

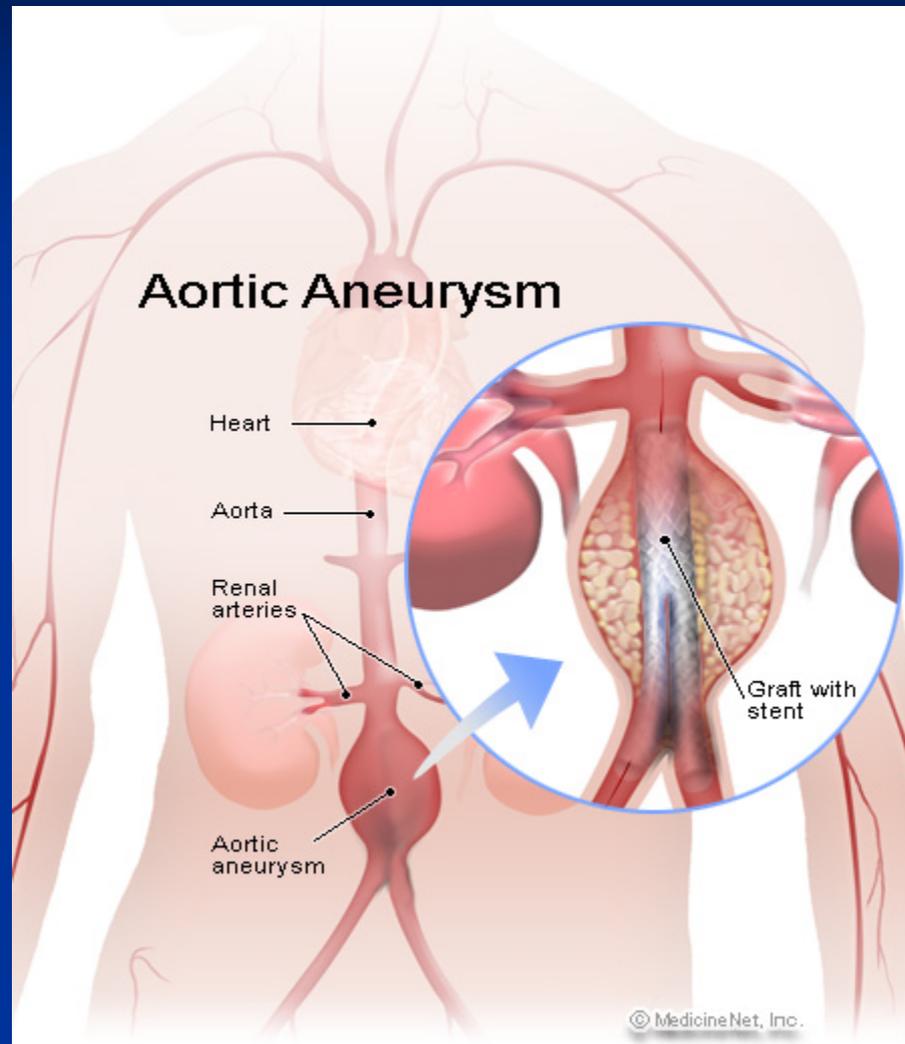
Abdominal Aortic Aneurysms

Arthur E. Palamara, MD

Voluntary Associate Professor of Surgery,
University of Miami

President, Florida Vascular Society

Aortic Aneurysm



Risk factors

- Occur in 6.5% of men over 80
- Autopsy series show 1.8% - 6.6% patients have aneurysms
- Male to female ratio 5:1 (over 80 1:1)
- Gender, smoking, white race, family history, high blood pressure (*not diabetes*)
- Arteriosclerosis > 1.5:1
- Chlamydia pneumonia

Natural History

- Rupture is 13th leading cause of death (1.2% men and 0.6% women)
- Continues to expand at about 0.4 cm per year (depends on size)
- After rupture, only about half patients reach hospital alive
- Operative mortality above 50% for ruptured aneurysm

Symptoms

- MAY have back or abdominal pain
- MAY have tenderness in abdomen
- MAY have diminished peripheral pulses
- MAY have distal atheroemboli (blue-toe syndrome)
- MAY have book bouncing up-and-down on abdomen while reading
- MAY have nothing.....(silent killer)

Symptoms (ruptured)

- SEVERE back pain, usually left side
- SEVERE (often) groin pain
- Hypotension (<80 mm Hg bad prognosis)
- TENDER Pulsatile abdominal mass
- Often confused with other abdominal catastrophes (cholecystitis, nephrolithiasis, diverticulitis, perforated viscus, even MI)

