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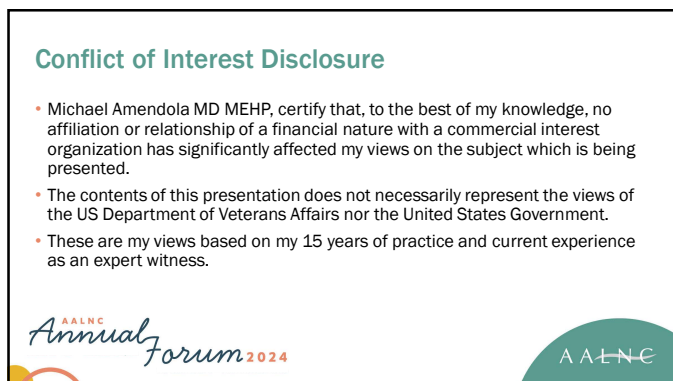
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### Learner Outcomes/Objectives

... to identify key aspects of the diagnosis and pre-operative management of peripheral vascular disease, cerebrovascular disease, and aortic disease.

... to recall basic therapeutic approaches (open, endovascular and/or medical) to peripheral vascular disease, cerebrovascular disease, and aortic disease.

... to identify key aspects of case reviews commonly found in liability cases involving to peripheral vascular disease, cerebrovascular disease, and aortic disease.



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**CONTENT**



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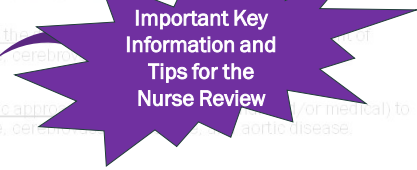
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**Michael F. Amendola MD MEHP**



- 804-519-4660
- mikeamen1972@gmail.com
- LinkedIn



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**The Rules**

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**Rules ...**

- Content for each section



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**Rules ...**

- Content for each section
- Literature



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**Rules ...**

- Content for each section
- Literature
- Images



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**Rules ...**

- Content for each section
- Literature
- Images ←



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**Conflict of Interest Disclosure**

- Michael Amendola MD MEHP, certify that, to the best of my knowledge, no affiliation or relationship of a financial nature with a commercial interest organization has significantly affected my views on the subject which is being presented.
- The contents of this presentation does not necessarily represent the views of the US Department of Veterans Affairs nor the United States Government.
- These are my views based on my 15 years of practice and current experience as an expert witness.
- **There will be pictures of operative repairs.** ←

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**You Can Ask Questions  
Anytime During the  
Talk**

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**How Did I Get This Topic?**

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## Vascular Surgery Experts

- 2022 from New York Authors
- 1999 through 2014
- 785 cases
- Westlaw = "vascular" and "surgeon"



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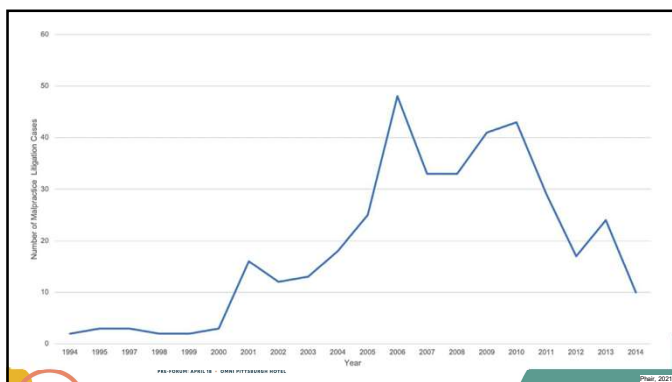
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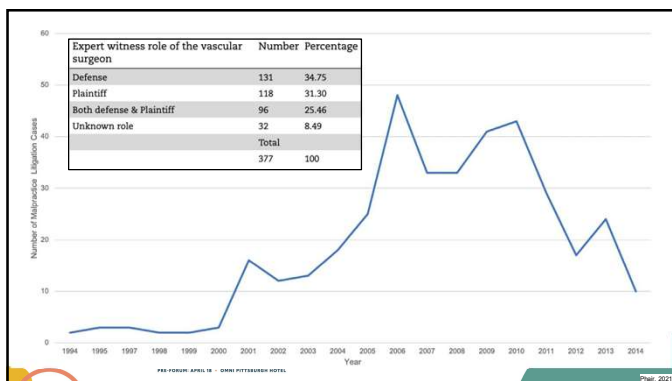
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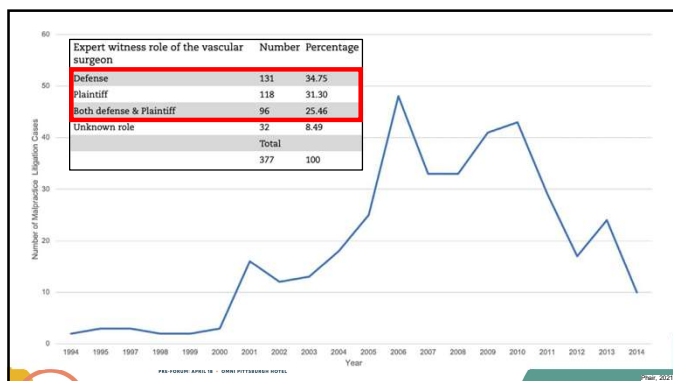
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	Defense	Plaintiff	P value
Years of practice (years)	23	24.6	0.10
H value	16.7	12.8	<0.01
Age (years)	57.2	58.6	0.12
Fellowship training	117 (74.5%)	102(71.8%)	0.7683

Defendant physician specialty	Total (n = 377)
Vascular surgeon	73 (19.4%)
General surgeon	53 (14.1%)
Internist	47 (12.5%)
Orthopedic surgeon	30 (8.0%)
Emergency medicine physician	25 (6.6%)
Podiatrist	15 (4.0%)

