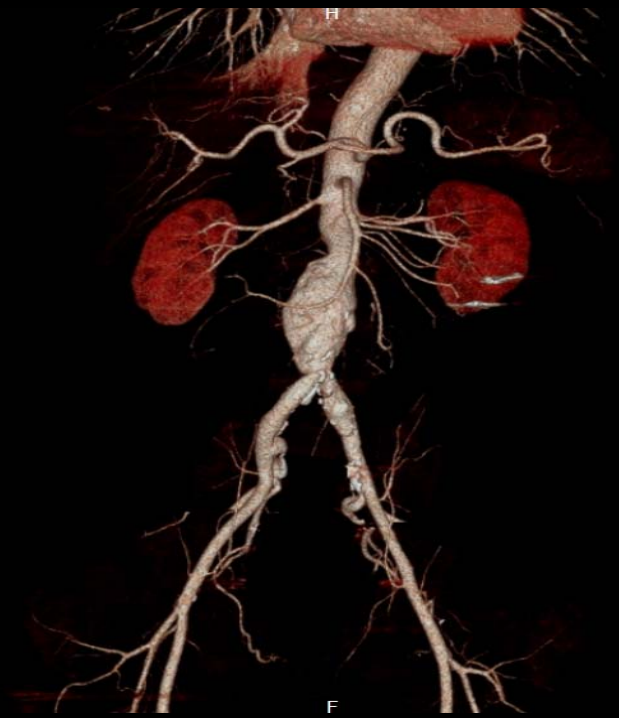
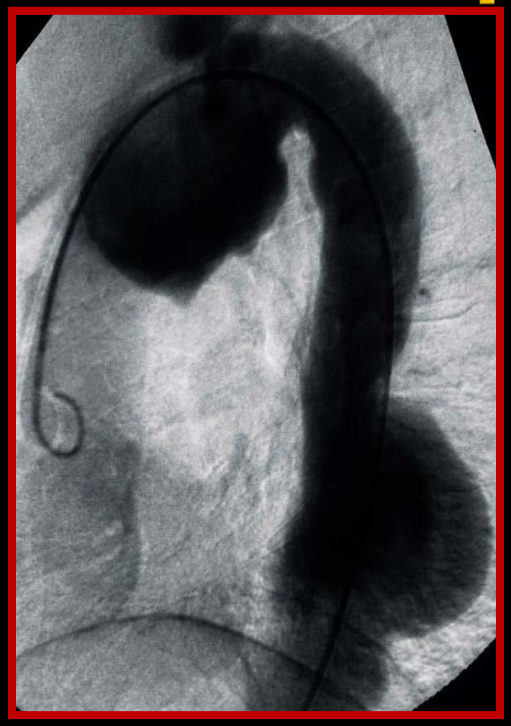
Arterial Aneurysms – Aortic and Peripheral





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Chief
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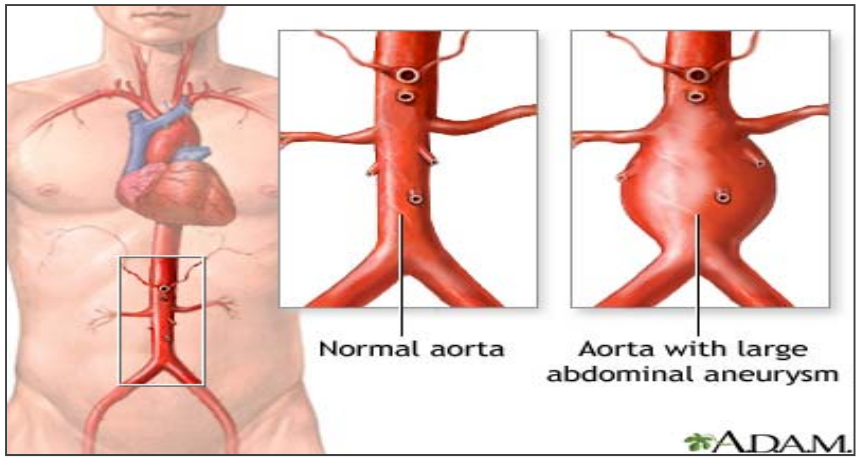
Vice-Chair
Department of Surgery

McLaren
BAY REGION

Aneurysma

- "A widening"
- Arteriomegaly - diffuse ectasia
- Ectasia - < 50% diameter increase
- Aneurysm - > 50% diameter increase



AORTA	DIAMETER	GENDER
Root	3.50–3.72	Female
	3.63–3.91	Male
Ascending	2.86	Female/male
Descending	2.45–2.64	Female
	2.39–2.98	Male
At diaphragm	2.40–2.44	Female
	2.43–2.69	Male
Infrarenal	1.5-1.7	Female
	1.7-1.9	Male

Aneurysm

- Pathological dilatation of the aorta involving one or several segments
- A permanent localized dilatation having a diameter at least twice the normal diameter of that segment

Facts & Figures

- ≈1.4% US Population
  - ≈15,000 deaths per year
  - 57,000 Hospital Discharges
- Prevalence increases with age
  - 1.3% in men age 45-54y; 12.5% in men ≥ 75y
  - Much lower female prevalence: 5.2% in women ≥ 75y
- Rupture associated with death rates as high as 90%
  - Elective repair decreases mortality to 5%
- **Only 15% of pts with AAA are diagnosed**

- Rates of expansion increase as AAA size increases

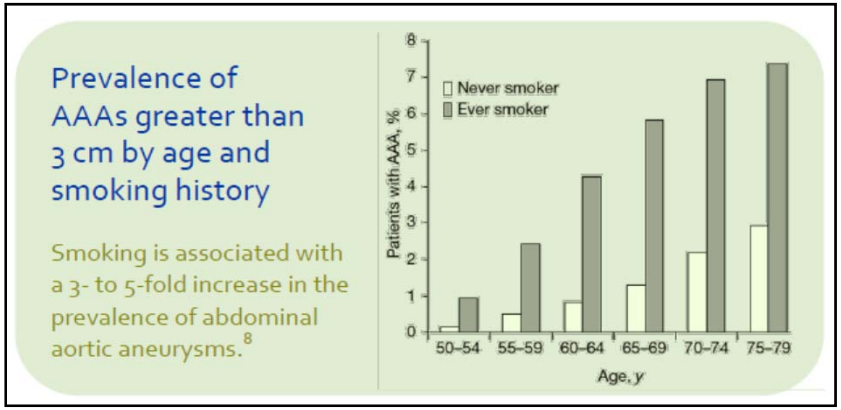
Aneurysm Size	Annual Expansion Rate
> 4 cm	1 – 4 mm
4 – 6 cm	4 – 5 mm
> 6 cm	7 – 8 mm

- Risk of rupture increases with AAA size

Aneurysm Size	Absolute Rupture Risk
≤ 5 cm	20%
≤ 6 cm	40%
≤ 7 cm	50%

Risk Factors

- Older Age
- Male Sex
- Tobacco



Source: Fleming C, Whitlock EP, Bell TL, Lederle FA. Screening for abdominal aortic aneurysm: A best-evidence systematic review for the U.S. Preventive Services Task Force. AHRQ Pub. No. 05-0569-B. 2005

- Family History of AAA
- Hypertension
- Manifest Atherosclerotic Disease (peripheral & coronary vascular disease)
- Other collagen vascular disease (Marfan's Syndrome, Ehlers-Danlos)
- AAA appears to be lower in women*, African Americans, and diabetics
  - *Women are 2 – 4 times more likely to experience rupture than men

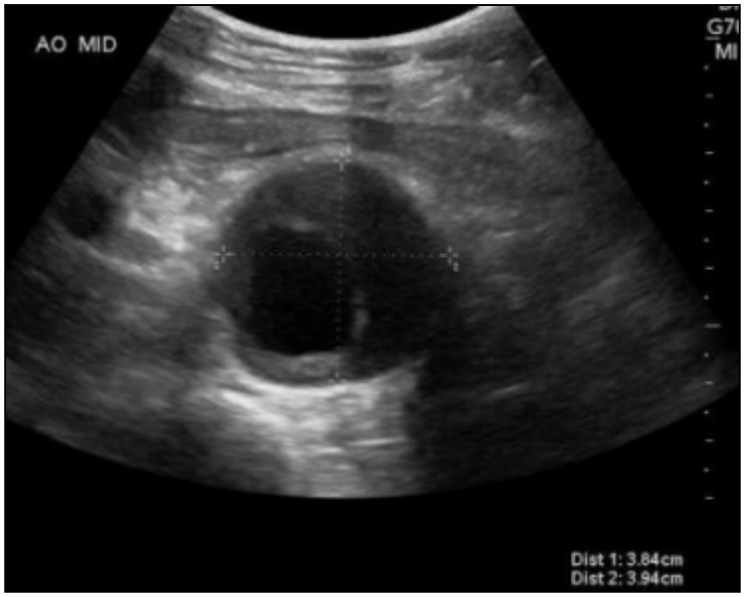
Risk Factors

- Males
  - account for 80% of AAA
  - 5% of men over 60 have AAA
- Age > 55
- COPD / smoking
  - > 100 packs smoked confers 7x greater risk of AAA
- Caucasians
- High blood pressure
- Diabetes
- Hypercholesterolemia

Screening – SAAAVE Act

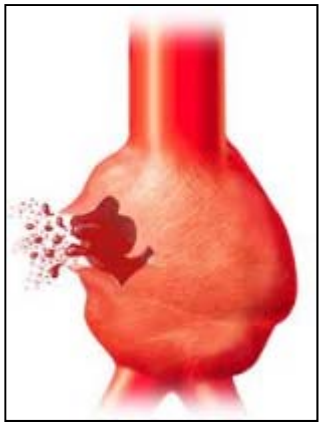
Screening Abdominal Aortic Aneurysms Very Efficiently

- Legislation introduced in 2005 to provide AAA screening for all newly eligible MediCare beneficiaries as part of "Welcome to Medicare"*
  - Includes all existing male MediCare beneficiaries with a history of smoking, and females with a family history of AAA
  - No co-pay for the patient; performing facility is reimbursed (HCPCS code G0389, CPT 76700)
- Less than 10% of SAAAVE-eligible patients may have ultrasound screening for AAA *(Shreibati, et al. Ann Int Med 2012: epublished September, 2012)*



AAA Presentation

- AAA rarely presents with symptoms and is most often an incidental diagnosis
- Only 30-40% are noted on physical exam*; detection dependent on size
- Rarely, patients can present with
  - Abdominal pain
  - Back pain
  - Pulsating, peri-umbilical mass



- A ruptured aneurysm can present with:
  - Abdominal or back pain
    - May be sudden, persistent, or constant
    - May radiate to groin, buttocks, or leg – severe, sudden, persistent, or constant
  - Diaphoresis, pre-syncope, nausea and vomiting
  - Tachycardia, shock

**Source: Chaikof EL, Brewster DC, Dalman RL, et al. "The care of patients with an abdominal aortic aneurysm: The Society for Vascular Surgery practice Guidelines." J Vasc Surg 2009 50 (8S): 2-42S.*

Initial Considerations

- ✓ All patients should be counseled to stop smoking
- ✓ Treatment for underlying hypertension, hyperlipidemia, diabetes, and other atherosclerotic risk factors should be initiated
- ✓ Family members should be screened
- ✓ Surveillance schedule initiated
- ✓ Aneurysms ≥ 5.5 cm are indicated for repair

Source: Chaikof EL, Brewster DC, Dalman RL, et al. "The care of patients with an abdominal aortic aneurysm: The Society for Vascular Surgery practice Guidelines." ***J Vasc Surg*** *2009 50 (8S): 2-42S.*

Natural History

- Is to gradually expand and eventually rupture if they become sufficiently large
- Distal embolization occurs in <2 – 5%
- Acute thrombosis is rare but catastrophic if it occurs

Inexorable Progression to Rupture

- Average rate of growth
  - 0.4 cm / year
  - ~ 10% per year

Growth Rate of AAA

Initial size (cm)	Mean growth rate (cm/yr)	95% CI
3.0- 3.9	0.39	0.20-0.57
4.0-4.9	0.36	0.21-0.50
5.0-5.9	0.43	0.27-0.60
6.0-6.9	0.64	0.16-1.10

Ann Surg 1984; 200: 255-63

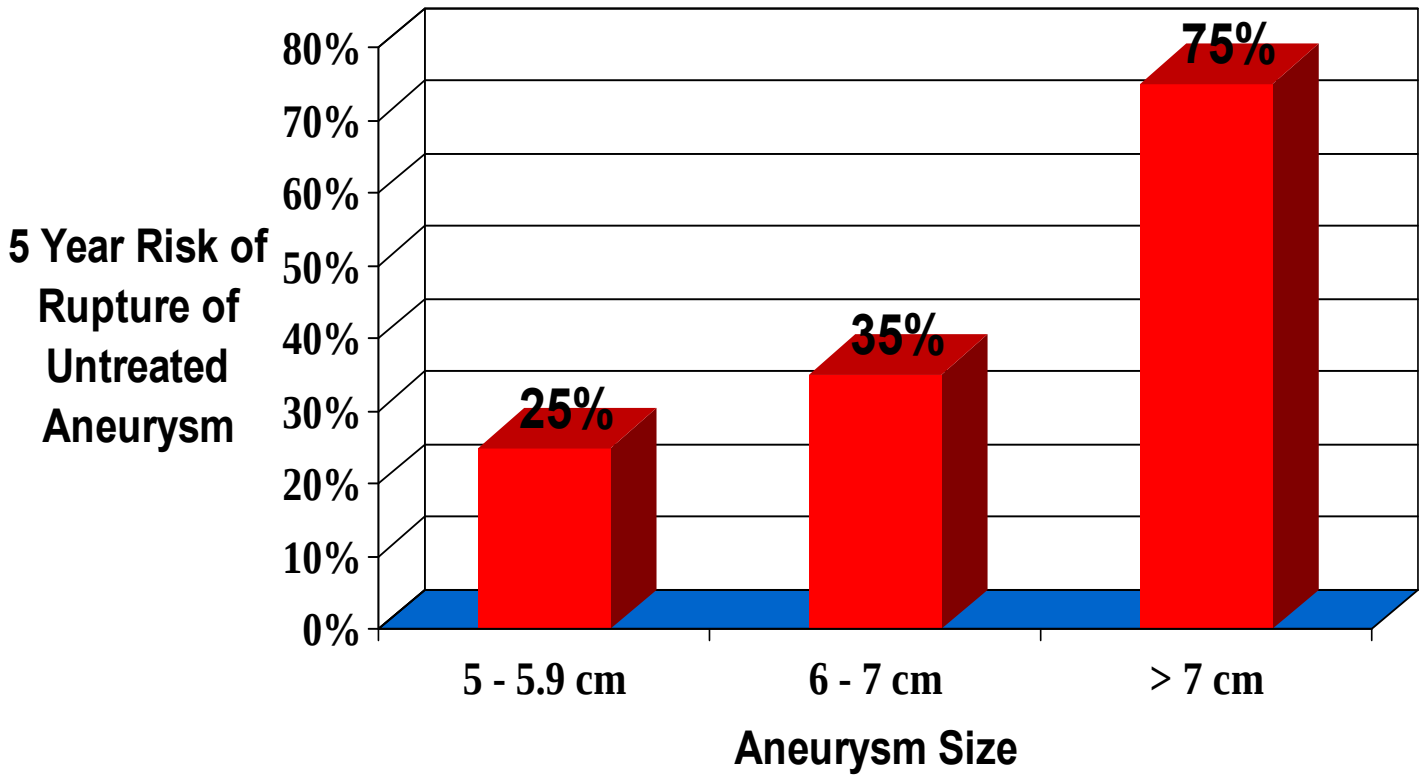
Risk of Rupture

- Mortality = 35 - 75%
  - unchanged over past 4 decades
  - higher with COPD, multiple co-morbidities

Diameter	Annual Risk of Rupture
< 4 cm	0 %
4 - 5 cm	0.5 - 5 %
5 - 6 cm	3 - 15 %
6 - 7 cm	10 - 20 %
7 - 8 cm	20 - 40 %
> 8 cm	30 - 50 %

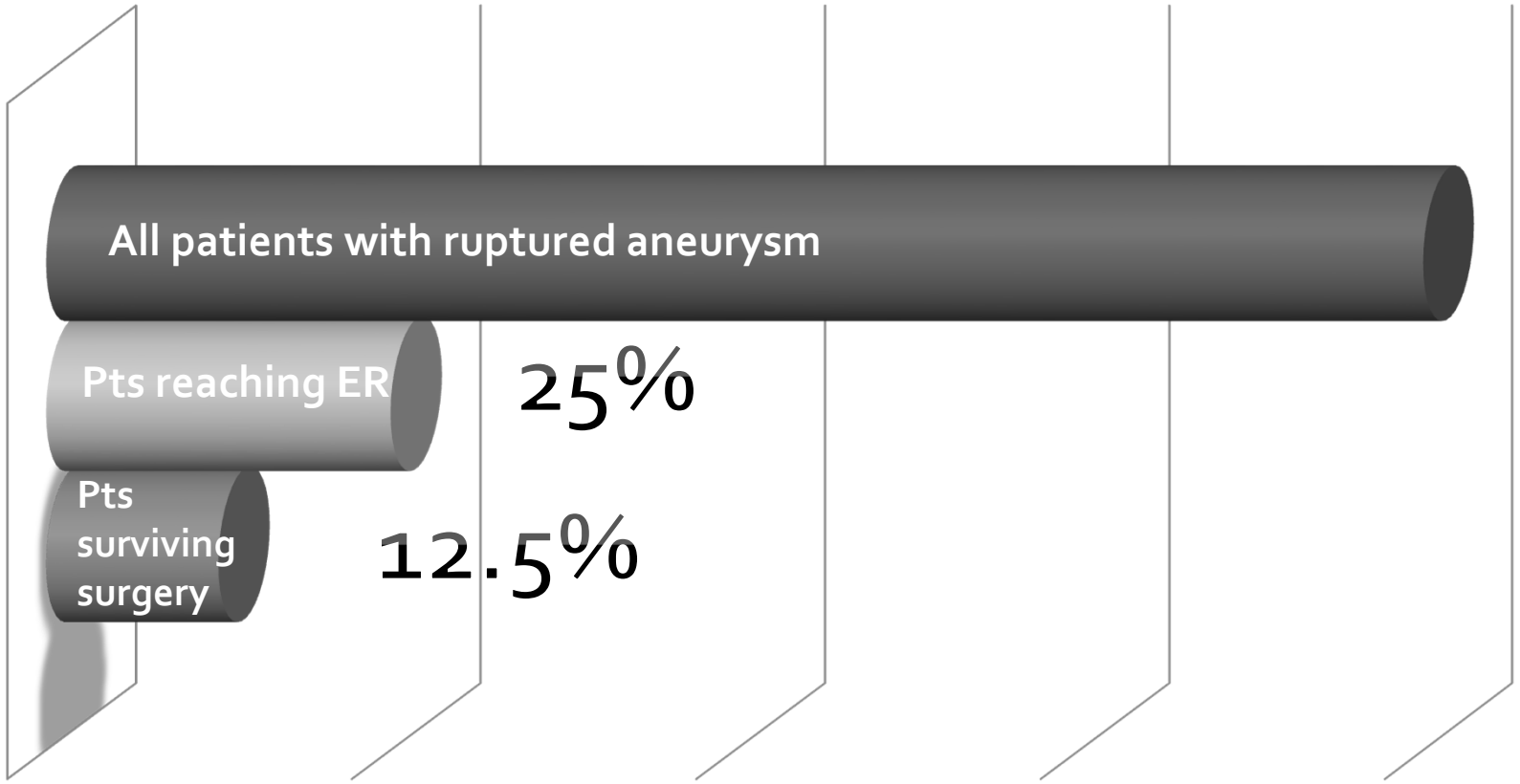
J Vasc Surg 2003; 37: 1106-17

Risk of Rupture



Rutherford: Vascular Surgery, 6th ed., 2005.

AAA rupture carries as much as 90% mortality



Rupture

- Approximately 40% of patients with ruptured AAAs die prior to presentation to the emergency department
- Only 10% to 25% of individuals with ruptured AAA survive until hospital discharge
- Prevent rupture!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Diagnosis

- History
- Physical exam
  - pulsatile, tender abdominal mass
  - bruit
- Ultrasound
  - Good Screening Test
  - > 80% accurate
- CT
- Angiography – not good for diagnosis

Physical Exam

Aneurysm diameter	Sensitivity
3.0-3.9 cm	29%
4.0-4.9 cm	50%
≥ 5.0 cm	76%

JAMA 1999; 281: 77-82

Ultrasound

- Sensitivity 82% to 99%
- Approaches 100% in cases with a pulsatile mass
- In a small proportion of patients, visualization of the aorta is inadequate because of obesity, bowel gas, or periaortic disease

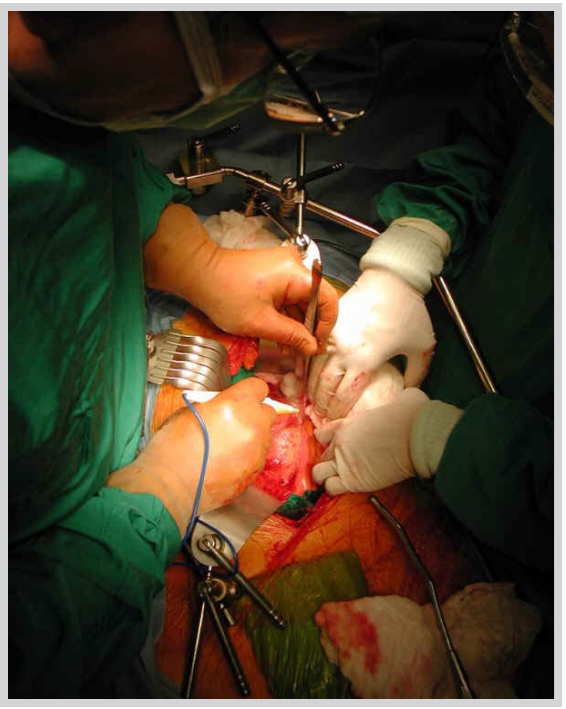
Surg Clin North Am 1989; 69: 713-20

Treatment Options

- Watch and wait
  - AAA < 5cm, asymptomatic
  - surgical risks > risk of rupture
  - lifestyle changes cannot reduce the size of the AAA
- Open surgical repair
- Endovascular repair

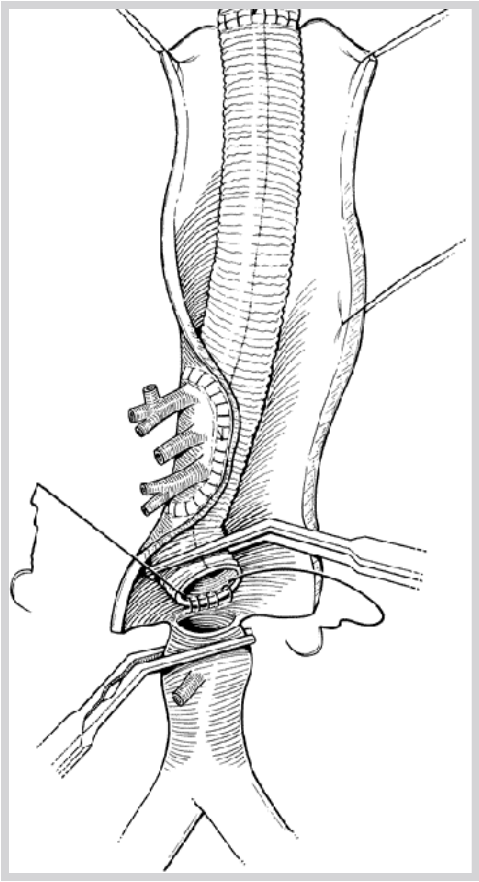
Elective Open Surgical Repair

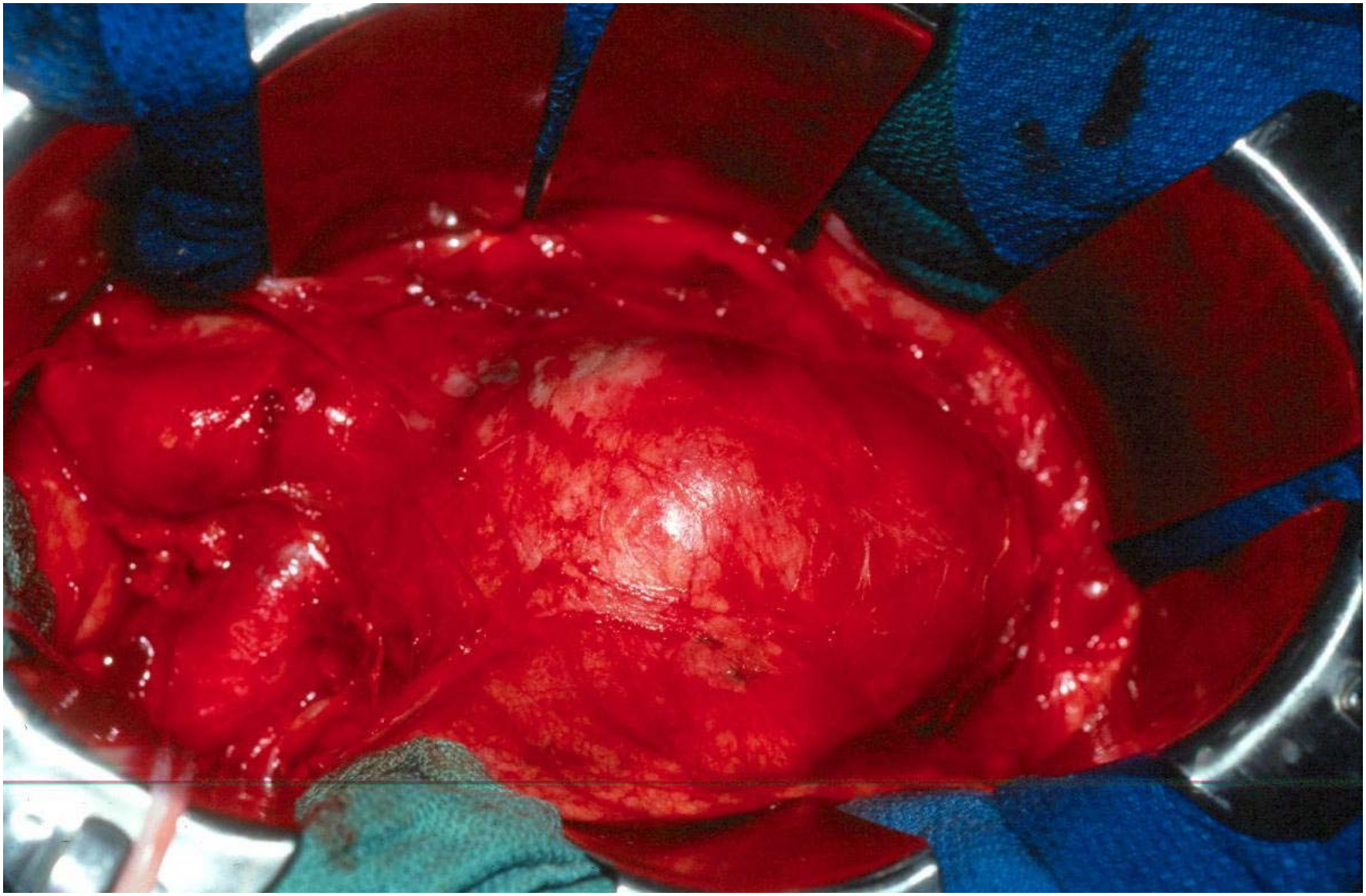
- Major surgical procedure
  - mortality 2% to 8%
- Complications
  - pseudoaneurysms (3%)
  - erectile dysfunction (>80%)
  - aortoenteric fistula (1-2%)
  - graft thrombosis (2%)
  - graft infection (1-2%)
- Recovery period 6 weeks to 4 months