Evaluation and Work Up

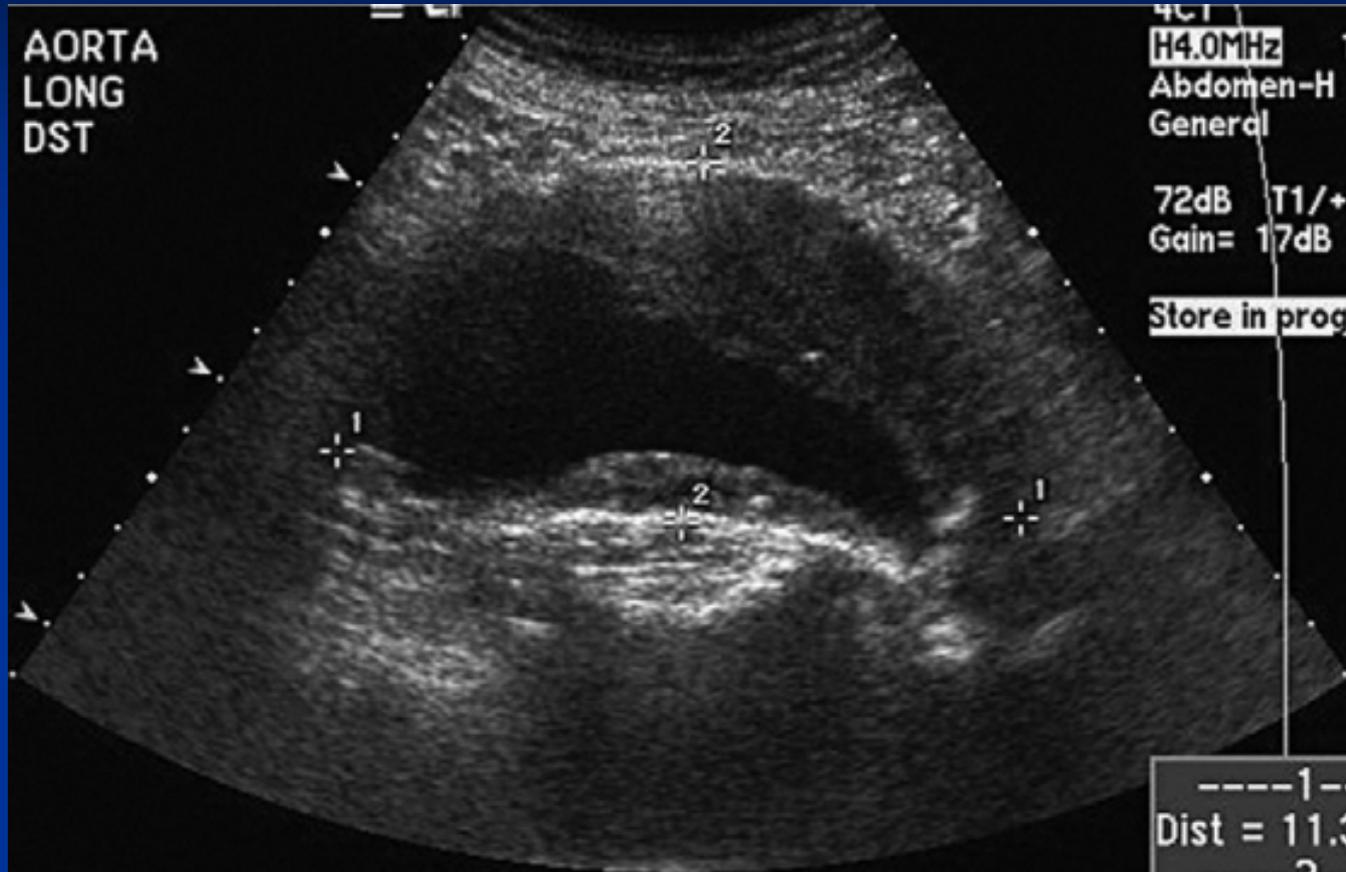
- Ultrasound (screening should be done in all males over 50)
- Reliable to 3 mm
- No ionizing radiation
- inexpensive

AORTA
LONG
DST

4C1
H4.0MHz 140mm
Abdomen-H
General

72dB T1/+1/3/2
Gain= 17dB Δ=2

Store in progress



----1----
Dist = 11.32cm
----2----
Dist = 6.04cm

CT Scan and CT angiography

- Accurate with good representation of arteriosclerosis and surrounding organ
- Largely replaced conventional contrast aortography
- Good planning tool
- Expensive (but not as bad as MRAs)
- Significant exposure to radiation



A



B



Pre-Op Assessment

- Functional status: active, mostly sedentary, inactive
- Cardiac: angina at rest, EF < 30%, recent MI, new onset atrial fibrillation, 6 PVCs
- Renal: creatinine above 2.0
- Pulmonary: no DOE, mild COPD - FEV1 above 1 liter/sec, Oxygen dependent – FEV1 < 1L/sec

Pre Op Assessment

- Patients who are able to walk up 2 flights of stairs without chest pain or abnormal SOB do NOT require further work-up
- Patients who do not have active angina, who can engage in normal activity, no recent MI, no frequent PVCs, no recent onset Atrial Fibrillation, less than 2 box ST depression DO NOT REQUIRE CARDIAC CLEARANCE

Beta Blockers

- The guidelines emphasize that “It is almost never appropriate to recommend coronary bypass surgery or other invasive interventions such as coronary angioplasty in an effort to reduce the risk of noncardiac surgery when they would not otherwise be indicated.” Thus, most of the attention of the guidelines is given to medical therapies and monitoring interventions for higher risk patients.
- The 2006 update focuses on the perioperative use of beta blockers mainly because the **Physicians Consortium for Performance Improvement and the Surgical Care Improvement Project** identified perioperative beta blockade as a quality measure. In this update, beta blockers receive support for use in various patient subgroups.

