CONTROVERSIES & UPDATES IN VASCULAR SURGERY
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MARRIOTT RIVE GAUCHE & CONFERENCE CENTER PARIS, FRANCE

TEVAR For Embolizing Lesions of the Aorta

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Disclosure

Speaker name: MICHEL MAKAROUN, M.D.

- ***No Financial Compensation or Conflicts***
- I have the following potential conflicts of interest to report:
  - WL Gore: Scientific Advisory Board / Research Grants
  - Medtronic: Study PI and Research Grants
  - Cordis: Study PI and Research Grant

Blue Toe Presentations

Severe bilateral with previous amps from Embolization
Palpable Pedal Pulses

After the blue toe: Prognosis of noncardiac arterial embolization in the lower extremities

Kara H. V. Kvilekval, MD, Jonathan P. Yunis, MD, Robert A. Mason, MD, and Fabio Giron, MD, PhD, *Stony Brook and Northport, N.Y.*

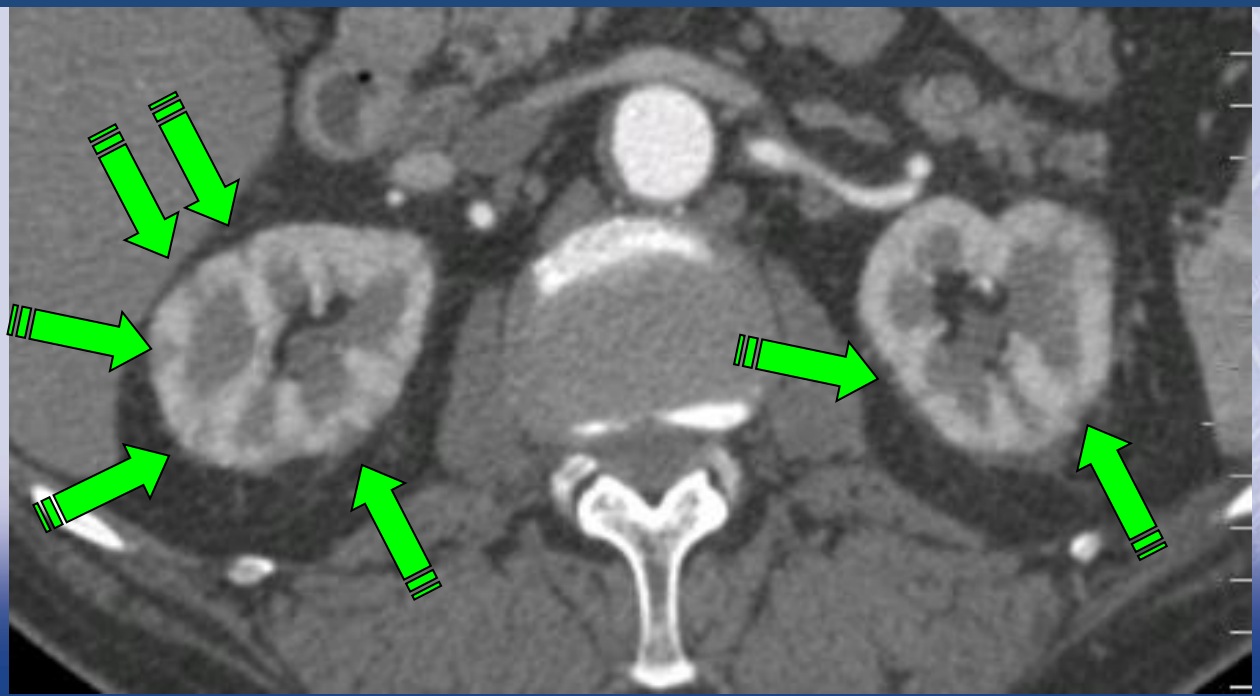
Embolization Source:	Thoracic	Abdominal
○ Recurrence	60%	8%
○ Mortality	60%	11%
○ Amputation	40%	17%

○ Surgical treatment reduces embolization: 7 vs 36%

J Vasc Surg1993;17:328-35

Athero-Embolic Renal Disease

- Can be Spontaneous but increasingly Iatrogenic
- Results in Renal Failure / Progressive with recurrence
- Dismal outlook !!
- Specific treatment is lacking



Clinical Features of *Atheroembolic* Renal Disease

	Fine	Lye	Thadhani	Belenfant	Scolari
N	221	129	52	67	52
% Spontaneous	69	40	0	4	21
% Iatrogenic	31	60	100	96	79
% Post Anticoagulation	14	13	37	76	21
% Skin lesions	35	43	50	90	96
% GI involvement	10	10	29	33	8
% Retinal emboli	6	10	25	22	8
% Eosinophilia	73	71	22	59	62
% Dialysis	28	40	44	61	35
ONE YR MORTALITY	**81**	**64**	**87**	**23**	**31**

Aortic Athero Emboli: The Shaggy Aorta

Stent Graft Coverage
may be an
Excellent Option to
Reduce Embolization
and avoid
Surgical Aortic Replacement
If it can be done safely

