Vesalius SCALpel™: Aorta and Branches (see also: vascular folios)

Thoracic aneurysm

ascending aneurysm: Marfans’s/connective tissue
- Marfan’s 50% mortality by 50
- cause of mortality: aortic insufficiency causing CHF, or tamponade

Dissection: most dissections start in ascending aorta
- I full length (multiple entry and reentry)
- II ascending only (Marfan’s)
- IIIA > subclavian/thoracic
- IIIB > subclavian/thoracic/abdominal
- unless visceral compromise, wait for 30% enlargement before OR

thoracoabdominal aneurysm
- complications: paraplegia, renal failure

transverse arch aneurysm: highest mortality with repair, hypothermic bypass
- 90% of blunt thoracic aortic ruptures die at scene

Congenital

bovine arch:
- origin of left common carotid from brachiocephalic artery (two vessel arch)
- most common aortic branching variation

double aortic arch most common ring anomaly
aberrant left subclavian as 4th arch branch
- esophageal compression: dysphagia lusoria
- reason for non-recurrent r laryngeal nerve

AAA

management
- 5% of men > 60; 4M:1F, 95% infrarenal
- women 4X as likely to rupture as men
- most asymptomatic until rupture
- ruptured aneurysm 90% mortality
- if reach hospital 50% mortality
  - factors: age, race, distance from hospital, complexity, surgeon’s experience
  - (>10 cases lower mortality)
- 60% ultimately need repair

no advantage of early repair for asymptomatic 4-5.5cm aneurysm
- reassess Q6mo, > 0.7cm increase between exams, operate

rupture symptomatic

rupture risk based on size and site: 5cm = 5% risk/year

size most important factor in rupture
- > 5.5cm aneurysm becomes most likely cause of death, repair
- 10-20% of patients w AAA have iliac aneurysms as well
(isolated iliac aneurysm [2%] > 3cm, repair: high incidence of rupture and mortality)
endovascular aortic aneurysm repair (EVAR)
> 50% are candidates
colon ischemia open = endo
dilatation of neck may result in graft migration
current proximal seal zone is 34mm
endograft: lower morbidity and mortality, more secondary procedures
need adequate neck below renals, not for suprarenal
small size vessels difficult, calcified iliacs
distal end/landing zone problem if there are iliac aneurysms
calcification of iliacs
pelvic ischemia risk if internal iliacs occluded
endoleak: most serious, at end, repair endo or open
dilation of neck may result in graft migration
current proximal seal zone maximum is 34mm
good results if seal zone is cylindrical or conical and has less than 33%
circumferential thrombus
interruption of one tolerated
25% temporary ipsilateral butt claudication (10-15% persistent)
complications: endoleak (main), migration, limb occlusion, infection, failure (stent
fracture, fabric fatigue/perforation)
collateral backbleed (IMA, lumbars): low pressure, treat only if aneurysm
enlarging, may close spontaneously within 12mo
III component separation/graft defect: repair endo or open
IV fabric degeneration/perforation, now rare
V endotension
complications of all aneurysm repairs
infection: increased incidence with groin incision 1-6%
gold standard: graft excision and extra-anatomic bypass
in situ reconstruction in selected pts.
CT diagnosis
< 4 mo PO more virulent
s. epi most common
aorto-femoral higher incidence than aorto-iliac
most > 1y post op
infected/mycotic aneurysm: salmonella most common
aortoenteric fistula, < 1%
sentinel bleed
endoscopy in OR 47% false negative
graft excision, extraanatomic bypass
30% post-op mortality
pseudoaneurysm 2-4% (usually host artery degeneration)
lymph leak/lymphocele 2-4%, groin
bleeding
occlusion
graft thrombosis 5-10% @5y
embolism < 1%