Management of small aneurysms < 5.5 cm

- ADAM study: 1136 patients – 5 years, OR 25.1% mortality vs. OBS 21.5% mortality
- UK Small Aneurysm Trials: 1090 patients – 10 years, OR 63.9% mortality vs. 67.3% mortality
- Conclusion: AAA less than 5.5 cm. should not be operated on
- Unless...they are symptomatic, recently expanded, tender, female, or sacular (bubble)

Open (Classical) Operation

- First done in 1952 by Charles Dubost
- Operative mortality about 4%
- Rarely need subsequent intervention
- Complications include retrograde ejaculation and impotency
- Durable
- Less-expensive

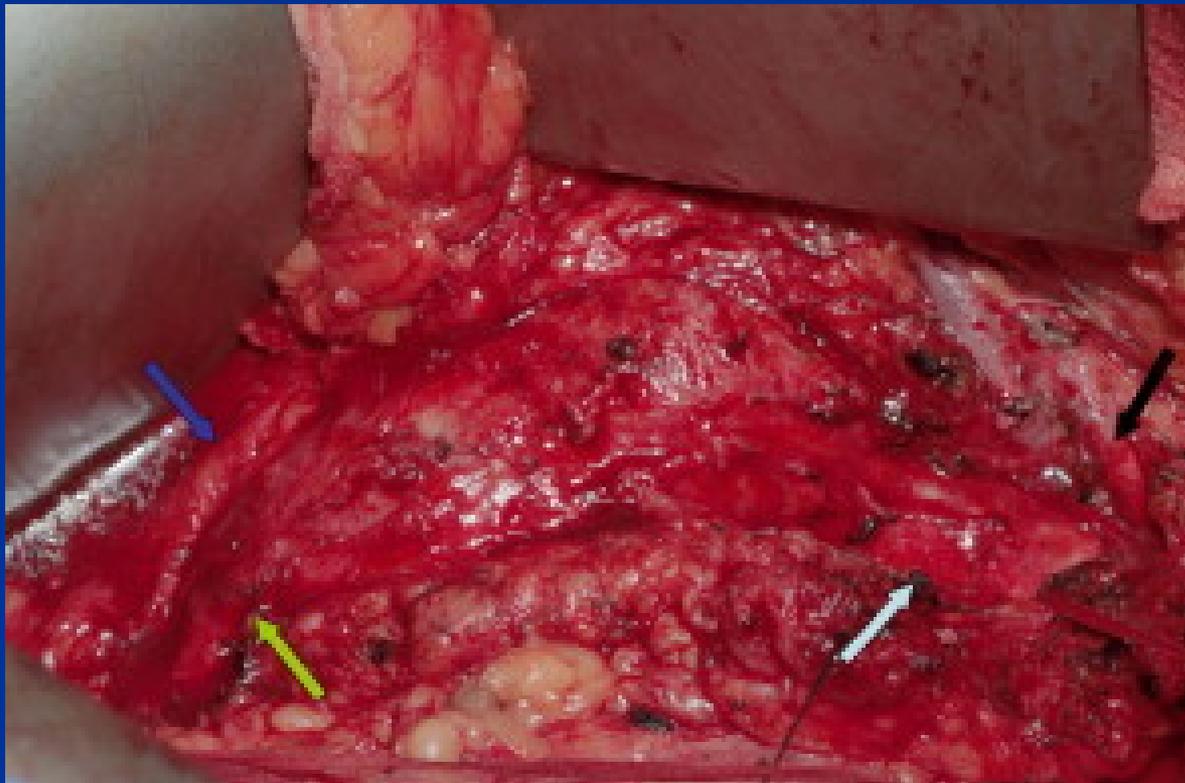
Open Aneurysm Technique

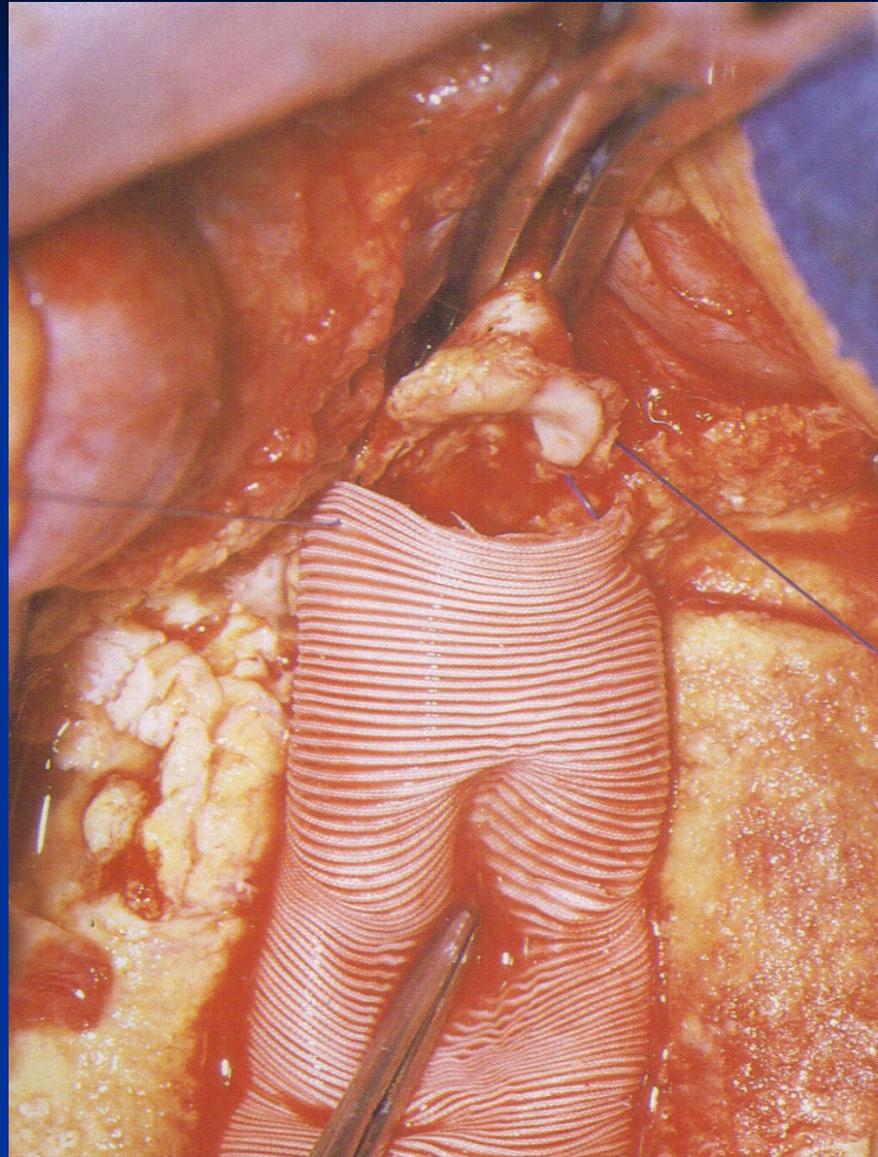
- Isolate aneurysm
- Place clamps on both common iliac arteries
- Place clamp on aortic “neck”
- Open aneurysm
- Sew in graft
- Flush
- Reperfuse legs