Aortic Athero Emboli: The Shaggy Aorta

Diagnosis

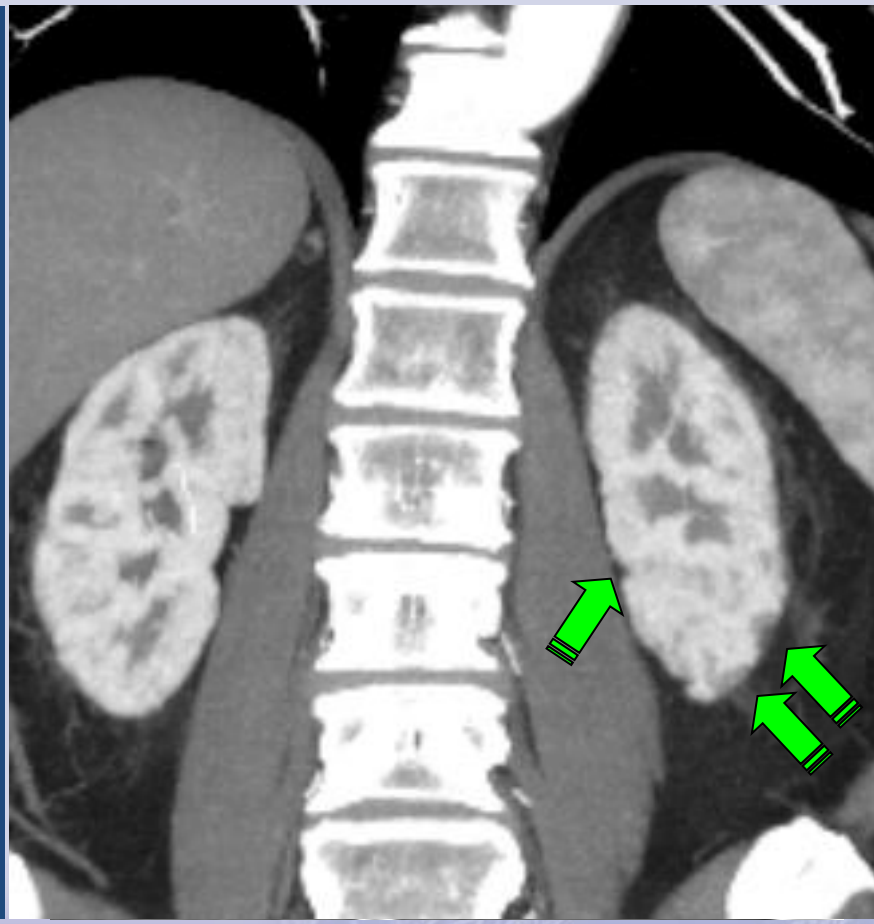
- Clinical suspicion essential
- CT scan with contrast if renal function allows
- TEE

Endovascular Management

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

Stent Grafts for Atheroembolism: 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 !



