Reducing Thrombotic Burden in Arterial Interventions

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Disclosure

Speaker name: Mario Galli

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

* * I do not have any potential conflict of interest
TIMI Myocardial Perfusion (TMP) Grades

ACCF/AHA Guideline
2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction
RecommendationClass IIa – Level of Evidence: B
Manual aspiration thrombectomy is reasonable for patients undergoing primary PCI.

Gibson et al. Circulation 2000;101:125
Catheter-based technique in (high-risk) PE patients with controindication to thrombolysis

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE with shock or hypotension (high-risk)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is recommended that intravenous anticoagulation with UFH be initiated without delay in patients with high-risk PE.</td>
<td>I</td>
<td>C</td>
<td></td>
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<tr>
<td>Thrombolytic therapy is recommended.</td>
<td>I</td>
<td>B</td>
<td>160</td>
</tr>
<tr>
<td>Surgical pulmonary embolectomy is recommended for patients in whom thrombolysis is contraindicated or has failed.</td>
<td>I</td>
<td>C</td>
<td>313</td>
</tr>
<tr>
<td>Percutaneous catheter-directed treatment should be considered as an alternative to surgical pulmonary embolectomy for patients in whom full-dose systemic thrombolysis is contraindicated or has failed.</td>
<td>IIa</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>
Current PAD Treatment
If Thrombus is present

Once Diagnosed (physical exam, history, ultrasound or other imaging)

- **Thrombolysis** followed by Primary Endovascular Intervention (Balloon, Stent)
- **Surgery** (not as common)
- **Percutaneous Mechanical Devices**, such as AngioJet, used to remove the thrombus followed by Primary Endovascular Intervention (Atherectomy, Balloon, Stent)
Limitations of Thrombolysis

Duration
- Time to reperfusion 4-48 hours
- Difficult on patient and personnel
- Probability of complications increases with duration

Embolization
- Theorized to “wash” emboli downstream
- Often self-treating

Expense
- Drugs
- Intensive care monitoring
- Serial arteriography
- Complications
AngioJet™ Thrombectomy System
Clinical Indications

• 1996 FDA approval of AngioJet System

• Current FDA and CE indications:
  – Coronary native arteries
  – Saphenous Vein Coronary Bypass Grafts
  – Peripheral Arteries
  – AV access hemodialysis grafts
  – Peripheral Veins
  – Pulmonary Embolism (CE)
AngioJet<sup>TM</sup> in Peripheral Procedures

### ANGIOJET<sup>TM</sup> Catheter Reference Guide

<table>
<thead>
<tr>
<th>AngioJet Console</th>
<th>Model</th>
<th>Indication</th>
<th>Delivery Platform</th>
<th>Minimum Vessel Diameter</th>
<th>Catheter Length</th>
<th>Catheter Diameter</th>
<th>Guidewire Diameter</th>
<th>Introducer Sheath</th>
<th>Power Pulse Delivery Embolized</th>
<th>Goldwire Swappables</th>
<th>Contrast Injection Port</th>
<th>Flow Rate</th>
<th>Total Run Time</th>
<th>Run Time with Blood Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solent&lt;sup&gt;TM&lt;/sup&gt; Dista</td>
<td>Peripheral Arterial</td>
<td>OTW</td>
<td>1.5 mm</td>
<td>145 cm</td>
<td>4F/3 F</td>
<td>0.014&quot;</td>
<td>4 F</td>
<td>Yes</td>
<td>Yes</td>
<td>23mL/min</td>
<td>600 sec</td>
<td>300 sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solent&lt;sup&gt;TM&lt;/sup&gt; Omni</td>
<td>Peripheral Arterial and Venous, AV Access</td>
<td>OTW</td>
<td>3 mm</td>
<td>120 cm</td>
<td>6 F</td>
<td>0.035&quot;</td>
<td>6 F</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>60mL/min</td>
<td>480 sec</td>
<td>240 sec</td>
</tr>
<tr>
<td>Solent&lt;sup&gt;TM&lt;/sup&gt; Proxi</td>
<td>Peripheral Arterial and Venous, AV Access</td>
<td>OTW</td>
<td>3 mm</td>
<td>90 cm</td>
<td>6 F</td>
<td>0.035&quot;</td>
<td>6 F</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>60mL/min</td>
<td>480 sec</td>
<td>240 sec</td>
</tr>
<tr>
<td>AVX&lt;sup&gt;TM&lt;/sup&gt;</td>
<td>AV Access Grafts and Fistula</td>
<td>OTW</td>
<td>3 mm</td>
<td>50 cm</td>
<td>6 F</td>
<td>0.035&quot;</td>
<td>6 F</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</tbody>
</table>

**Power Pulse Delivery**
Delivers medication directly into the clot, where it’s most effective, saturating and softening tough thrombus for easier removal.