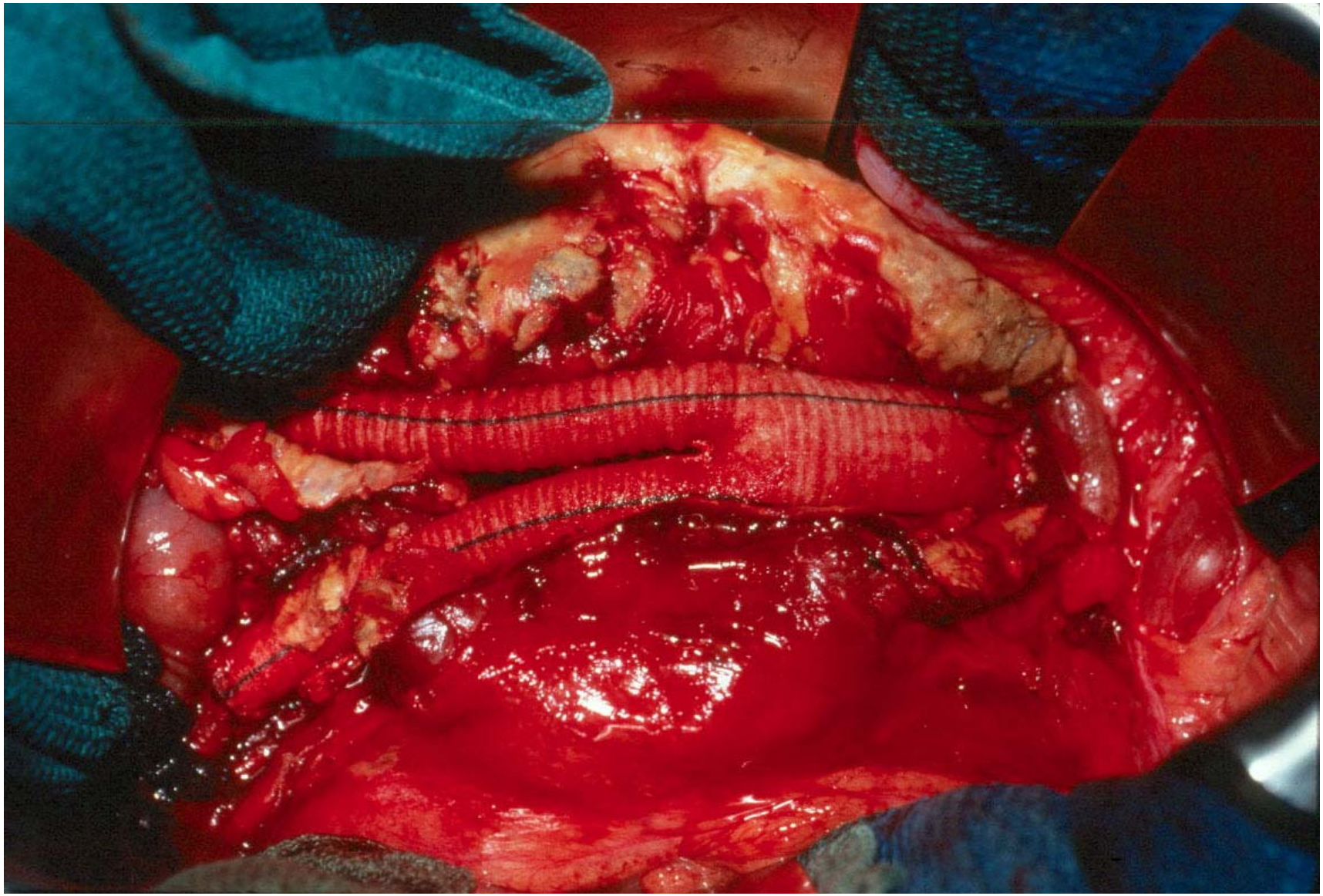


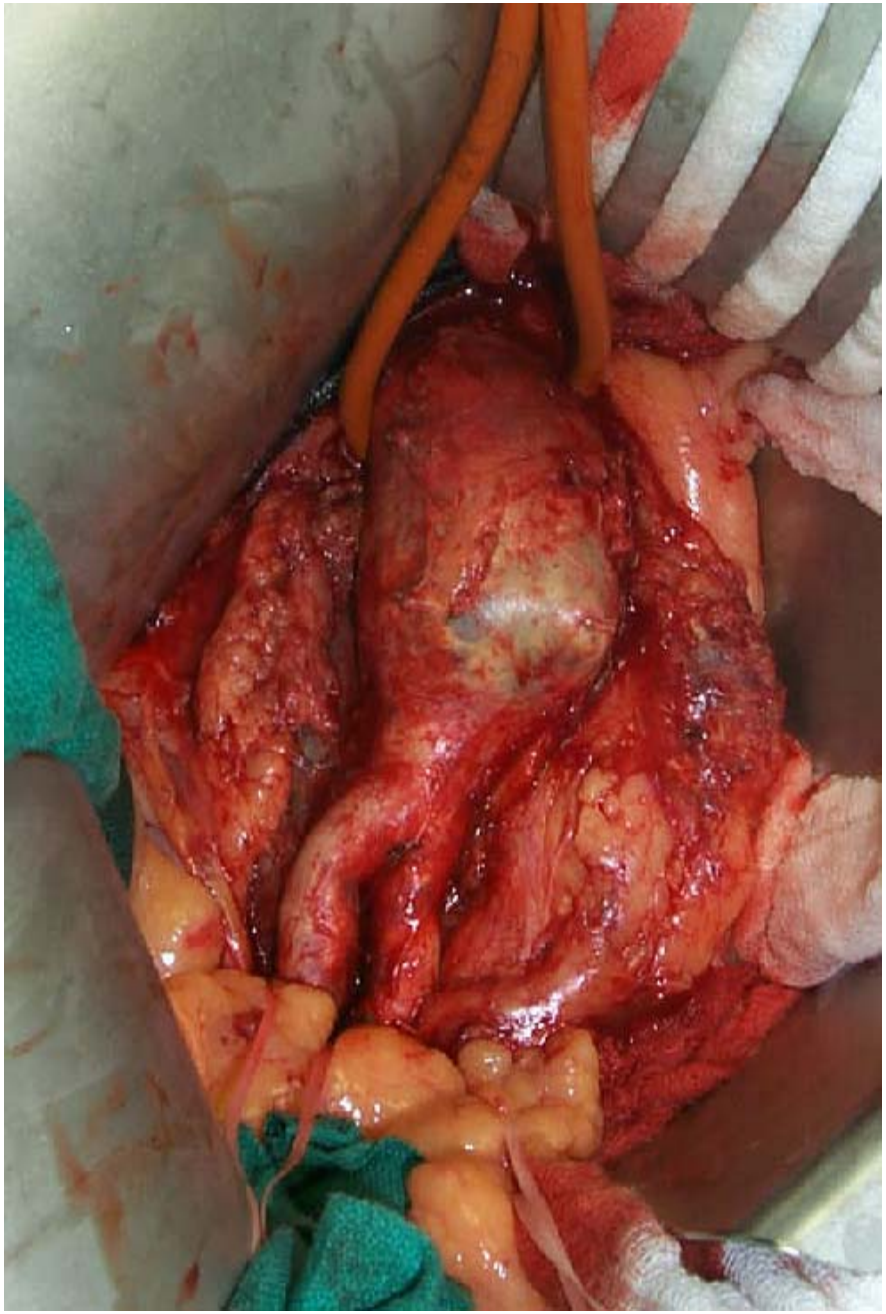
Open Surgical Repair

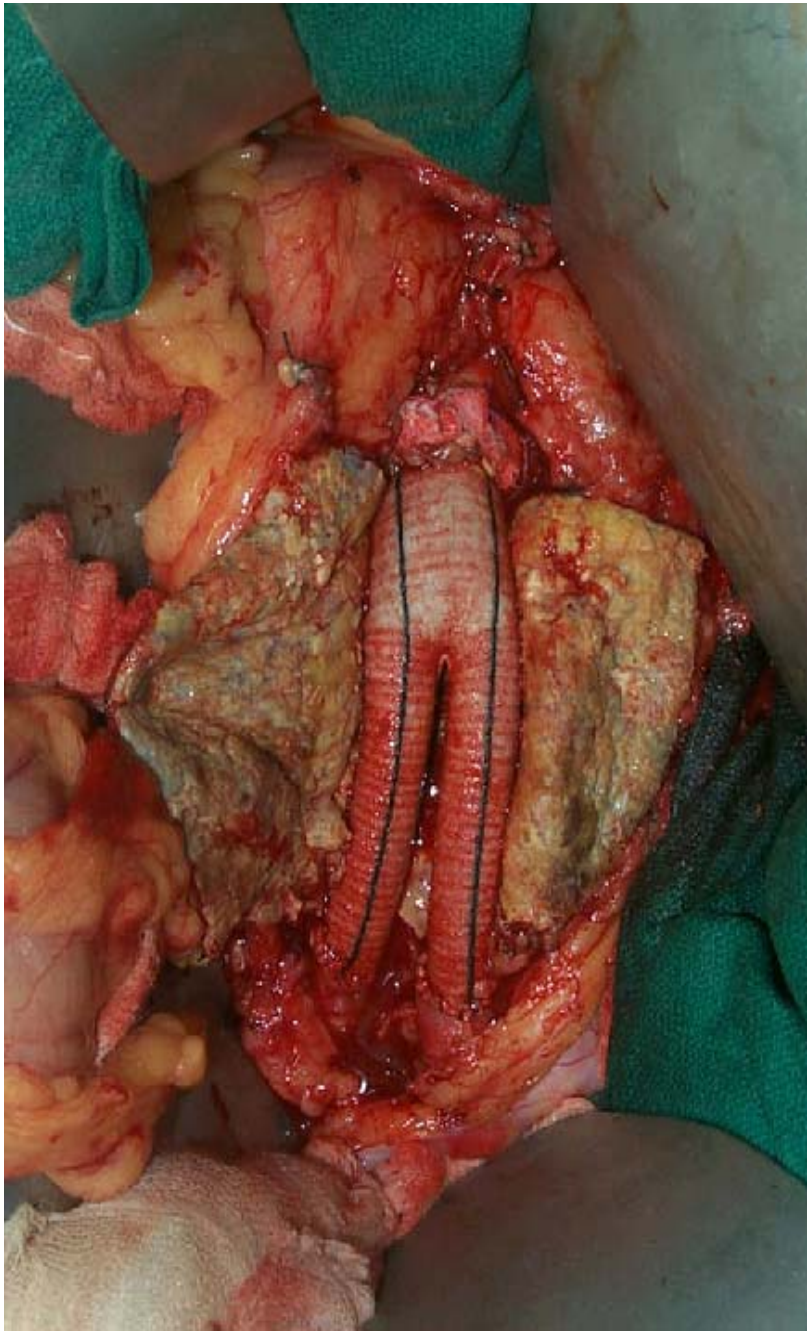
- Aneurysm opened, graft sewn in, aorta wrapped and closed around graft
- Excludes aneurysm and prevents sac growth
- Proven long-term results
- Considered the "Gold Standard"