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Table 7 – ACS Guidelines for Expert Witness.	
Requires a current, valid, and unrestricted state license to practice medicine at the time of the alleged occurrence	
Be a diplomate of a specialty board recognized by the American Board of Medical Specialties at the time of the alleged occurrence	
Have a specialty that is appropriate to the subject matter in the case	
Have privileges to perform the same or similar procedures to the case in a hospital accredited by The Joint Commission or the American Osteopathic Association.	
Be familiar with the standard of care provided at the time of the alleged occurrence and should have been actively involved in the clinical practice of the specialty or the subject matter of the case at the time of the alleged occurrence.	
Be able to demonstrate evidence of continuing medical education relevant to the specialty or the subject matter of the case.	
Table 8 – SVS Guidelines.	
Have sufficient knowledge of and experience in the specific subject(s)	
"Ideally"- Have current hospital privileges to perform the procedures discussed in the trial	
Be familiar with prior and current concepts of standard vascular surgical practices before giving testimony or providing a written opinion about such practice standards	
"Ideally"- Be able to demonstrate evidence of continuing medical education relevant to the subject matter of the case.	

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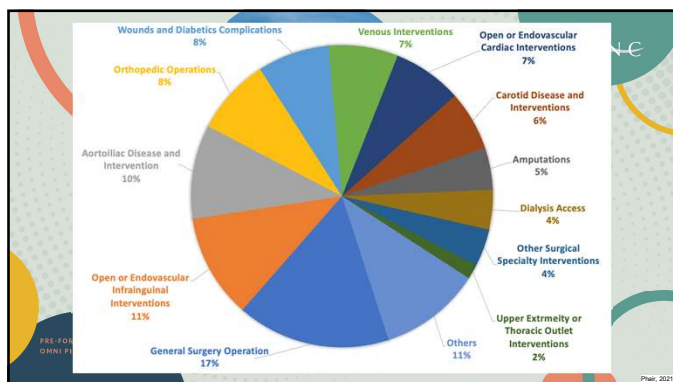
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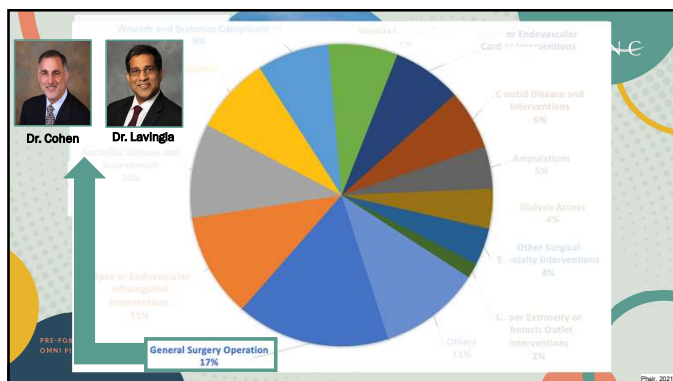
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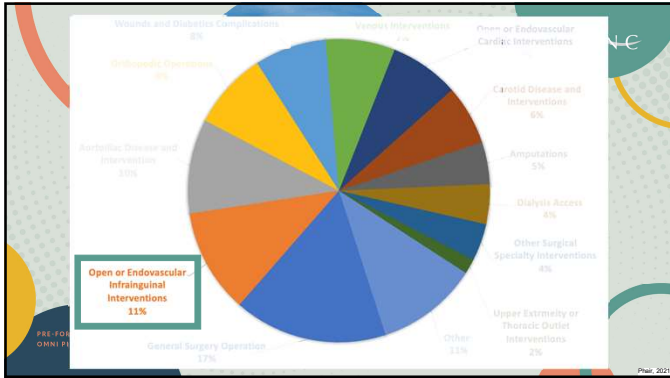
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## Peripheral Vascular Disease

- Diagnosis
- Basic Treatment Approaches

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## Diagnosis

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- CT Angiogram

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### Diagnosis

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- CT Angiogram

My legs hurt when I walk

I have some swelling in my legs

I have an ulcer on my great toe

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### Diagnosis

Vascular Claudication  
Distance related pain in a patient's legs

Can be confused with neurogenic based pain

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### Diagnosis

Factor	Vascular	Neurogenic
Walking Distance	Fixed	Variable
Makes it Better	Standing	Sitting
Makes it Worst	Walking	Walking/Standing
Pulse	Hard to Find	Easy to Find
Back Pain	Occasionally	Commonly

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## Diagnosis

- Patient Symptoms
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## Diagnosis

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- CT Angiogram

PAIN

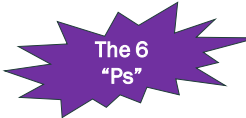
POIKILOThERMIA

PARESTHESIA

PARALYSIS

PULSELESSNESS

PALLOR



The 6 "Ps"

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6 P's of NEUROVASCULAR ASSESSMENT		
	RESPONSE	METHOD
<b>PAIN</b>	Should only be felt at the site of the injury	<ul style="list-style-type: none"> <li>• Ask the individual to note the location, severity, &amp; radiation of pain</li> <li>• Consider non-verbal pain cues</li> </ul>
<b>POIKILOThERMIA</b>	Affected area should be the same temperature as the rest of the body	<ul style="list-style-type: none"> <li>• Place back of hand on the individual's extremities, bilaterally</li> </ul>
<b>PARESTHESIA</b>	Feeling of numbness & tingling	<ul style="list-style-type: none"> <li>• Apply light touch to the extremities</li> <li>• Prick the area with the end of a pen cap</li> </ul>
<b>PARALYSIS</b>	Inability to move part or all of the body	<ul style="list-style-type: none"> <li>• Ask the individual to perform certain movements with their arms &amp; legs</li> </ul>
<b>PULSELESSNESS</b>	Absence of the radial, dorsalis pedis, & posterior tibialis pulses	<ul style="list-style-type: none"> <li>• Grade pulses using a 0 to 3+ point scale                             <ul style="list-style-type: none"> <li>↳ 0 = absent pulses</li> <li>↳ 3+ = strong and bounding pulses</li> </ul> </li> </ul>
<b>PALLOR</b>	Pale or discolored skin	<ul style="list-style-type: none"> <li>• Compare the color of the skin on both sides of the body</li> <li>• Look for unusually pale or purplish discoloration of the skin</li> </ul>

