Aspiration Thrombolysis and Thrombectomy in Peripheral Arterial Disease Management

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Aspiration Thrombolysis and Thrombectomy in Peripheral Arterial Disease Management

- PAD affects approximately **8-12 million people** in the U.S., mainly those who are 50 and older
- **Affects 12-20%** of Americans who are 65 and older
- **160,000 amputations annually**
  - mortality rates of:
    - 30% at 5 years
    - 50% at 10 years

Sources:
American Heart Association website, www.americanheart.org, 1-6-06.
Society of Interventional Radiologists website, www.sirweb.org, 1-6-06
Ouriel KJ. Detection of peripheral arterial disease in primary care. JAMA
PAD Patients are Hypercoagulable

Ongoing Fibrin Formation and Degradation as a Function of ABI

50% of patients with are asymptomatic.

Obstruction of the arterial lumen decreases blood flow until the patient becomes symptomatic.

Thrombus is often present and is frequently the precipitating factor that moves chronic limb ischemia to critical limb ischemia.

Source: University of Chicago Hospitals website, www.uchospitals.edu/online-library/content=P00236
Thrombus, an intravascular aggregation of platelets, fibrin and entrapped blood cells, can cause a vessel occlusion.
Treatment Options

- **Thrombolytic Therapy**
  - Catheter infusion of thrombolytic agents
  - Infusion may last 8-48 hours with multiple trips to the lab to assess thrombus resolution

- **ADVANTAGES**
  - Easy to administer
  - Effective

- **DISADVANTAGES**
  - Potential for bleeding complications
  - Distal embolization risk
  - Higher doses and longer infusions increase risk of potential complications
Treatment Options

- **Surgery**
  - Surgical bypass
  - Surgical thrombectomy

- **Advantages**
  - Good long-term patency
  - Option for multiple stenosis

- **Disadvantages**
  - Invasive
  - Increased morbidity and mortality
  - Increased healing time
  - Increased hospital stay
Chronic or Acute closure of Iliac and Femoral vessels are challenging to treat.

A significant component, particularly in the Acute setting, is likely a large thrombus burden.

Primary treatment with angioplasty may be ill advised due to the high risk of embolization, long lesion lengths, and large volume of thrombus.

Thrombolytics are useful but when used alone are costly, time consuming and may have high complication rates with variable outcome.

Surgery can provide good patency but there is associated morbidity and mortality, as well as increased hospital stay.

Endovascular intervention with combined thrombolysis/thrombectomy is most effective and efficient option.
Types of Thrombectomy Tools
Basic Syringe Aspiration

- “Old School”
- End hole or side hole aspiration with advancement of catheter
- Easy to use
- Cost effective
- Difficult to remove large thrombus burden
- Increased risk of embolization

- Pronto - Vascular Solutions
- Export® AP Aspiration Catheter – Medtronic
- Fetch™2 - Boston Scientific
- QuickCat - Spectranetics
Aspire Aspirator-Control Medical Technology

- Uses a hand held pump with a one way valve to aspirate thrombus and purge to a collection barrel in a single motion
- Easy to set up, relatively cost effective
- Versatile connects to any catheter
Types of Thrombectomy Tools

Electromechanical Aspiration

- Electrical pump provides continuous vacuum aspiration
- A soft tipped Penumbra Separator™ is used to agitate the thrombus and maintain patency of the aspiration catheter
- Multiple sizes available and can be used in small vessels such as cerebrovascular
Types of Thrombectomy Tools
Pharmacochemical

- Occluding balloons isolate the thrombus
- Thrombolytics are infused into the isolated area
- Drive unit activates catheter to macerate thrombus and disperse lytic
- Thrombus and residual lytic is aspirated

Trellis™ Medtronic
Types of Thrombectomy Tools
Ultrasonic accelerated thrombolysis

- Enhanced catheter-directed thrombolysis
- Ultrasound energy facilitates dispersion of the lytic agent
- Increases efficiency and decreases total lytic dose
- Minimal trauma to the vessel

EkoSonic Endovascular System-Ekos Corporation
Types of Thrombectomy Tools
Rotational Thrombectomy

- Indicated in grafts and fistulas
- Atraumatic sinusoidal wire conforms to vessel size
- Macerates thrombus
- Thrombus aspiration through introducer sheath

CLEANER XT™-Argon Medical
Types of Thrombectomy Tools

Rheolytic Thrombectomy

- Powerful saline jets create a low pressure zone around the catheter tip that causes a vacuum effect
- Thrombus is drawn into the catheter, where it is fragmented by the jets and then removed from the body
- Wide variety of catheter sizes and lengths

AngioJet system (Boston Scientific Corporation)
AngioJet thrombectomy indicated for the controlled and selected infusion of physician-specified fluids, including thrombolytic agents.

Utilizing mechanical thrombectomy to power-infuse lytic solution directly into the clot.

Wait time followed by removal in the thrombectomy mode.

Combination of chemical and mechanical thrombolysis.
Distal Protection

- Safe and effective in capturing macrodebris
- Associated with good angiographic outcomes in high-risk endovascular interventions and high risk lesion
- Strongly consider in acute closures, particularly in surgical grafts
- Strongly consider in atherectomy cases
- Mandatory when utilizing certain atherectomy devices
- Strongly consider when tibial/peroneal runoff is diminished or single vessel runoff
Major Distal Protection Devices

- Emboshield Nav6
- Filterwire EZ
- SpiderFX
- All have variable ease of use
Emboshield Nav6

- The Emboshield NAV6 Embolic Protection System is indicated for use as a guide wire and embolic protection system to contain and remove embolic material (thrombus / debris) while performing angioplasty and stenting procedures in carotid arteries.
- BareWire system allows wire movement independent of the filter, with an advanced filter design for enhanced capture efficiency and flow preservation.
Distal Protection WORKS!!!
Case 2

- 84 year old Caucasian male
- History
  - PAD
  - HTN
  - Smoking
  - Facial Ca with jaw resection
  - CAD
- Occluded SFA stent
- CTO deep femoral with collateralization from the hypogastric
- 3 vessel runoff
- Ischemic left foot ulcer
Case 2
Case 2
Case 2
Case 2
Conclusion

- Peripheral thrombus is a major factor in CLI
- Proper management and treatment are the keys to a successful outcome
- Key points:
  - Distal protection is a no brainer!!
  - Thrombolysis and thrombectomy is essential to improve flow and visualized underlying lesions
  - Evaluate and treat inflow
  - Evaluate and treat outflow
  - The above tips lead to shorter case times and better outcomes
Shorter Case Times and Better Outcomes Makes the Cath "Crue" Happy!!