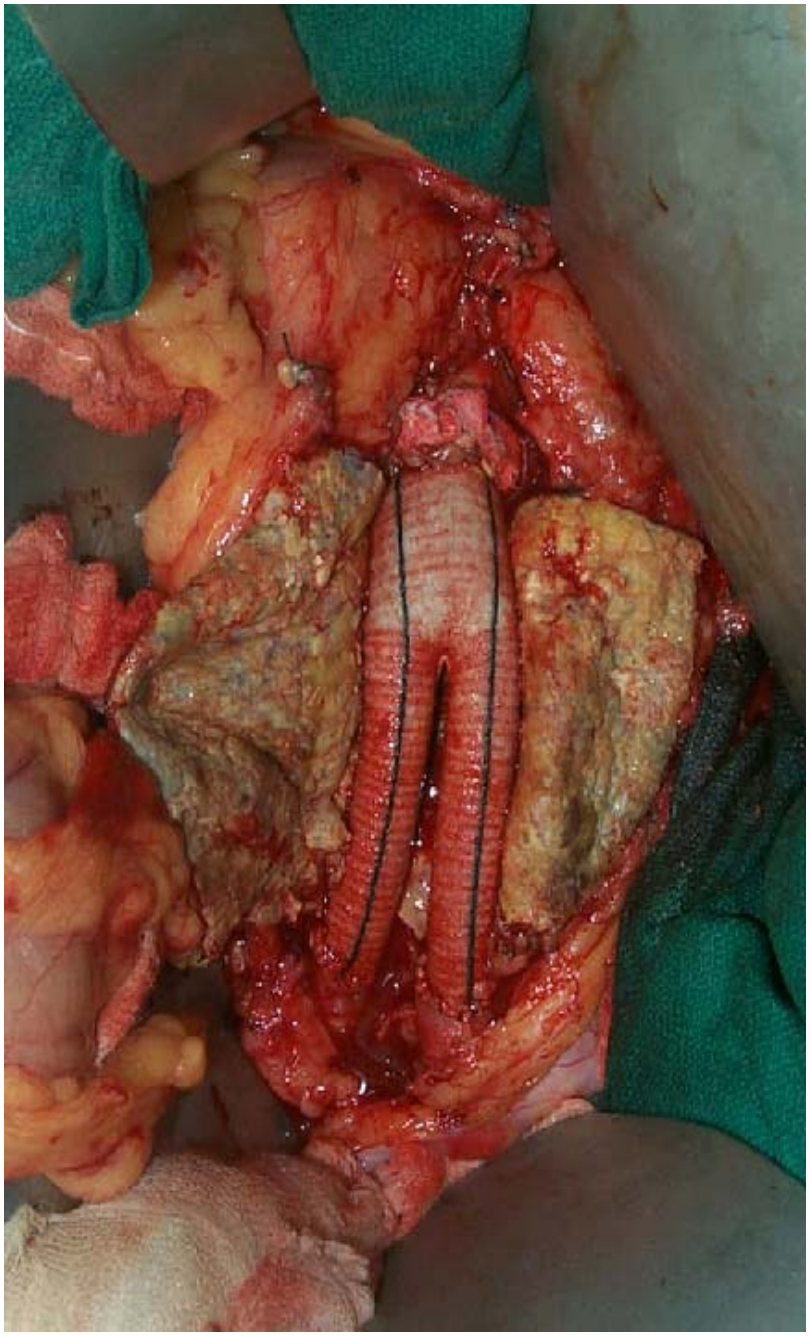


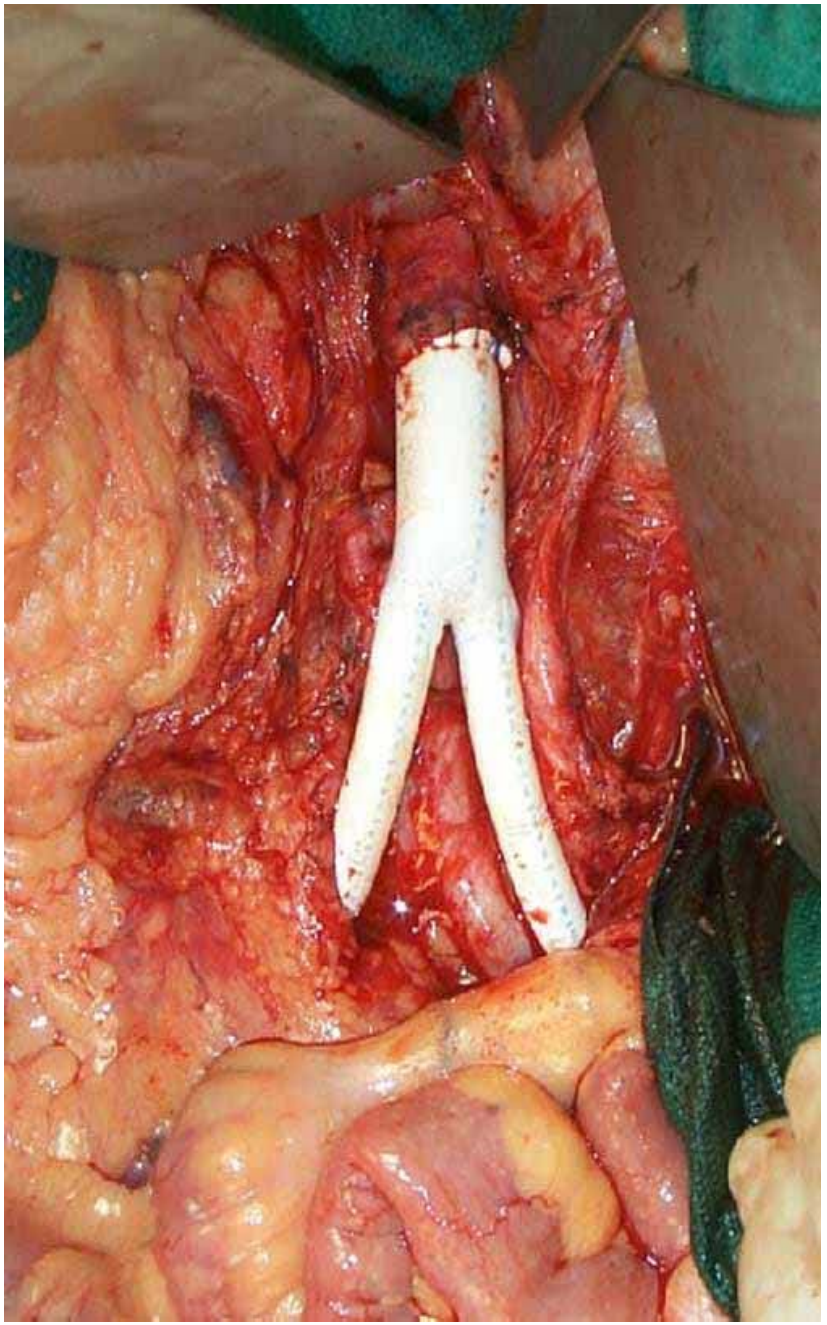


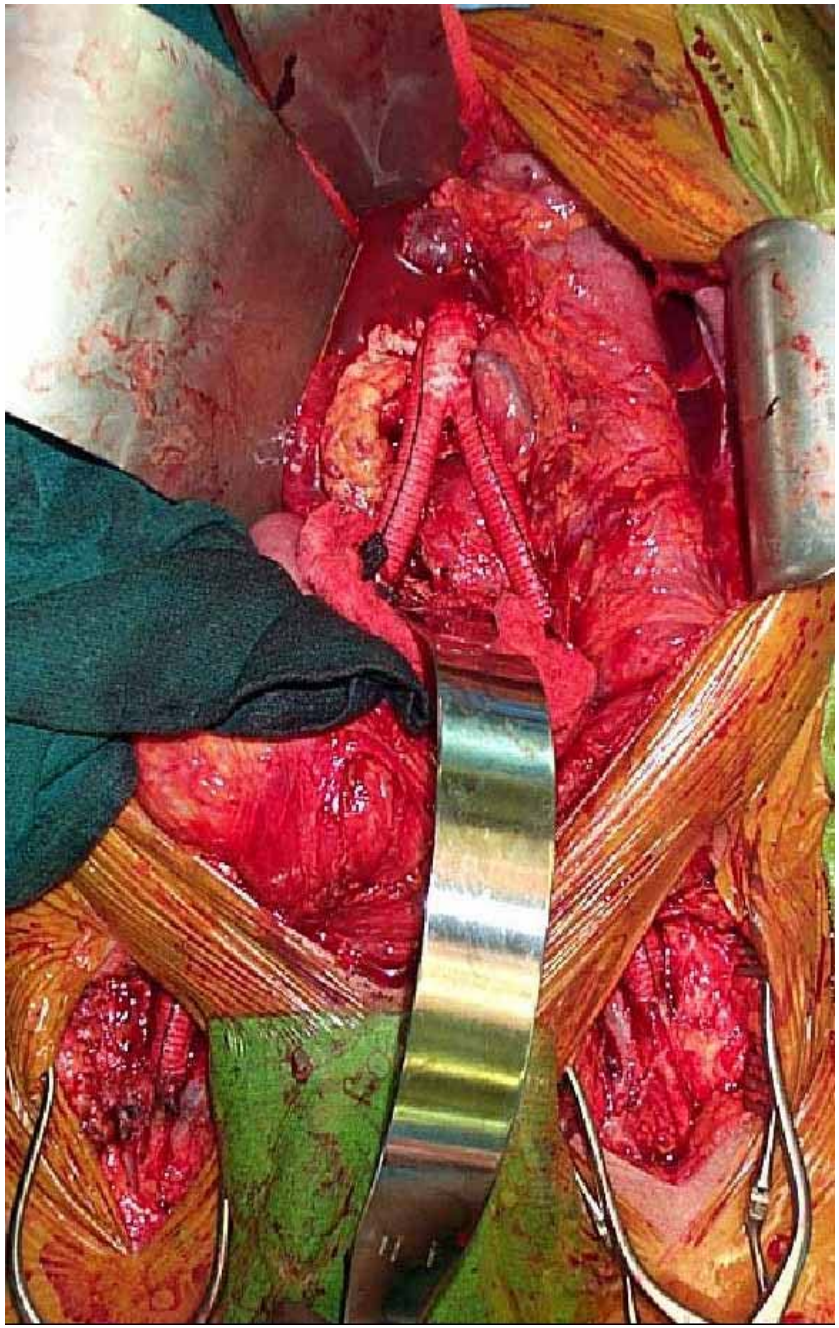


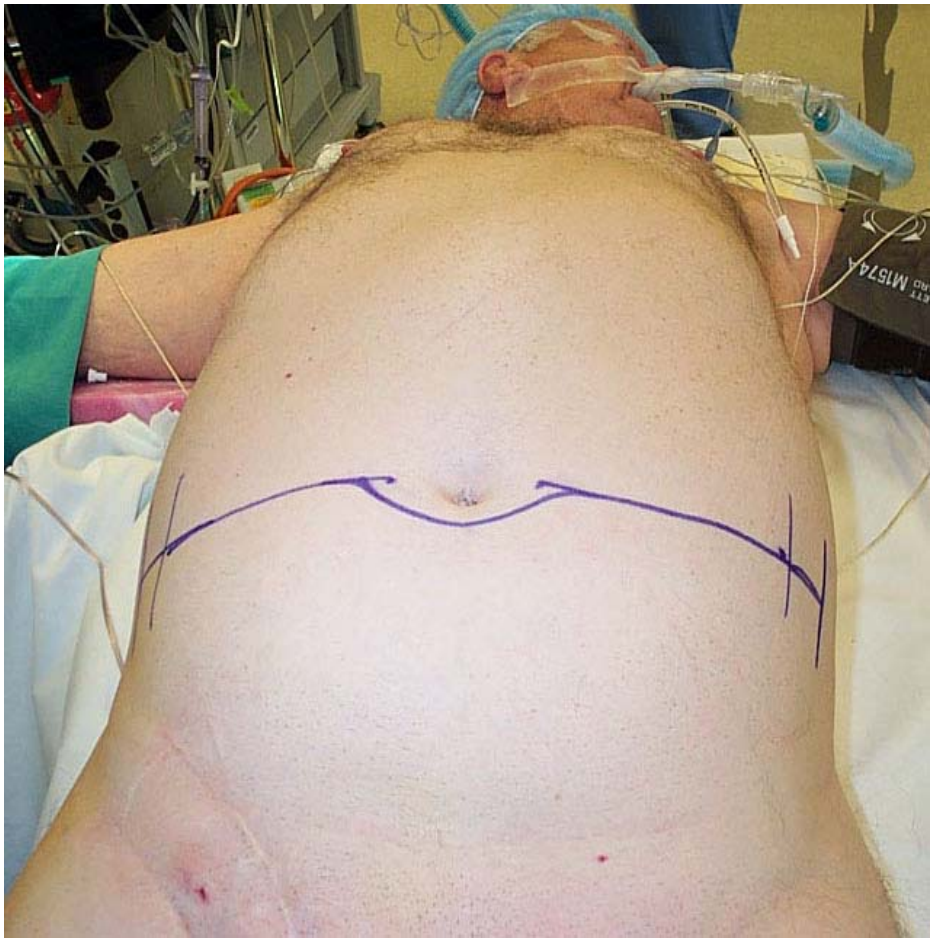


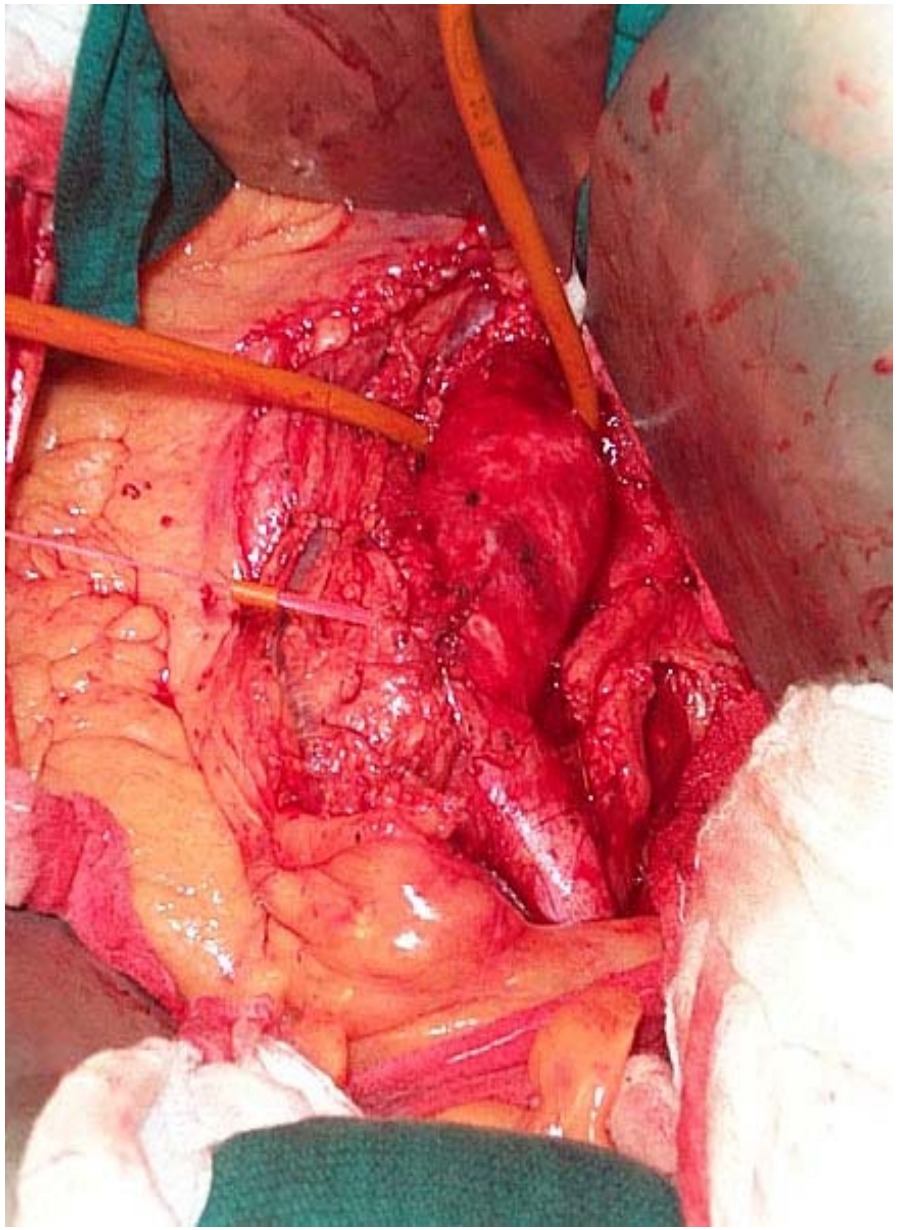


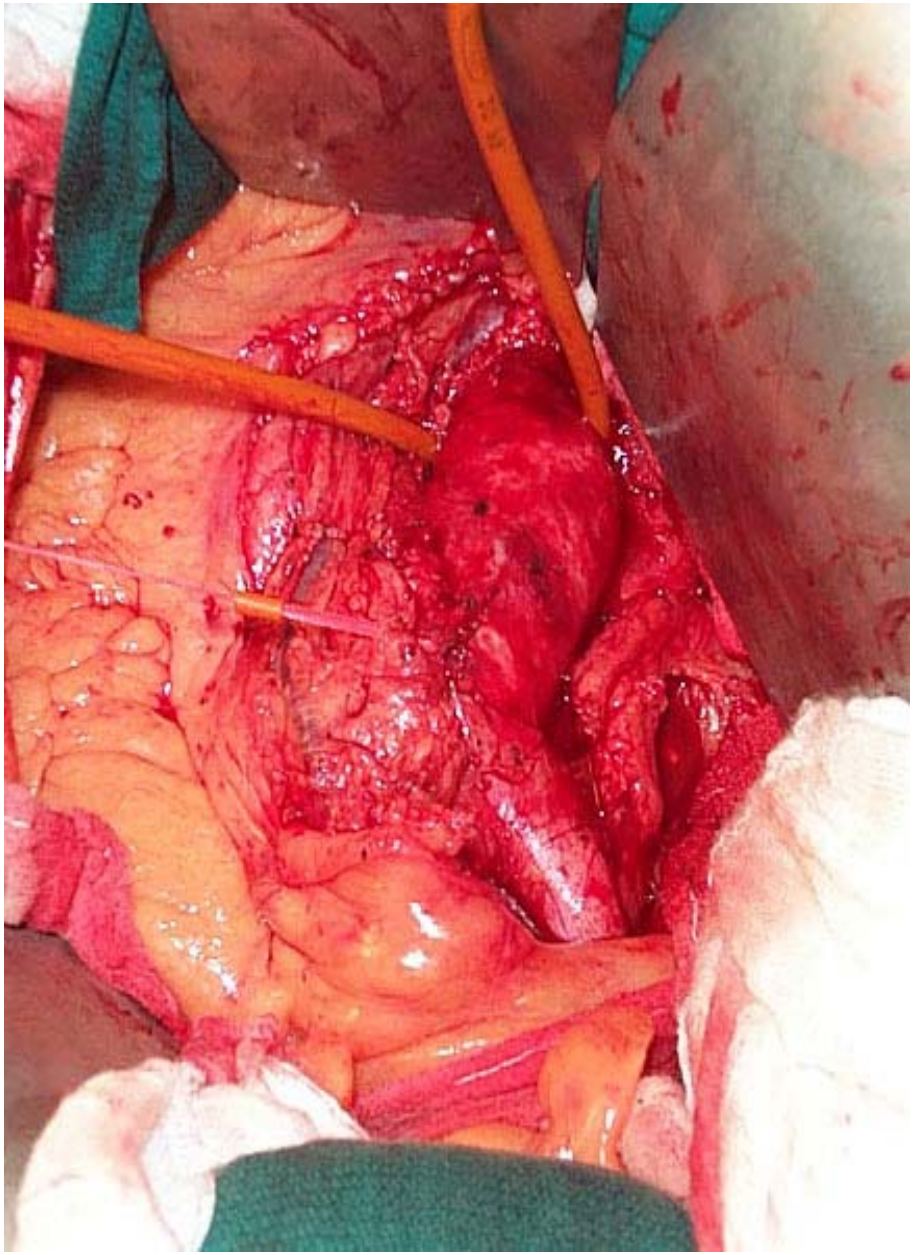


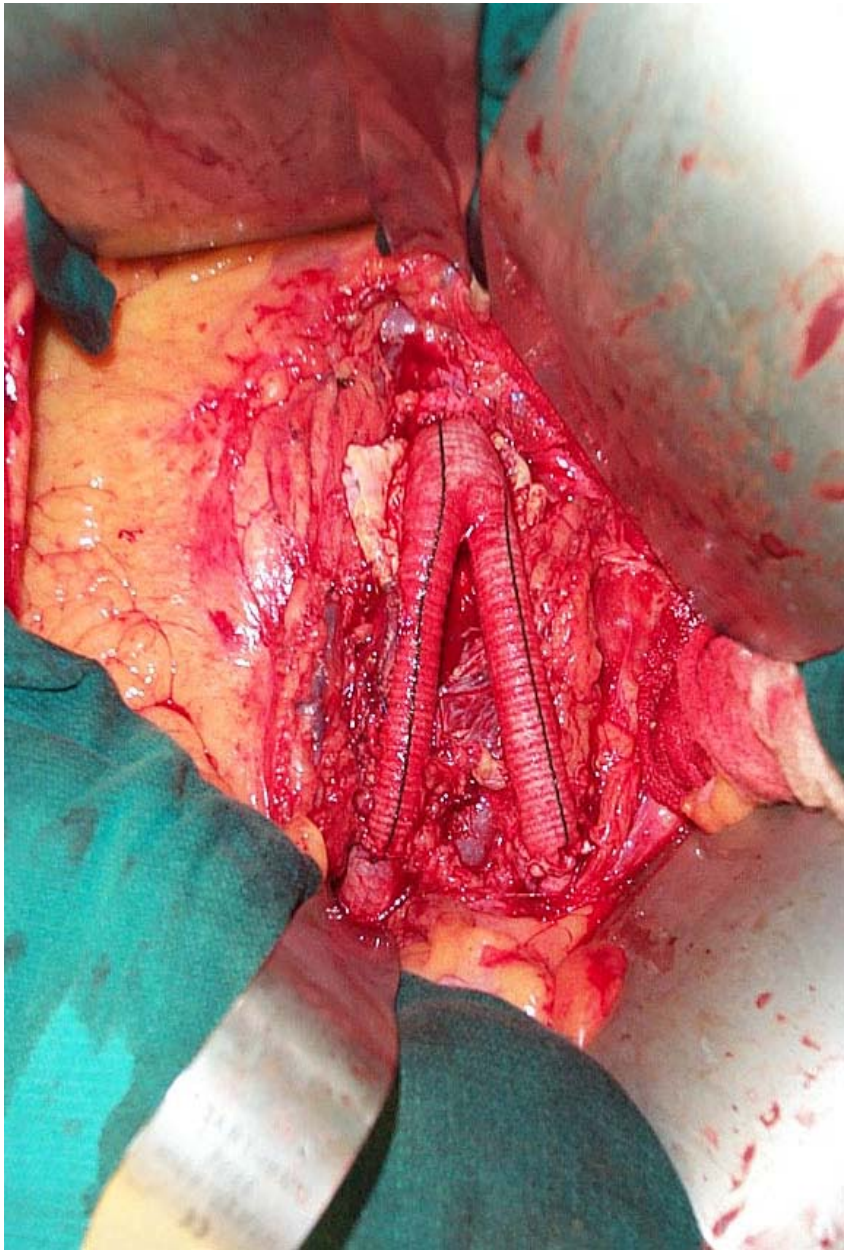






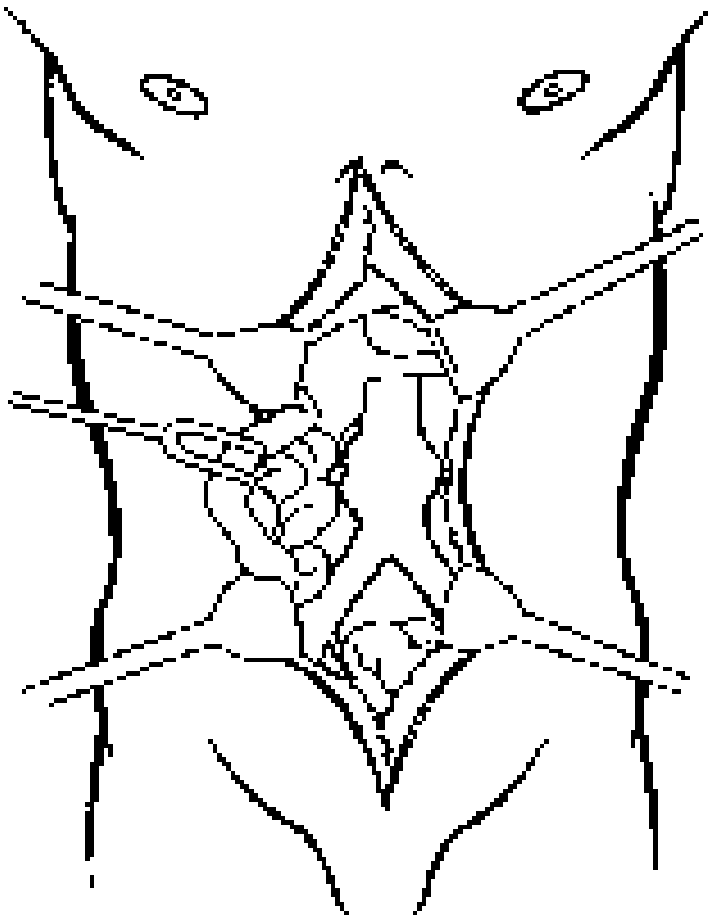






Drawbacks to Open Repair

- Significant incision in the abdomen
- 30 - 90 minute crossclamp
- Up to a 4 hour procedure
- Contraindicated in many patients
- 1 - 2 days intensive care, 7 - 10 day hospitalization, 4 - 6 weeks recovery time



Many Patients Are Considered "Unfit" for Open Repair

- High anesthesia risk
- Significant cardiac comorbidities
- Previous abdominal surgery / hostile abdomen

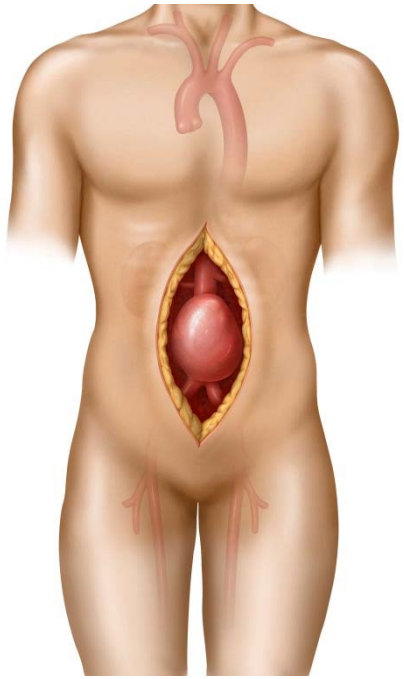
Complications

- 15% non-aneurysm-related
  - cardiac
  - pulmonary
  - renal

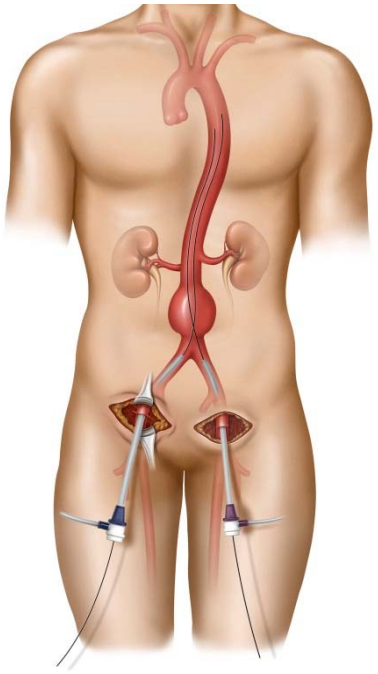
Endovascular AAA Repair (EVAR)

- Ability to treat patients unfit for open repair
- Reduction in morbidity
- Reduced blood loss
- Shorter hospital stay
- Earlier return to function

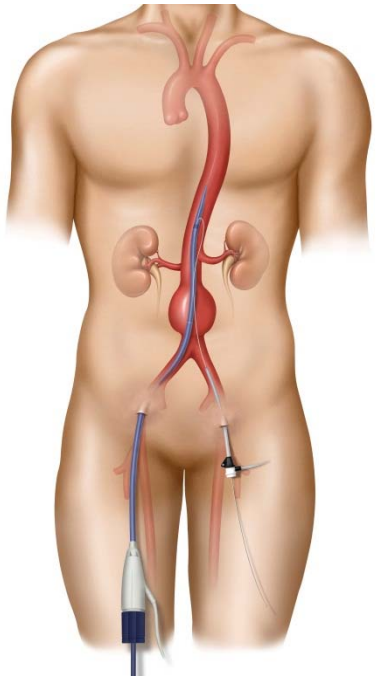
Percutaneous EVAR (PEVAR) is an option for many patients



Open Surgical Aortic Aneurysm Repair



Endovascular Aortic Aneurysm Repair (EVAR)



Percutaneous Endovascular Aortic Aneurysm Repair (PEVAR)

EVAR Endograft Options

- Several FDA approved devices exist
  - Address range of anatomies
  - Each have specific attributes
- Vary in profile
- Each with established, published data

FDA Approved AAA Endografts

Medtronic Endurant™

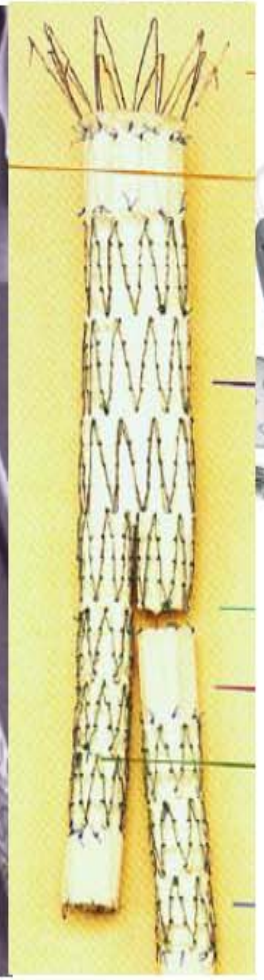
Endologix AFX2™

Gore Excluder™

Endologix Ovation™

Cook Zenith™

Excluder
Gore



Zenith
Cook

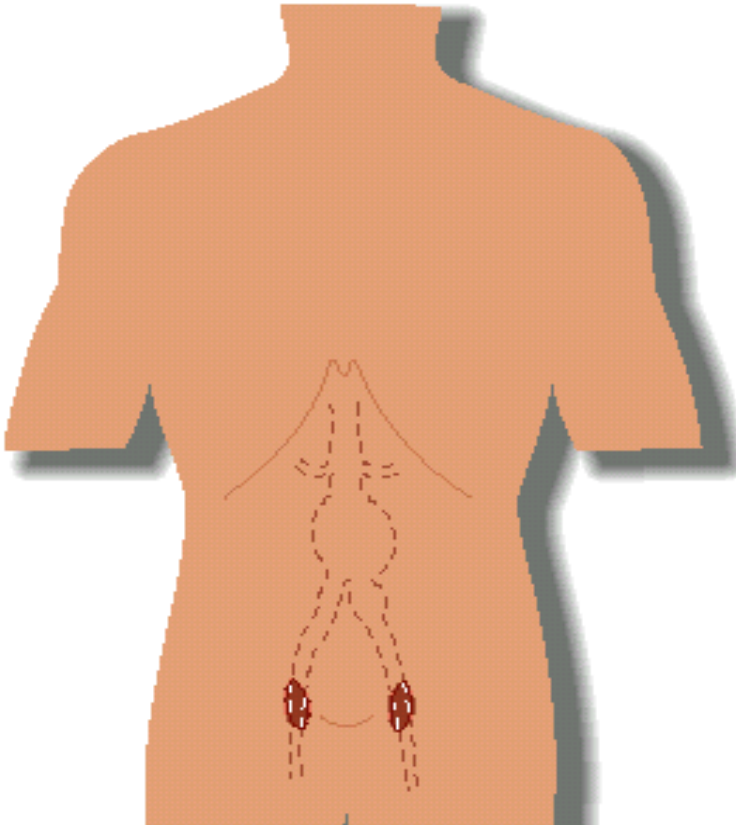
Endurant
Medtronic

PowerLink
Endologix

Ovitation
Trivascular

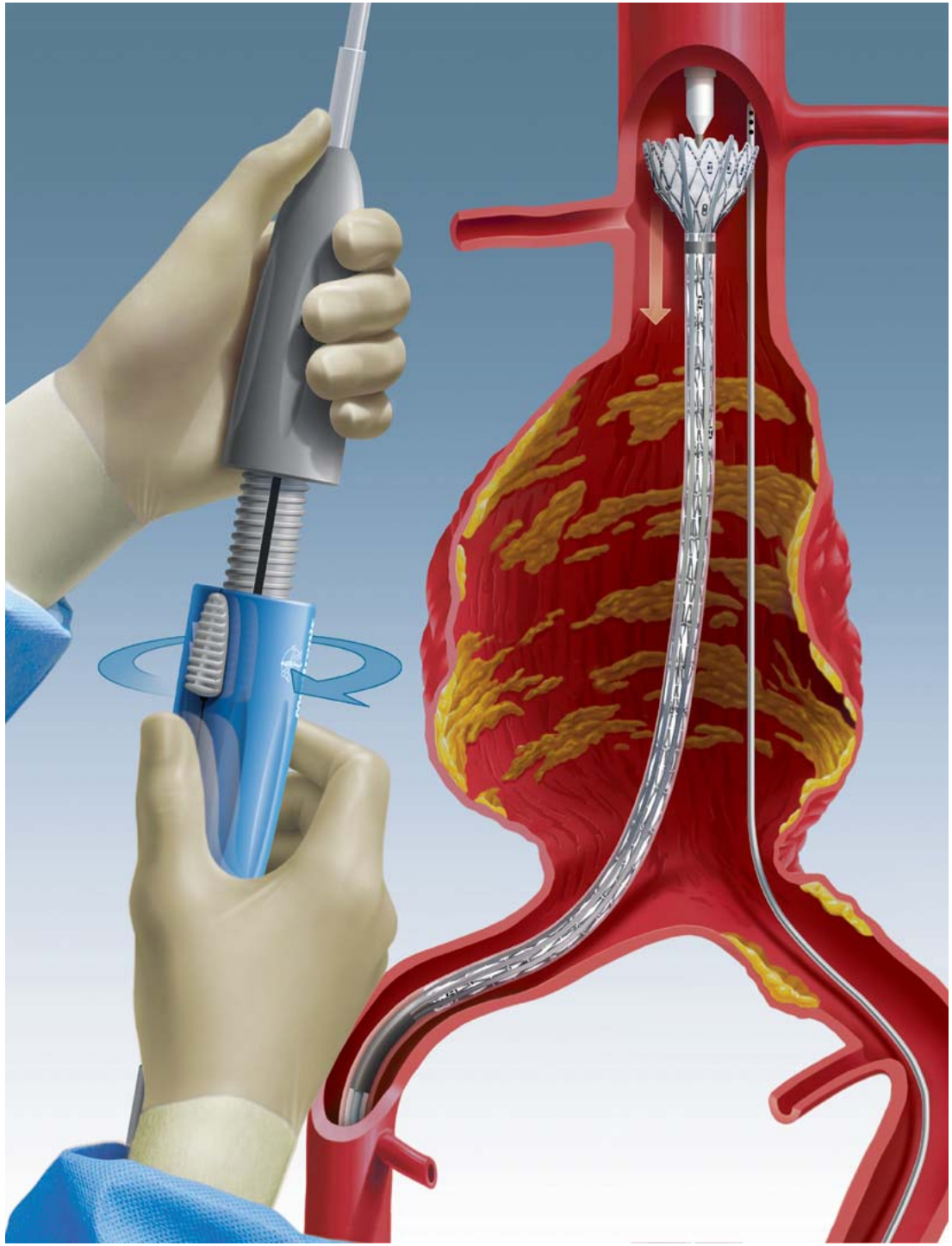
Aortix
Lombard

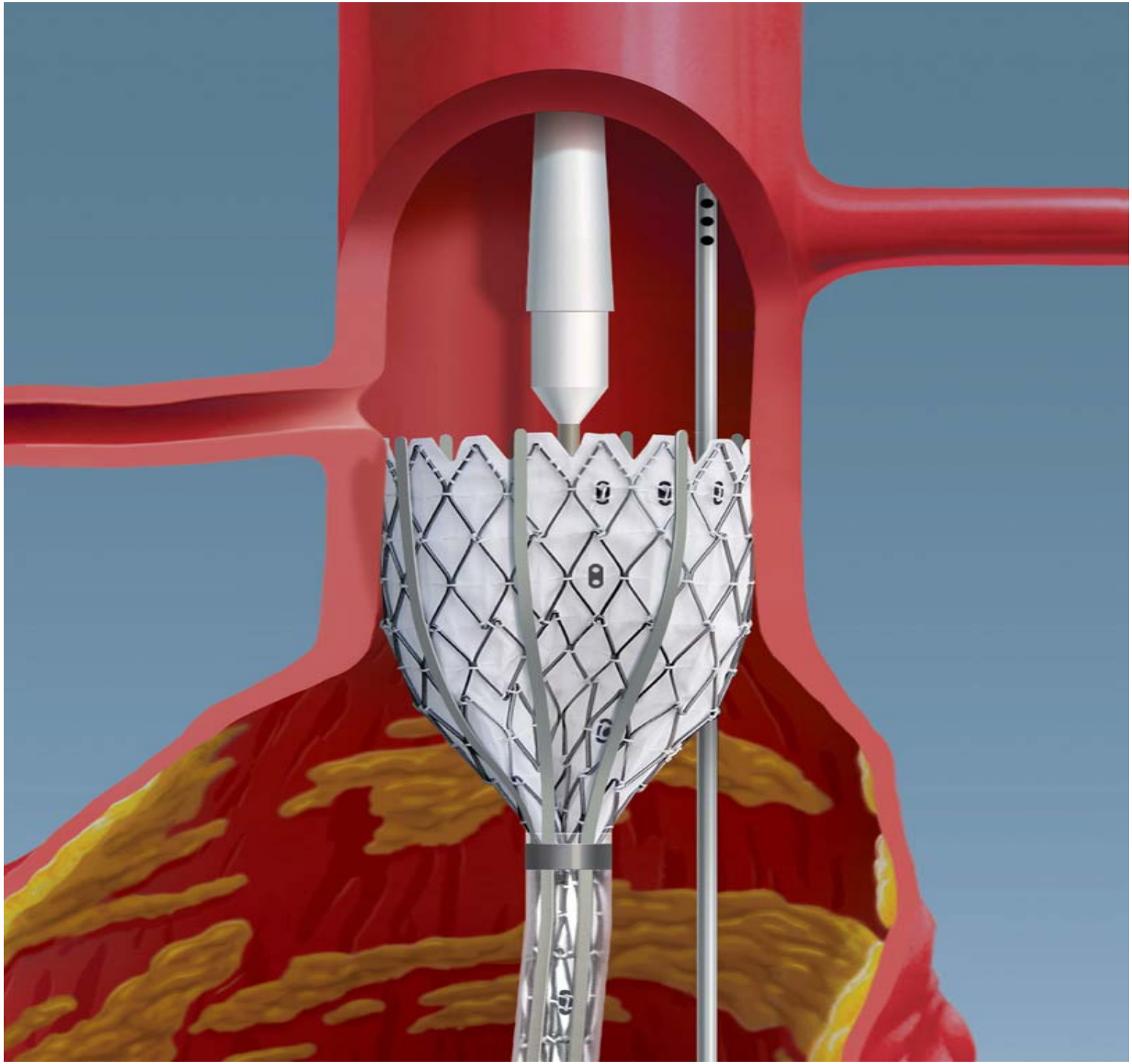
Procedural Overview

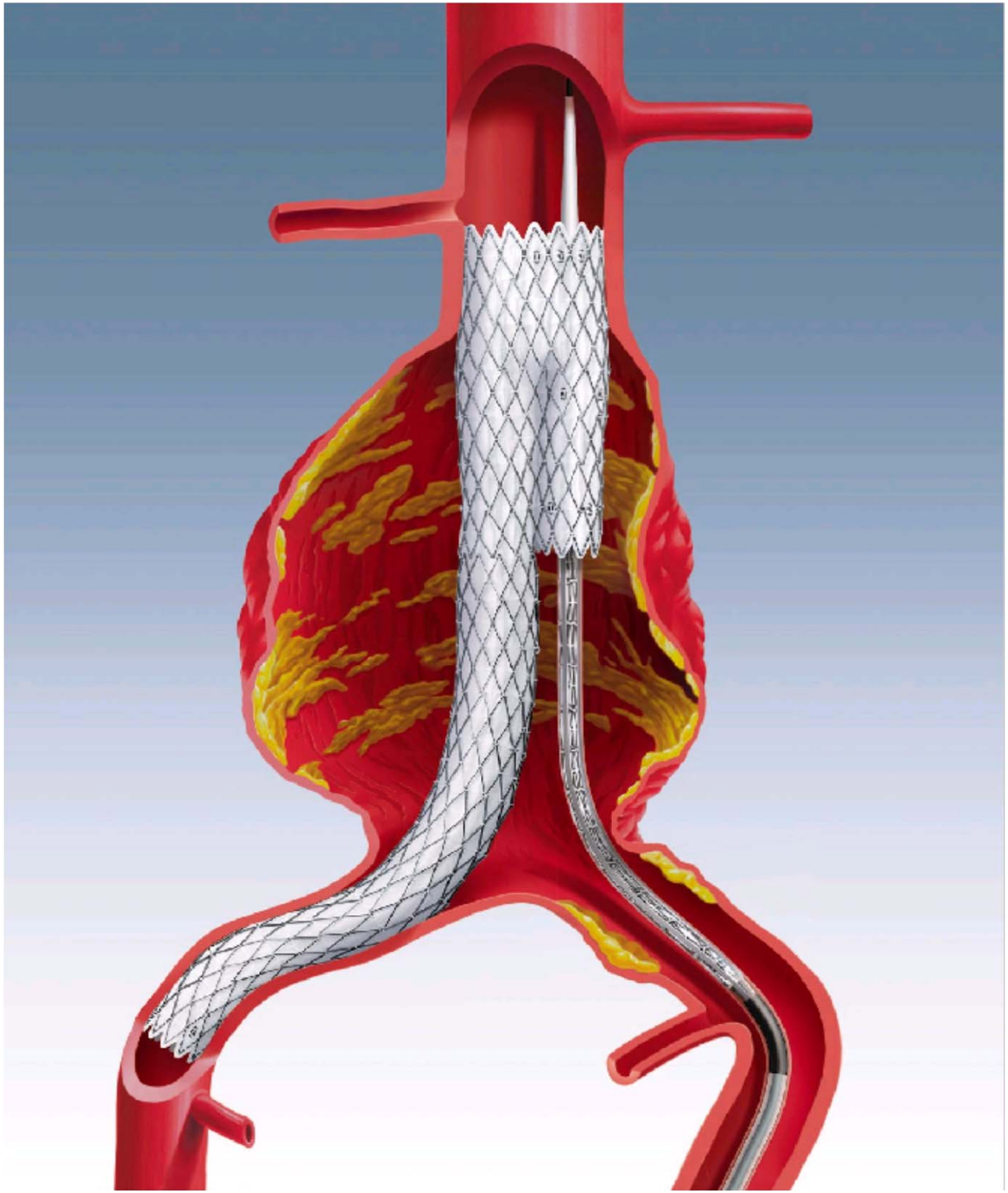


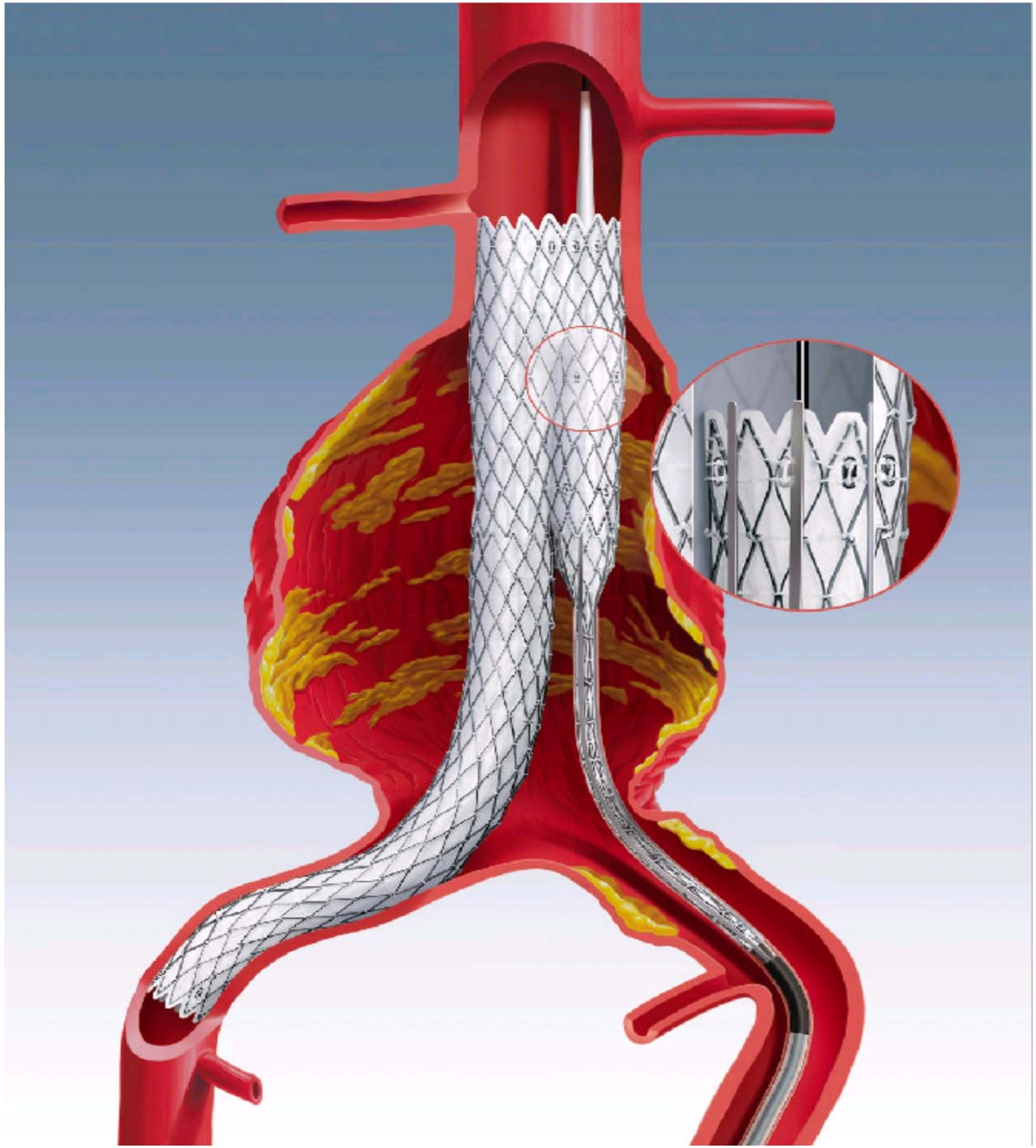
Bilateral femoral exposure or percutaneous access

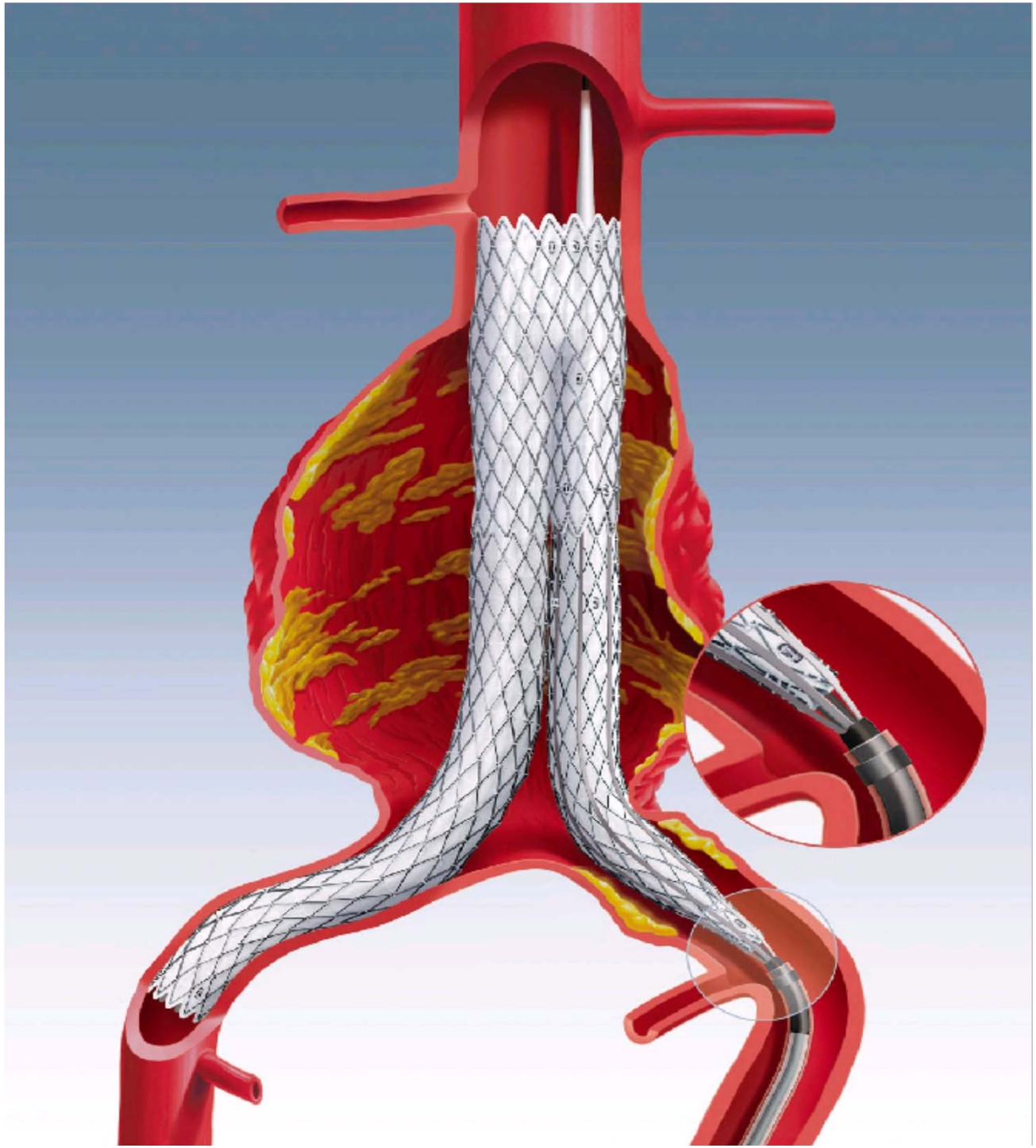
Device placement in O.R. or angio suite under fluoroscopic guidance

