that enrolled 119 patients presenting with ALI. Patients were treated either with mechanical thrombectomy using the Indigo aspiration system, before or after angioplasty, or other therapies as determined by treating physician. The primary end point was target limb salvage at 30 days after the procedure. Secondary end points included 30-day target limb salvage, all-cause mortality, and periprocedural major bleed. Secondary end points included 30-day target limb salvage, all-cause mortality, and periprocedural major bleed. Secondary end points included 30-day target limb salvage, all-cause mortality, and periprocedural major bleed. Secondary end points included 30-day target limb salvage, all-cause mortality, and periprocedural major bleed.

### Data Supports Frontline Thrombus Removal with Indigo


ICD9	ICD10	Baseline characteristic	% (n) or mean (SD)	COMES	% (n/n)
500.00	I18.22, I60.1	Thrombus location			
500.01	I18.23, I60.2	Distal	5.0 (10)		
500.02	I18.24, I60.3	Common femoral	1.5 (4)		
500.03	I18.25, I60.4	Superficial femoral	4.5 (10)		
500.04	I18.26, I60.5	Popliteal	5.0 (10)		96.2% (109/111)
500.05	I18.27, I60.6	Tibiofibular trunk	5.0 (10)		94.6% (4/10)
500.06	I18.28, I60.7	Peroneal	0.0 (0)		
500.07	I18.29, I60.8	Other	0.0 (0)		
500.08	I18.30, I60.9	Indigo aspiration thrombectomy	96.3% (105/109)		
500.09	I18.31, I61.0	Other	3.7% (4)		
500.10	I18.32, I61.1	Target limb salvage (n = 119)	63 (52.9)		63 (52.9)
500.11	I18.33, I61.2	Mean (SD)	6.0 (0.0-11.0)		
500.12	I18.34, I61.3	Median (IQR)	10 (0-18)		
500.13	I18.35, I61.4	Target limb salvage (n = 97)	96.3% (75/76)		
500.14	I18.36, I61.5	Mean (SD)	23.3% (30/130)		
500.15	I18.37, I61.6	Median (IQR)	0.2% (1/50)		
500.16	I18.38, I61.7	Baseline ischemic severity (n = 119)	89.4% (101/113)		
500.17	I18.39, I61.8	Durometer (n = 119)	546 (89.9)		
500.18	I18.40, I61.9	Mean (SD)	10.0 (4.0)		
500.19	I18.41, I62.0	Median (IQR)	10.0 (4.0)		
500.20	I18.42, I62.1	Target limb salvage (n = 119)	96.3% (105/109)		
500.21	I18.43, I62.2	Mean (SD)	10.0 (4.0)		
500.22	I18.44, I62.3	Median (IQR)	10.0 (4.0)		
500.23	I18.45, I62.4	Target limb salvage (n = 119)	96.3% (105/109)		
500.24	I18.46, I62.5	Mean (SD)	10.0 (4.0)		
500.25	I18.47, I62.6	Median (IQR)	10.0 (4.0)		
500.26	I18.48, I62.7	Target limb salvage (n = 119)	96.3% (105/109)		
500.27	I18.49, I62.8	Mean (SD)	10.0 (4.0)		
500.28	I18.50, I62.9	Median (IQR)	10.0 (4.0)		
500.29	I18.51, I63.0	Target limb salvage (n = 119)	96.3% (105/109)		
500.30	I18.52, I63.1	Mean (SD)	10.0 (4.0)		
500.31	I18.53, I63.2	Median (IQR)	10.0 (4.0)		
500.32	I18.54, I63.3	Target limb salvage (n = 119)	96.3% (105/109)		
500.33	I18.55, I63.4	Mean (SD)	10.0 (4.0)		
500.34	I18.56, I63.5	Median (IQR)	10.0 (4.0)		
500.35	I18.57, I63.6	Target limb salvage (n = 119)	96.3% (105/109)		
500.36	I18.58, I63.7	Mean (SD)	10.0 (4.0)		
500.37	I18.59, I63.8	Median (IQR)	10.0 (4.0)		
500.38	I18.60, I63.9	Target limb salvage (n = 119)	96.3% (105/109)		
500.39	I18.61, I64.0	Mean (SD)	10.0 (4.0)		
500.40	I18.62, I64.1	Median (IQR)	10.0 (4.0)		
500.41	I18.63, I64.2	Target limb salvage (n = 119)	96.3% (105/109)		
500.42	I18.64, I64.3	Mean (SD)	10.0 (4.0)		
500.43	I18.65, I64.4	Median (IQR)	10.0 (4.0)		
500.44	I18.66, I64.5	Target limb salvage (n = 119)	96.3% (105/109)		
500.45	I18.67, I64.6	Mean (SD)	10.0 (4.0)		
500.46	I18.68, I64.7	Median (IQR)	10.0 (4.0)		
500.47	I18.69, I64.8	Target limb salvage (n = 119)	96.3% (105/109)		
500.48	I18.70, I64.9	Mean (SD)	10.0 (4.0)		
500.49	I18.71, I65.0	Median (IQR)	10.0 (4.0)		
500.50	I18.72, I65.1	Target limb salvage (n = 119)	96.3% (105/109)		
500.51	I18.73, I65.2	Mean (SD)	10.0 (4.0)		
500.52	I18.74, I65.3	Median (IQR)	10.0 (4.0)		
500.53	I18.75, I65.4	Target limb salvage (n = 119)	96.3% (105/109)		
500.54	I18.76, I65.5	Mean (SD)	10.0 (4.0)		
500.55	I18.77, I65.6	Median (IQR)	10.0 (4.0)		
500.56	I18.78, I65.7	Target limb salvage (n = 119)	96.3% (105/109)		
500.57	I18.79, I65.8	Mean (SD)	10.0 (4.0)		
500.58	I18.80, I65.9	Median (IQR)	10.0 (4.0)		
500.59	I18.81, I66.0	Target limb salvage (n = 119)	96.3% (105/109)		
500.60	I18.82, I66.1	Mean (SD)	10.0 (4.0)		
500.61	I18.83, I66.2	Median (IQR)	10.0 (4.0)		
500.62	I18.84, I66.3	Target limb salvage (n = 119)	96.3% (105/109)		
500.63	I18.85, I66.4	Mean (SD)	10.0 (4.0)		
500.64	I18.86, I66.5	Median (IQR)	10.0 (4.0)		
500.65	I18.87, I66.6	Target limb salvage (n = 119)	96.3% (105/109)		
500.66	I18.88, I66.7	Mean (SD)	10.0 (4.0)		
500.67	I18.89, I66.8	Median (IQR)	10.0 (4.0)		
500.68	I18.90, I66.9	Target limb salvage (n = 119)	96.3% (105/109)		
500.69	I18.91, I67.0	Mean (SD)	10.0 (4.0)		
500.70	I18.92, I67.1	Median (IQR)	10.0 (4.0)		
500.71	I18.93, I67.2	Target limb salvage (n = 119)	96.3% (105/109)		
500.72	I18.94, I67.3	Mean (SD)	10.0 (4.0)		
500.73	I18.95, I67.4	Median (IQR)	10.0 (4.0)		
500.74	I18.96, I67.5	Target limb salvage (n = 119)	96.3% (105/109)		
500.75	I18.97, I67.6	Mean (SD)	10.0 (4.0)		
500.76	I18.98, I67.7	Median (IQR)	10.0 (4.0)		
500.77	I18.99, I67.8	Target limb salvage (n = 119)	96.3% (105/109)		
500.78	I19.00, I67.9	Mean (SD)	10.0 (4.0)		
500.79	I19.01, I68.0	Median (IQR)	10.0 (4.0)		
500.80	I19.02, I68.1	Target limb salvage (n = 119)	96.3% (105/109)		
500.81	I19.03, I68.2	Mean (SD)	10.0 (4.0)		
500.82	I19.04, I68.3	Median (IQR)	10.0 (4.0)		
500.83	I19.05, I68.4	Target limb salvage (n = 119)	96.3% (105/109)		
500.84	I19.06, I68.5	Mean (SD)	10.0 (4.0)		
500.85	I19.07, I68.6	Median (IQR)	10.0 (4.0)		
500.86	I19.08, I68.7	Target limb salvage (n = 119)	96.3% (105/109)		
500.87	I19.09, I68.8	Mean (SD)	10.0 (4.0)		
500.88	I19.10, I68.9	Median (IQR)	10.0 (4.0)		
500.89	I19.11, I69.0	Target limb salvage (n = 119)	96.3% (105/109)		
500.90	I19.12, I69.1	Mean (SD)	10.0 (4.0)		
500.91	I19.13, I69.2	Median (IQR)	10.0 (4.0)		
500.92	I19.14, I69.3	Target limb salvage (n = 119)	96.3% (105/109)		
500.93	I19.15, I69.4	Mean (SD)	10.0 (4.0)		
500.94	I19.16, I69.5	Median (IQR)	10.0 (4.0)		
500.95	I19.17, I69.6	Target limb salvage (n = 119)	96.3% (105/109)		
500.96	I19.18, I69.7	Mean (SD)	10.0 (4.0)		
500.97	I19.19, I69.8	Median (IQR)	10.0 (4.0)		
500.98	I19.20, I69.9	Target limb salvage (n = 119)	96.3% (105/109)		
500.99	I19.21, I70.0	Mean (SD)	10.0 (4.0)		
500.100	I19.22, I70.1	Median (IQR)	10.0 (4.0)		