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## Diagnosis

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
  - CT Angiogram

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**Right ABI**  
Higher right ankle pressure  
Higher arm pressure

**Left ABI**  
Higher left ankle pressure  
Higher arm pressure

**Integration of ABI**

1.00	Noncompressible
1.00-1.29	Normal
0.91-0.99	Biochemical (peripheral)
0.61-0.90	Mild to moderate peripheral arterial disease
0.00-0.40	Severe peripheral arterial disease

	Normal	Intermittent claudication	Rest pain	Impending gangrene
1.3	[Scatter plot]	[Scatter plot]	[Scatter plot]	[Scatter plot]
1.2				
1.1				
1.0				
0.9				
0.8				
0.7				
0.6				
0.5				
0.4				
No. of limbs:	50	213	77	36
Mean:	1.11	0.59	0.26	0.05
SD:	0.10	0.15	0.13	0.08

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### The World of ABI Compression

external 170 mmHg

vessel 150 mmHg

open

external 150 mmHg

vessel 150 mmHg

compressed

external 150 mmHg

vessel 150 mmHg

open

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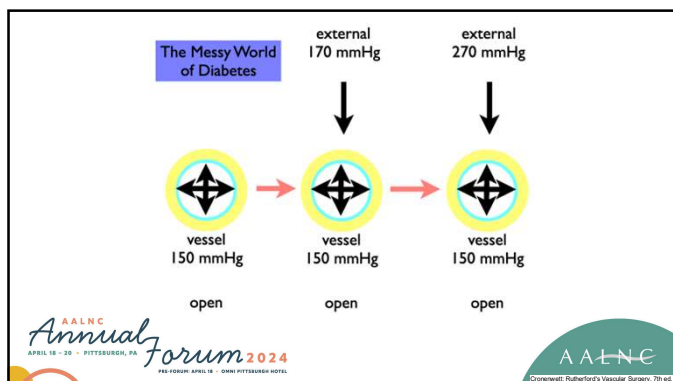
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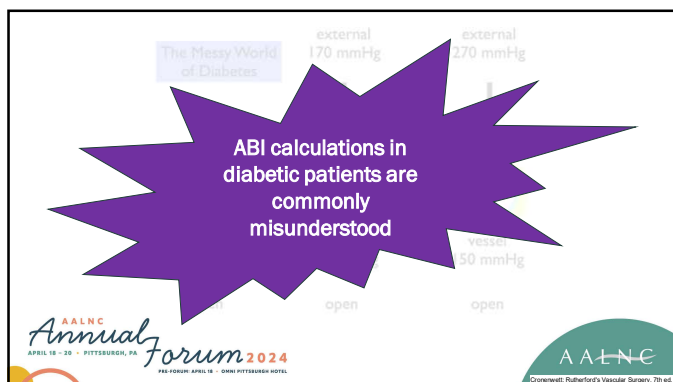
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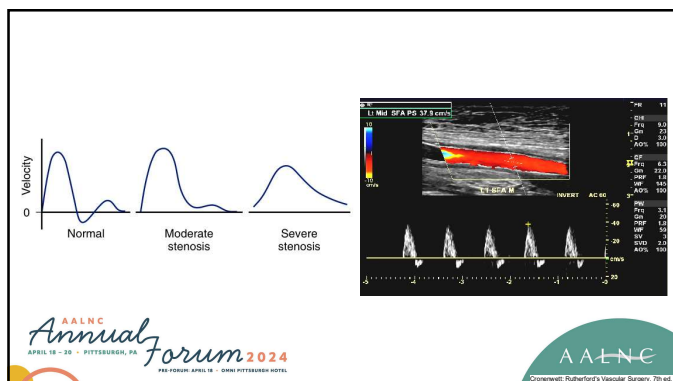
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### Diagnosis

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- CT Angiogram

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### Basic Therapeutic Approaches

- Risk factor modification
- Medical Management
- Structured Exercise Therapy
- Endovascular Treatment
- Open Treatment

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### Basic Therapeutic Approaches

- Risk factor modification
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## Basic Therapeutic Approaches

- Risk factor modification
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## Basic Therapeutic Approaches

- Risk factor modification
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## Basic Therapeutic Approaches

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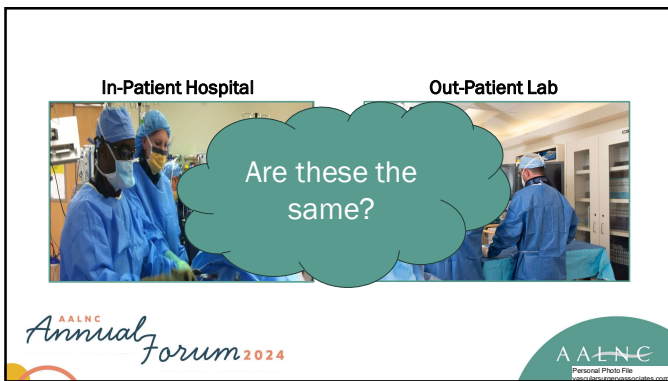
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### What are the Differences and Similarities

In-Patient Hospital	Out-Patient Lab
Safety Net	Minimal Personnel
Full Array of Tools	Limited Tools
Hard for the Patient	Easy for the Patient
Two Parties in the Room	One Party in the Room
\$ to the MD	\$\$\$\$\$ to the MD
Minimal Ethical Conflicts	Potential for Large Conflicts