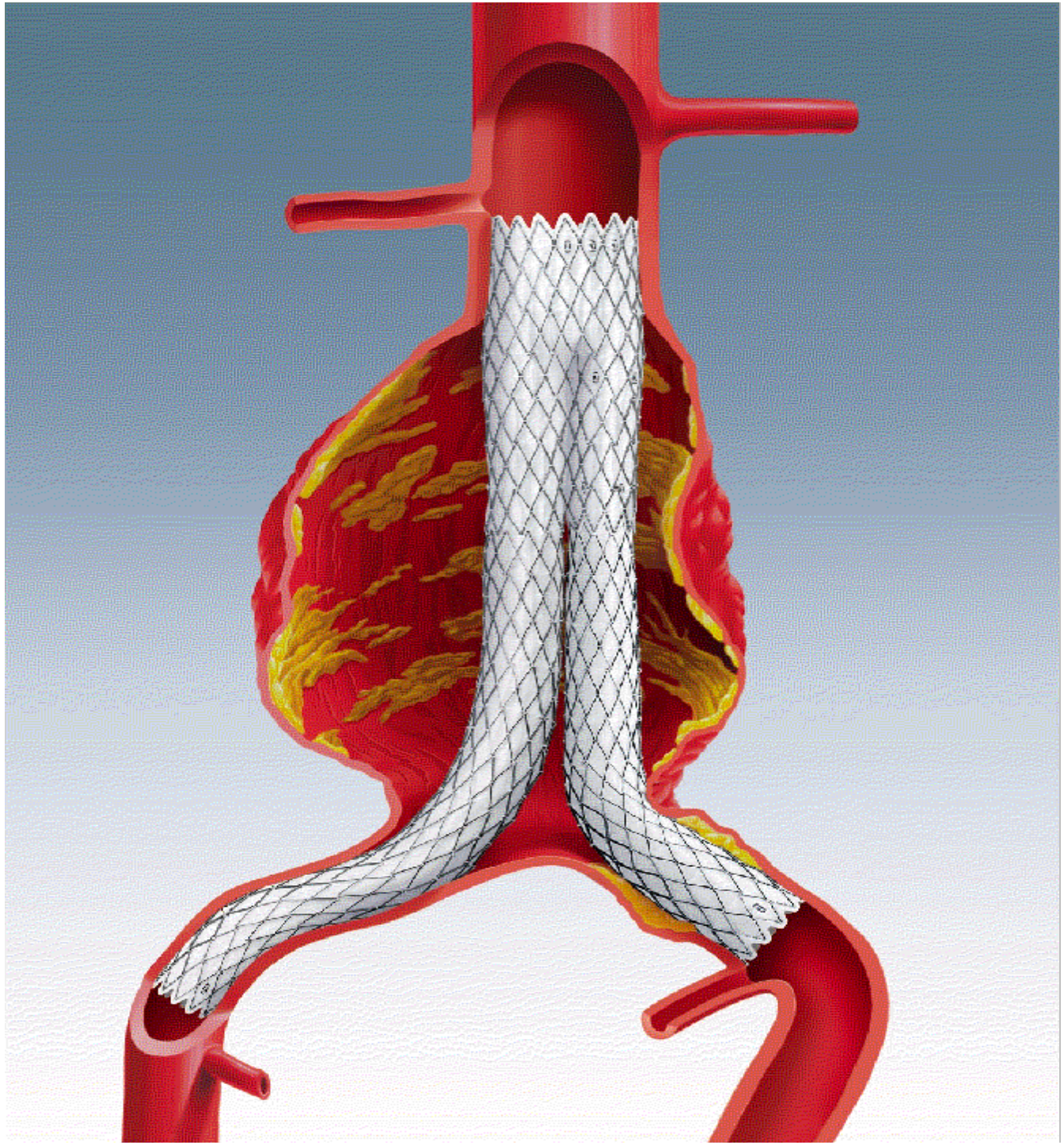






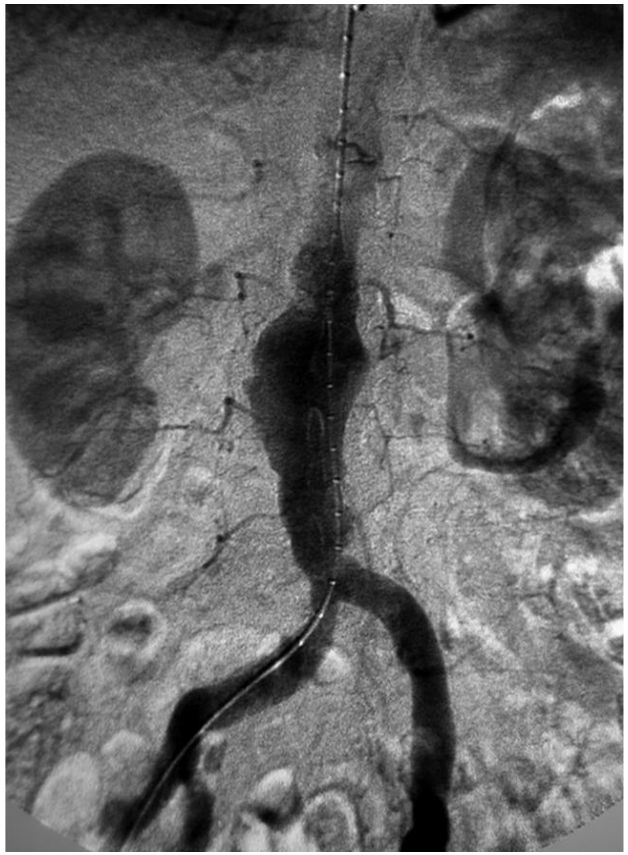






- Completion angiogram shows aneurysm exclusion
- CT demonstrates thrombosis of aneurysm sac with arterial blood flow through stent graft

EVAR



Endografts: Risks and Complications

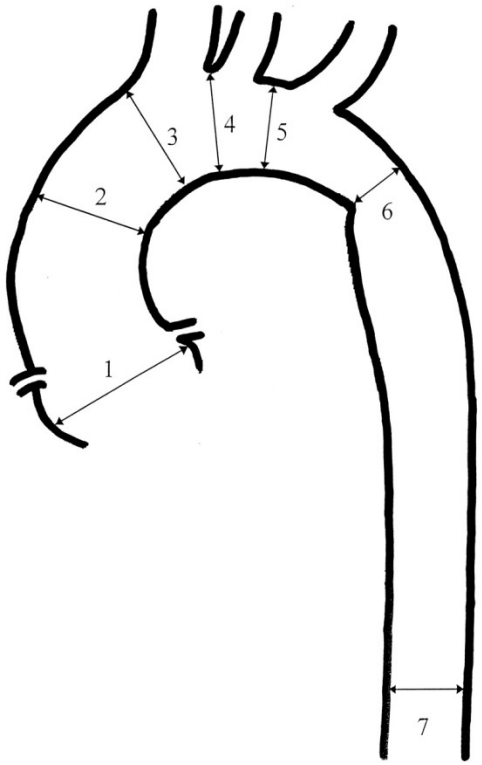
- Risks
  - radiation exposure
  - contrast agents
  - need for surveillance
  - potential future interventions
- Complications
  - endoleaks
  - migration
  - infection

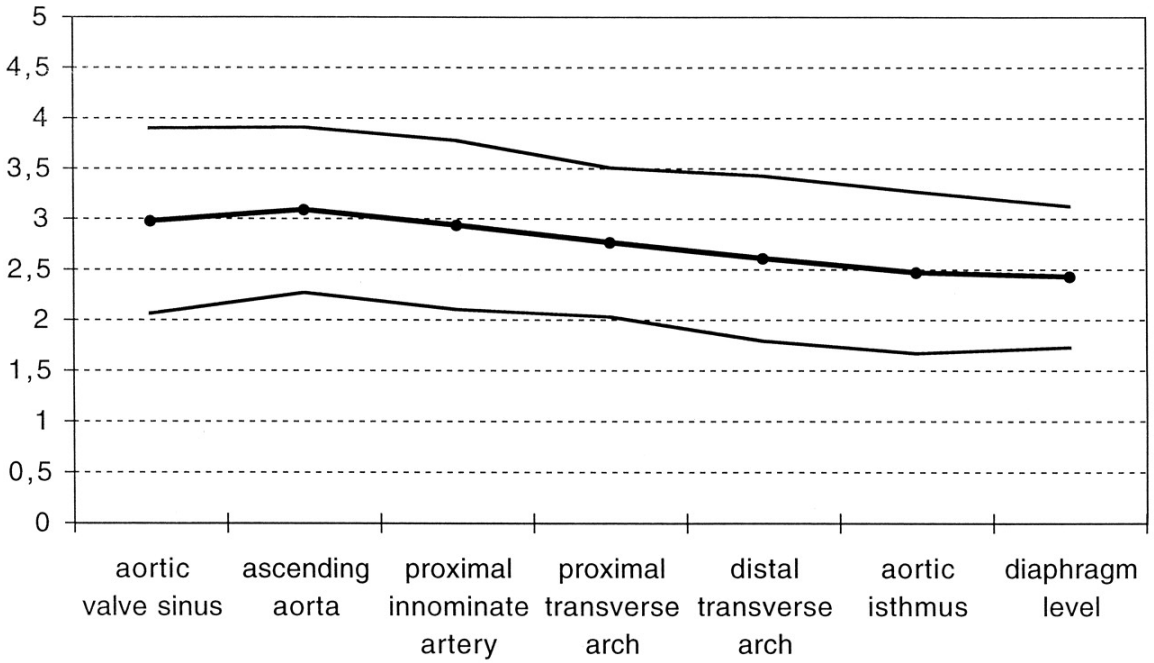
Open Versus Endovascular Repair

- No difference in overall mortality
- Advantage in aneurysm related mortality for EVAR
- Increased complication and reintervention rate for EVAR

Well what about other areas??!

Normal Aortic Dimensions



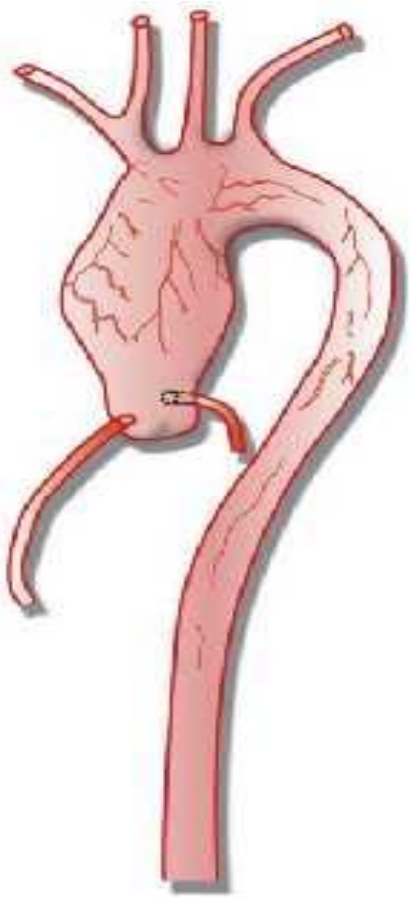


Hager A. et al.; J Thorac Cardiovasc Surg 2002;123:1060-1066

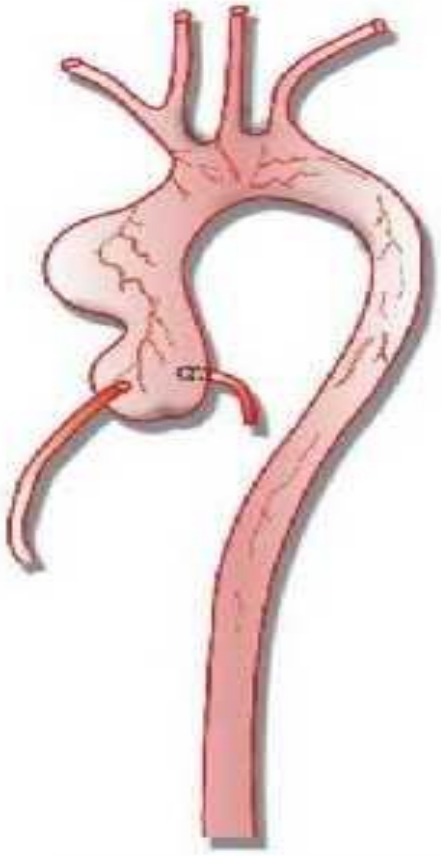
Thoracic Aortic Pathologies

- **Aortic aneurysm**
- **Aortic dissection**
- **Obstructive disease of branches of the thoracic aorta**
- **Traumatic aortic rupture**

Aortic Aneurysm

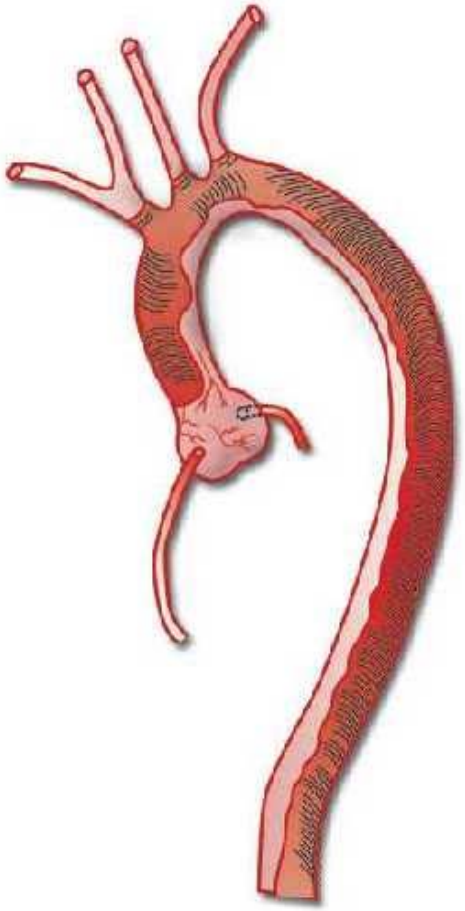


Fusiform Aneurysm

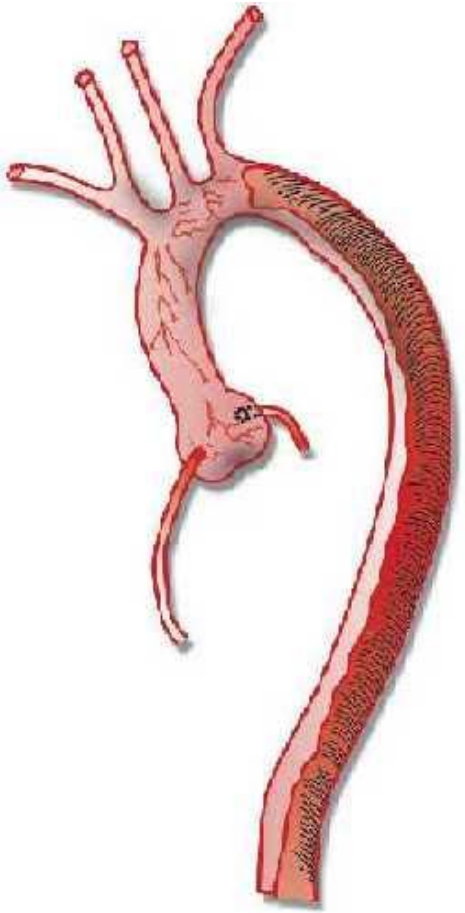


Saccular Aneurysm

Aortic Dissection

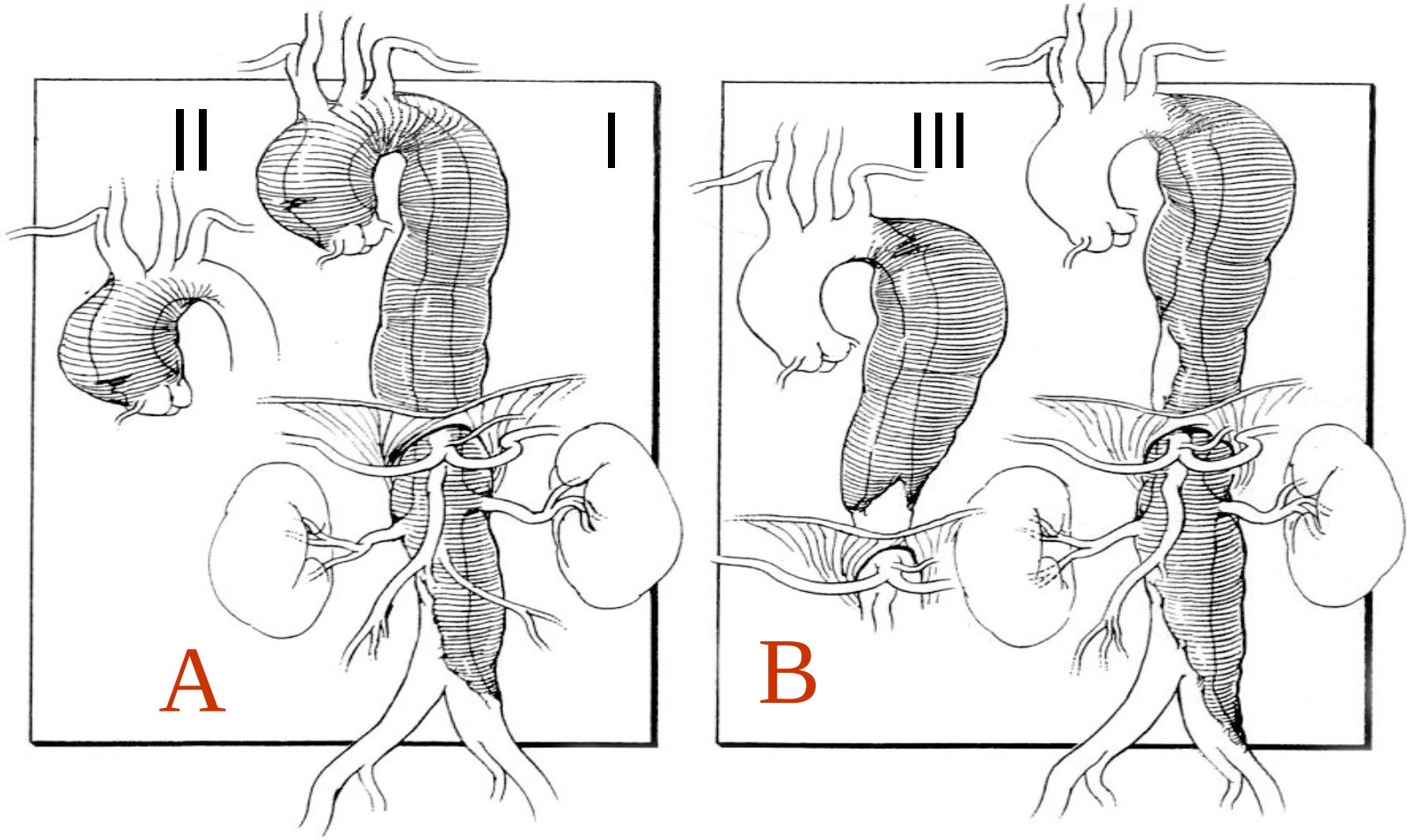


Type A Dissection



Type B Dissection

Classification of Aortic Dissection



Thoracic Aortic Aneurysms

- **Aortic aneurysm**
  - Incidence
    - 5.9 new aneurysms / 100,000 person-years
  - Life time probability of rupture : 75~80%
  - 5-yr untreated survival rate : 10~20%
  - Median time to rupture : 2~3 yrs

Size	*Risk of rupture within 1yr*
< 5 cm	4 %
≥ 6 cm	43 %

- Thoracic aneurysms
  - Prevalence greater than 3-4% of those over 65
  - 6 cases per 100,000 person-years
  - Incidence increasing
  - In the top 15 causes of death
  - Thoracic aortic aneurysm – rupture 3.5/100,000 persons

Clinical Presentation of AA

- **Symptoms & signs**
  - Asymptomatic
  - Compressive symptoms
    - recurrent laryngeal n. or vagus n. : hoarseness
    - tracheobronchial tree : dyspnea
    - pulmonary a. : fistula, bleeding → pulmonary HT & edema
    - esophagus : dysphagia
    - stomach : sensation of satiety → wt. loss
  - Pain ← aneurysmal expansion
  - Intestinal angina, renovascular HT
    ← associated atherosclerotic obstructive disease (5% in TAAA)
- **Physical finding - usually unremarkable**
  - Wide pulse pressure, diastolic murmur ← AR

Indications for Aortic Aneurysm Repair

- **Aneurysm diameter ≥ 5cm**
- **Aneurysm with documented enlargement**
- **Symptomatic aneurysm**
  - — chest pain or back pain indicating expansion
  - — significant aortic regurgitation

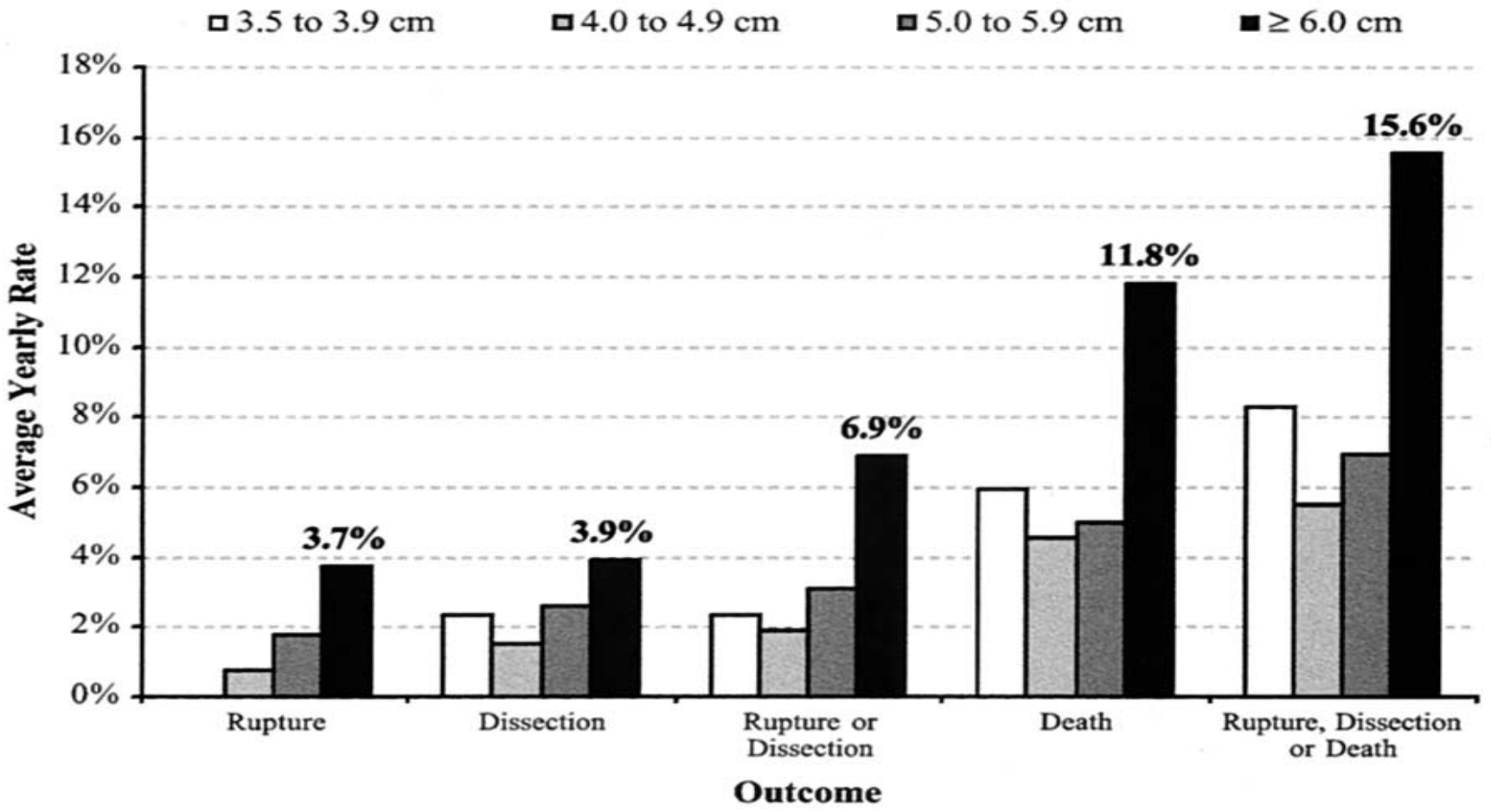
Etiologies

- Underlying Etiologies
  - Atherosclerosis
  - Marfan's
  - Type IV Ehlers-Danlos
  - Infection (syphillis)
  - Arteritis (giant cell, Takayasu, Behcet's)
  - Trauma
- Risk Factors
  - Smoking
  - COPD
  - HTN
  - Male gender
  - Older age
  - High BMI
  - Abnormal aortic valve (e.g., bicuspid valve)
  - Family history

Diagnosis

- Chest x-ray
  - Widened mediastinum
- Echocardiogram
  - Transthoracic – aortic root
  - Transesophageal – ascending and descending
- Aortography
  - Delineates the lumen
- CT scan
  - Most widely used diagnostic tool
- MRI
  - Avoids contrast dye

Natural History



Average yearly rates of negative outcomes during the first 5 years after presentation

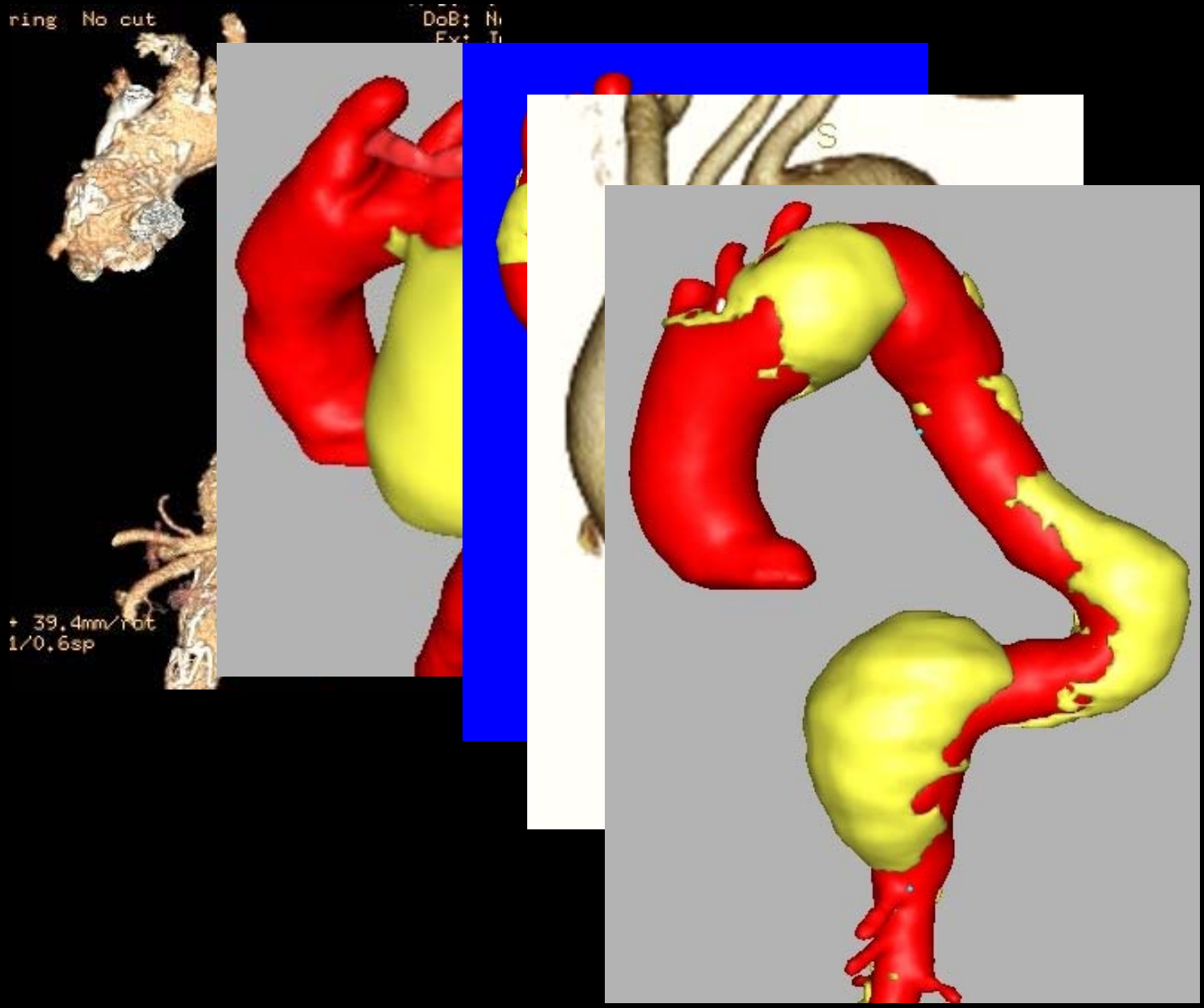
Davies RR, et al. *Ann Thorac Surg* 2002;73:17