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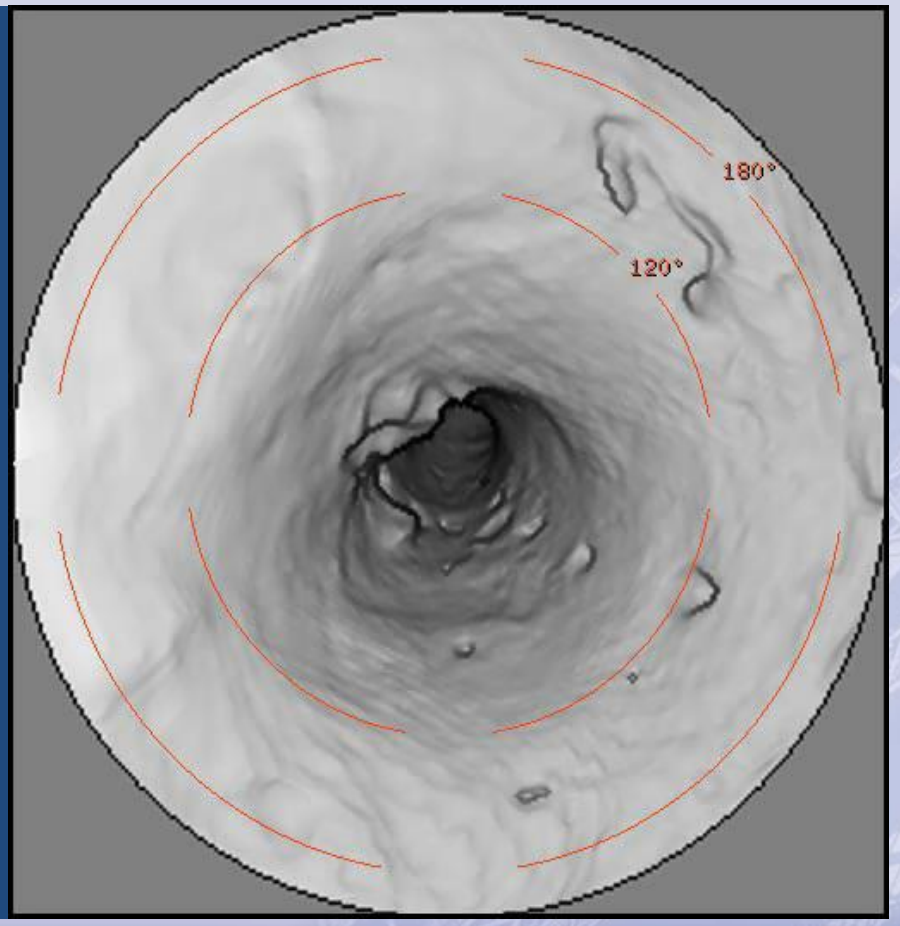
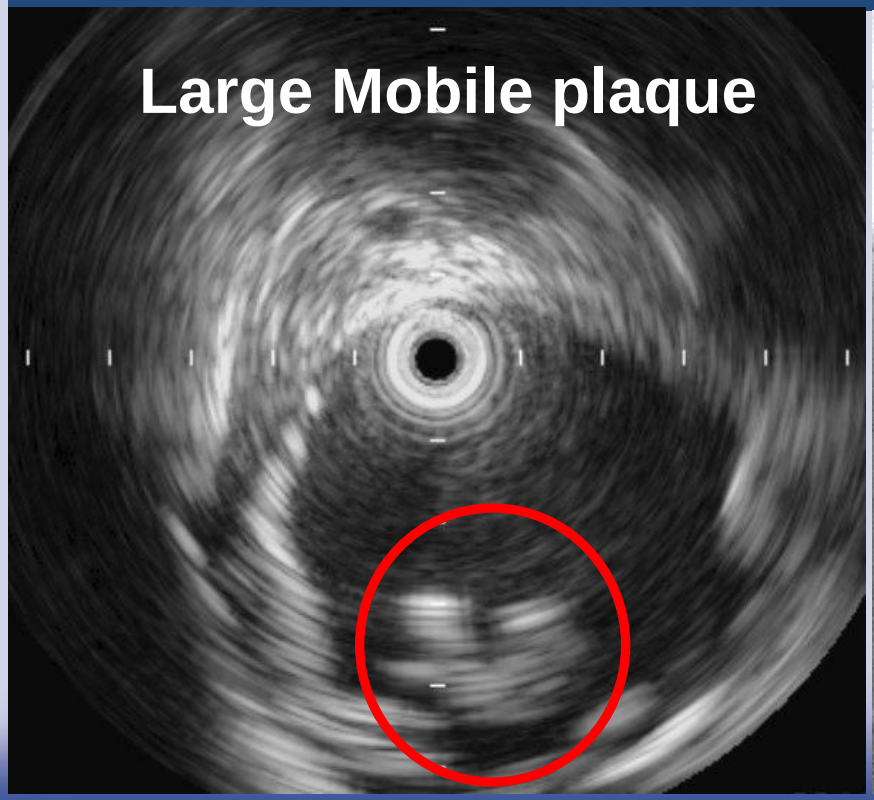


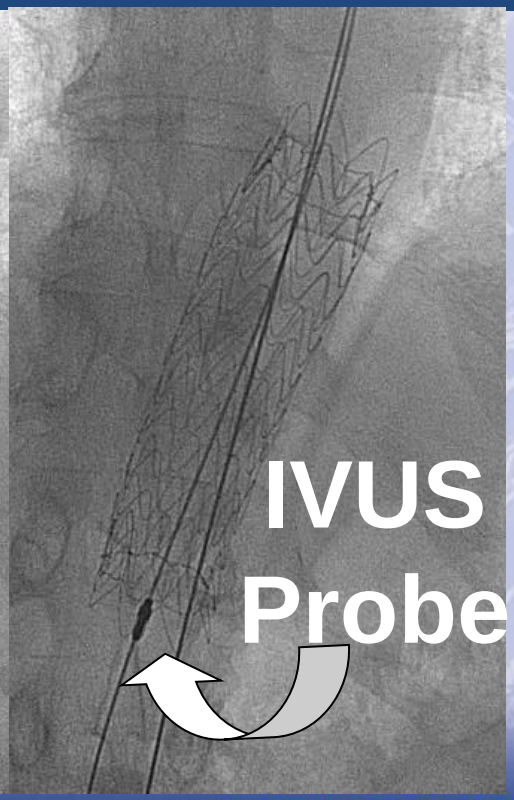
Stent Grafts for Atheroembolism: JS

- Refused Stent Graft in Mar 06
- Returned May 06: New episode of Blue toes on the right
- Progressive Renal dysfunction: Cr = 2.4
- Agrees to Stent-Graft Coverage.