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Atherectomy in some practices is being overused and a potential area of litigation



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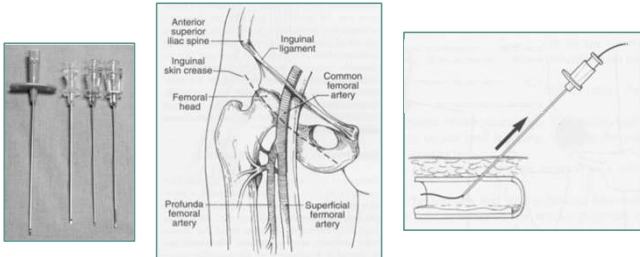
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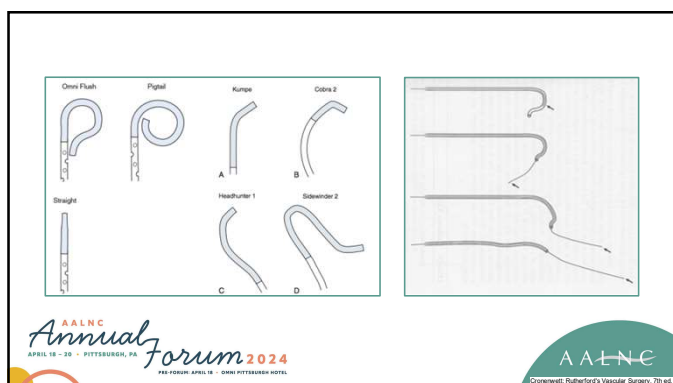
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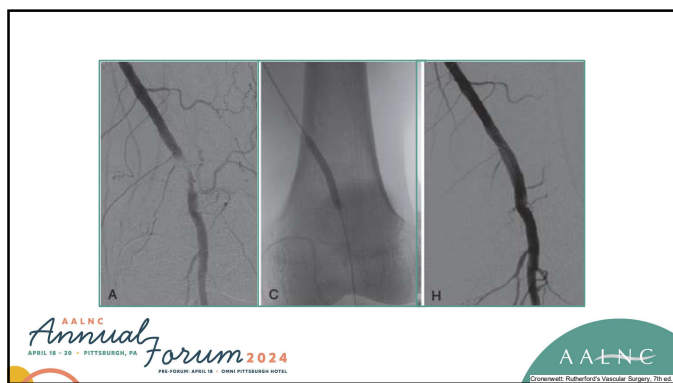
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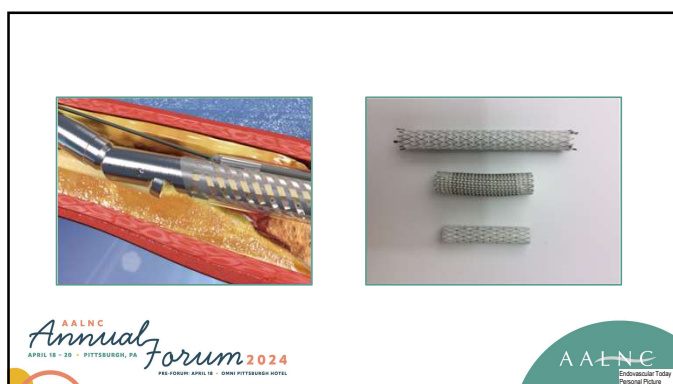
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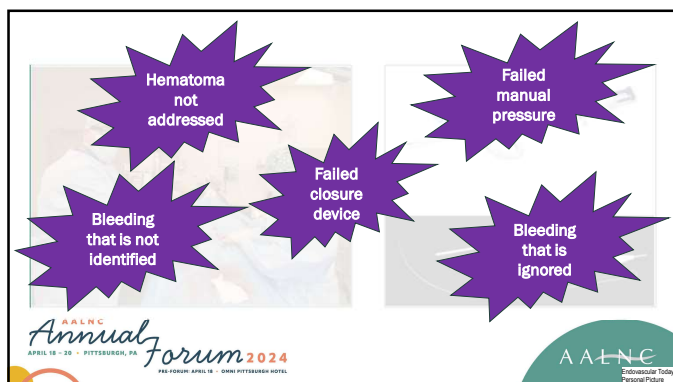
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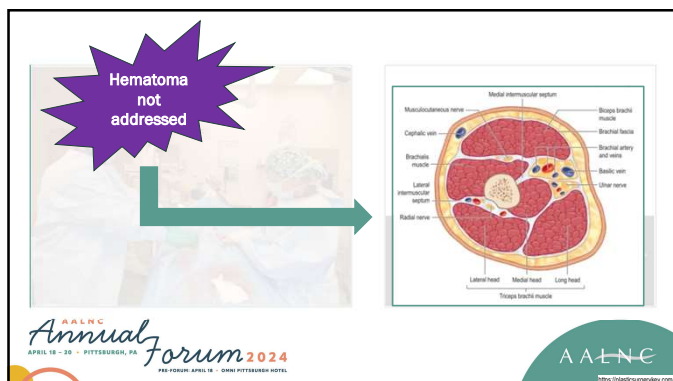
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### Basic Therapeutic Approaches

- Risk factor modification
- Medical Management
- Structured Exercise Therapy
- Endovascular Treatment
- Open Treatment

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The diagram shows a cross-section of an artery with a stenosis (narrowing) and an occlusion (blockage). A red arch above the artery indicates collateral circulation. Arrows show retrograde flow (from the distal end back to the stenosis) and prograde flow (from the proximal end through the stenosis).

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The image shows a surgical procedure for popliteal artery exposure. On the left is a diagram of the leg with the artery location marked. On the right is a photograph of the surgical site with the artery exposed.