### DVX / Xpeedior
- Abdominal Aorta: 10 – 24 mm DVX
- Common Iliac: 6 – 12 mm DVX
- External Iliac: 5 – 9 mm DVX
- Deep Femoral: 4 – 5 mm Xpeedior/DVX
- Superficial Femoral: 4 – 6 mm Xpeedior/DVX

### XVG / Xpeedior
- Popliteal: 3 – 5 mm

### XMI
- Anterior Tibial: 2 – 4 mm
- Peroneal: 2 – 3 mm
- Posterior Tibial: 2 – 4 mm
- Dorsalis Pedis: 1 – 3 mm
AngioJet Thrombectomy Catheter Comparison:

Relative Areas-of-Effect

22mm tubes were filled with simulated clot and screen mesh to represent a vessel. Each catheter was activated in the tube for about 60 seconds.

Bench test results may not necessarily be indicative of clinical performance. BSC data on file.
There is a need for a better solution

**AngioJet + Lytics Concept:**
For more challenging cases, Interventionalists are now using combination therapies to:
- maximize and combine the advantages and
- minimize the risks and disadvantages of *both*

Thrombolysis and Mechanical Thrombectomy
Pharmacomechanical thrombectomy (PMT)

**PMT - benefits**

- lower dose of thrombolytic agent and decrease of hemorrhagic complications rate
- shortening the procedure duration
- shortening the length of ICU stay and hospitalisation
AngioJet® Pharmacomechanical thrombectomy (PMT)

**Rapidlysis** (20mg Actilyse added to 250/500ml saline)
Simultaneous application of thrombolytic with thrombus thrombectomy

**Power pulse technique** (20mg Actilyse added to 50ml saline power pulse spray, then 20-30 minutes wait and after that thrombectomy)
Application of thrombolytic agent and after 20-30 minute thrombus aspiration
Acute Total Aortic Occlusion and Limb-Threatening Ischemia (1)

Patient History:
A 68 year-old male presented with atrial fibrillation, acute inferior MI, and abdominal aortic occlusion with a 4.5cm aneurysm. He was not a surgical candidate and was taken emergently to the catheterization lab.

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute Total Aortic Occlusion and Limb-Threatening Ischemia (1)

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Acute Total Aortic Occlusion and Limb-Threatening Ischemia (1)

Kissing Stent BMS  Final Result

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Acute SFA and TPT Occlusion and Limb-Threatening Ischemia (2)

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Acute SFA and TPT Occlusion and Limb-Threatening Ischemia (2)

PMT + 5 mg rtPA (rapidlysis)

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Acute SFA and TPT Occlusion and Limb-Threatening Ischemia (2)

Final angio after PMT + 5 mg rtPA (rapidlysis) + PTA

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Acute SFA and Distal Occlusion and Limb-Threatening Ischemia (3)

PMT (DVX) + 5 mg rtPA (rapidlysis)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute SFA and Distal Occlusion and Limb-Threatening Ischemia (3)

Final Angio

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute EIA and Limb-Threatening Ischemia (4)

EIA thrombotic occlusion

Right Recanalization

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute Ela and Limb-Threatening Ischemia (4)

PMT (DVX) + 5 mg rtPA (rapidlysis)

Final Angio

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Acute Viabahn occlusion
Limb-Threatening Ischemia (5)

SFA thrombotic occlusion
Viabahn Recanalization

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Acute Viabahn occlusion
Limb-Threatening Ischemia (5)

Distal filter protection
Reholityc thrombectomy

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Acute Viabahn occlusion
Limb-Threatening Ischemia (5)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute Aortic Thrombus Embolization (6)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute Aortic Thrombus Embolization (6)

PMT (DVX) + 10 mg rtPA (rapidlysis)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute popliteal aneurysm occlusion (7)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Acute popliteal aneurysm occlusion (7)

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.

PMT (DVX) + 10 mg rtPA (rapidlysis) + Viabahn
Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.
Conclusion

Mechanical thrombectomy or PMT offers:

- Thrombus removal in single procedure
- Decreased dose and duration of lytic
- Potential of decreased bleeding complications
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