Stent Grafts for Atheroembolism: JS

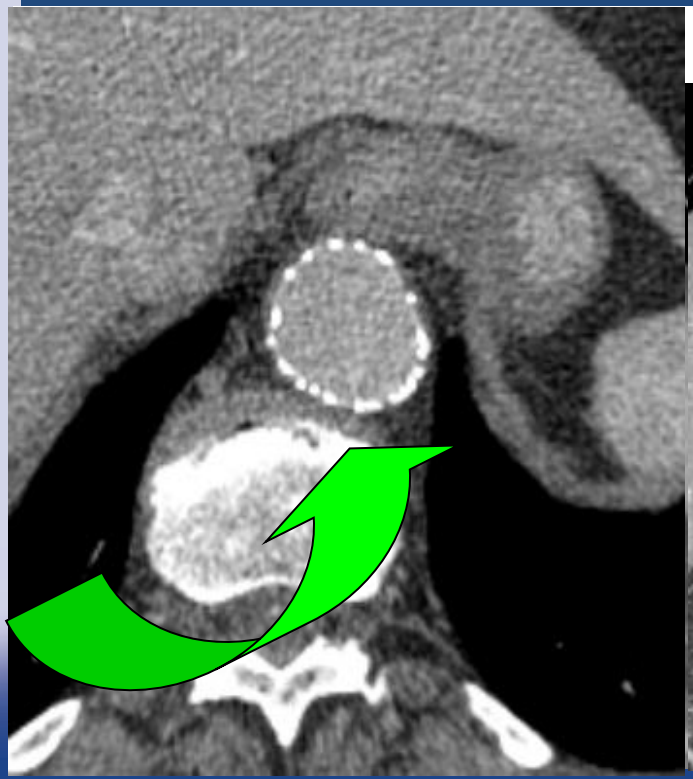
- Thoracic Endograft June 06
- IVUS control. No contrast used





Stent Grafts for Atheroembolism: JS

- Dec 2007 _ No recurrence _ Cr: 1.7 ⟹ CT scan
- No new renal infarcts _ clean luminal surface
- FU 12/08 _ No recurrence _ CR: 1.5
- Returned with more embolizations Aug 2014 _ CR 2.7