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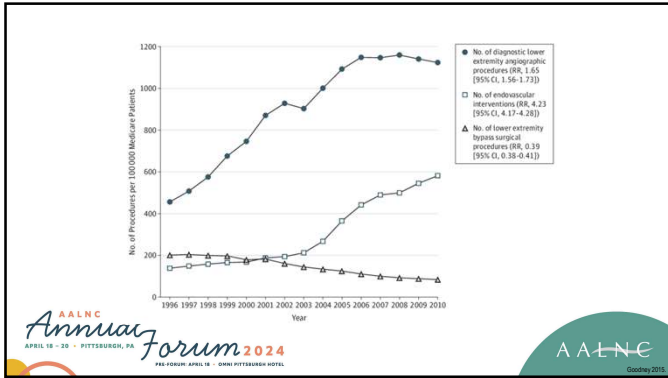
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**Analysis Shows Dramatic Declines in Open Vascular Surgery Training in U.S.**  
 Study of ACCME case log data spurs proposals to reverse the trend

**Younger surgeons are doing fewer open bypasses which might lead to increased complications**

The advent of endovascular aortic repair (EVAR) in the 1990s increased demand for learning the technique and shifted focus away from open surgical procedures. As a case in point, a recent review of Medicare data of Vascular Surgery (2010-2011) revealed that open abdominal aortic aneurysm (AAA) repair has declined from 1996 to 2010.

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 Total Section 2, 2015

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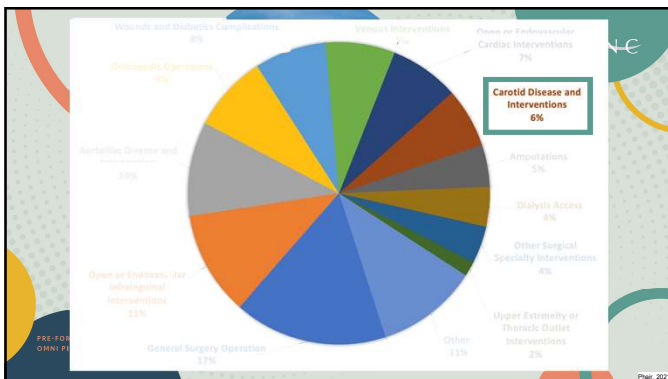
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**Cerebrovascular Disease**

- Diagnosis
- Basic Treatment Approaches

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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- MRI/CT Angiogram

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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- MRI/CT Angiogram

Asymptomatic

Ipsilateral Blindness

Contralateral sensory and/or motor deficits

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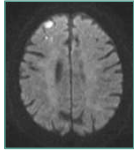


**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- MRI/CT Angiogram

Head CT Scan

Baseline Neurological Assessment



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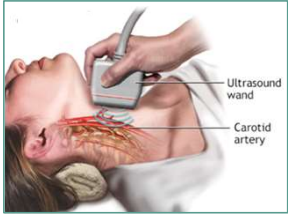
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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Vascular Lab
- MRI/CT Angiogram



Ultrasound wand

Carotid artery

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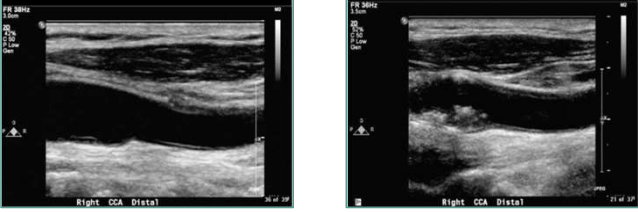
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Right CCA Distal

Right CCA Distal

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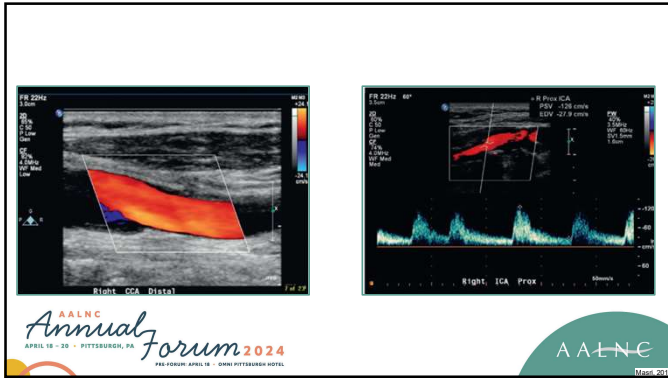
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### Basic Therapeutic Approaches

- Observation
- Endovascular Treatment
- Open Treatment

Trans-Femoral Carotid Stent (TF-CAS)

<<<

Trans-Carotid Artery Revascularization (TCAR)

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### TF-CAS

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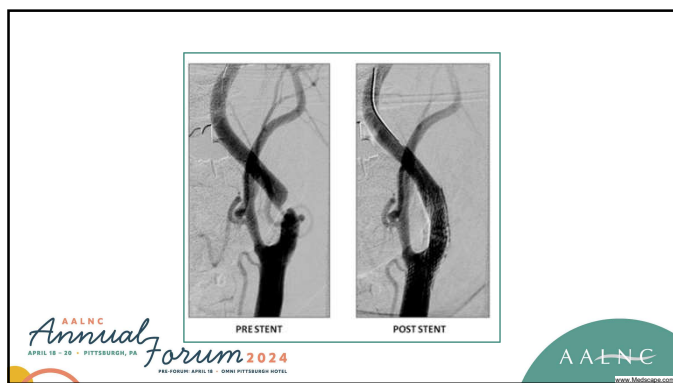
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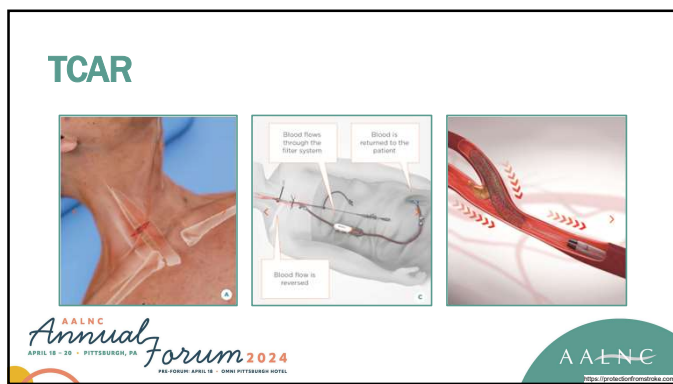
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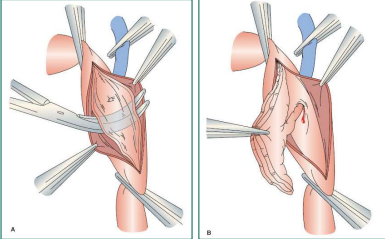
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### Basic Therapeutic Approaches