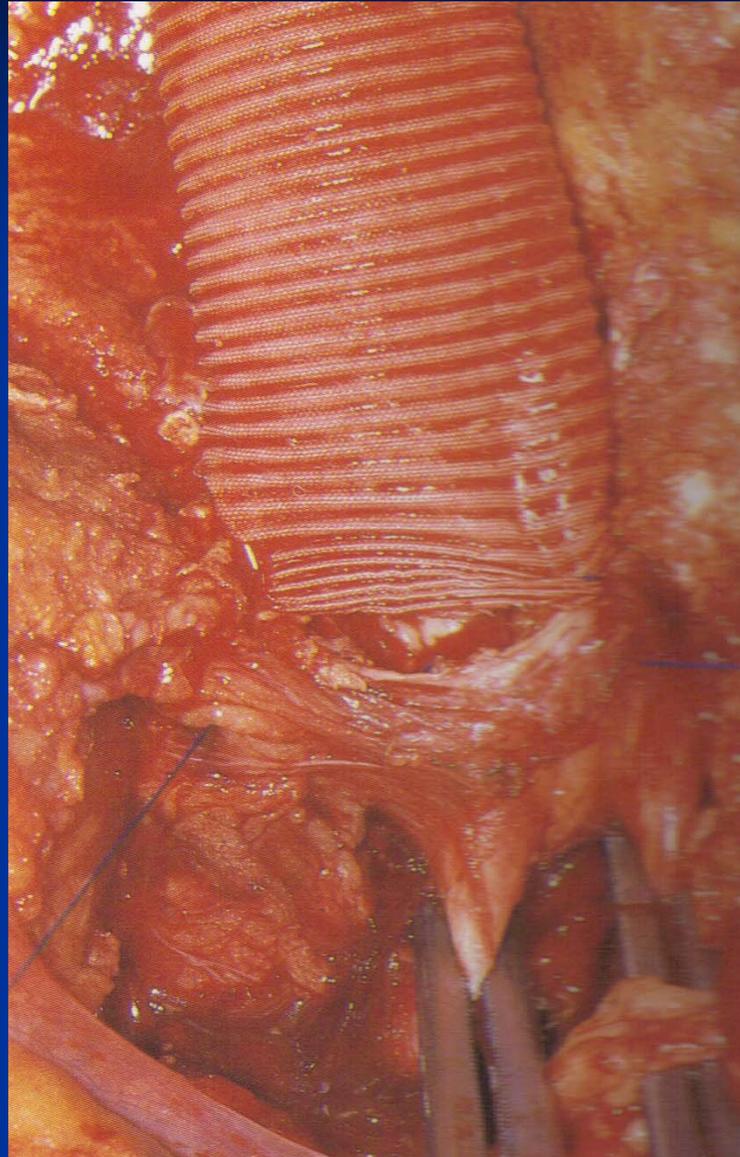
Open Repair of AAA

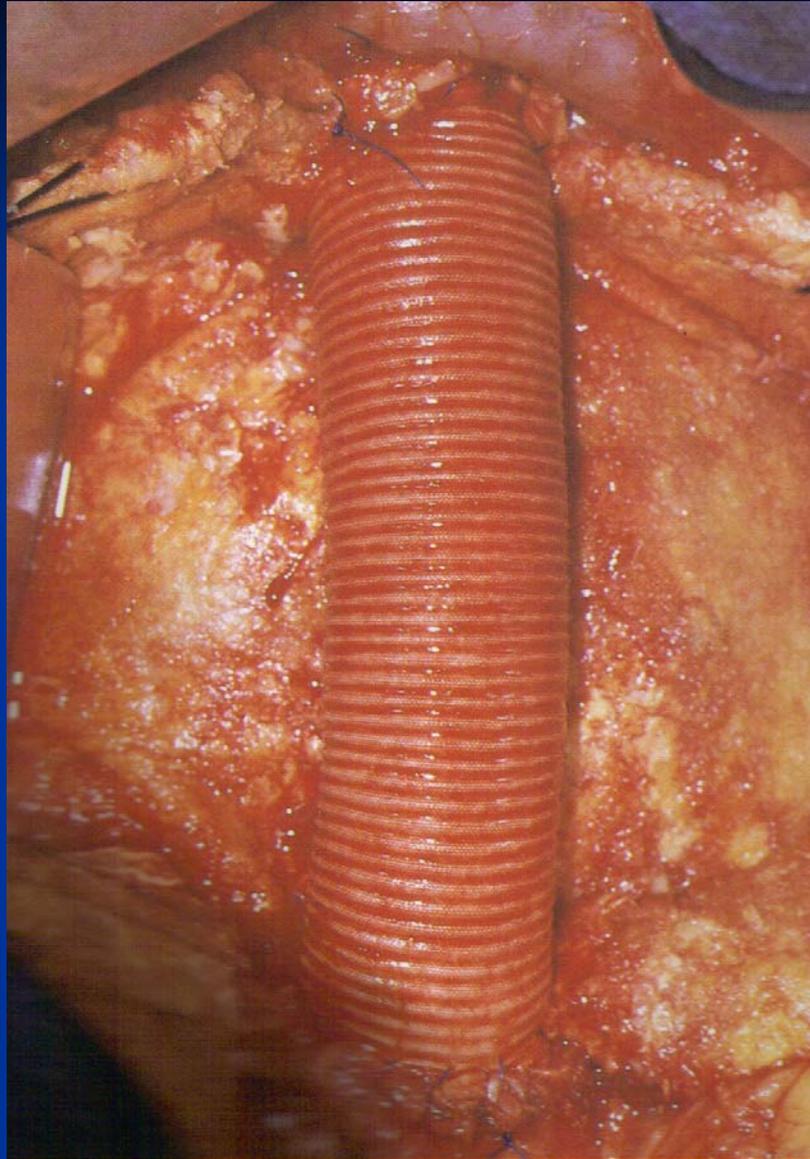
Foot

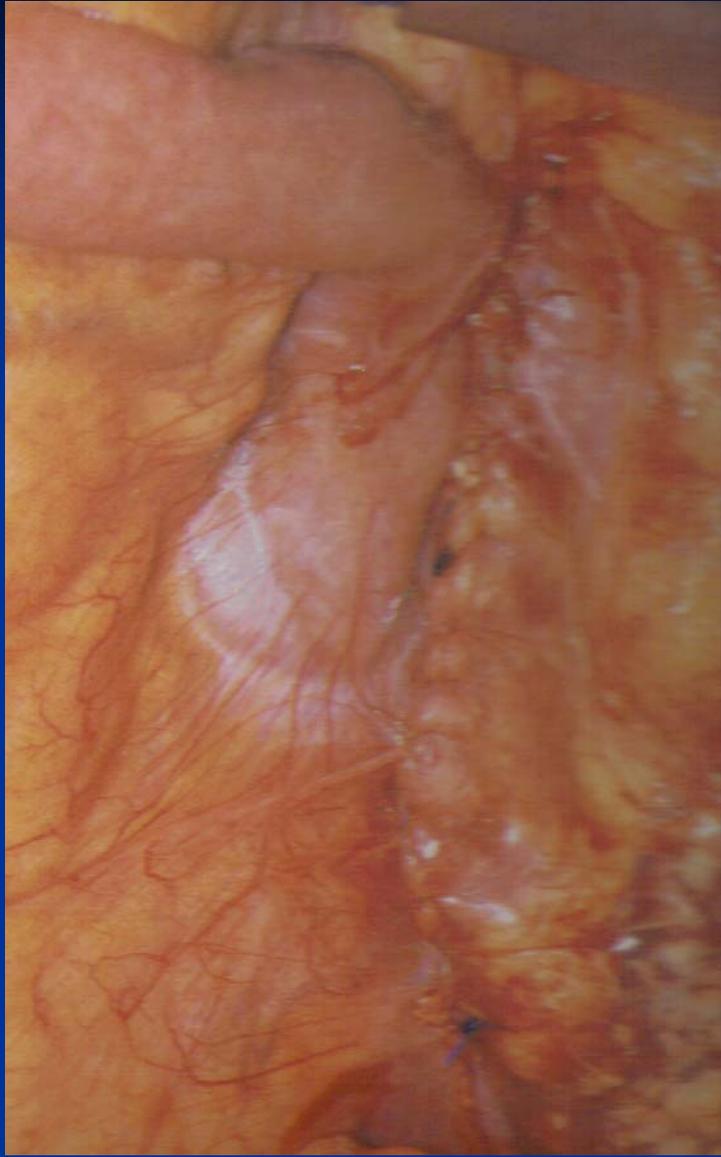
Head

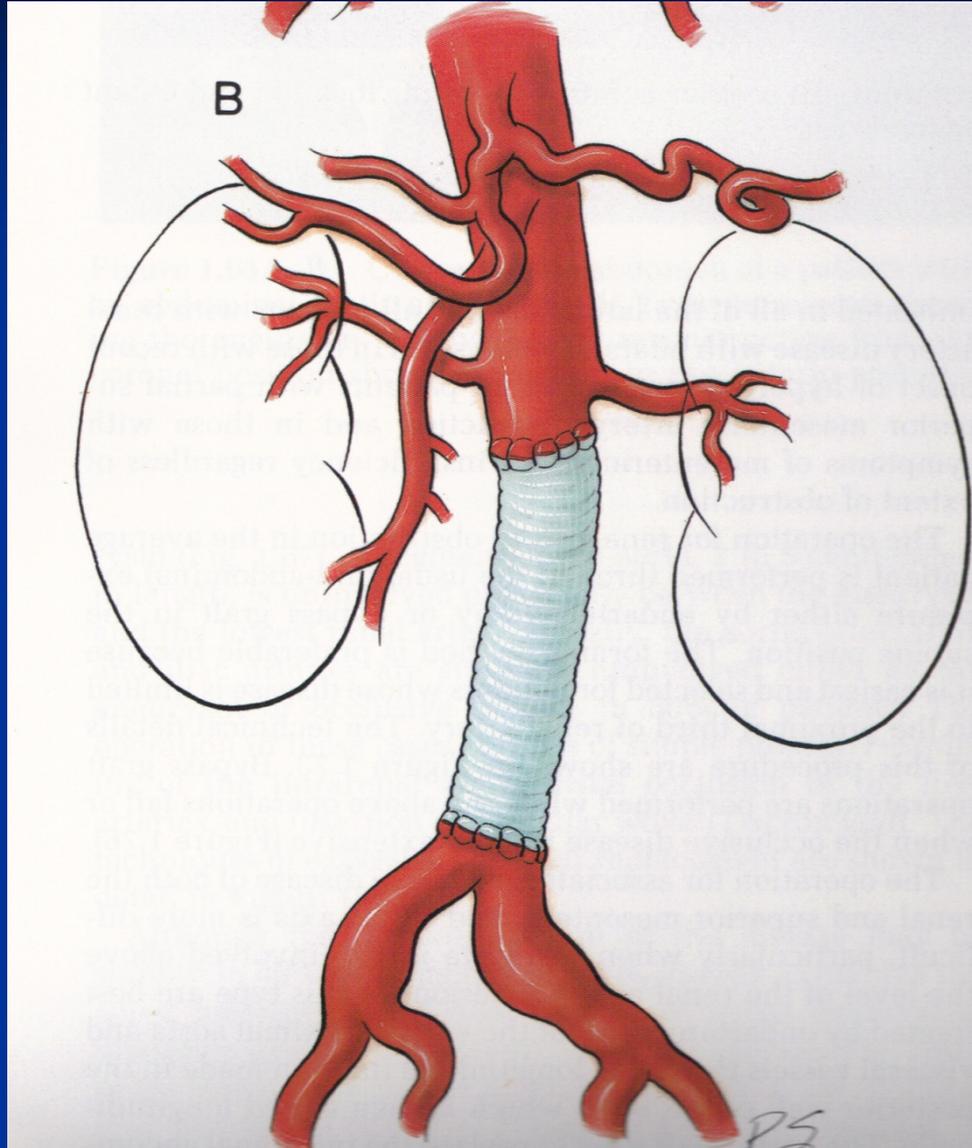












Stent Grafts

- First done in 1992 by Juan Parodi
- Emerging as first line of treatment
- Controversy as to benefit of long-term results
- Patient needs CT scans every 6 months
- As much as 20% re-intervention rate
- Most problems can be corrected percutaneously

Endovascular Technique