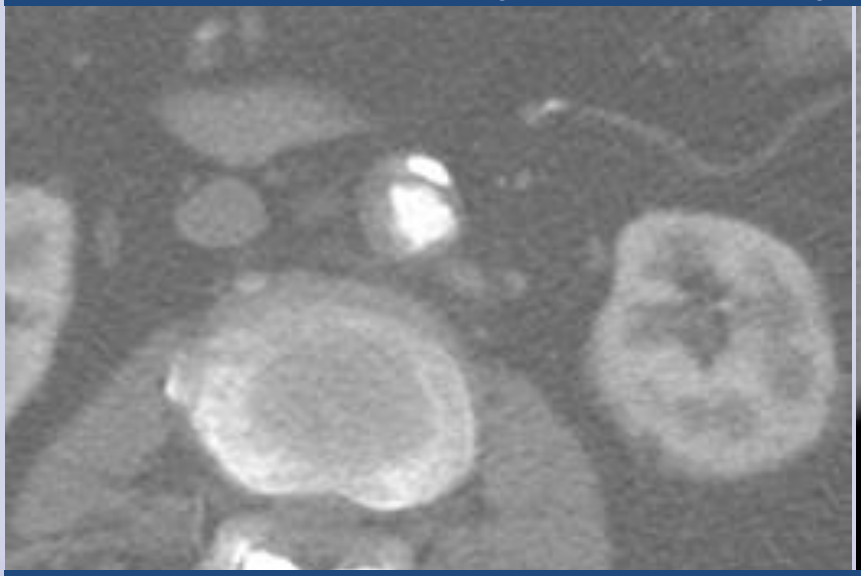
Dec 2007 Post Rx

Dec 2007 Post Rx

Stent Grafts for Atheroembolism: FN

Sources can be multiple: All Should be Treated if feasible

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



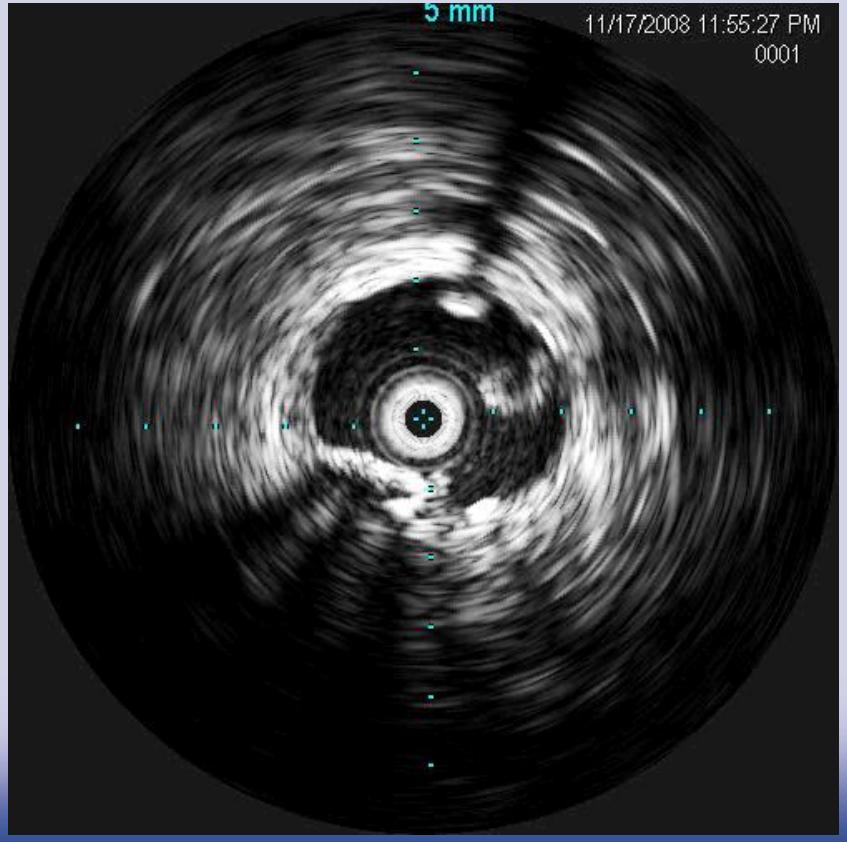
Abdominal Aortic Thrombus

Thoracic Aortic Thrombus

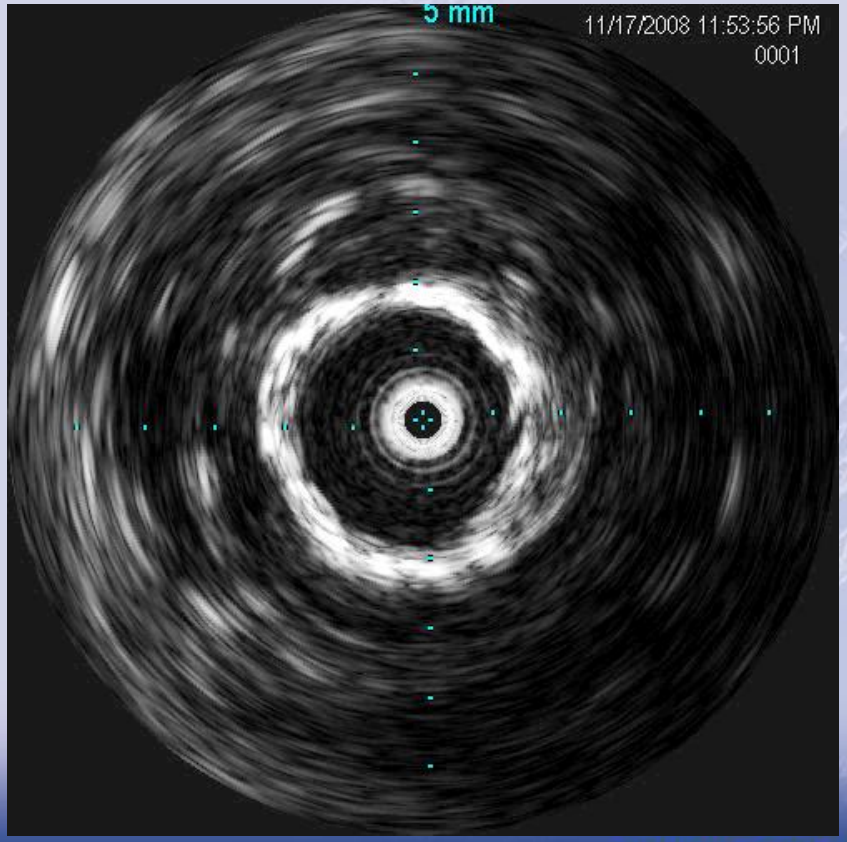
Stent Grafts for Atheroembolism: FN

Nov 08 Thoracic and Abdominal Aorta covered _ IVUS control

Before Coverage

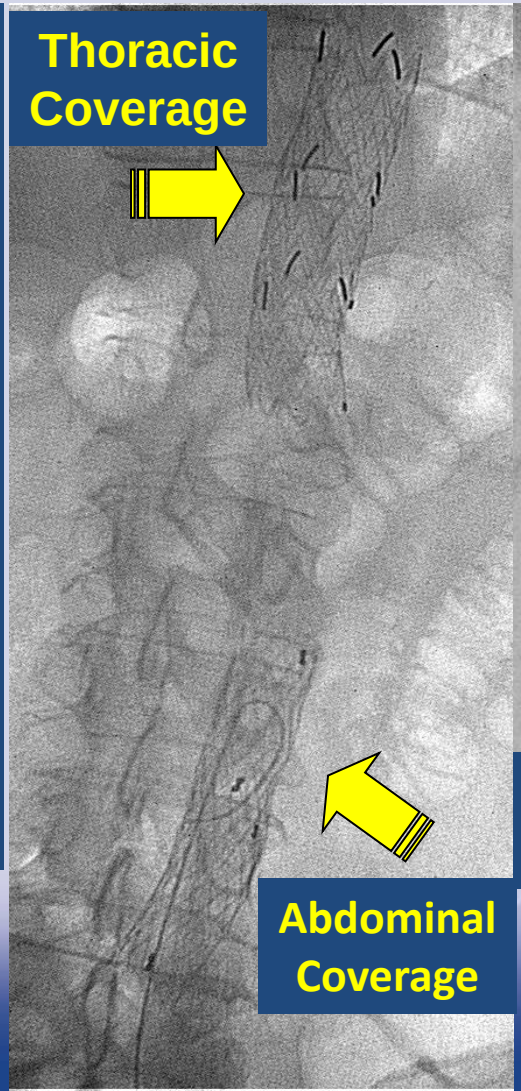


After Coverage



Stent Grafts for Atheroembolism: FN

- Nov 2008 Stent graft
- Apr 2009 Iliac stent
- FU May 2009
  - Lesions healed
  - No recurrence
  - Cr stable



