Acute Deep Vein Thrombosis: indication and treatment with a mechanical thrombectomy system

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Deep vein thrombosis

• Third leading vascular disease after MI and Stroke
• Incidence 100 -180/ 100,000 year
• Incidence rates increase with age in both genders
• Over 250,000 new cases/year.
• Expected to double (2018 – 2050)

DVT: complications

1. Phlegmasia cerulea dolens
2. Pulmonary embolism (TE)
3. Postthrombotic syndrome (PTS)
Phlegmasia cerulea dolens

Surgical or Endovascular Thrombectomy recommended (Grade 1B)
Pulmonary Embolism

- 50% of Deaths in not anticoagulated patients
- 200,000 deaths from PE every year
Post Thrombotic Syndrome (PTS)

- Incomplete recanalization
- Deep valve damage
- Venous Hypertension

Diagram showing normal blood flow and blood clots in a vein.
Post Thrombotic Syndrome (PTS)

- Chronic Leg heaviness
- Venous claudication
- Edema
- Varicosities
- Trophic skin changes (lipodermatosclerosis)
- Venous Ulcers
Conservative management

- Anticoagulation
  - Unfractionated Heparine
  - LMWH (X factor inhibitors)
  - OAC (K vitamin antagonist)
  - DOAC (Thrombine inhibitors)

- Compression stockings

- Ultrasound monitoring
Anticoagulation Therapy

Systemic anticoagulation has been the “Gold Standard” treatment for many years.

**Objective:** To determine the clinical course of patients during the 8 years after the first episode of symptomatic Deep Venous Thrombosis. A prospective study of 355 patients with first episode of symptomatic DVT.

**Conclusion:** Patients with symptomatic DVT, especially those without transient risk factors for DVT, have a high risk for recurrent venous thromboembolism that persists for many years. The *post-thrombotic syndrome occurs in almost one third of these patients* and is strongly related to ipsilateral recurrent deep venous thrombosis. These findings challenge the widely adopted use of short course anticoagulation therapy in patients with symptomatic deep venous thrombosis.
Compression Stockings

Randomized controlled trials on PTS prevention with conservative treatment

• 50% Reduction of PTS
• No prevention of PTS at 2 years after DVT

Prandoni et al, Annals Internal Medicine 2004
Brandjes et al, Lancet 1997
Kahn et al, The Sox Trial, Lancet 2014
Vein damage

Time is VALVES!
New approach to DVT

- Anticoagulation
- Early thrombous removal
- Endovascular repair
“We suggest the use of early thrombous removal strategies in patients with - good functional capacity and first episode of iliofemoral DVT of <14 days in duration (grade 2C) and strongly recommend their use in patient with limb-threatening ischemia due to iliofemoral venous outflow obstruction (Grade 1B)”

Meissner MH et al, JVS 2012
Early thrombous Removal

- Relief of symptoms
- Preservation of valve function
- Reduction in clot recurrence
- Reduction in PTS
Early thrombous Removal: tecníques

1. Catether Direct Thrombolisys (CDT)
2. Mechanical Thrombectomy
3. Pharmaco-meccanical thrombolisis
Catheter Direct Thrombolysis

- Venous US guided puncture
- rTPA - Urochinese
- Saline solution
- Unfractionated Heparin
- Monitoring
# CDT: contraindications

<table>
<thead>
<tr>
<th>ABSOLUTE</th>
<th>RELATIVE</th>
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<tbody>
<tr>
<td>Active or recent (&lt;3months) bleeding</td>
<td>Recent (10d) mayor surgery, trauma, CPR</td>
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<tr>
<td>Recent Stroke</td>
<td>Uncontrolled Hypertension</td>
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<tr>
<td>History of intracranial or intraspinal tumor, vascular malformation or aneurysms</td>
<td>Bacterial endocarditis</td>
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<tr>
<td>Recent craniotomy</td>
<td>Diabetic retinopathy</td>
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<tr>
<td>Pregnancy</td>
<td>Mild hepatic disfunction</td>
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<tr>
<td>Coagulopathy</td>
<td></td>
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<tr>
<td>Severe Liver disfunction</td>
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Mechanical Thrombectomy

- On-label
- Quick reperfusion
- Removal of thrombus
- Can be used with other treatment strategies
Indigo Penumbra

- Continuous Mechanical Aspiration
- High pressure
- Separator brakes thrombous
MECHANICAL CLOT ENGAGEMENT
Proprietary Separator Technology

MAXIMISED ASPIRATION POWER
Large Lumen Aspiration

TIP DIRECTIONALITY
For Circumferential Aspiration
Circumferential Aspiration

CAT8 Tip Shapes

- STR
- TORQ
- XTORQ

Angle: 20–45°
Tip length: 1.8 cm
Acute DVT

67 Years Old Male,

• Previous Urologic Surgery
• Acute DVT
• Left Compression of EIA
• Severe Leg Swelling
• 3 day of Persistent Pain
Acute DVT
Acute DVT
Acute DVT
IVC/Iliac Vein Thrombus

Drs. Bella Huasen & Stephen D'Souza, Royal Preston, United Kingdom

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Iliac Vein Thrombus
CAT8XTORQ with SEP8

Dr. Lawrence Whitney,
Lakeland Regional Medical Center, FL, USA

Images used with permission. Consent on file at Penumbra, Inc.
Pulmonary Artery Thrombus

Dr. Corey Teigen, Sanford Health, ND, USA

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Conclusion

• Early thrombous removal is safe and effective in selected patients

• Decision making in referral centers

• Mechanical Thrombectomy can restore quickly flow to preserve valve and veins and prevent PTS