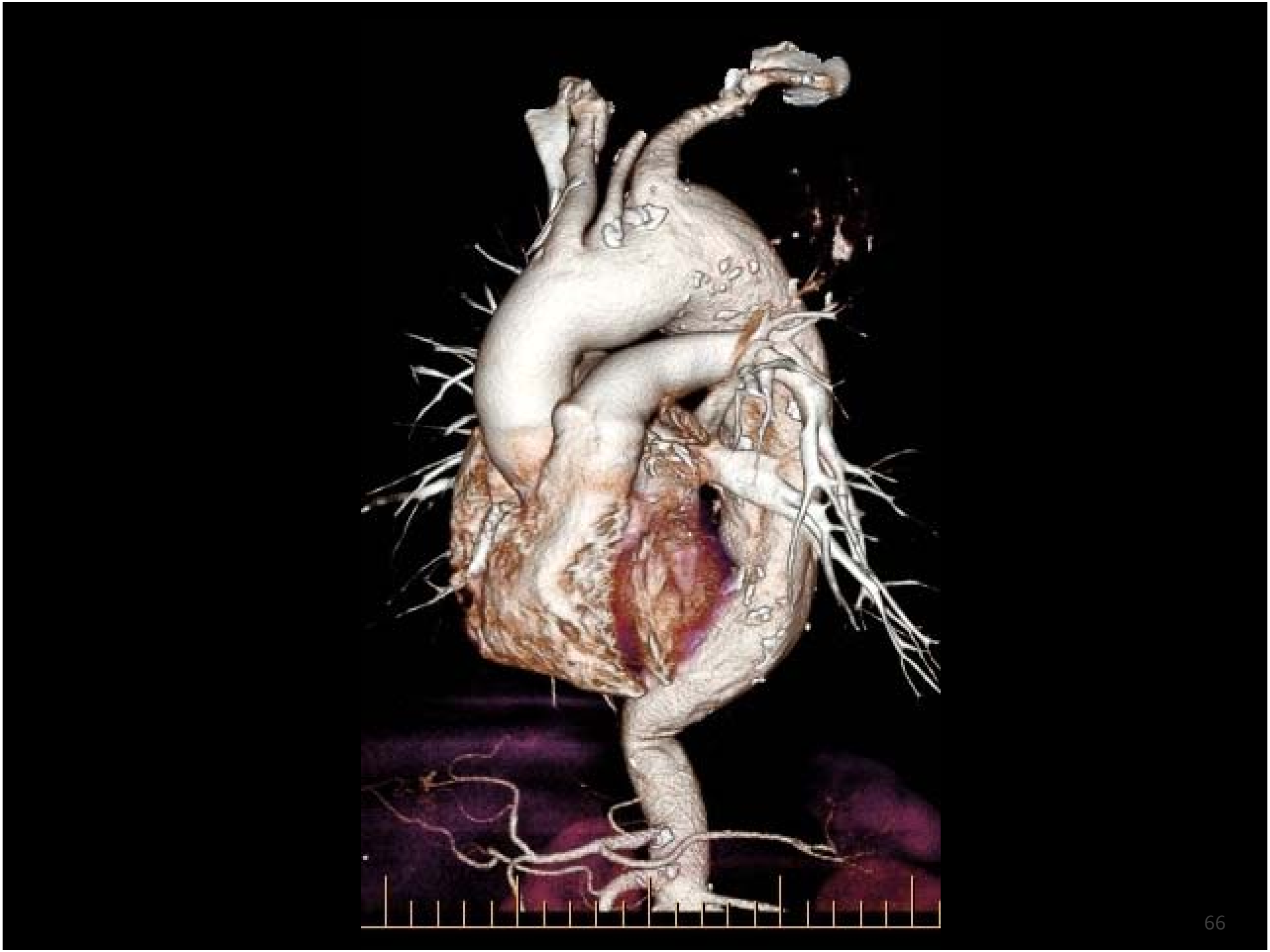
Treatment - Aneurysm

- Medical
  - BP control
  - Smoking cessation
  - No heavy lifting
- Surgical
  - Dacron tube graft
  - Ascending – may need to replace valve
  - Arch – graft
  - Descending – graft, stent grafts

Treatment – Indications for Intervention

- Aortic size
  - Ascending diameter ≥5.5 cm
  - Descending diameter ≥6.5 cm
  - Growth rate ≥1 cm/yr (avg ascending 0.07 cm/yr; descending 0.19 cm/yr)
- Symptomatic aneurysm
- Traumatic rupture
- Pseudoaneurysm
- Large saccular aneurysm
- Mycotic aneurysm
- Aortic coarctation


ring No cut
+ 39.4mm/rot
1/0.6sp



Treatment

- Traditional Open Repair

- Endovascular Repair

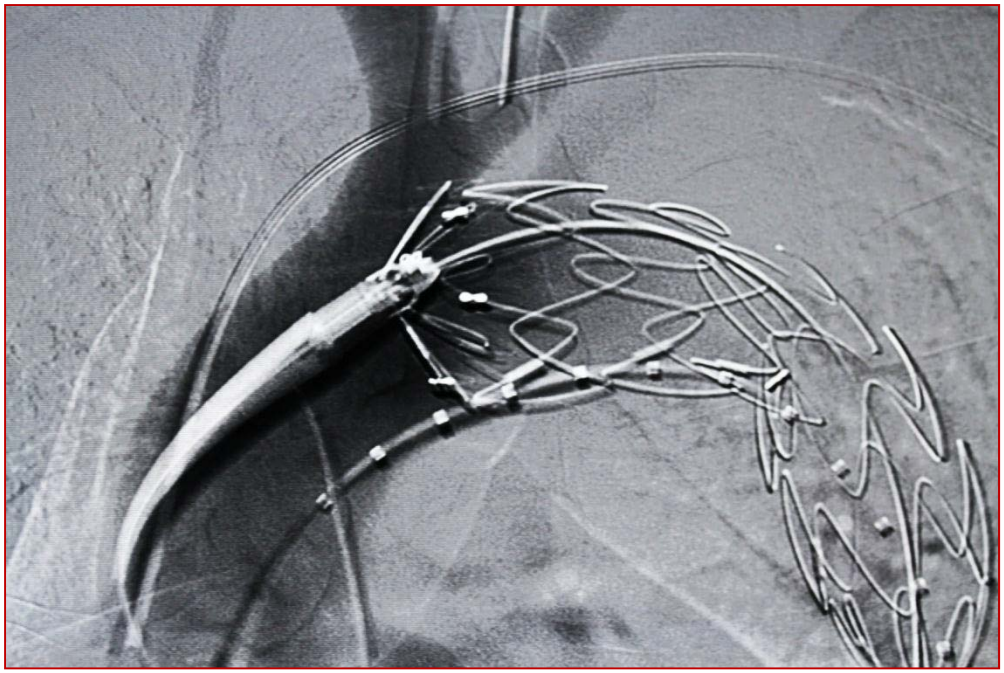
to replace the ascending aorta and aortic arch. Reproduced from [21], with permission

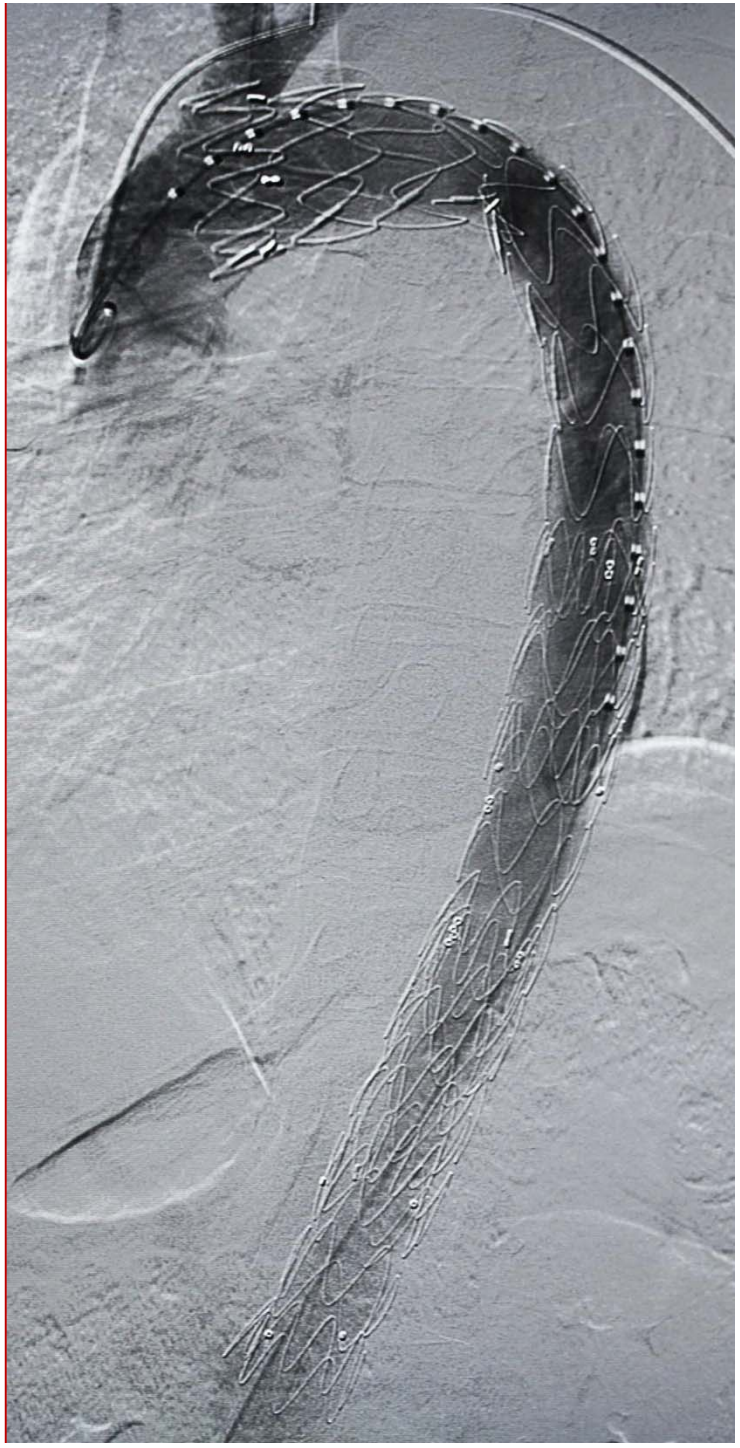
Open Surgical Treatment:

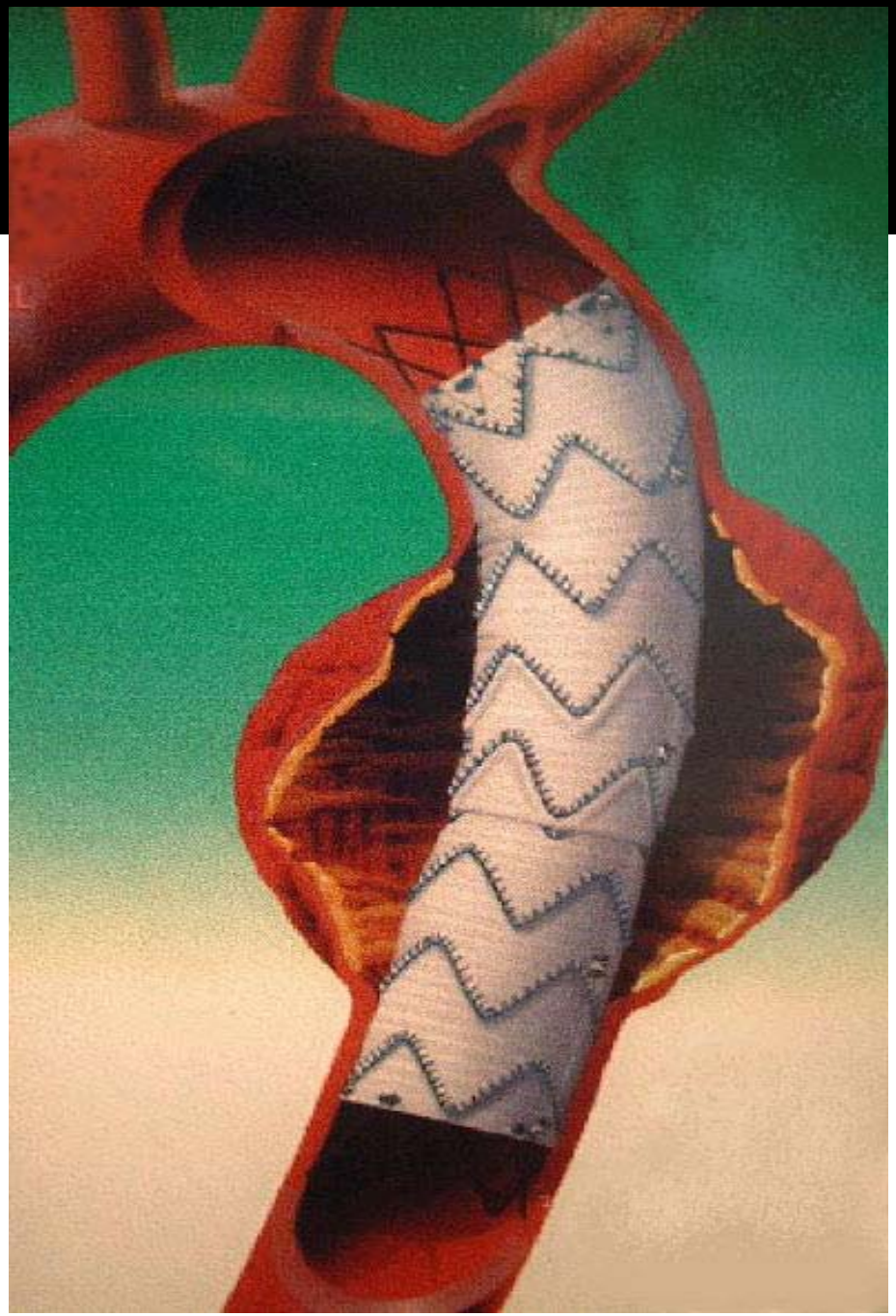
- Possible? YES… but
- Very risky and difficult
- High mortality/serious morbidity
- Mastered by few surgeons/centers
- Many pts left without a Rx option…
- More pts still left undiagnosed…

Endovascular Treatment

Figure 3. A timeline of FDA approvals for TEVAR stent grafts.

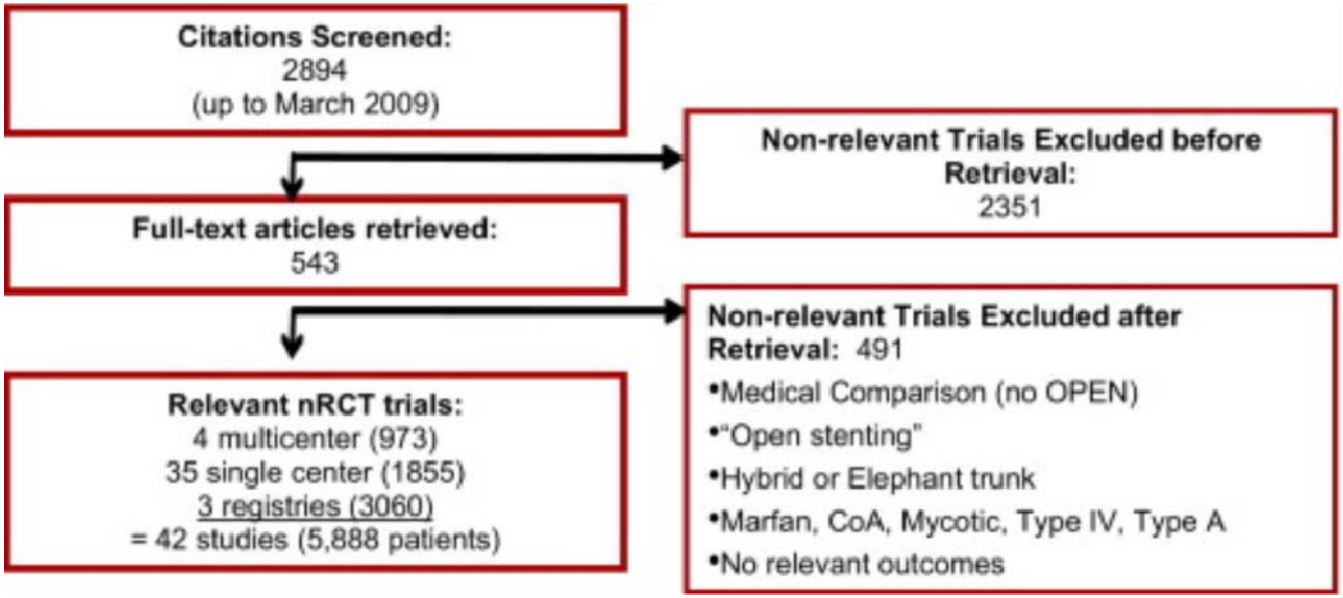






Endovascular Aortic Repair Versus Open Surgical Repair for Descending Thoracic Aortic Disease:

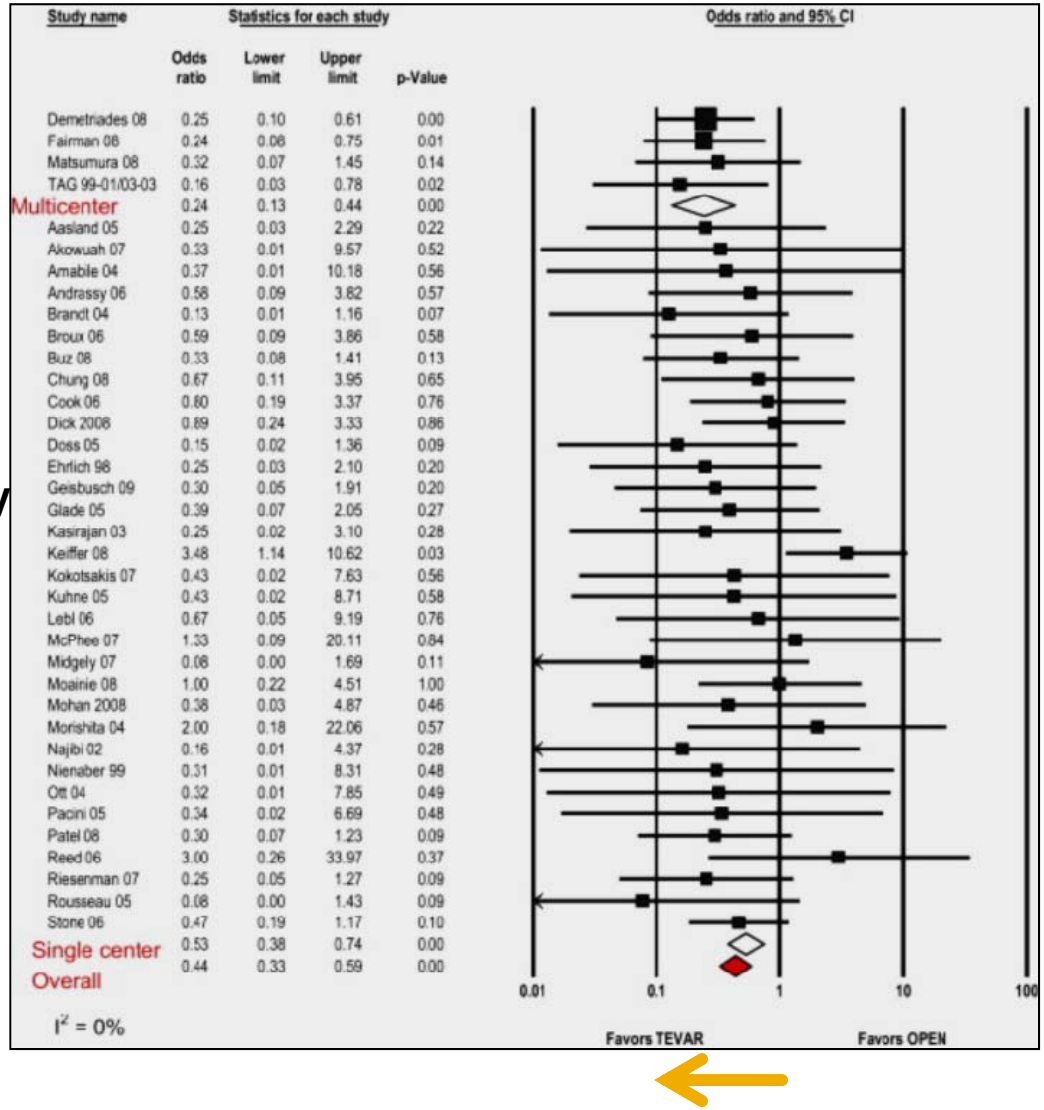
Systematic Review and Meta-Analysis of Comparative Studies



J Am Coll Cardiol. 2010;55(10):986-1001. doi:10.1016/j.jacc.2009.11.047

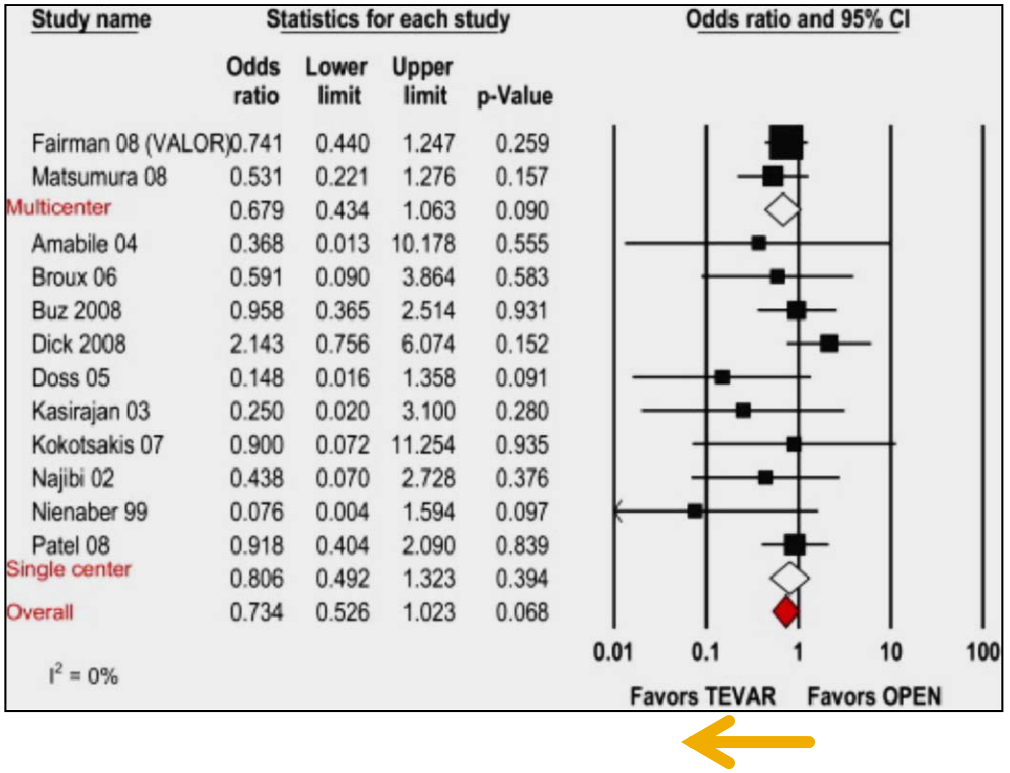
Death at 30 Days:

TEVAR Versus Open Surgery



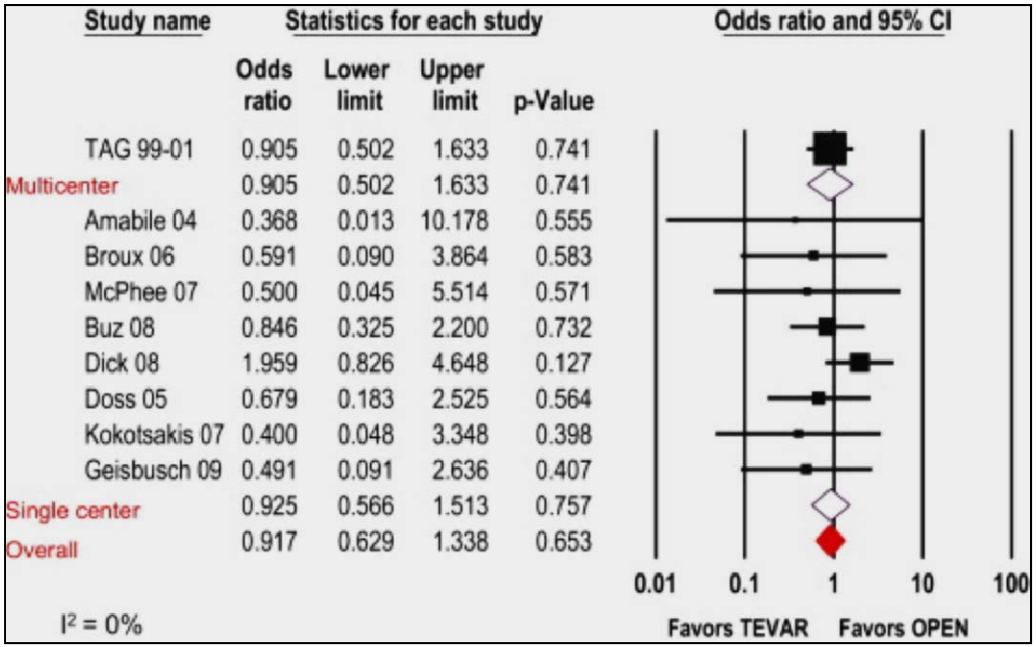
Death at 1 year:

TEVAR Versus Open Surgery



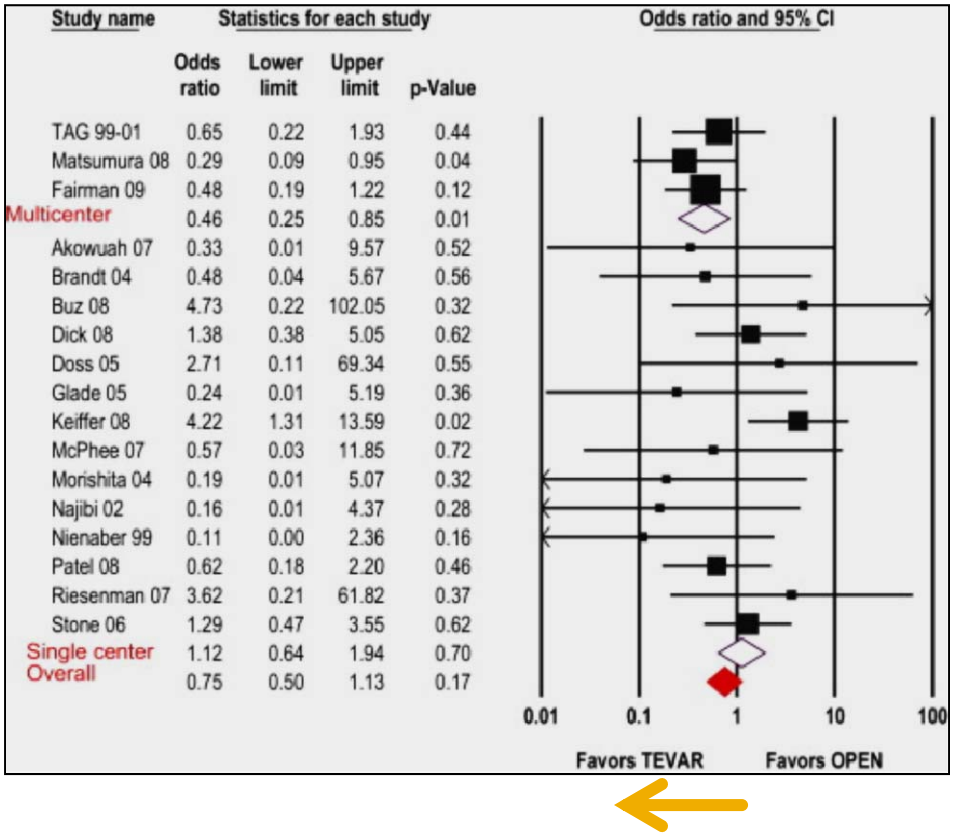
Death at 2-3 years:

TEVAR Versus Open Surgery



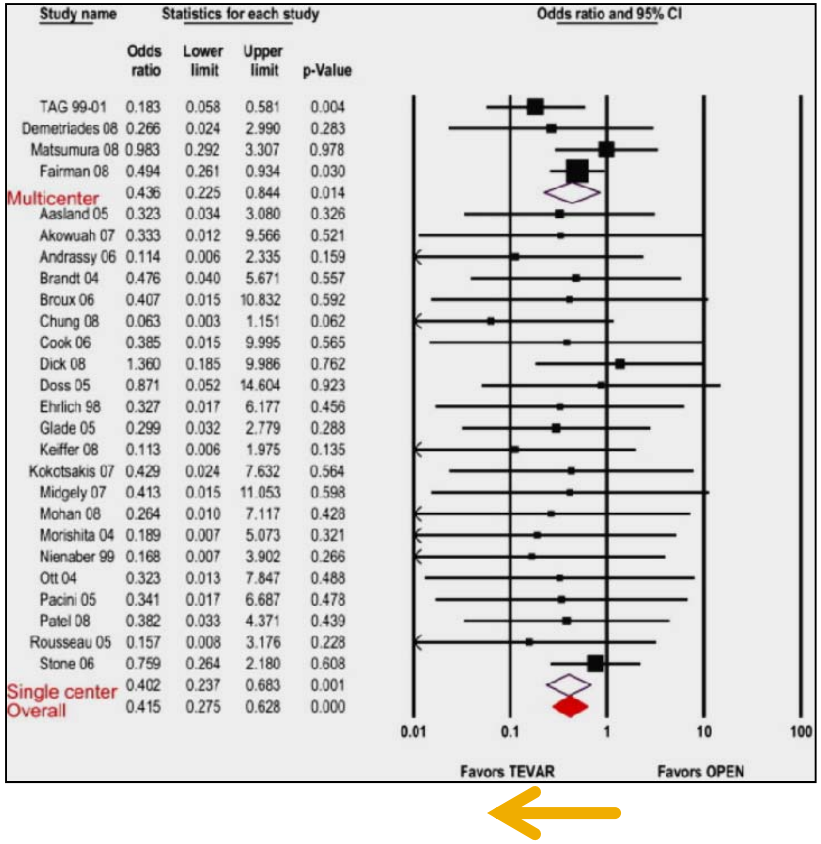
Stroke:

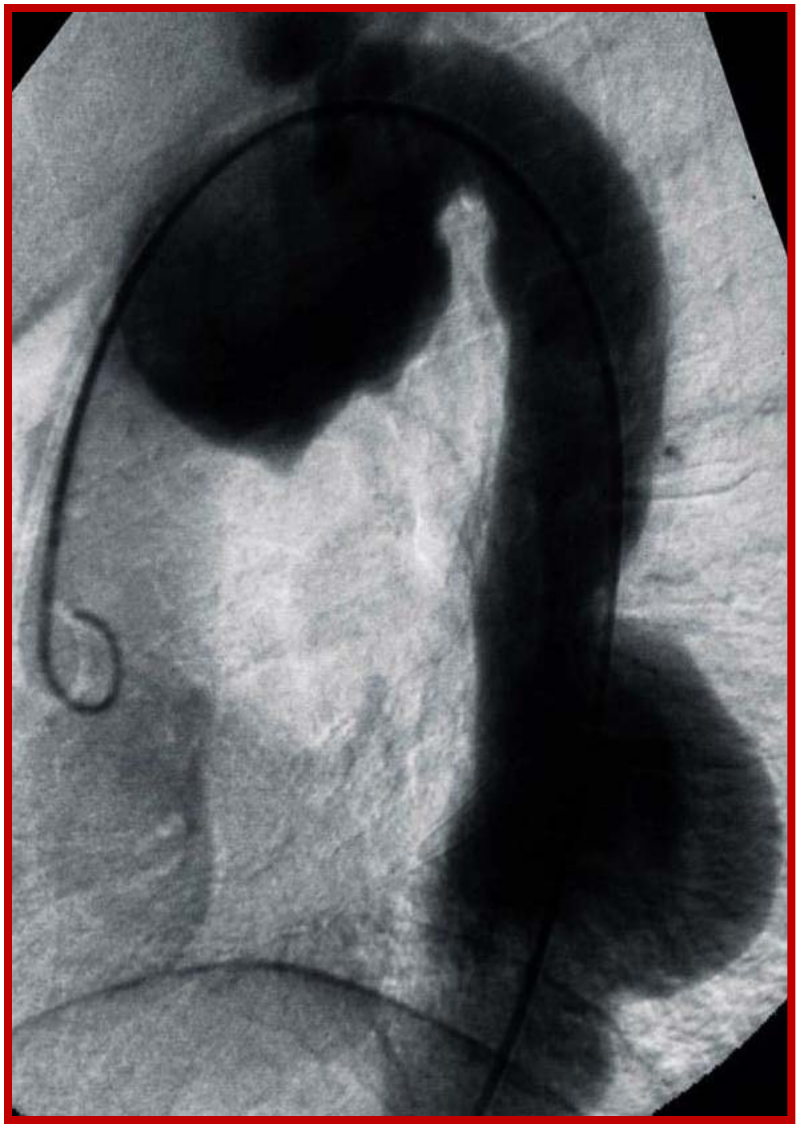
TEVAR Versus Open Surgery

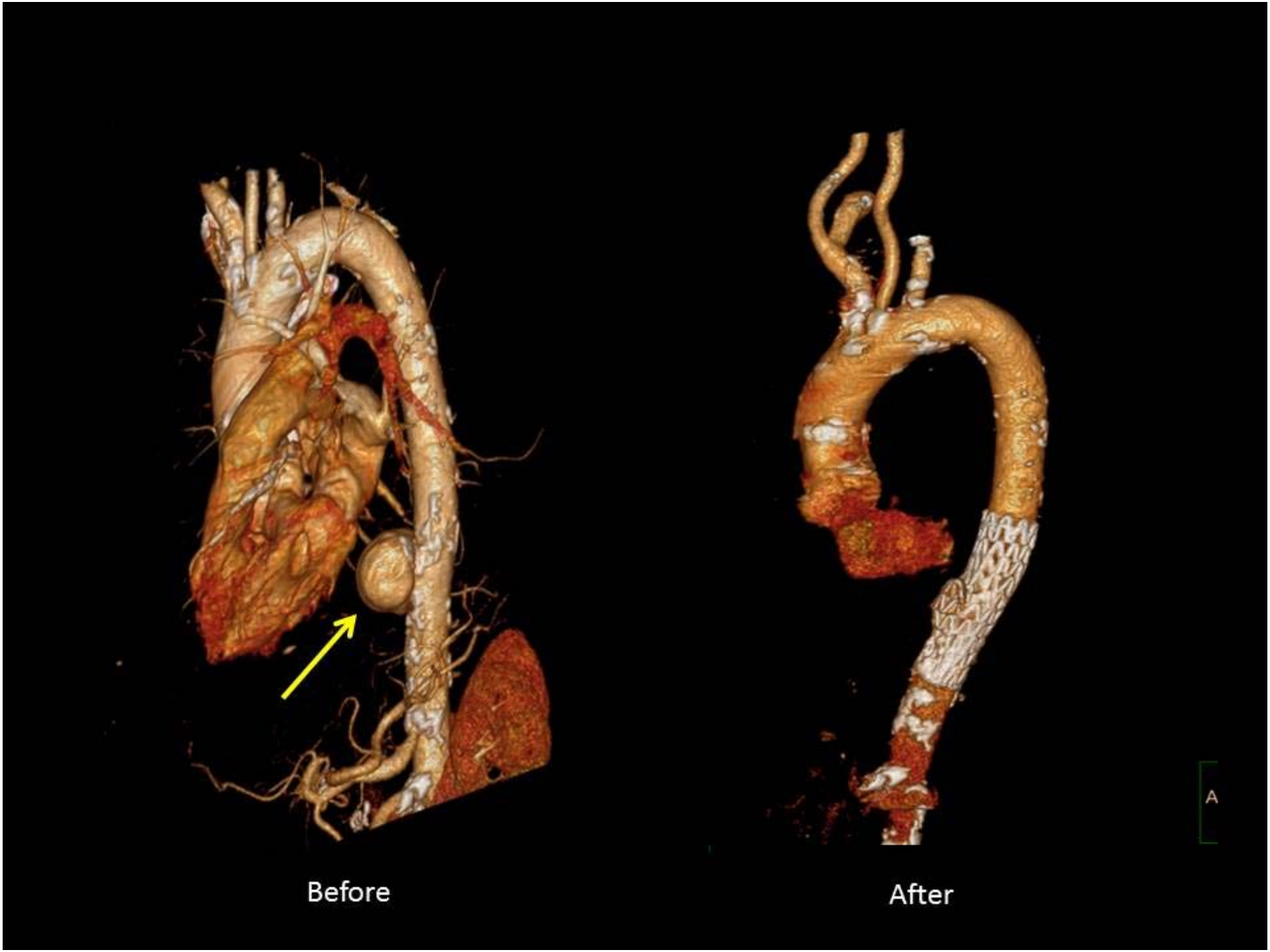


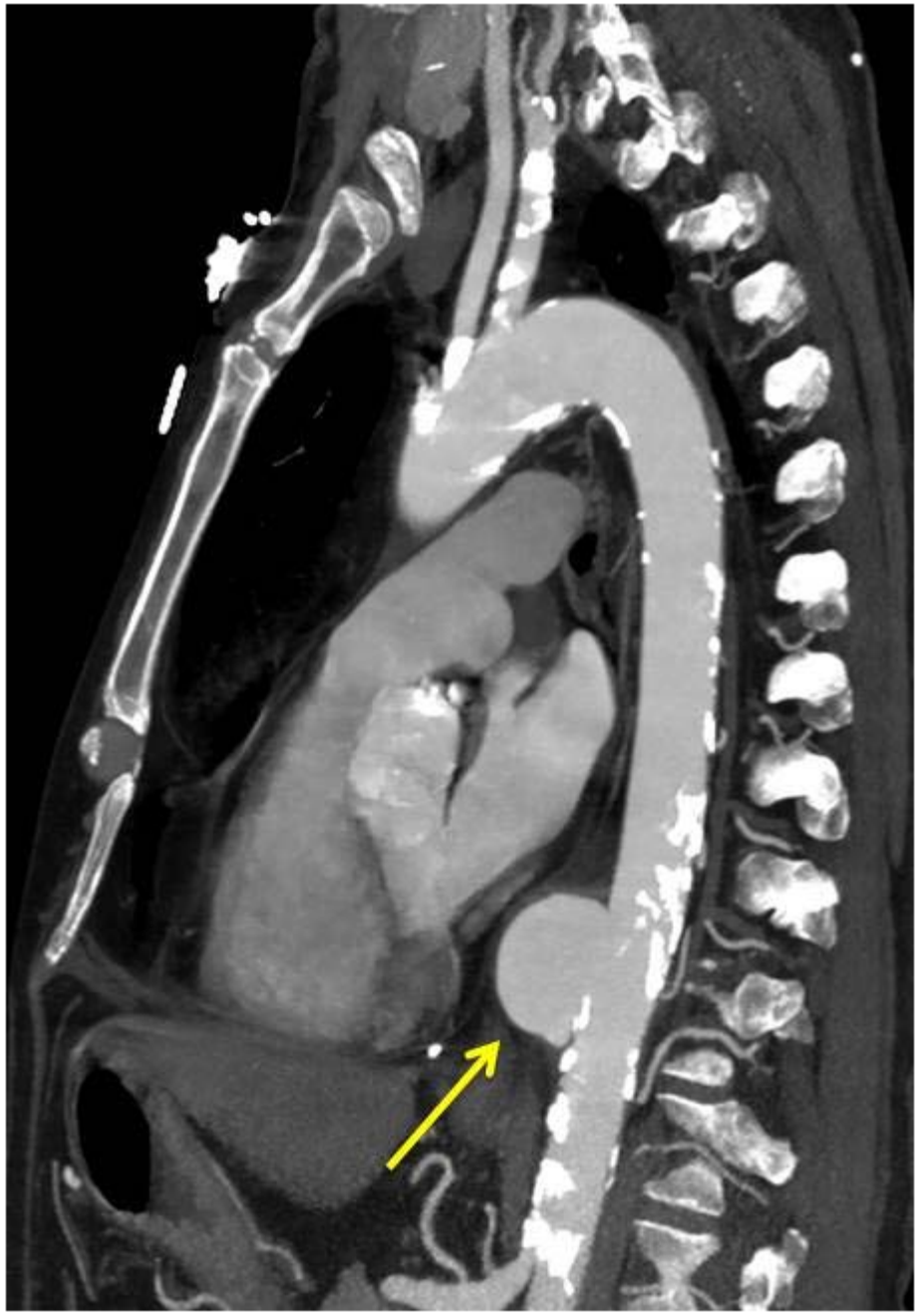
Paraplegia or Paraparesis:

TEVAR Versus Open Surgery






Before
After
A



Before

After


PHILIPS

Post op surveillance

Pathology	Interval	Study
Acute dissection	Before discharge, 1 mo, 6 mo, yearly	CT or MR, chest plus abdomen TTE
Chronic dissection	Before discharge, 1 y, 2 to 3 y	CT or MR, chest plus abdomen TTE
Aortic root repair	Before discharge, yearly	TTE
AVR plus ascending	Before discharge, yearly	TTE
Aortic arch	Before discharge, 1 y, 2 to 3 y	CT or MR, chest plus abdomen
Thoracic aortic stent	Before discharge, 1 mo, 2 mo, 6 mo, yearly Or 30 days*	CXR, CT, chest plus abdomen
Acute IMH/PAU	Before discharge, 1 mo, 3 mo, 6 mo, yearly	CT or MR, chest plus abdomen

You are the first to see the patient!!

- Elective surgery does better than emergency surgery

- Thoracic aortic dilation/aneurysm fairly common with age
- Risk factors are traditional cardiovascular risk factors
- Most are asymptomatic
- Thoracic aortic rupture rare
- Thoracic dissection rare
- Ascending aorta most common site of aneurysm formation

REMEMBER

Refer to your vascular surgeon – can offer all options!

Well what about other areas….

Peripheral Arterial Aneurysms

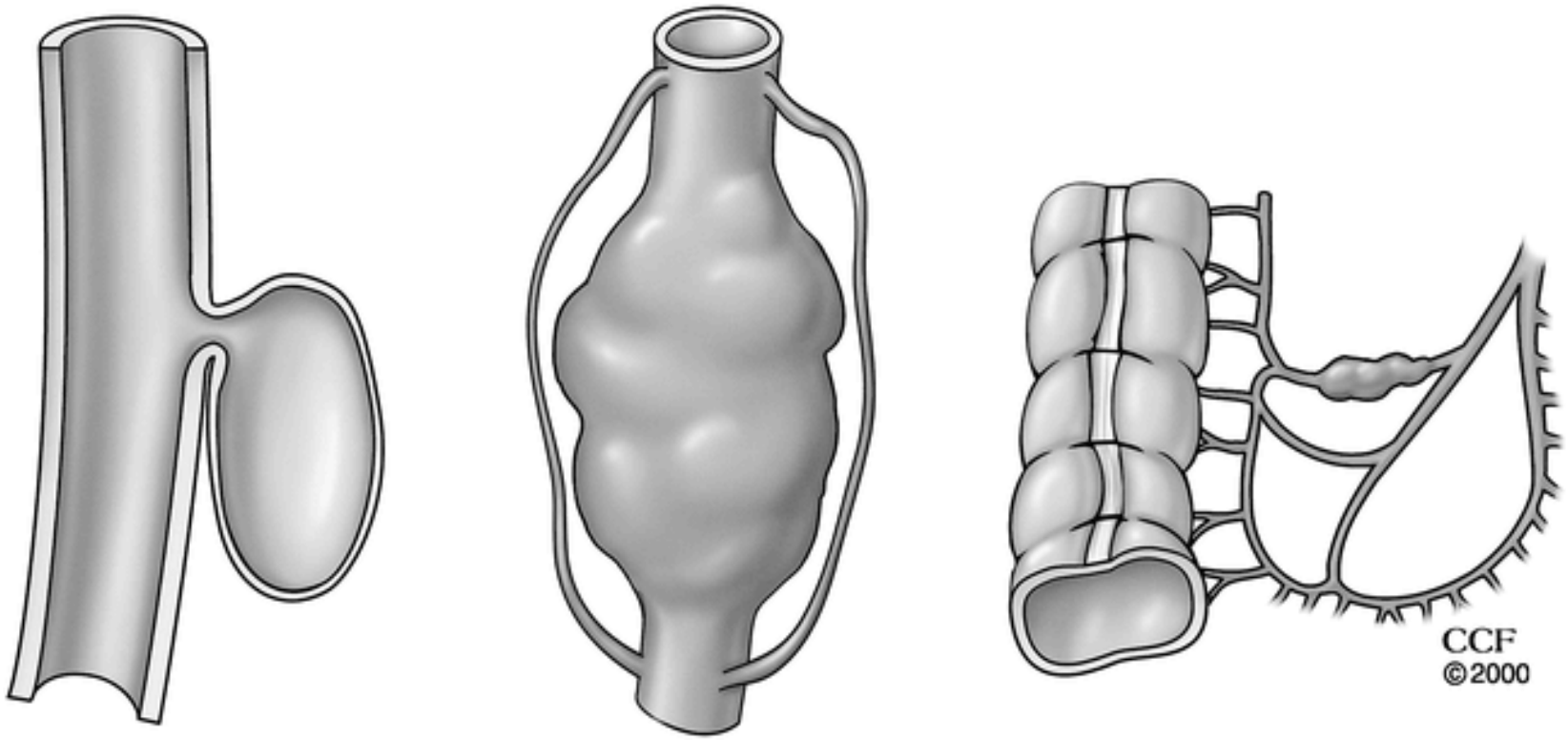
- Definition:
  - " Any artery that exceeds 150% the size of the normal vessel proximal or distal to it."

- Clinically significant aneurysm:
  - "Any artery that exceeds 200% the size of the normal vessel proximal or distal to it."

Peripheral Arterial Aneurysms

- Potential Complications
  - Thrombosis
  - Embolization
  - Compression
  - Rupture

Peripheral Arterial Aneurysms



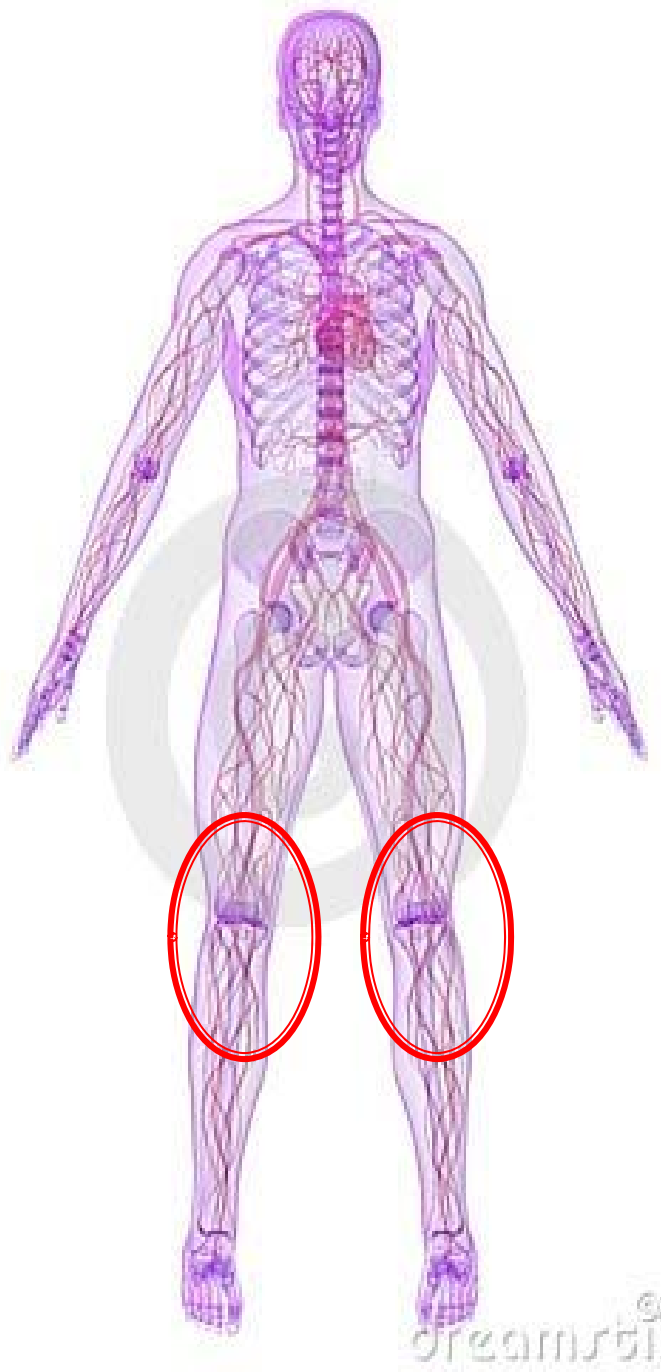
Type I

Type II

Type III

Peripheral Arterial Aneurysms

- Etiology: Loss of structural integrity of arterial wall
  - Inflammatory
    - Pancreatitis, infection, vasculitides and arteritis
  - Mechanical
    - Post-stenotic (TOS, popliteal entrapment)
    - Traumatic
  - Congenital disorders
    - Marfan Syndrome (defective elastin)
    - Ehlers-Danlos Syndrome (defective collagen)
    - Fibrodysplasias
  - Degenerative
    - Arteriosclerosis (Atherosclerosis)
    - Matrix Metalloproteinases (MMP's)


dreamstime.com

Popliteal Artery Aneurysm

- 70% of true peripheral artery aneurysms
- >2cm diameter
- > 60% bilateral
- > 50% associated aneurysms
- 30% associated AAA
- 8% of patients with with AAA have PAA

Popliteal Artery Aneurysm

- Incidence:
  - 7.39/100,000 males
  - <1.00/100,000 females
- Age Range: 42-90 yrs.
- Median age: 60 yrs.
- ~95% Men

Popliteal Artery Aneurysm

- Presenting Symptoms (2445 PAA)*
  - None 37%
  - Claudication 42%
  - Rest Pain 28%
  - Ulceration 6%
  - Compression 7%
  - Pain or DVT <2%
    - *Dawson: Br J Surg. 1997Mar;84(3): 293-9

Popliteal Artery Aneurysm

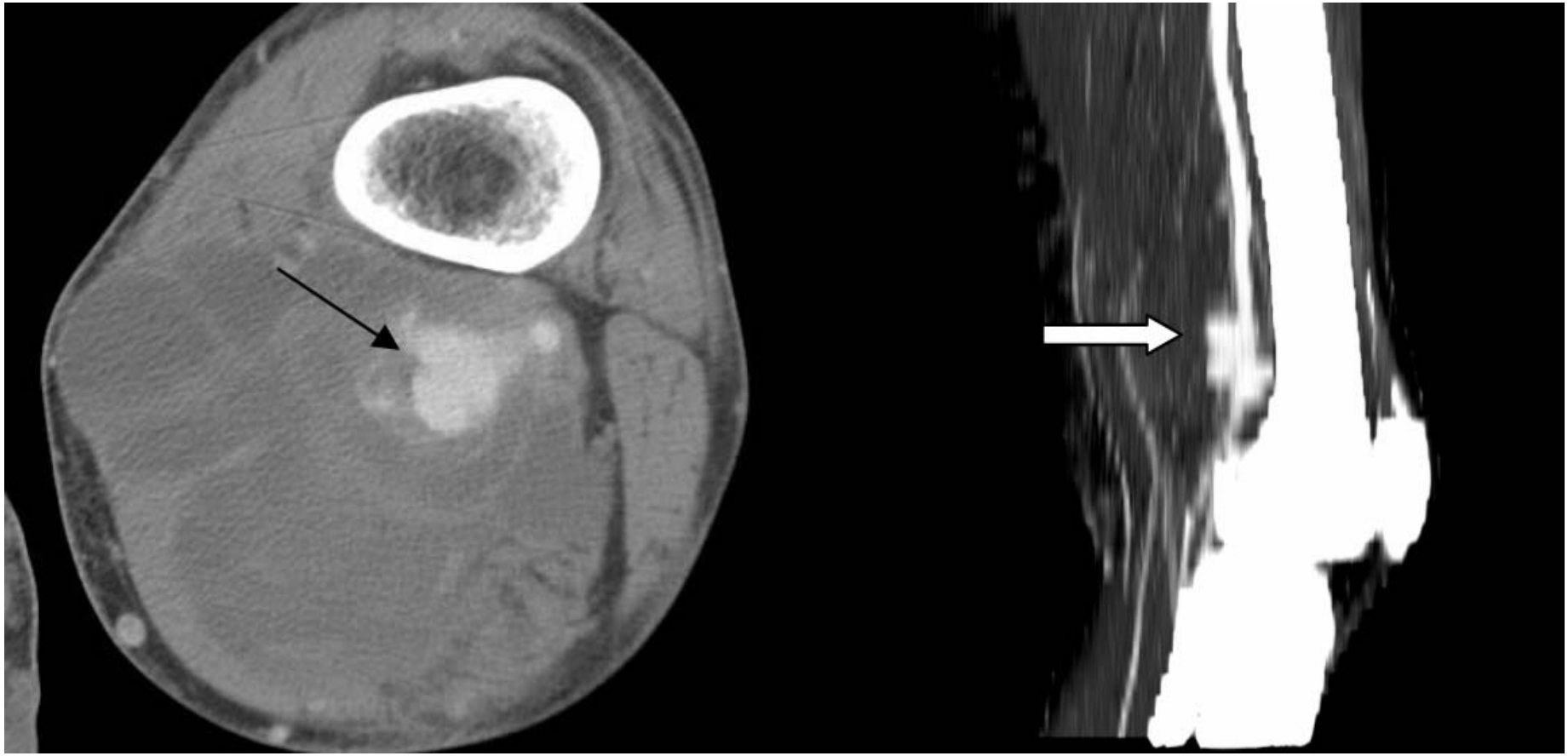
- Complications:*
  - None 38%
  - Thrombosis 44%
  - Emboli 21%
  - Rupture 2%

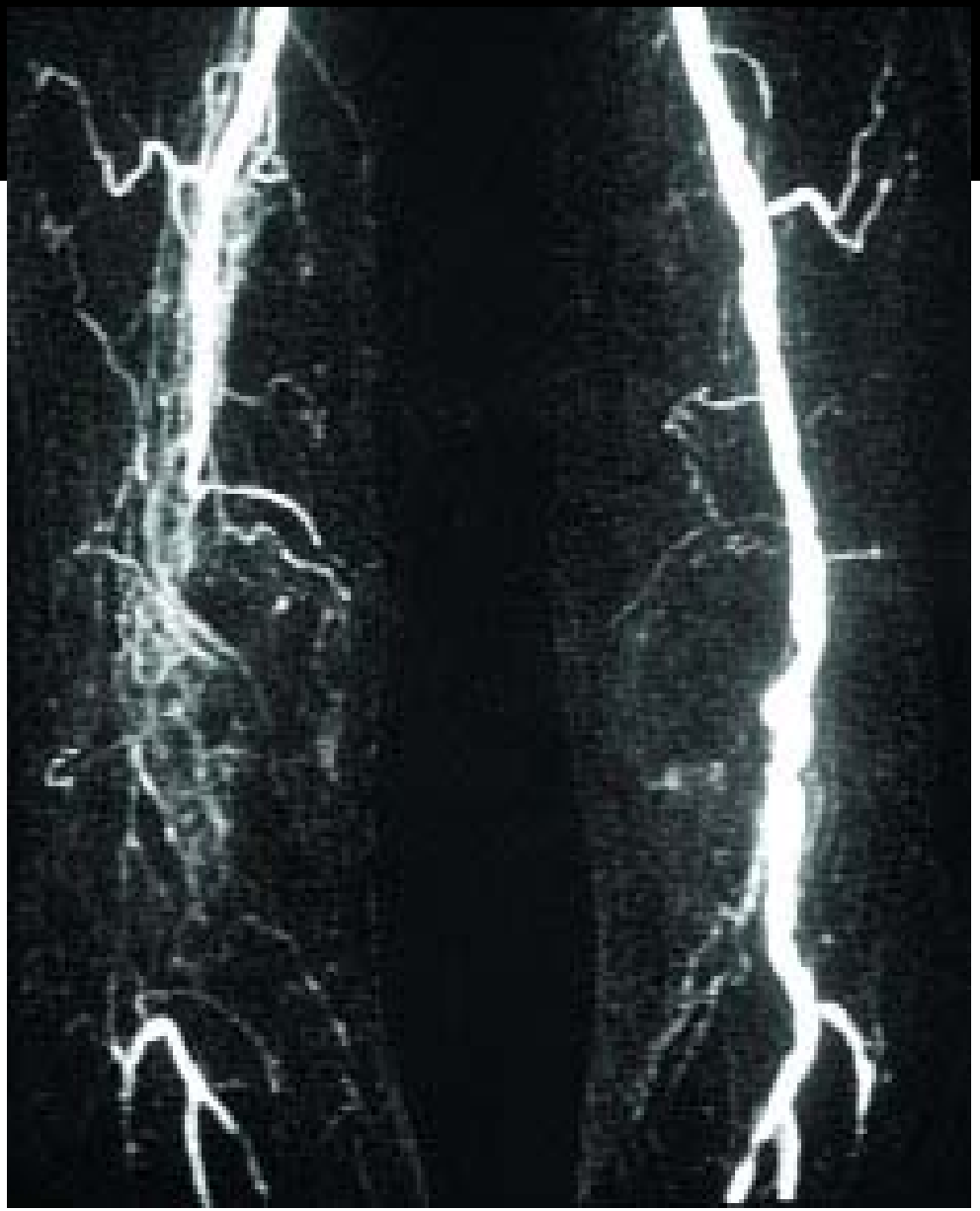
*Varga, J Vasc Surg 20: 171-177,1994

Popliteal Artery Aneurysm

- Diagnosis
  - Suspect PAA by H&P
  - Confirm PAA by CTA or US
  - Explore treatment options by angio

Popliteal Artery Aneurysm





Popliteal Artery Aneurysm

- Treatment Goals
  - Eliminate PAA from the system
  - Re-establish distal flow (>20% ampt. Rate)
  - Prevent further complications

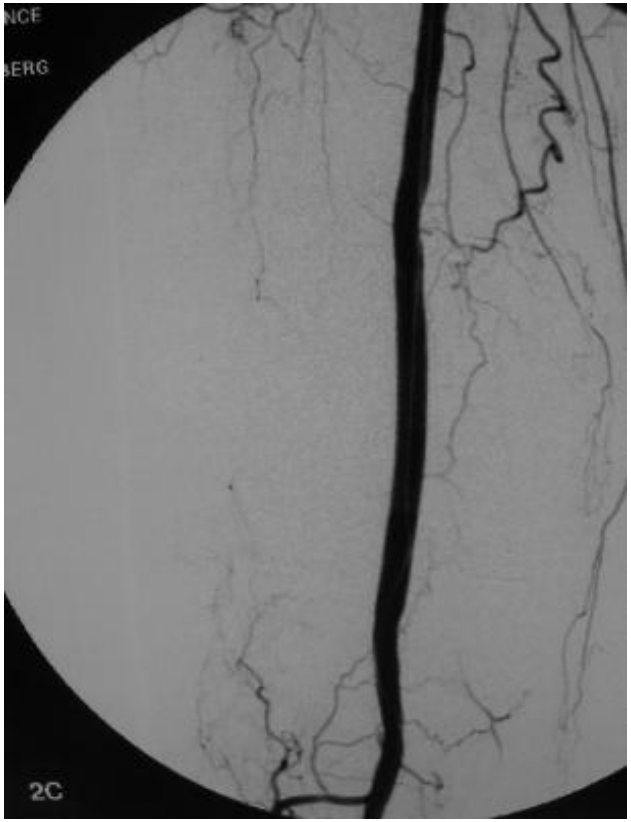
Popliteal Artery Aneurysm

- Who to treat
  - All symptomatic PAA
  - PAA >2cm with reasonable risk and life expectancy