- Observation
- Endovascular Treatment
- Open Treatment



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Shunts are accepted safe practice

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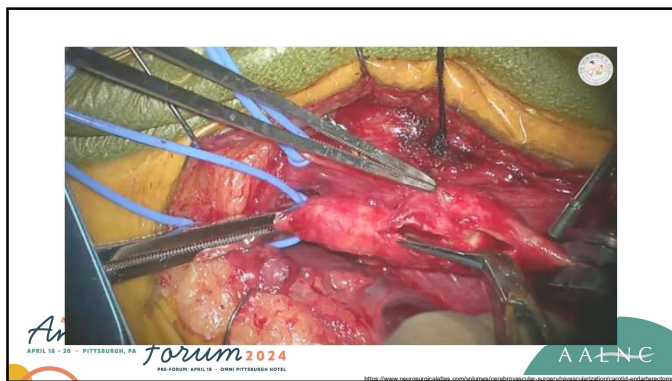
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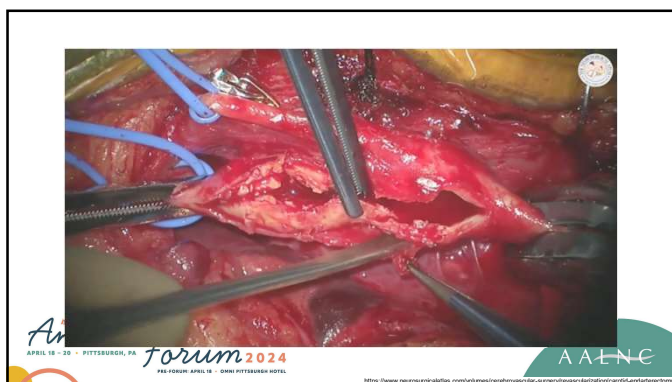
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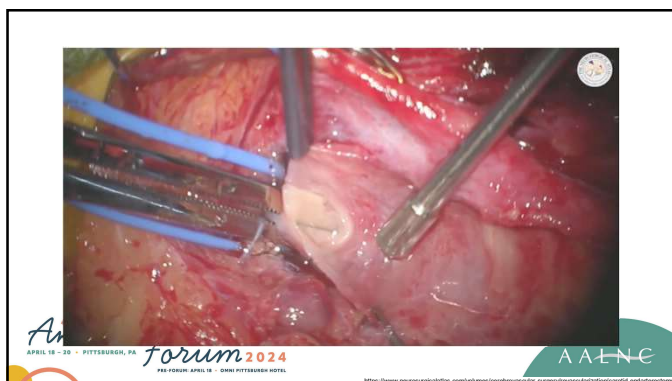
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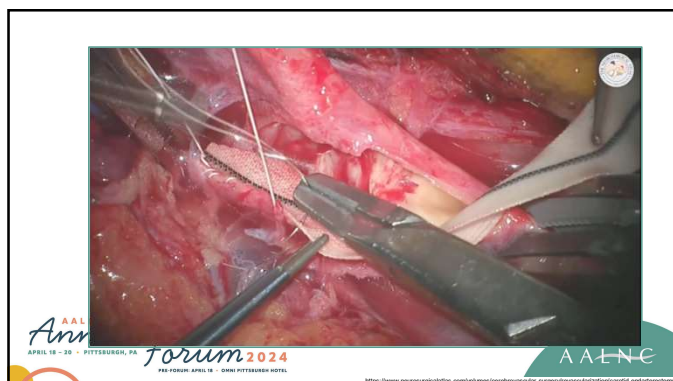
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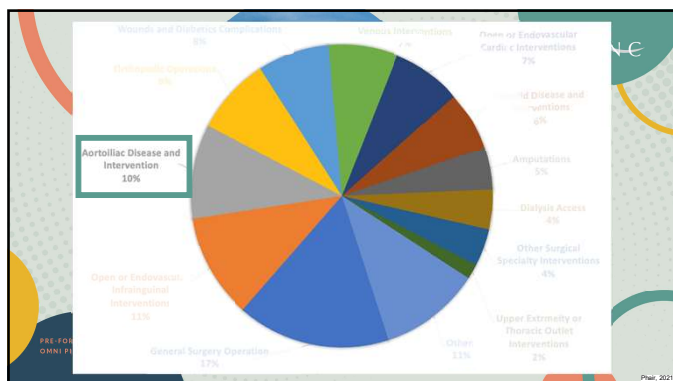
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**Aortic Disease**  
 - Diagnosis  
 - Basic Treatment Approaches

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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging

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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging

My belly hurts

My back hurts

I have no symptoms - what's the big deal

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**Diagnosis**

- Patient Symptom
- Clinical
- Duplex Imaging
- CT

**Asymptomatic is the most common presentation**

I have no symptoms - what's the big deal

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**Diagnosis**

- Patient Symptom
- Clinical
- Duplex Imaging
- CT/MRA

**Patients with pain need admission and emergent to urgent repair**

I have no symptoms - what's the big deal

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### Diagnosis

- Patient Symptoms
- Clinical Assessment
  - Duplex Imaging
  - CT/MRA Imaging

Physical Exam

Fitness for the Operating Room

Associated peripheral vascular disease

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### Diagnosis

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging

Most all aneurysms are unable to be palpated

Associated peripheral vascular disease

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### Diagnosis

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging



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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging

Duplex scans can be off as much as 0.5 cm

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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging



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**Diagnosis**

- Patient Symptoms
- Clinical Assessment
- Duplex Imaging
- CT/MRA Imaging



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### Basic Therapeutic Approaches

- Observation
- Endovascular Treatment
- Open Treatment

Risk of rupture for untreated aneurysms within 5 years (%)

Aneurysm Size	Risk of rupture (%)
5-5.9cm	25%
6-7cm	35%
>7cm	75%

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### Basic Therapeutic Approaches

- Observation
- Endovascular Treatment
- Open Treatment

Kidney  
Normal aorta width  
Iliac artery  
Aneurysm

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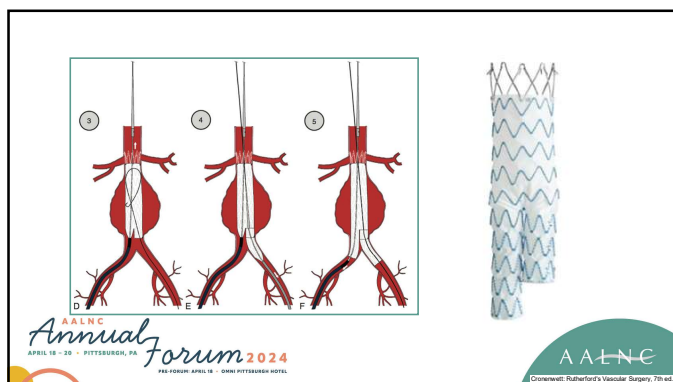
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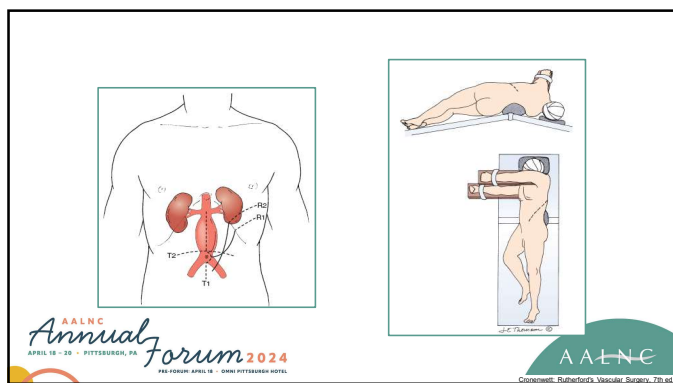
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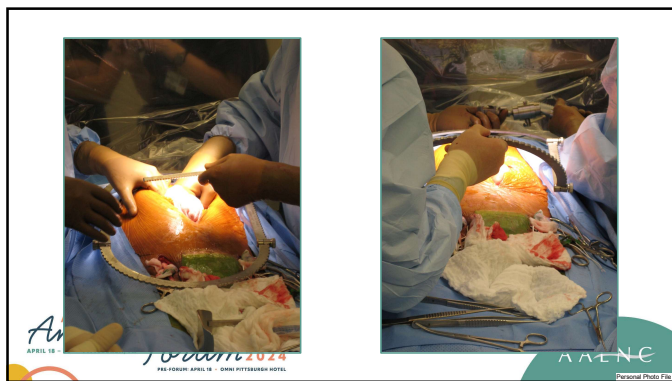
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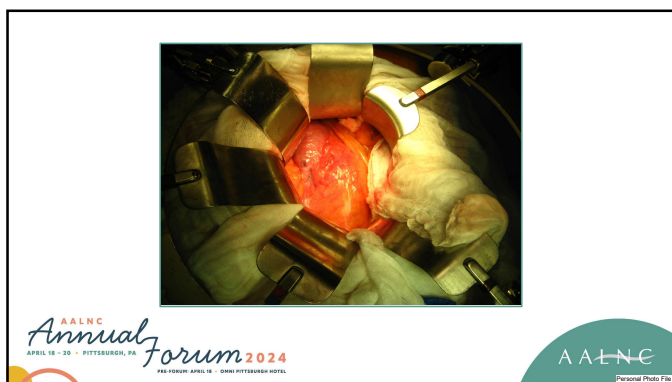
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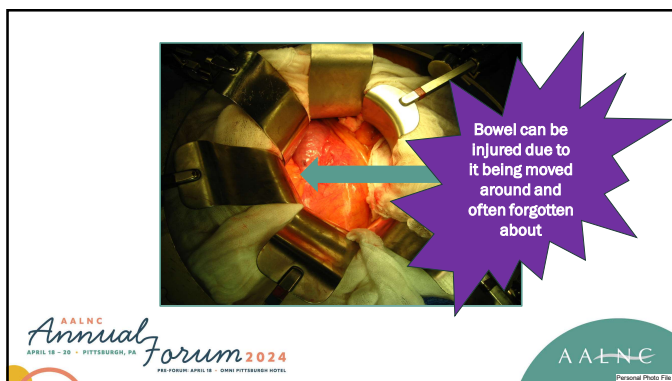
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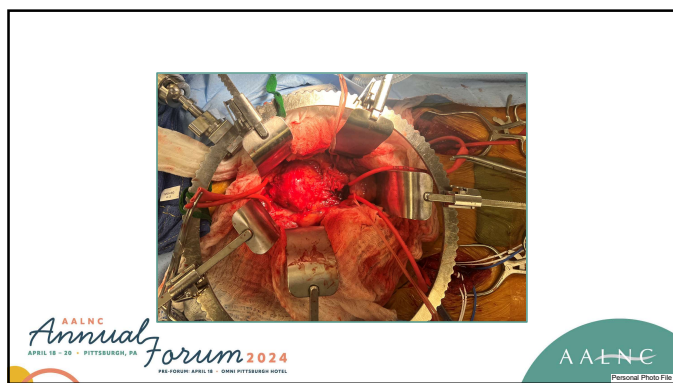
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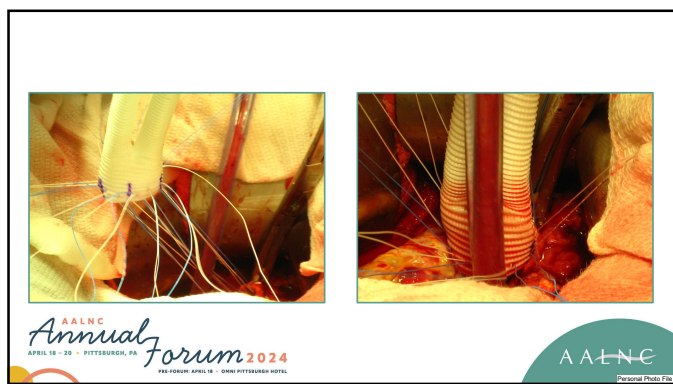
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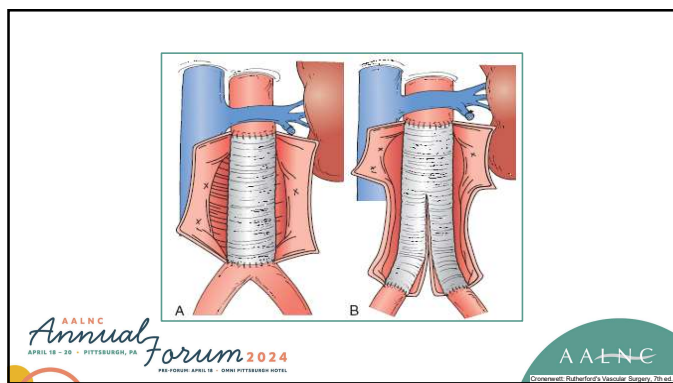
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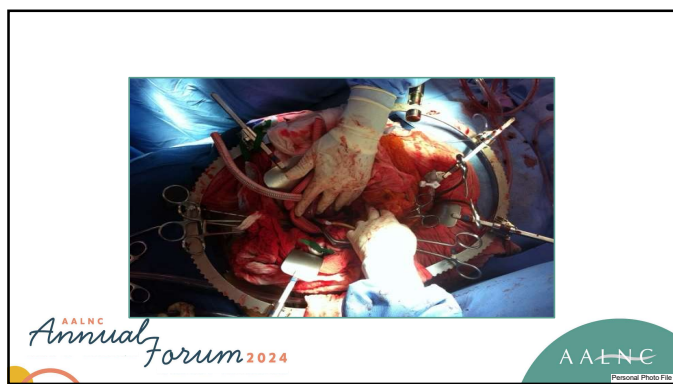
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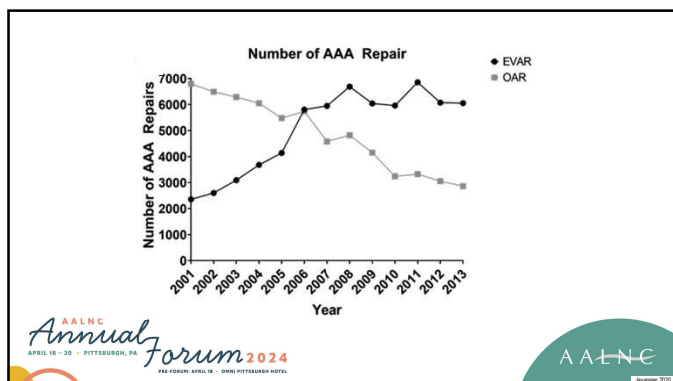
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**EDUCATION CORNER**

