Endovascular mechanical thrombectomy in arterial and venous cases: 
*Our experience with the Indigo system*

Theodosios Bisdas, MD, PhD

Ass. Prof. for Vascular Surgery
Endovascular Specialist (DGG)
Clinic for Vascular Surgery, St. Franziskus Hospital GmbH
Muenster, Germany
The ideal thrombectomy catheter

**Characteristics**

- Atraumatic profile
- Safe
- Simple setting
- Flexible
- No lytic agent

- CDT
- Syringe-based thrombosuction
- Rheolytic pharmaco-mechanical thrombectomy
- Rotational mechanical thrombectomy
The Indigo thrombectomy system

Penumbra
MECHANICAL CLOT ENGAGEMENT
Proprietary Separator Technology

MAXIMISED ASPIRATION POWER
Large Lumen Aspiration

TIP DIRECTIONALITY
For Circumferential Aspiration

ADVANCED TRACKING TECHNOLOGY
Multiple Materials Transitions
The concept behind...
Visualisation Under Fluoro

CAT6

CAT8TORQ85

CAT8XTORQ115

CAT5/SEP5

CAT8XTORQ115/SEP8
With more powerful tubing for maximum aspiration through entire system

25% more and continuous aspiration power (-29 mmHg)
Technical features
In vitro model
Aspiration Efficiency

Aspiration Volume (mL in 20 sec)

- Competitor A: 3 mL
- CAT3: 14 mL
- CAT5: 56 mL
- CAT6: 90 mL
- CAT8: 160 mL

More Efficient

a. Data on file at Penumbra, Inc.
CAT8 Tip Shapes

- Angle 20-45deg
  Tip length 1cm

- Angle 20-45deg
  Tip length 1.8cm

**Straight**
Available in 85 cm

**Torq**
Available in 85 cm

**XTorq**
Available in 115 cm
Circumferential aspiration
Evidence
PRISM trial

- Retrospective case review study (NCT02085551)
- N=85 patients
- Indications:
  - Failed thrombolysis
  - Acute limb ischemia
  - Distal emboli secondary to preceding intervention
- Vessel patency, evaluated by TIMI score, was assessed at:
  - Presentation
  - Prior to aspiration thrombectomy by Penumbra/Indigo System (Post tPA/other therapy (if used))
  - Immediately post aspiration thrombectomy
  - Post all interventions

Benenati et al, SIR 2016, Vancouver
## Target vessel location

<table>
<thead>
<tr>
<th>Location</th>
<th>%, n/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Popliteal</td>
<td>32.9% (28/85)</td>
</tr>
<tr>
<td>Peroneal</td>
<td>7.1% (6/85)</td>
</tr>
<tr>
<td>Posterior tibial</td>
<td>4.7% (4/85)</td>
</tr>
<tr>
<td>Anterior tibial</td>
<td>5.9% (5/85)</td>
</tr>
<tr>
<td>Tibial-peroneal trunk</td>
<td>3.6% (3/85)</td>
</tr>
<tr>
<td>Superficial femoral</td>
<td>27.1% (23/85)</td>
</tr>
<tr>
<td>Profunda femoris</td>
<td>5.9% (5/85)</td>
</tr>
<tr>
<td>Common femoral</td>
<td>1.2% (1/85)</td>
</tr>
<tr>
<td>Superior mesenteric</td>
<td>3.5% (3/85)</td>
</tr>
<tr>
<td>Renal</td>
<td>2.4% (2/85)</td>
</tr>
<tr>
<td>Other</td>
<td>5.9% (5/85)</td>
</tr>
</tbody>
</table>

54.2% Popliteal/Tibial

34.1% Fem/SFA
TIMI Scores Pre- and Post Thrombectomy

**Pre (TIMI 0-1)**

- Baseline: 68.3%
- Prior to INDIGO aspiration thrombectomy: 55.3%
- Immediately post INDIGO thrombectomy: 43.5%
- Post all interventions: 1.2%

**Post (TIMI 2-3)**

- Immediately post INDIGO thrombectomy: 36.9%
- Post all interventions: 51.2%

Rate of revascularization, %

- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

**Procedure Timeline**

- TIMI 0
- TIMI 1
- TIMI 2
- TIMI 3

Benenati et al, SIR 2016, Vancouver
Arterial experience
Visceral vessels

CAT 6/8
Visceral vessels
Bridging stent-grafts
after FEVAR or chEVAR
Aortoiliac vessels

CAT8
Infrainguinal vessels

CAT 3-8
Infrapopliteal vessels

CAT 3-8

CAT 6

CAT 8
AV Fistula

CAT 3-8

Courtesy: Dr. L.P. Moramarco, Pavia, Italy
Venous experience
Case 1
Female, 40y, acute TVT after cholecystectomy
Case 1
Female, 40y, acute TVT after cholecystectomy
Conclusions

• Indigo thrombectomy is a unique and effective tool for lysis-free thrombectomy in both arteries and veins of all diameters and territories

• **For new users:**
  - Give time to the device for aspiration (up to 90 sec)
  - Move gently the separator inside and outside the proximal tip (1 cm)
  - Start with the treatment of acute thrombosis (<14 days)
  - Try to embed the catheter into the thrombus to avoid unnecessary blood loss
  - **2 operators:** 1 navigates the catheter and the other controls the bleeding!
Thank you!

Email: th.bisdas@gmail.com
St. Franziskus Hospital Muenster, Germany
Endovascular mechanical thrombectomy in arterial and venous cases: 
Our experience with the Indigo system

Theodosios Bisdas, MD, PhD

Ass. Prof. for Vascular Surgery
Endovascular Specialist (DGG)
Clinic for Vascular Surgery, St. Franziskus Hospital GmbH
Muenster, Germany