Popliteal Artery Aneurysm

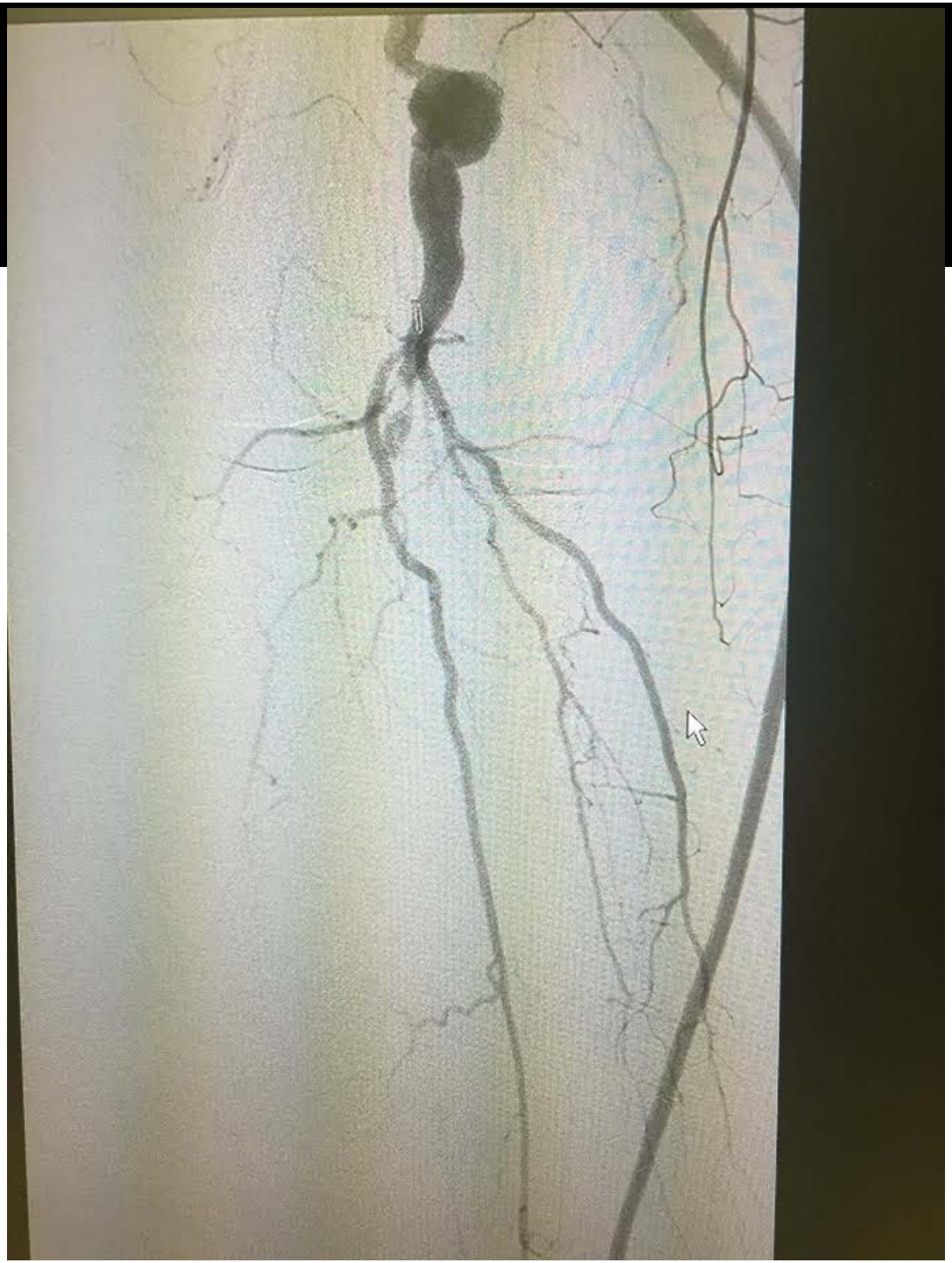
- Treatment Options
  - Observe
  - Covered Stent Graft
  - Excise – end to end anastamosis
  - Bypass and Ligation – RSV preferred
  - Lyse and treat

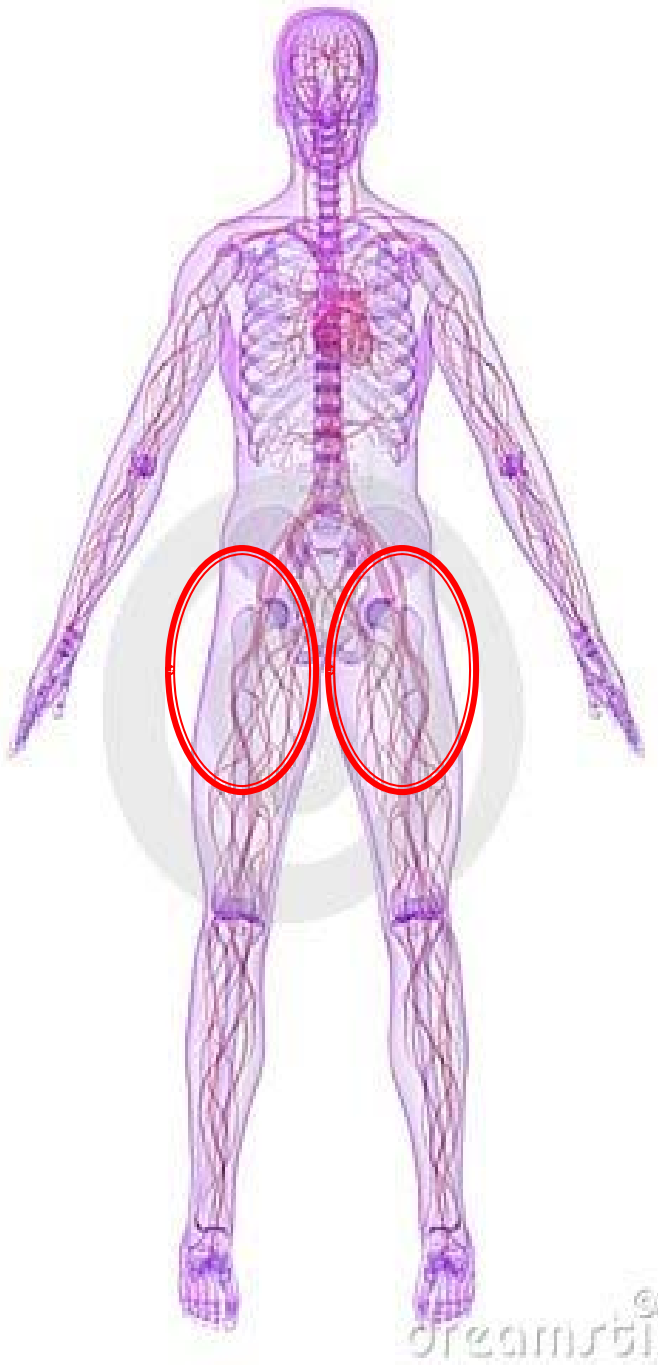
Popliteal Artery Aneurysm



Popliteal Artery Aneurysm

Hybrid Approach?




dreamstime.com

Femoral Artery Aneurysm

- 25% true Peripheral Artery Aneurysm
- 2nd most common
- Mean age of onset = 65yrs
- Male : Female = 28 : 1
- 50% Associated AAA prior 1980
- 75% Associated AAA after 1980
- >30% Associated Popliteal Aneurysm

Femoral Artery Aneurysm

- Type I* Common Fem Art. (98%)
- Type II Common & profunda (2%)
  - Cutler & Darling, 1973

Femoral Artery Aneurysm

- Complications*
  - Embolization 25%
  - Thrombosis 15%
  - Rupture 2-5%

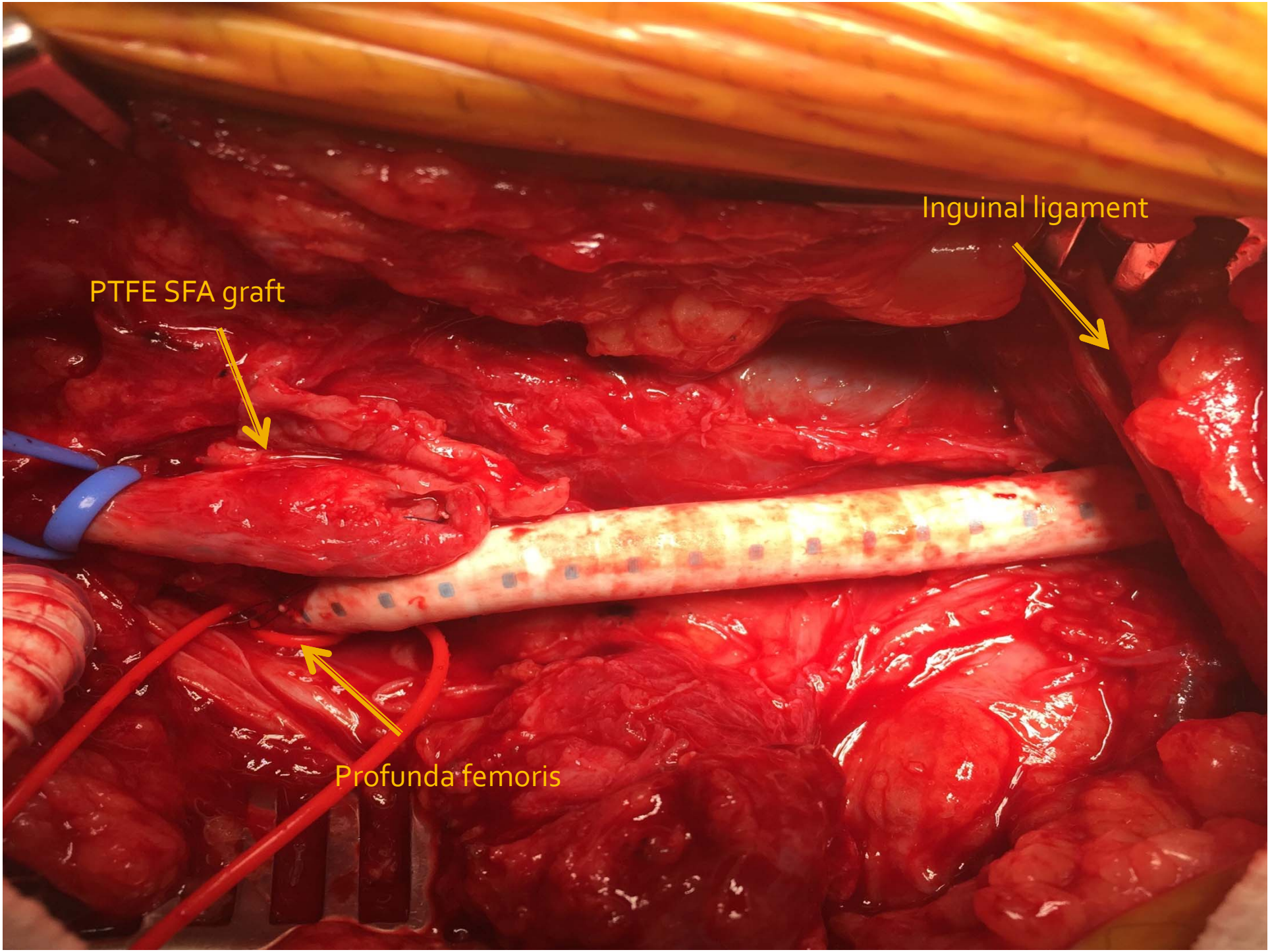
*Levi: J Cardiovasc Surg 38: 335-338, 1997

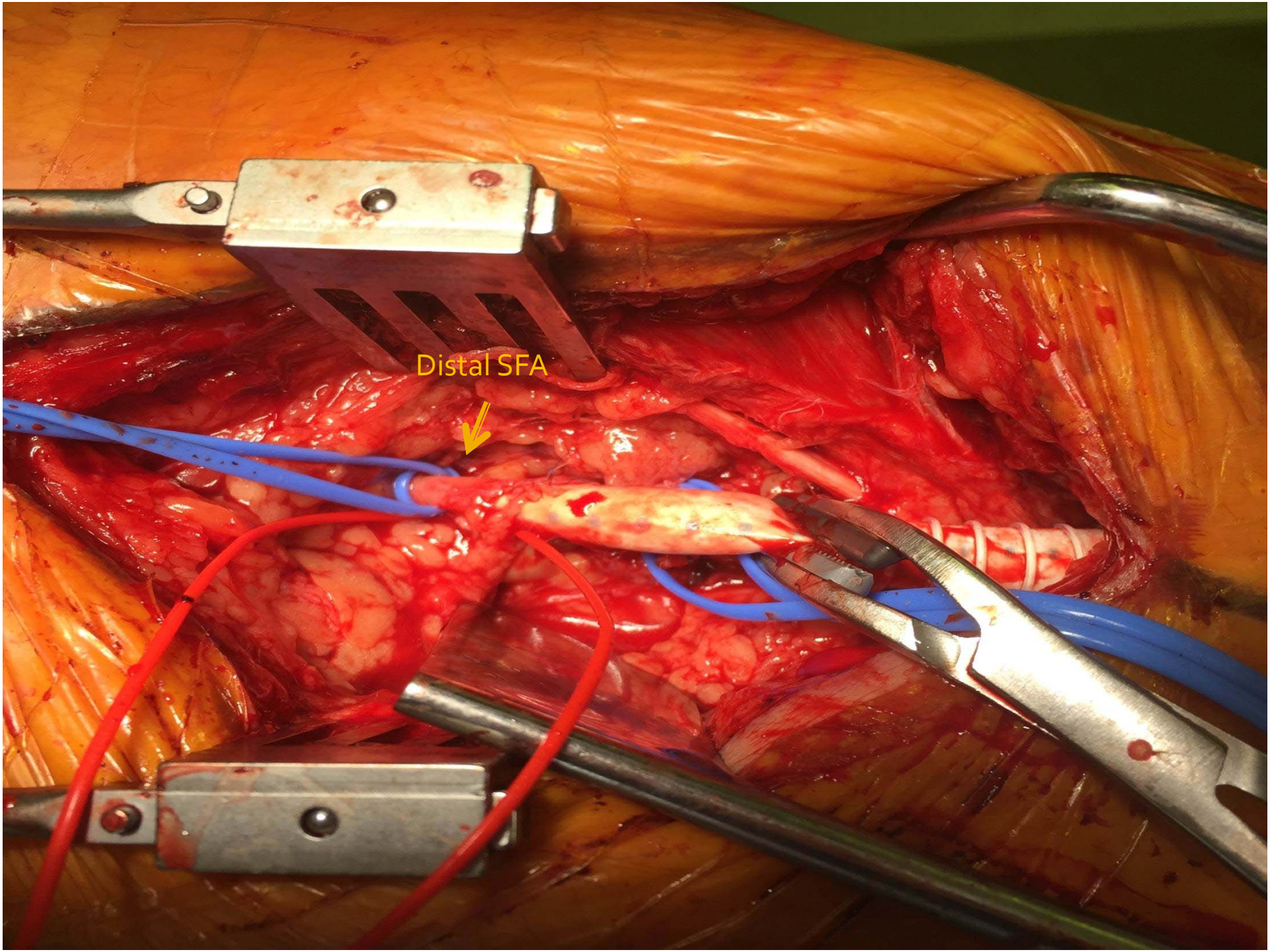
Femoral Artery Aneurysm

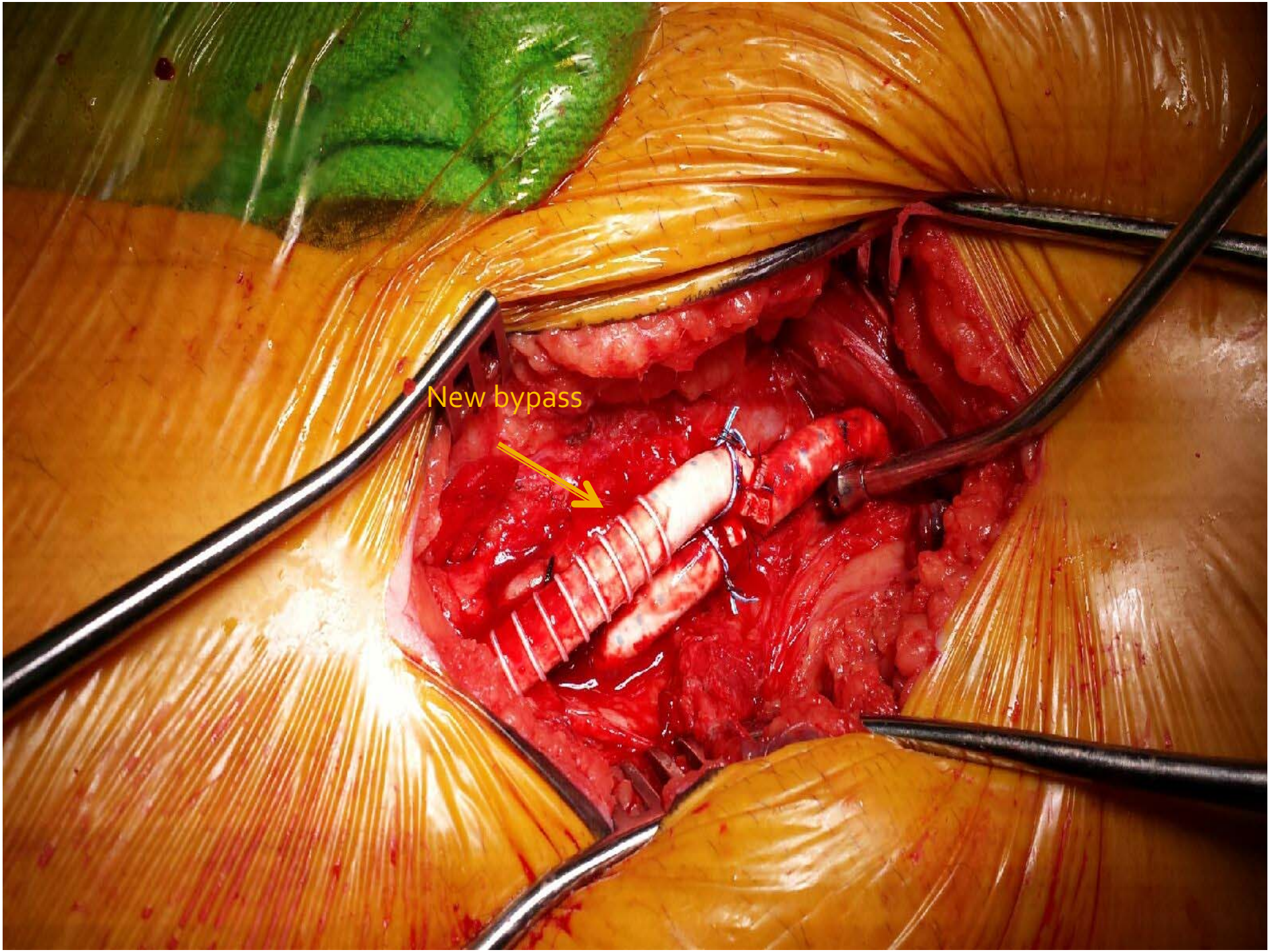
- Treatment Options:
  - Surgical Repair
    - PTFE, Dacron
    - 80% 5 yr. Patency
  - Endovascular Repair
    - Not Rx of choice
      - Ease of Surgical Access
      - Hostile anatomy
        - Hip joint
        - Inguinal ligament
        - Profunda

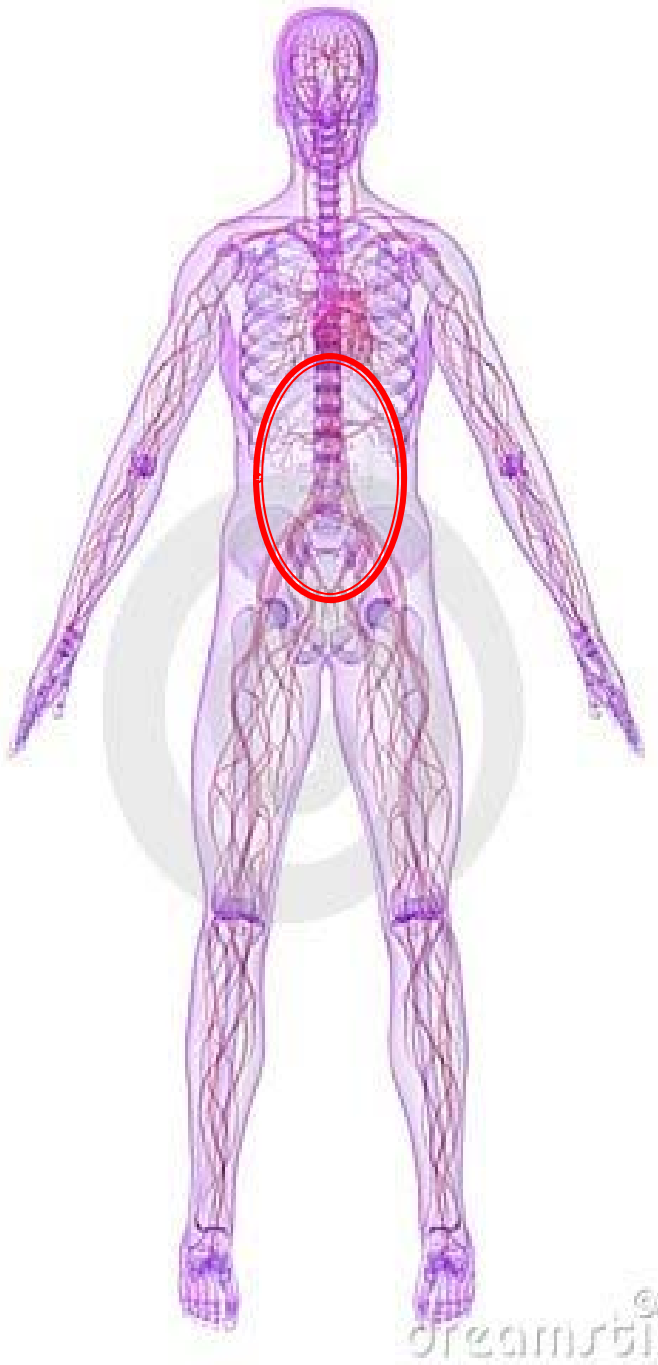
Femoral Artery Aneurysm

- Indications for Repair
  - All complicated or symptomatic FAA
  - All asymptomatic >2.5-3.0 cm.
  - All profunda femoris aneurysms (Type II)


Inguinal ligament
PTFE SFA graft
Profunda femoris


Distal SFA


New bypass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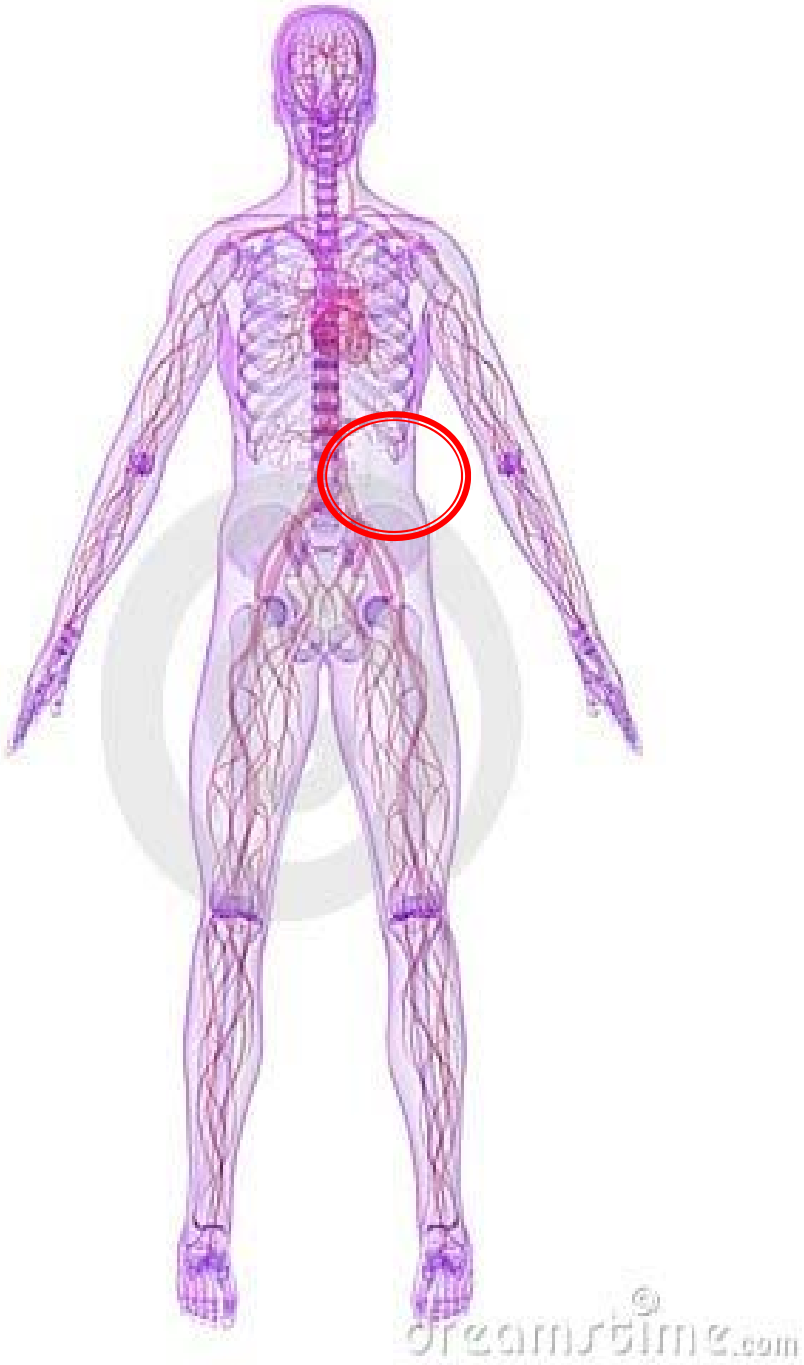
Visceral Artery Aneurysms

Location	Incidence	M:F
Splenic	60%	1:4
Hepatic	20%	2:1
SMA	5.5%	1:1
Celiac	4%	1:1
Gastric	4%	3:1
Intestinal	3%	1:1
Pancreaticoduodenal	2%	4:1
Gastroduodenal	1.5%	4:1

Visceral Artery Aneurysm

- 22% present with rupture*
- 8.5% mortality with rupture*
- 70% maternal mortality } Splenic**
- 75% fetal mortality } Art
- >30% associated non-visceral aneurysms***

  - *Stanley, Vascular Emergencies;1987:387
  - **Lincer, ObGyn Surg, 48:145,1993
  - ***Carr, J Vasc Surg 33:806, 2001


dreamstime.com

Splenic Artery Aneurysm

- Incidence: ~0.7%
- Saccular type
- Location: Bifurcations
- Multiple: 20%
- M:F = 1:4

- Renal Artery FMD: 6x increased incidence of SAA

Splenic Artery Aneurysm

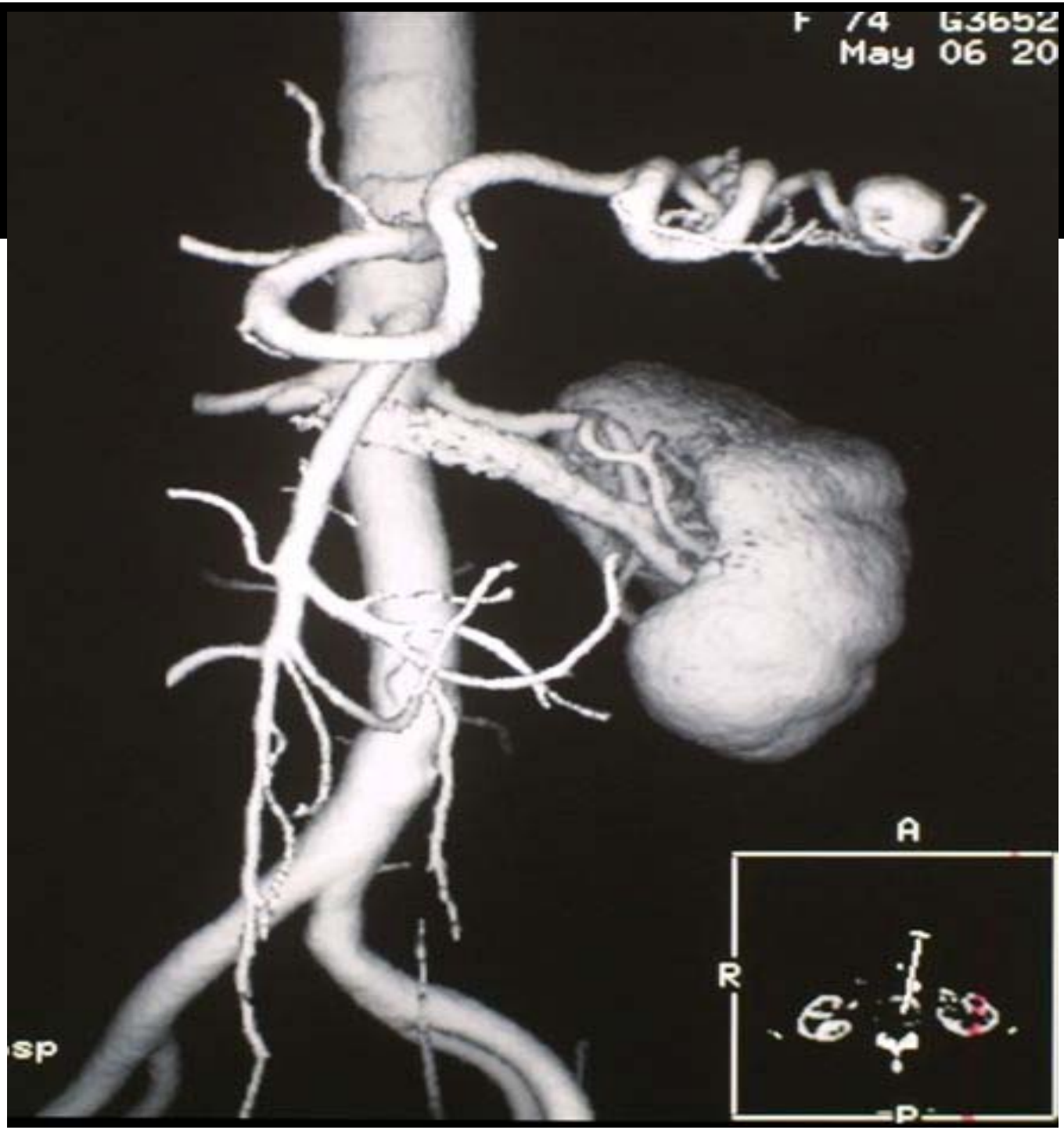
- Contribution Factors:
  - FMD
  - Portal Hypertension
    - Hyperkinetic process
  - Repeated Pregnancy
    - Gestational Alterations (hormonal & hemodynamic)
    - Increased Splenic A-V shunting
    - Pre-existing structural abnormalities

Splenic Artery Aneurysm

- Contributing Factors (cont) :
  - Inflammatory Process
    - Pancreatitis
  - Penetrating & Blunt Trauma
  - Mycotic Lesions
    - I.V. Drug Users