L Ext Iliac plaque Treated

Stent Grafts for Mobile Thrombus: TS

- Different Pathology
- Consequences similar
- Same principles apply

- TS: 44 year old Female
- Abdominal and flank pain

- Thoracic clot

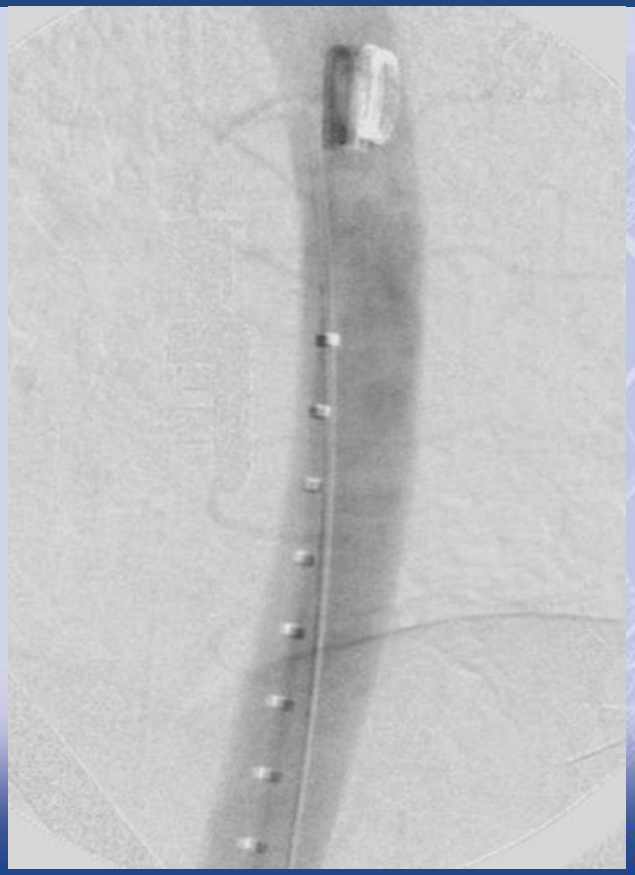
- Splenic Infarcts

- Renal Infarct

- SMA embolus

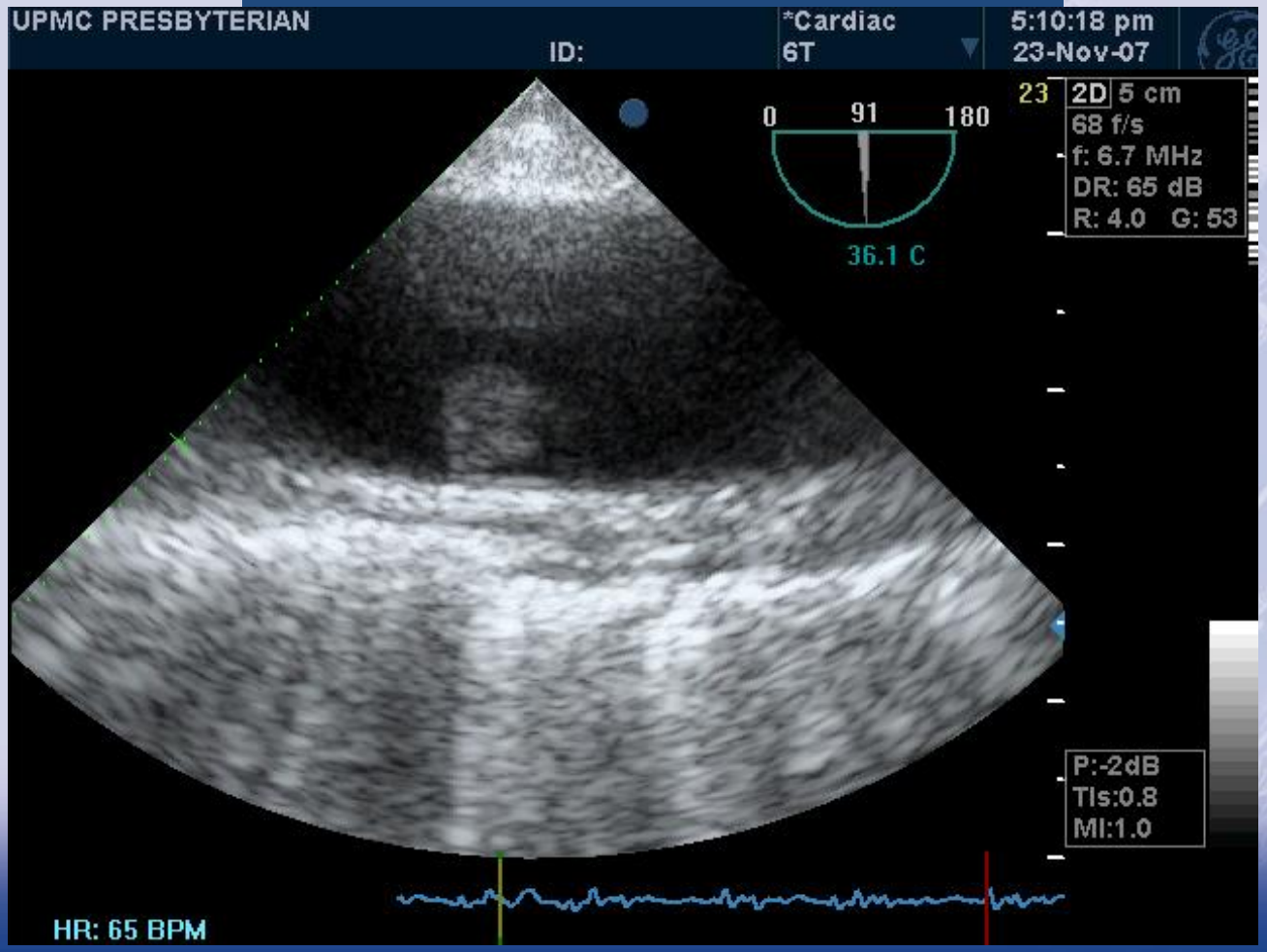