### Conclusion

✓ Aspiration is effective

🔧 Modulated Aspiration is the new standard



For more information visit [www.esvs.org](http://www.esvs.org)

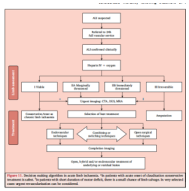
**CLINICAL PRACTICE GUIDELINE DOCUMENT**

#### ESVS 2020 Clinical Practice Guidelines on the Management of Acute Limb Ischaemia

Martin Bakh <sup>1</sup>, Jonathan J. Fowkes <sup>2</sup>, Stefan Avram <sup>3</sup>, Federico Bazzio Gagliardi <sup>4</sup>, Prabhat Chakraborty <sup>5</sup>, F. J. Garcia <sup>6</sup>, Gianni Giacchino <sup>7</sup>, Marco Legido-Quigley <sup>8</sup>, Mark W. Moolenaar <sup>9</sup>, Gabor Munkacsy <sup>10</sup>, Alison V. Smith <sup>11</sup>, Riccardo Tassiola <sup>12</sup>, Leo C. Van Der Wal <sup>13</sup>

ESVS Scientific Committee: Carlo E. Bardi, Mark Chahal, Simon A. Kidwell, Igor Kremen, Leo C. Van Der Wal, Marco Van de Campel, Tapan Verhaegh, Mark W. Moolenaar, Robert C. Ockene, Peter J. Coleman

Supporting Committee: Jonathan W. Baker, Sanjeet Bhatia, Richard Cook, Robert C. Ockene, Peter J. Coleman, Robert A. Phillips, Thomas C. Franken, Muhammad N. Hamzah, Roberto Salinas, Stefan Müller-Holthuis, Michael Raj



### ESVS Guidelines 2020