Splenic Artery Aneurysm

- Incidental (80%)
  - U/S
  - Angio
  - CT Scan
  - MRI
  - Abd. Film: signet ring calcification
- Rupture or LUQ pain (20%)
  - "Double Rupture Phenomenon"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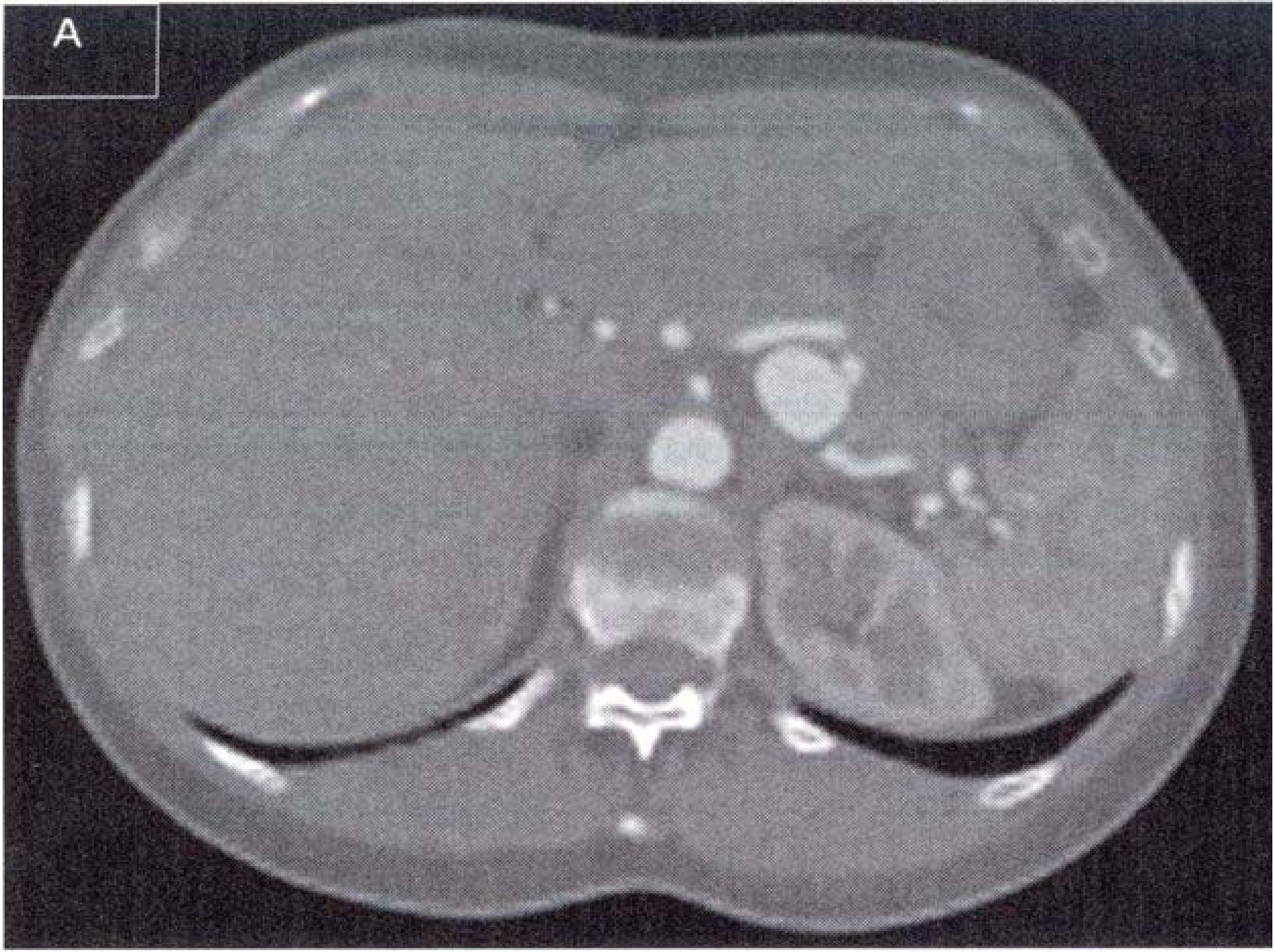
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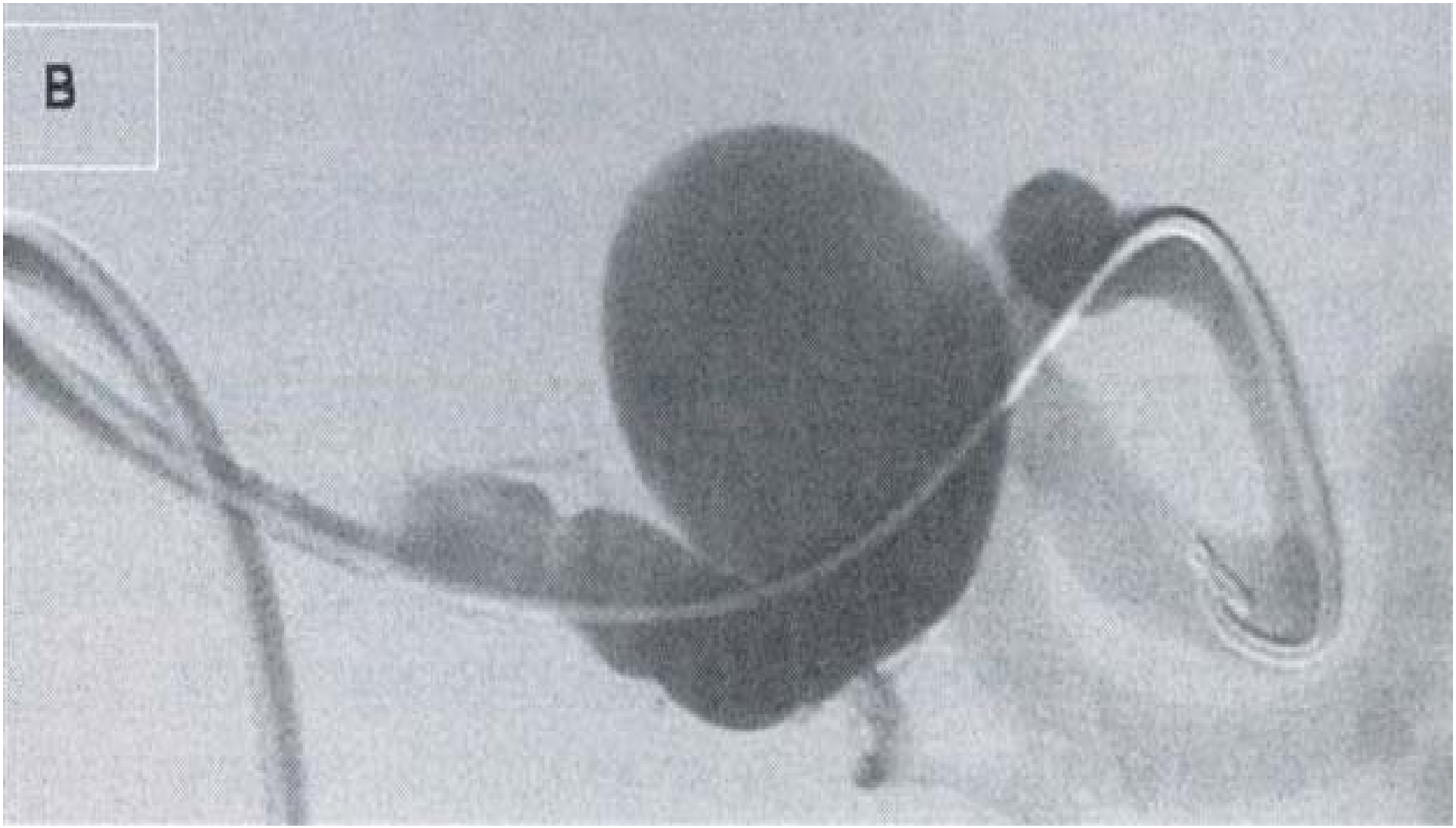
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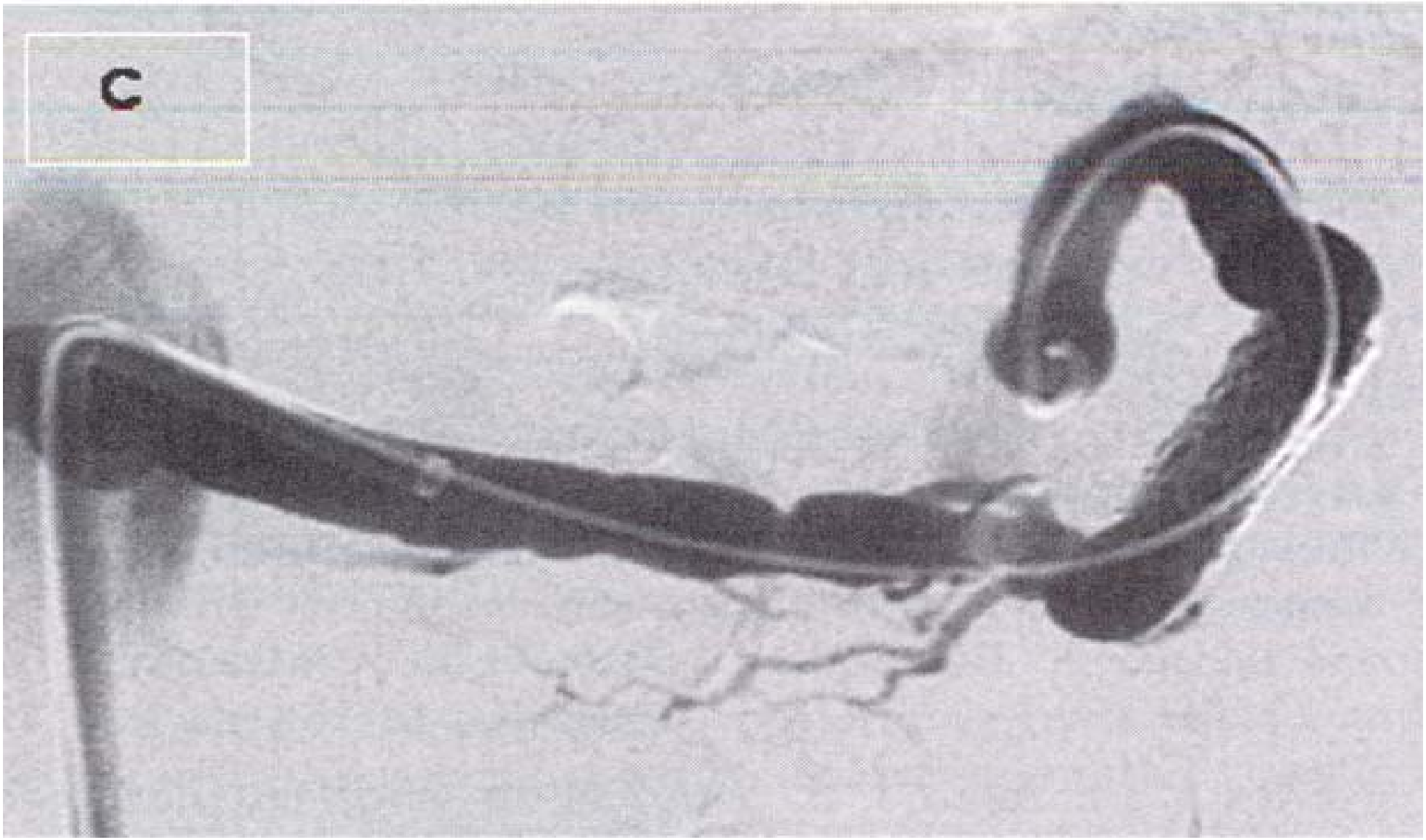
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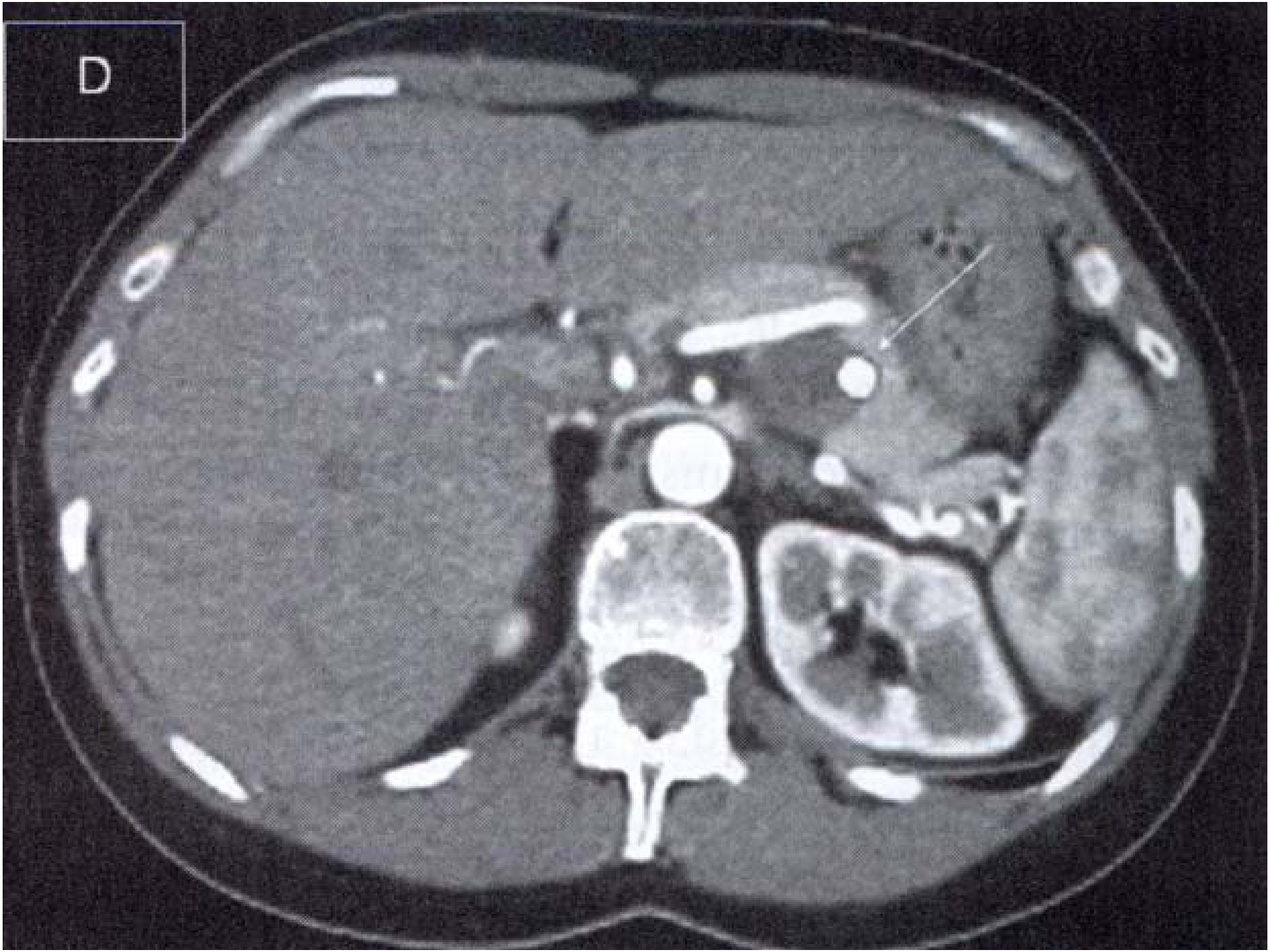
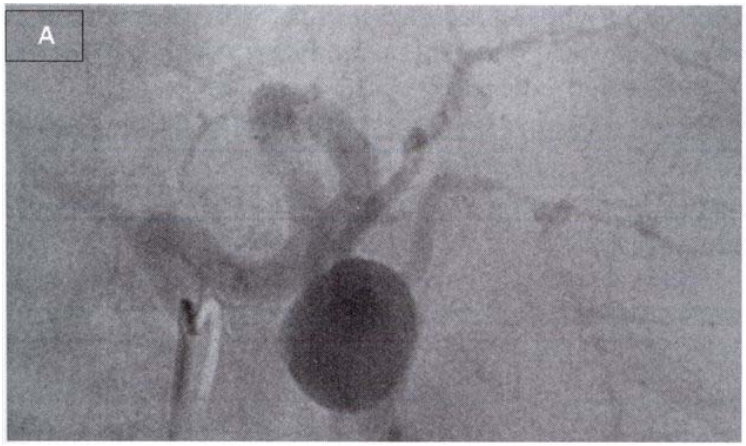
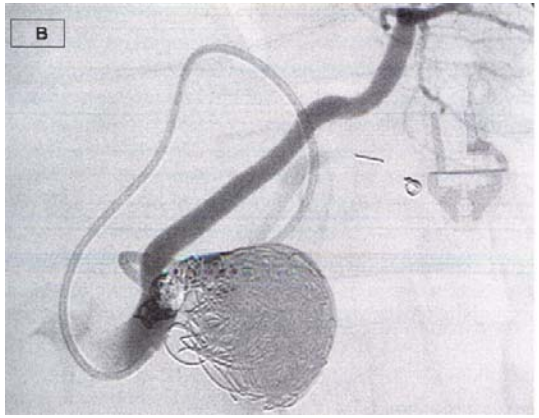

D

Splenic Artery Aneurysm

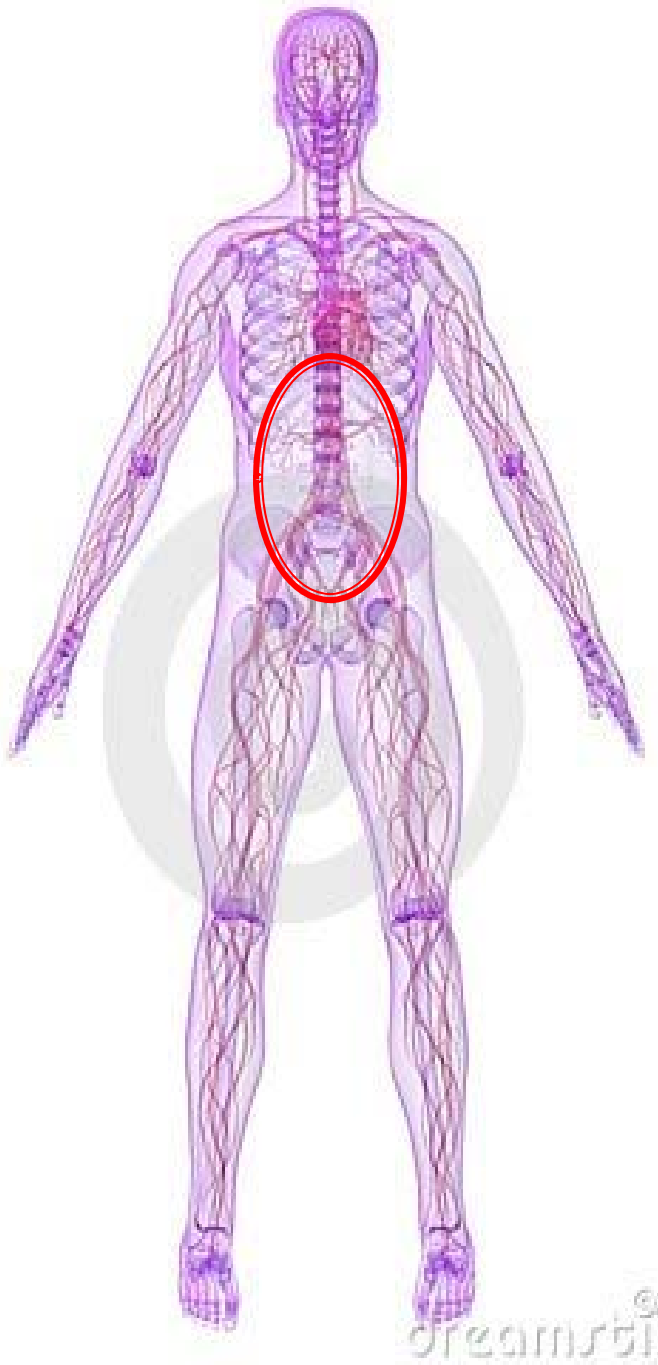
Splenic Artery Aneurysm





Splenic Artery Aneurysm

- Indications for Treatment
  - Symptomatic aneurysms
  - Aneurysms in pregnant women
  - Aneurysms in women of childbearing age
  - Aneurysms >2cm in good risk patients


dreamstime.com

Hepatic Artery Aneurysm

- Etiology
  - 60% pseudoaneurysm
  - 40%:
    - Medial degeneration (24%)
    - Mycotic (10%)
    - periarterial inflammation, polyarteritis nodosa, amphetamine use (6%)
- >30% associated visceral aneursyms

Hepatic Artery Aneurysm

- Location
  - 80% extrahepatic
  - 20% intrahepatic
- Form
  - <2cm. – fusiform
  - >2cm. - saccular

Superior Mesenteric Artery Aneurysm

- Etiology:*
  - 60% Mycotic (endocarditis)
  - 30% degenerative/dysplastic process
  - 10% Misc. .
- Symptoms*
  - Asymptomatic (80%)
  - Mass (50%)
  - Rupture (20%)
    - * Palcini Ann Ital Chir: 73(2), 129-136

Celiac Artery Aneurysms

- Etiology:
  - Medial Degeneration/Dysplasia
  - Atherosclerosis (probably secondary)
  - Elastic tissue disorders
  - Post stenotic dilatation
  - Infection
- Associated AAA 18%*
- Other splanchnic aneurysms 38%*
  - *Grahm, J Vasc Surg 5:757, 1985

Visceral Artery Aneurysms

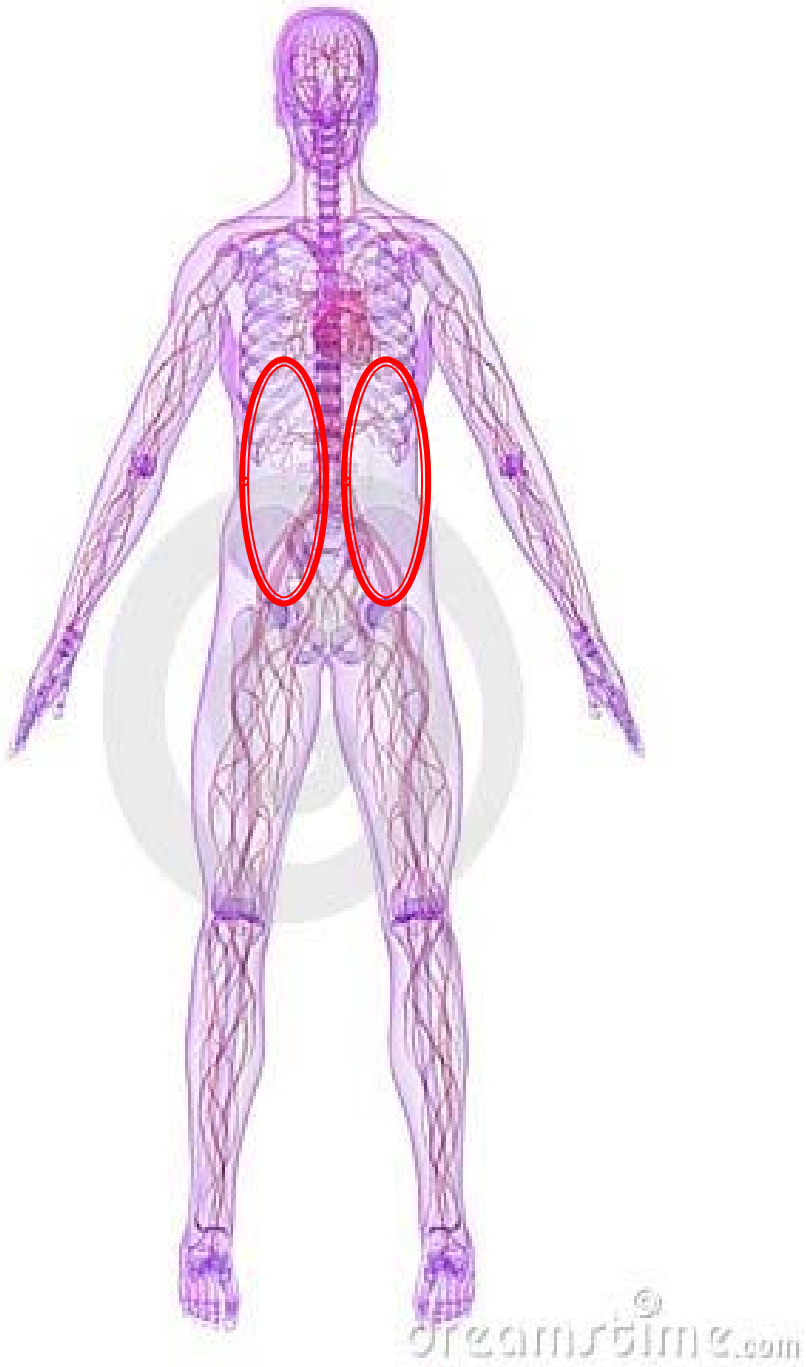
Aneurysm(61)	Endo(36)	Open(25)
Splenic		
true	14	11
Pseudo	3	0
Hepatic		
true	1	7
Pseudo	10	4
Others		
True	3	3
Pseudo	5	0

- *Sachdev, J Vasc Surg 2006; 44; 718-724

Visceral Artery Aneurysm

61 VAA	Endo(36)	Open(25)
Complications	9	3
Re-intervene	7	3
Deaths <30day	1	1

- *Sachdec, J Vasc Surg 2006; 44; 718-724


dreamstime.com

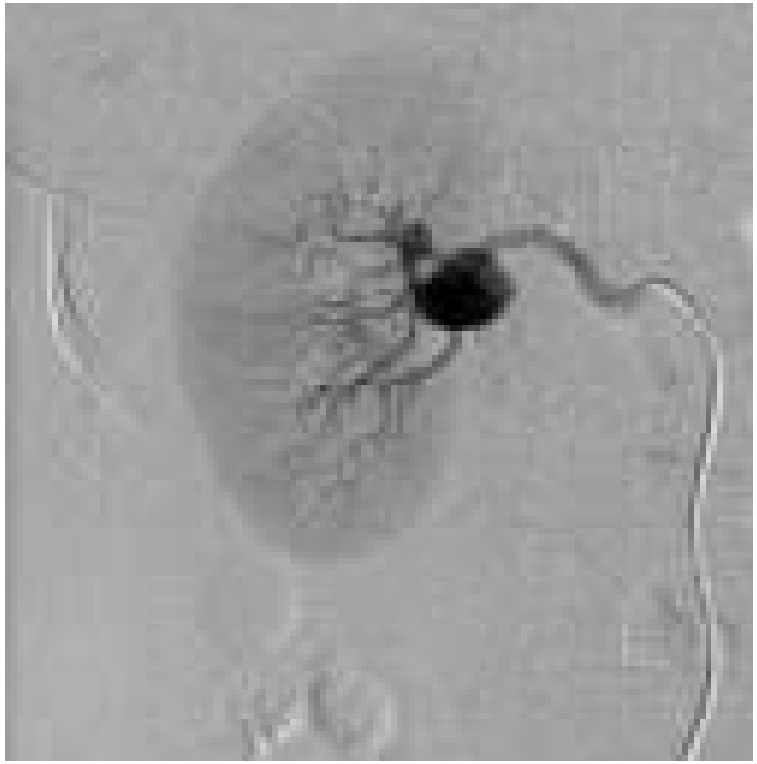
Renal Artery Aneurysms

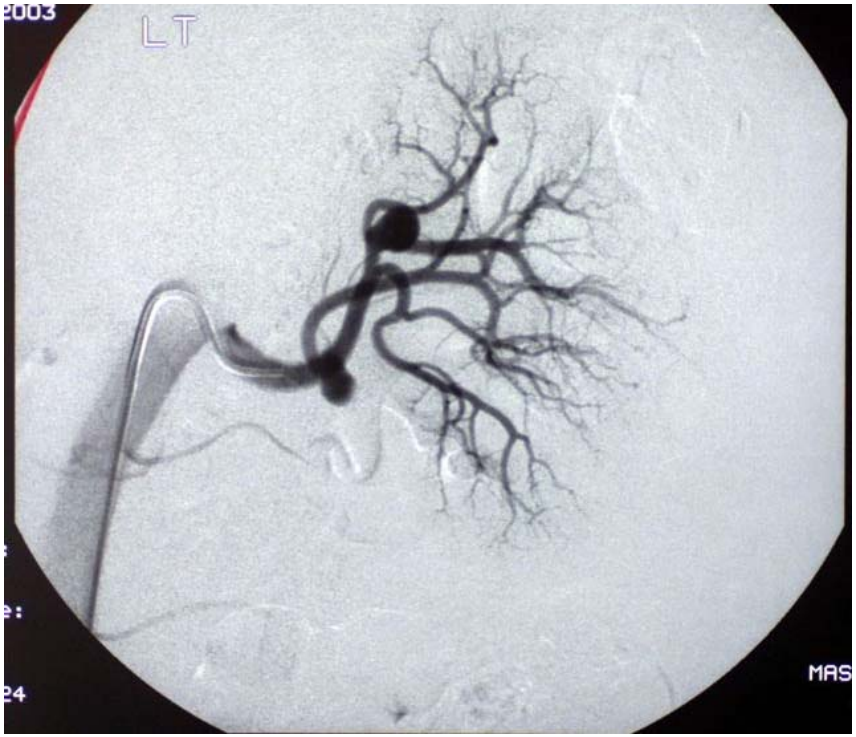
- Etiology:*
  - Atherosclerosis (75%) (?)
  - Degenerative/Dysplastic Process(21%)
    - FMD
  - Ehlers-Danlos syndrome(4%)
    - Walton, Cardiovasc Surg, 4(2), 185-189, 1996

Renal Artery Aneurysm

- Indications for intervention
  - Symptomatic or enlarging aneurysms
  - Renal Embolization
  - Pregnant females or considering preg. >2cm
  - Renovascular Hypertension
  - Aneurysm >2.5cm

Renal Artery Aneurysm





Conclusions

- Peripheral arterial aneurysms:
  - Incidence increasing
  - Frequently multiple
  - Diagnosis usually incidental
  - Repair all symptomatic aneurysms
  - Repair all pseudo aneurysms
  - Treat splenic & renal aneurysms aggressively in pregnant females

Conclusions

- Endovascular techniques have less morbidity but also have a lower patency
- Surgical management provides the best long term patency

- Surgical management depends on a variety of patient and anatomic factors
- Initial vascular surgery involvement is key – we are happy to provide longitudinal surveillance of patients with aneurysmal disease
- Initial surgical management is NOT a failure of medical or interventional management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