Stent Grafts for Mobile Thrombus: TS

- Treatment with a stent graft
- Angiography almost useless for these procedures



Stent Grafts for Mobile Thrombus: TS

TEE Control



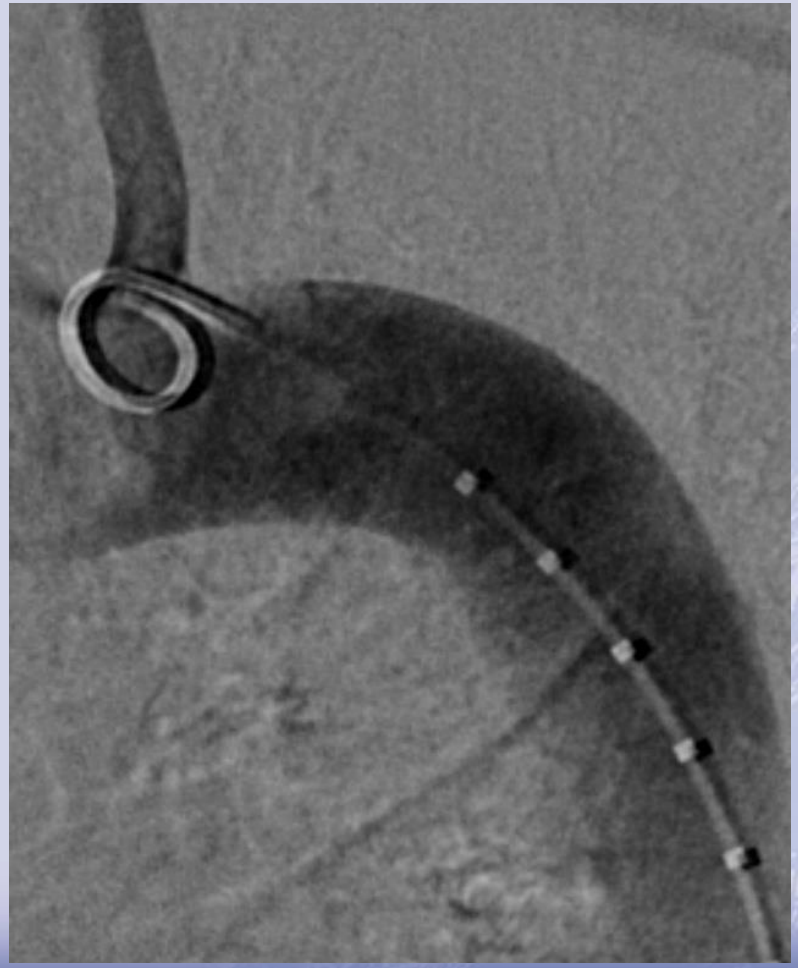
Stent Grafts for Mobile Thrombus: TS

TREATMENT

- SMA Embolectomy
- Stent Graft Coverage of the Mobile thrombus
- No complications
- No recurrence