- Expose both common femoral arteries
- Place wires from both left and right femoral arteries
- Slide graft up the right femoral-iliac arteries and “deploy”
- Slide left limb of graft up the left femoral-iliac arteries and “deploy”
- Completion aortogram

Table 2 -- U.S. Food and Drug Administration-approved infrarenal aortic stent-graft devices

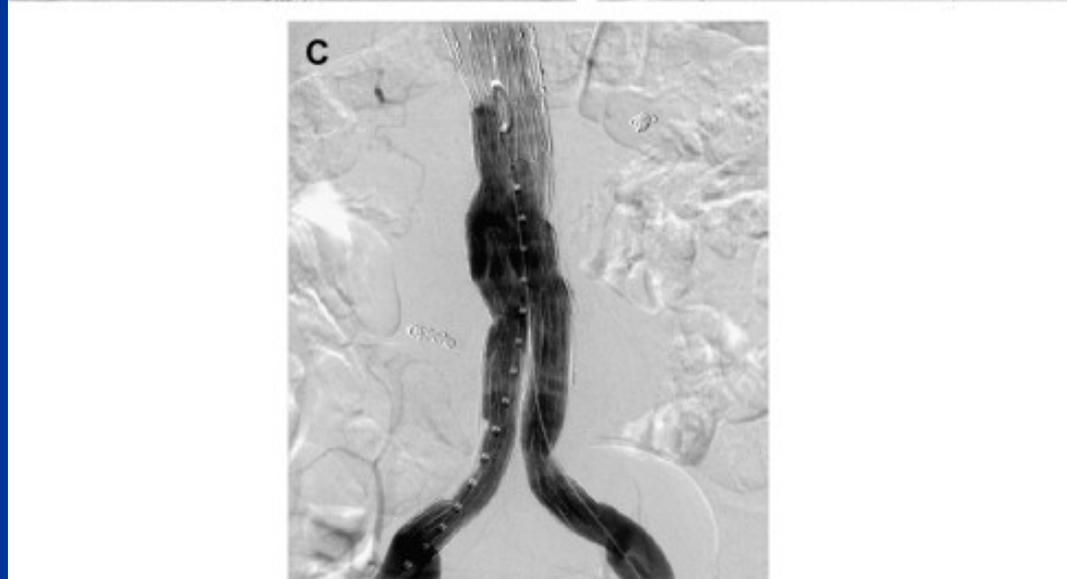
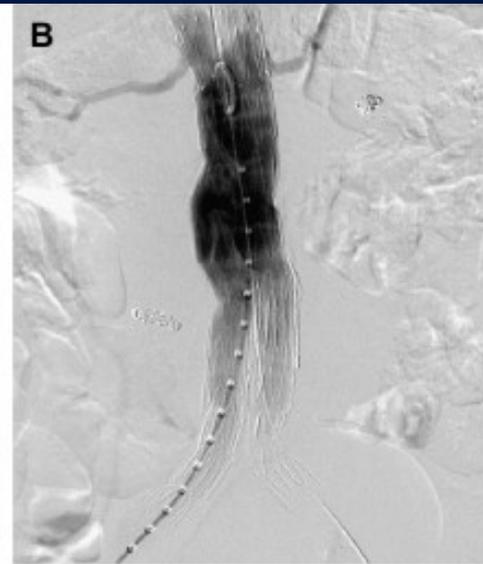
Device	Stent material	Graft material	Main body diameter (mm)	Main body delivery size (Fr)	Iliac limb diameter (mm)	Graft construction	Fixation
Cook Zenith	Stainless steel	Woven polyester	22–36	18–22	8–24	Modular	Self-expanding stents and active suprarenal hooks
Endologix Powerlink	Cobalt-chromium alloy	ePTFE	25–28	21	16–20	Unibody	Self-expansion
Gore Excluder	Nitinol	ePTFE	23–28.5	18	12–20	Modular	Self-expansion and active barbs in neck
Medtronic AneuRx AAA Advantage	Nitinol	Woven polyester	20–28	21	12–24	Modular	Self-expansion

