For Aortic Lesions That Are Embolizing, Endograft Treatment is Generally the Best and Most Durable Treatment

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Consultant
WL Gore: Scientific Advisory Board, PI TAMBE
Cordis: PI for Incraft IDE
Medtronic: PI for Endurant IDE, Advisory Board

Research Grants in Aortic Field
WL Gore, Cook, Cordis, Medtronic, Boston Scientific, Bolton, Lombard, Endologix, Trivascular

Embolizing Aortic Lesions
Two Major Types

- Atherosclerotic (Shaggy Aorta)
  - Embolic material: Plaque debris
  - Source: Thoracic > Abdominal > Iliacs
  - Target: Small peripheral arteries
    - Blue toes most common presentation
    - Visceral involvement if Thoracic origin
- Thrombus
  - Hypercoagulable patients (malignancy, genetic...)
  - Occasionally Underlying Aortic pathology

Blue Toe Presentations
Usually Bilateral / Recurrent
Often in the presence of Palpable Pedal Pulses

Athero-Embolic Renal Disease
- Dismal outlook!! One Year Mortality 30-75%
- Results in Renal Failure
- Specific treatment is lacking

Embolization Source: Thoracic Abdominal
- Recurrence 60% 8%
- 1 year Mortality 60% 11%
- Amputation 40% 17%
- Surgical Rx reduces embolization rate: 36% to 7%
  BUT associated with high Mortality and Morbidity

Aortic Athero-Emboli: The Shaggy Aorta

Stent Graft Coverage may be an Attractive Option to Reduce Embolization and avoid Surgical Aortic Replacement

If it can be done safely

Diagnosis of Aortic Embolic Source
- High Index of Suspicion is Essential
- CT scan with contrast if renal function allows
- TEE

Endovascular Management
- Minimal manipulation
- Minimize contrast use
- Intraoperative IVUS: localization of offending lesions

Stent Grafts for Athero-Embolism: JS

62 year old Truck driver
- March 2006: Two Blue toes on left
- Renal dysfunction: Cr = 1.7
- CT SCAN: Large Atheromas in the Thoracic Aorta with Renal Micro-emboli!
- Refused Stent Graft in Mar 06
- Returned May 06: New episode of Blue toes on the right side
- Progressive Renal dysfunction: Cr = 2.4
- Agrees to Stent-Graft Coverage

Stent Grafts for Athero-Embolism: JS

Thoracic Endograft June 06
- IVUS control. No contrast used
- Large Mobile plaque
- IVUS Probe

Stent Grafts for Athero-Embolism: JS

Dec 2007: No recurrence. Cr. 1.7 CT scan
- No new renal infarcts. Clean luminal surface
- 2008: Cr drops to 1.5 / Stable for 8 Years
- Returned with more embolizations Aug 2014. Cr 2.7

Dec 2007 Post Rx Dec 2007 Post Rx
Sources can be multiple: All Should be Treated if feasible

- 2008 Repeated episodes of Left Blue toes
- Weak but Palpable Left pedal pulses

Abdominal Thrombus
Thoracic Thrombus

**Stent Grafts for Athero-Embolism: FN**

Nov 08 Thoracic and Abdominal Aorta covered  IVUS

Before Coverage
After Coverage

**Stent Grafts for Mobile Thrombus: TS**

Traditional Rx with Anticoagulation
Not Always effective
DC 54 Year old with Arch Clot and Neuro endocrine Tumor

Arch Thrombus
Larger Clot + Arm Embolus

Feb 2013
March 2013 On Anticoagulation

**Stent Grafts for Mobile Thrombus: TS**

- Different Pathology
- Serious morbidity
- Same principles apply
- TS: 44 year old Female
- Abdominal and flank pain
- Thoracic clot
- Splenic Infarcts
- Renal Infarct
- SMA embolus

**Stent Grafts for Mobile Thrombus: TS**

Angiography almost useless for Dx or procedural control

**Stent Grafts for Mobile Thrombus: TS**

TEE Control
**TREATMENT**
- SMA Embolectomy
- Stent Graft Coverage of the Mobile thrombus
- Anticoagulation
- No complications
- No recurrence

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**UPMC Experience 2006-2013**
- 4 of 8 patients tested did have Hypercoagulable state
  - Thoracic aorta only: 12 patients 48%
  - Abdominal aorta only: 5 patients 20%
  - Thoracic and abdominal: 8 patients 32%
- Pathology
  - Atherosclerotic plaque: 16 patients 64%
  - Mobile isolated thrombus: 9 patients 36%
  - AAA: 6 patients 24%

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**Not all Patients are suitable**
Aortic replacement or Endarterectomy still has a role in some Athero-Embolic cases

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**Endovascular strategies for treatment of embolizing thoracoabdominal aortic lesions**
- Mean Age: 65 years  16 women (64%)  
- CKD Stages II or higher: 19 patients
- Clinical Presentation
  - 17 peripheral embolizations  5 Acute ischemia
  - 6 Renal
  - 5 Abdominal pain and visceral emboli
  - 3 No current symptoms

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**Not all Patients are suitable**
Anticoagulation remains an adequate Treatment option for Thrombotic emboli

May 2014 MB: 55 Year old woman with Diverticulitis liver and Peri-Rectal abscess. Non Mobile clot next to SMA

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**Stent Grafts for Mobile Thrombus: TS**

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**UPMC Experience 2006-2013** 25 patients
- Mean Age: 65 years  16 women (64%)
- CKD Stages II or higher: 19 patients
- Clinical Presentation
  - 17 peripheral embolizations  5 Acute ischemia
  - 6 Renal
  - 5 Abdominal pain and visceral emboli
  - 3 No current symptoms

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**UPMC Experience 2006-2013**
- Stent Graft coverage with IVUS – TEE in 25% of patients
  - Variety of Stent grafts used
  - One segment covered 18 patients
  - Multiple 7 patients
- 3 adjunctive surgical thrombectomies
- No Operative Mortality
- One CKD stage V progressed to dialysis
- No Clinical Embolizations
- 1 Recurrence at 8 years

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**DG Sept 2013: 65 Year old woman. Plaque in Visceral Aorta**

Aortic Endarterectomy

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**May**

**August**
Summary

- Endovascular Rx of embolizing lesions is Safe and Effective in controlling emboli
- IVUS or TEE are best suited for intraoperative control and identifying the offending lesions for treatment
- Stent coverage before end organ damage occurs can offer beneficial outcomes.