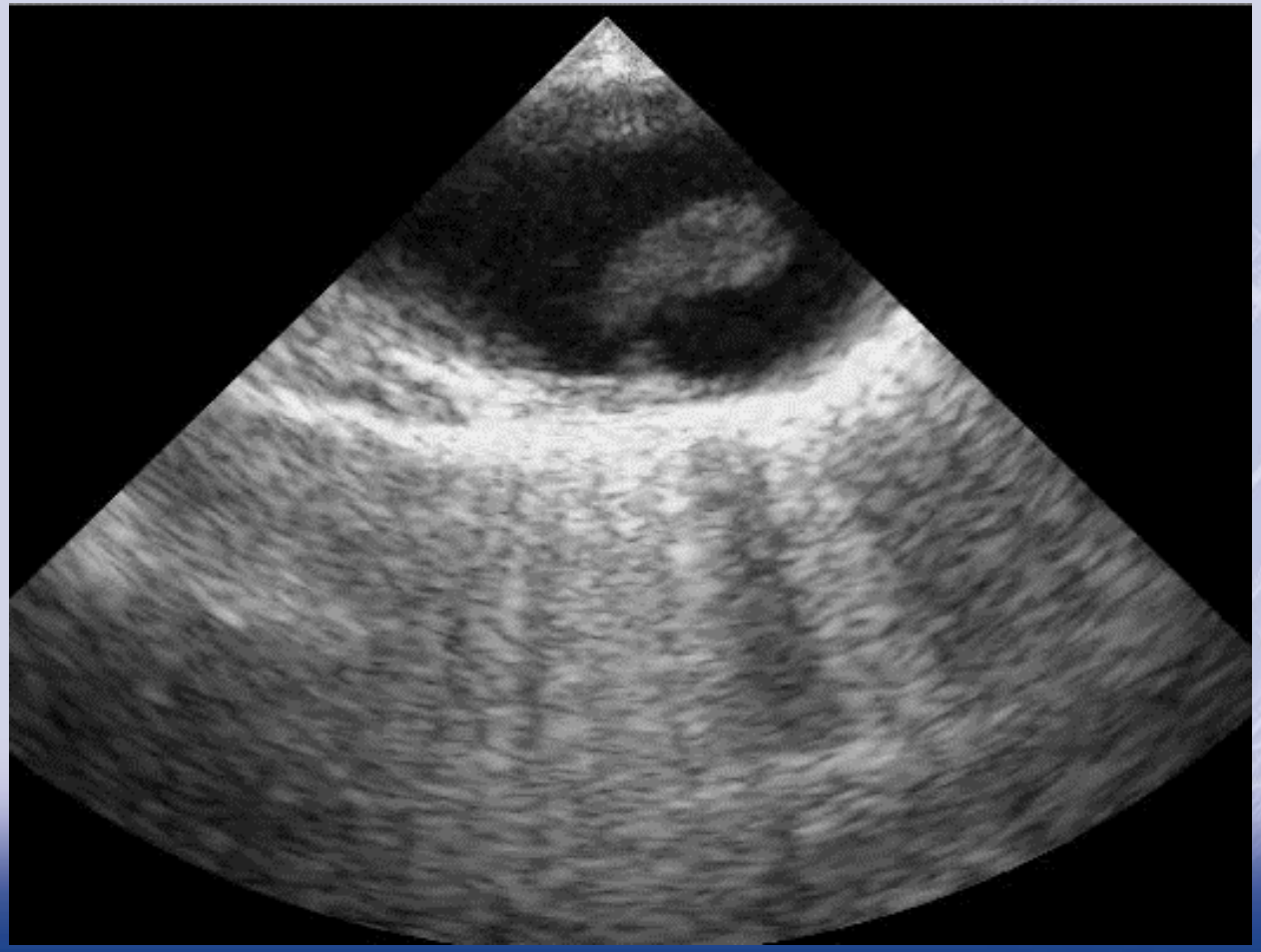
Stent Grafts for Mobile Thrombus: AD

- 57 year old Lady
- Nov 2008: Blue toes and splenic infarct
- 2008 past history
  - Sigmoid colectomy
  - Bilateral renal stents
- CT: Arch clot
- Angio: No help
- Rx under TEE



Stent Grafts for Mobile Thrombus: AD

TEE Control



Stent Grafts for Mobile Thrombus: AD

Endovascular strategies for treatment of embolizing thoracoabdominal aortic lesions

Geetha Jeyabalan, MD, Justin R. Wallace, MD, Rabih Antoine Chaer, MD, Steven A. Leers, MD, Luke Keith Marone, MD, and Michel S. Makaroun, MD, *Pittsburgh, Pa*

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

J Vasc Surg 2014;59:1256-64

UPMC Experience 2006-2013

- **4 of 8 patients tested have Hypercoagulable state**
- **Anatomy**
  - 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%

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
  - EVAR for suspected AAA source: 3 patients
- 3 adjunctive surgical thrombectomies
- No Operative Mortality
- One CKD stage V progressed to dialysis
- No Clinical Embolizations

Summary

- Early suspicion and prompt evaluation by CT and TEE can identify the problem
- 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.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