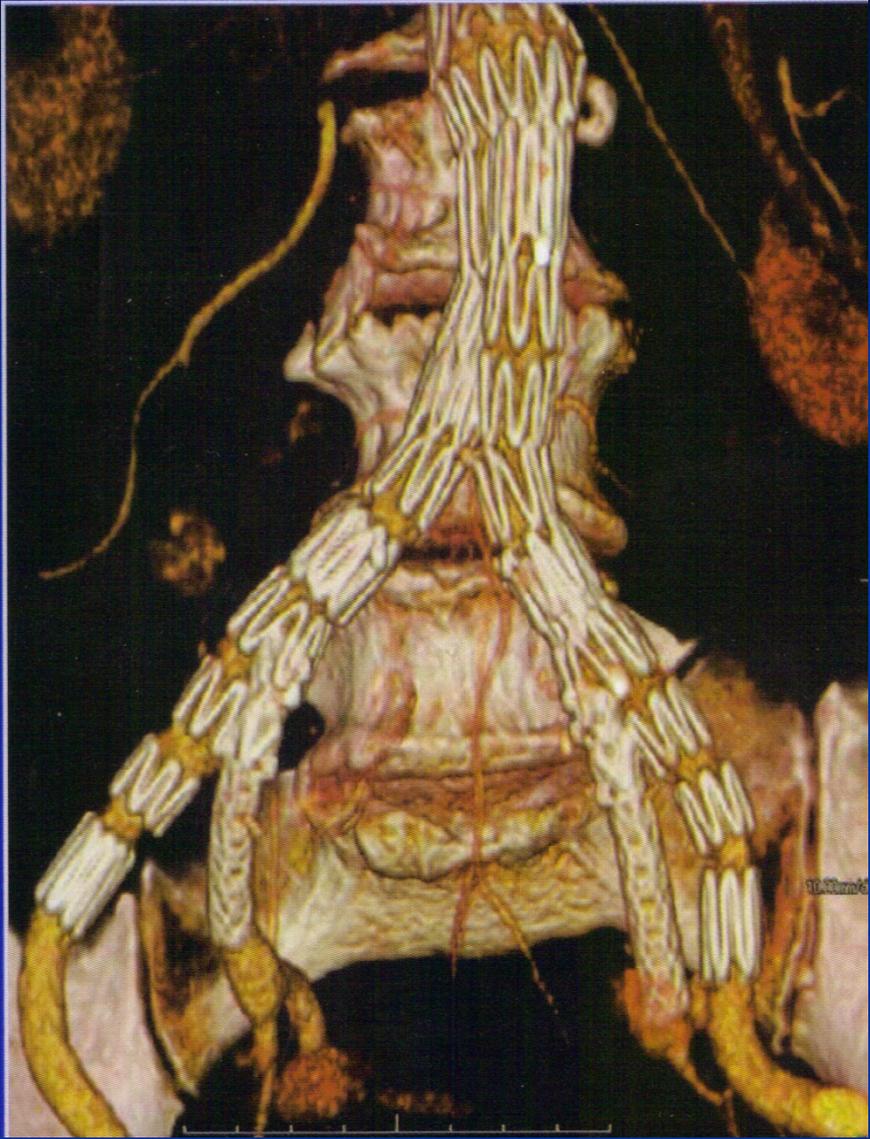


A



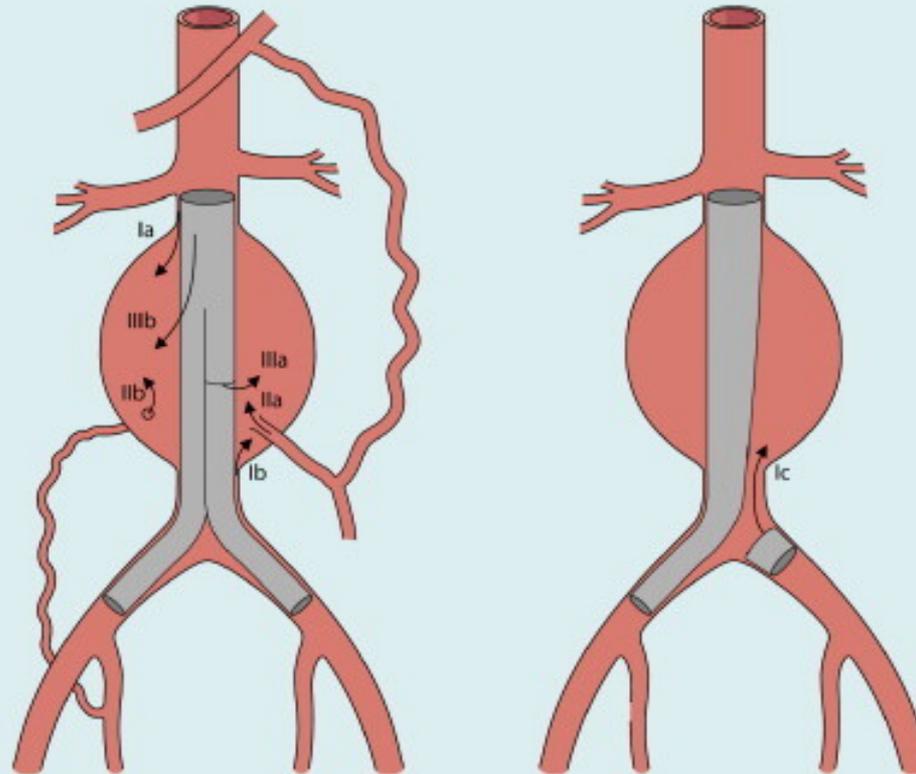
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Endoleaks

Classification of endoleak



- Type Ia : Proximal fixation site
- Type Ib : Distal fixation site
- Type Ic : Iliac occluder
- Type IIa : Inferior mesenteric artery
- Type IIb : Lumbar artery
- Type IIIa : Disjunction
- Type IIIb : Fabric tear
- Type IV : Fabric porosity

Which is better?

Endovascular or Open

- Perioperative mortality
- Endoleaks
- Migration
- Limb occlusion
- Long-term mortality
- Cost: EVAR body is \$12,000; additional modular units are \$6,000

Results- EVAR I

(European study, to end in 2011)

- At two years, 134 endoleaks in 110 patients
- 20 secondary procedures in 17 patients (18%)
- Lower mortality in EVAR (at two years)

OVER Trial

(Veterans study; open vs. endo)

- EVAR: two year mortality was 7%
- Open: two year mortality was 9.4%

Zenith Endolink Data

5 year data

- 739 patients
- 28% mortality (all causes)
- Aneurysm related deaths 3%
- Limb occlusion, migration, conversions <3%
- Late endoleak was 13%
- Secondary interventions: 23%

Probably Definitive

- 22,380 match patients in each cohort
- Perioperative mortality: 1.2% v. 4.8%
- Rupture: at 4 years Endo 1.8% v. Open 0.5%
- Reintervention: Endo 9% v. Open 1.7%
- Surgery: Open 9.7% v. Endo 4.1%
- Long-term survival: Even 65%

Schemerhorn, M.L., et al, N Engl J Med 2008; 358:464-74

Should we do EVAR on small aneurysms?

- PIVOTAL trial
- Currently enrolling patients
- Aneurysms smaller than 5.5 cm
- Technically easier
- Does the risk outweigh the benefit?
- DOES EVAR MODIFY THE COURSE OF THE DISEASE?

Post-op AAA: Assessment

Blood Pressure –

Low (systolic below 100) – may need volume; common in post operative period as they “fill up their tank” - **give Normal Saline or Albumin**

Check Hgb, coags, urine output, bleeding

High – treat with Cardene drip; Lopressor, Vasotec, hydralazine early on; oral meds and catapres

Post-op Assessment AAA

- Peripheral pulses – check and mark with a Doppler
- Color and temperature of feet
- Pulse oximetry on toes
- Urine output (quantity and color – blood?)
- CVPs, PA pressures, Vigileo –Trending most important
- Abdominal palpation: expansion, soft/hard?

Post-op Assessment

Neurological

- Able to respond to verbal commands
- Able to move all four extremities
- Inability to move lower extremities (spinal cord infarct – more prevalent in Thoracic aneurysm repair)

Pulse – tachycardia (>120)

Low volume

Dropping saturations, respiratory distress

Pain

Arrhythmia - afib, SVT, PVCs

Electrolytes (particularly Potassium and Magnesium)

MI – do EKG, troponins, isoenzymes

Pulse – Bradycardia <50

Check meds

Check electrolytes (K and Mg slow pulse)

EKG and compare with pre-op

Pacing pads and external pacemaker close by

Gastrointestinal

Paralytic ileus – lasts about 4-5 days

Leave nasogastric tube; begin to clamp for 4 hours
unclamp; reattach to suction for nausea,
vomiting, hiccups (signs of gastric distention)

Bowel function starts from rectum and works its
way up

Acute Cholecystitis/Pancreatitis rare (enzymes
usually positive)

Pulmonary Edema: occurs after 2-3 days

- Mobilization of third space fluid can cause 3-6 liters of fluid to be redeposited into the intravascular space
- Fluid overload causes left ventricular strain
- This should be anticipated on 3rd day post op and the patient vigorously diuresed
- If not: respiratory distress, MI, heart failure and Death

Mobilization

- Extubate ASAP
- Get out of bed (patients lose 2% of muscle mass per day in bed)
- Avoid over-sedation
- Avoid excess pain control