The decline of open abdominal aortic aneurysm surgery among individual training programs and vascular surgery trainees [Check for updates](#)

Margaret E. Smith, MD, MS,<sup>1</sup> Elizabeth A. Andrasik, MD, MS,<sup>2</sup> Danielle C. Sutzko, MD, MS,<sup>1</sup> Anna M. Boniakowski, MD,<sup>1</sup> Dawn M. Coleman, MD,<sup>1</sup> and Nicholas H. Osborne, MD, MS,<sup>1</sup> Ann Arbor, Mich and Pittsburgh, Pa

**Younger surgeons are doing fewer open aortic cases which might lead to increased complications**

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**Conclusions**

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## Vascular Surgery

- Risky practice leading to legal action
- Experts for the defense, plaintive or both in equal numbers
- Peripheral arterial occlusive, cerebrovascular and aortic disease are common areas of litigation



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## Peripheral Vascular Disease



- Vascular and Neurogenic Claudication
- The 6 "Ps"
- Ankle Brachial Index
- In- and Out-Patient Treatment

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## Cerebrovascular Disease

- Variable Radiologist and Surgical Measures of Carotid Stenosis
- Shunt Usage During Open Surgical Repair is Crucial
- TCAR Patients need Dual Antiplatelet



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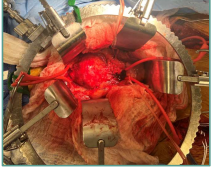
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## Aortic Disease



- Asymptomatic is the Common Presentation
- If with Abdominal Pain, Needs Repair Urgently or Emergently
- Experience with Open Aortic Repair is becoming Less Common

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## Thank You for Your Time



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