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colon ischemia 1-2%
   need for reimplanting IMA: open aneurysm, look at orifice for good
     backbleeding
     IMA pressure > 30-40, test occlude
     Doppler sigmoid mesenteric border
bowl ischemia
   if large meandering mesenteric artery, means IMA or SMA obstruction
     look for calcification at origins of visceral vessels on pre-op studies
     preserve IMA in case of SMA obstruction or may devascularize whole small
     bowel
spinal cord ischemia < 0.1%
20% ventral hernia after open aneurysm repair
highest renal failure rate after bypass, vascular procedures

Visceral aneurysm

visceral aneurysm: male celiac, hepatic more common, female splenic
   repair splenic in women of childbearing age, symptomatic in others
spleen 60%, hepatic 20%, mesenteric 5%, other 15%
spleen
   4F:1M
   calcification not protective
   repair > 2cm, symptomatic, childbearing age (increased risk of rupture during
     pregnancy)
renal a. aneurysm
   F>M, multiparous
   tissue relaxants late in pregnancy affect elastin, especially at bifurcations
most asymptomatic, ~1.5cm, average number 1.5
repair results in 60% reduction of hypertension
all > 2cm operate
repair for hypertension, not size
mesenteric aneurysm
   most SMA, celiac or branches including pancreaticoduodenal
etiology: infection (mycotic), atherosclerotic, digestive (pancreatitis), fibromuscular
   dysplasia

Mesenteric ischemia

50% arterial, 20% venous, 20% non-occlusive mesenteric ischemia (NOMI)
acute: embolus (arrhythmia, MI)(25%), thrombosis (superimposed on narrowing)(65%)
most lethal form of mesenteric ischemia
lo flow
pruning of smaller branches
Papaverine vasodilation except in shock
second look after resuscitation if extensive
73% mortality
digitalis causes mesenteric vasoconstriction, worsens
mesenteric venous thrombosis
< 10% of mesenteric ischemia
shorter segments, usually non-operative
variable onset, symptoms of intestinal ischemia
causes: (90% hypercoagulable)
prothrombotic: ATIII deficiency, V-Leiden, birth control pills
hematologic: polycythemia, thrombocytosis
inflammatory: pancreatitis, abdominal sepsis, IBD
other: post op, portal hypertension/cirrhosis, trauma
pneumatosis, portal v air = infarction
contrast CT 90% accurate
treat cause, anticoagulate (lifelong)
30% mortality
chronic: atherosclerosis
post prandial (30-45m) pain, weight loss (food fear), bloating, flatulence, diarrhea,
constipation, chronic volume depletion, hypoglycemia, tremulous
hydrate well to do angio: AP & lateral aortogram
90% 2 vessel stenosis, 50% 3 vessel
PTA/stent
emergency surgery 33% mortality
antegrade bypass better long term patency than retrograde (longer, kink)
transaortic endarterectomy

Renal artery stenosis

atherosclerotic, fibromuscular dysplasia (most common)
fibromuscular dysplasia associated with intracranial aneurysm
80% from atherosclerotic narrowing near origin, 1/3 bilat
hypovolemic, rehydrate
management remains controversial
intervention best reserved for bilateral disease in patients who have failed best
medical management (i.e. worsening Cr or uncontrolled HTN despite 3 meds)
almost all done endovascularly now
atherosclerotic least amenable to endovascular, requires stent
renal artery stenosis in renal transplant: PTA, rigid stent
PTA/stent: 90% success
treat hypertension, preserve renal function
surgical: endarterectomy, bypass (aortorenal, hepato-, spleno-)
results:

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young do better than old
shorter duration of hypertension better than long
FMD better than ASCVD
2/3 with renovascular hypertension cured or improved

Paget-vonSchrotter

subclavian/axillary venous thrombosis
high recurrence with thrombolytic/anticoag Rx
treat thoracic outlet problem
vascular and/or neurologic manifestations of thoracic outlet syndrome
first rib resection most common therapeutic requirement
ulnar N pain/paresthesia most common manifestation of thoracic outlet syndrome

SVC syndrome

mediastinal invasion by bronchogenic main cause
obstruction below azygous better tolerated (alternate route to IVC)

Reynaud’s

Ca channel blocker

References:
