AORTOILIAC OCCLUSIVE DISEASE

Brooklyn VAH
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7/29/10
Case Presentation

- 55 y/o BF who presented with LE rest pain
- PMHx:
  - Hep C (childs A)
  - PTSD/depression
  - Chronic anemia
  - Chronic thrombocytopenia
  - Aortic insufficiency
Case Presentation

- **PSHx:** sp AVR x2 (2004, 2009), CABG x 1
  - Post AVR/CABG Rt. Femoral Artery injury
    - repair of right SFA, sartorius flap
  - R EIA stent (6x40mm) - 11/09

- Social hx: + tobacco 1 ppd / 40 yrs, former drug abuse (cocaine), former ETOH

- NKDA
Case Presentation

Physical Exam

VS: T: 97.6, 126/87, 81
Awake and alert
Neck: no carotid bruits
Chest: s1s2 RRR
Abd: no pulsatile masses
Ext: warm, no tissue loss
fem: R-np L- +1
pop: R-np L-np
distal: R-np L-np

Studies

- ABI/PVR:
  - R: 0.8, 0.71, 0.8
  - L: 0.64, 0.57, 0.59
  - Poor waveform from calf distally on L side
  - Unchanged from 2005
- Angiogram 6/8/10
- Echo (7/10): EF 60%
- Stress test (7/10): normal
- Medical/cardiac clearance
Case Presentation: Angiogram (6/8/10)

- RCIA diffuse narrowing
- REIA in stent stenosis
- RCFA diffuse narrowing
- R proximal SFA stenosis
- R distal SFA stenosis with reconstitution to below knee popliteal

- LCIA > 70% stenosis
- Distal LCIA high grade stenosis
- L IIA occluded proximally
- Stenosis to L CF/SFA jxn
- Pelvic collateral
Angiogram
Angiogram
Angiogram
Case Presentation

- On 7/8/10
  - Aorto bifemoral bypass 12 x 6 mm Dacron
  - end-to-side anastamososis
  - aortic clamp time: 30 minutes

- OR:
  - 11 liters of crystalloid
  - EBL: 1.8L 4 units of PRBC’s cell saver-725ml
  - Urine output: 700ml
  - 7000 units of heparin
  - 50mg of protamine
Case Presentation

- 11PM: Post op (MICU): Hemodynamically stable

  ABG: 7.33/38/183/19/-5.2/99 lactate-4

  WBC: 12, PT: 22 Hct: 41, PLT: 68, INR: 1.83
  PT: 22
  U/O: 80cc/hr

  2 units of FFP given
Case Presentation

1am: POD # 1 hemodynamically stable + abdominal distension

ABG: 7.32/43/123/32/-3.4/98 lactate 3.2

WBC: 6.5, PT:17 Hct: 26, PLT 43, INR 1.43, PT: 17

AST 753  ALT 403 ? postoperative bleeding

Re-exploration/suspected surgical bleed
Case Presentation

Resuscitation:
- 2.5 liter bolus
- No blood available until morning
- CVP: 13-16
- BP 120 – 170 / 50 – 80
- Pulse 90’s
- Urine output: > 100cc / hour
- ABG: 3 am 7.33 / 37 / 94 Lactate 4
  6 am 7.27 / 37 / 370 Lactate 5.2
- CBC: 4:30 am Hct 26 % Plts. 39
Case Presentation

OR: negative for active bleeding, + oozing, segment of sigmoid colon ? dark appearing
anastamosis patent
IMA pulsatile

OR time
1 hr : 40 minutes
2 units PRBC
no platelets available
stable vitals / urine output
Case Presentation

- **Post operatively:**
  - VSS
  - u/o 40-60cc/hr
  - CVP 12-18
  - DIC, TTP and HIT ruled out
  - PLTs given

- **Post op labs**
  - ABG: 7.38 / 31 / 97 / 18 / -5.1 / 98  lactate 5.4
  - WBC 11, Hct 35, PLT 27,
  - trop-neg AST 1794 / ALT 707  PT 14
  - Repeat (2pm) ABG 7.34 / 35 / 97 / 18 / -5 / 97  lactate 5.4
Case Presentation

VS: T 97.8, 131-175/69-89, 78-101
CVP: 11-15 u/o: 40-60cc/hr

10pm labs WBC- 11, Hct 33, PLT 160, AST 1964 / ALT 593
Case Presentation

- On POD # 2 Midnight
  - hemodynamically unstable
    - bradycardic (BP 61-76 / 60-40’s, HR-50-60’s)
    - u/o 30-40 cc/hr

- MICU team resuscitated her with atropine 2.5L fluid bolus
- started on high dose phenylephrine levophed
- broad spectrum abx started

**Labs:**

- Abg 7.14 / 34 / 106 / 16 / 98 lactate 13,
- WBC-11.9, Hct-30 PLT-137 PT 24 trop 4.07

Persistent metabolic acidosis / high dose pressors / bicarb drip
Case Presentation

Back to the OR 12 noon

Exploratory Laparotomy
- necrotic sigmoid colon, patchy ischemic small bowel
- ischemic liver and spleen
Sigmoid resection / end colostomy

MICU: 4:pm
- hypotensive / bradycardic
- multiple codes @ 9pm, 10:30pm
  - Persistent Metabolic acidosis pH: 7.1 lactate 22 – 23
  - 2 units PRBC albumin
  - Urine output nil
Aortoiliac Occlusive Dz (AIOD)

- Atherosclerosis of distal abdominal aorta and iliac arteries
- Symptoms: restricting blood flow to LE

**Leriche Syndrome:**
- Absent femoral pulses
- Buttock claudication
- Impotence

**Symptoms:**
- Intermittent / disabling calf claudication
- Thigh or buttock claudication
- Rest pain with multilevel disease
AIOD

- Risk factors:
  - Cigarette smoking
  - HTN
  - Hypercholesterolemia
  - DM
  - Men

- Physical exam:
  - Diminished / absent femoral pulses,
  - dependent rubor or pallor with elevation
  - ultimately tissue loss (ulcers, gangrene)
AIOD

- Dx
  - ABI/PVR’s
  - Duplex US
  - MRA (renal insufficiency/allergy)
  - CT angiography (limtd by calcifications)
  - Angiography- gold std, can be both dx/tx

- Collateral pathways- provide flow distal to lesion
  - SMA to distal IMA, then to IIA
  - Lumbar arteries to sup gluteal, then to IIA
  - Lumbars to lateral and deep Cx, then to CFA
  - Winslow’s path: SCA to sup epigastric-> inf epigastric-> EIA
AOID (TASC II classification)

- TASC II (Trans-Atlantic Inter-Society Consensus) – categorizes extent of iliac atherosclerotic lesions and suggests therapeutic options based on classification

- **Type A**
  - Unilateral or bilateral stenoses of CIA
  - Unilateral or bilateral single short (≤3 cm) stenosis of EIA

- **Type B**
  - Short (≤3 cm) stenosis of infrarenal aorta
  - Unilateral CIA occlusion
  - Single or multiple stenosis totaling 3–10 cm of the EIA not into the CFÂ
  - Unilateral EIA occlusion not involving the origins of internal iliac or CFA
AIOD (TASC II)

- **Type C**
  - Bilateral CIA occlusions
  - Bilateral EIA stenoses 3–10 cm long not into the CFA
  - Unilateral EIA stenosis extending into the CFA
  - Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA
  - Heavily calcified unilateral EIA occlusion with or without involvement of origins of internal iliac and/or CFA

- **Type D**
  - Infrarenal aortoiliac occlusion
  - Diffuse disease involving the aorta and both iliac arteries
  - Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA
  - Unilateral occlusions of both CIA and EIA
  - Bilateral occlusions of EIA
AIOD (TASC II)

- **Type A:** Endovascular tx
- **Type B:** Endovascular tx
- **Type C:** If good risk pt-surgical tx
- **Type D:** Surgery is the tx of choice
Treatments

- No effective medical management for AIOD
- Control of risk factors, smoking cessation, antiplatelet tx, and graduated exercise program
- If these fail, consider limb revascularization
- TX options
  - ABF, aortoiliac endarterectomy, iliofemoral bypass, extra-anatomic bypasses, endovascular modalities
  - ABF most often performed. Most pts have bilat iliac dz. Operation has excellent long-term patency rates 85-90% at 5 yrs, 70-75% at 10 yrs. Mortality from 2-3%; morbidity 8.3%.
  - ABF remains as gold standard to which all other modalities are compared
Aorto-BiFemoral Bypass

- Bilateral groin incisions to expose femoral arteries
- Transabdominal approach to expose aorta from below renal arteries to above IMA
- Tunneling done bluntly along anterior surface of iliacs and posterior to ureters
- Knitted Dacron (collagen coated) graft used
- Aorta is clamped below renals and another clamp horizontally to occlude lumbers and iliacs
- Graft beveled and anastomosis performed; (end to side or end to end), and end to side at level of femorals
## Aorto-BiFemoral Bypass

<table>
<thead>
<tr>
<th>End to side anastomosis</th>
<th>End to end anastomosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Less dissection, therefore faster</td>
<td>▪ In pts c coexisting aneurysmal dz or a complete aortic occlusion extending into renals</td>
</tr>
<tr>
<td>▪ Larger anastomosis</td>
<td>▪ Advocates: superior hemodynamics, therefore patency</td>
</tr>
<tr>
<td>▪ Preserves flow to distal aortic branches and pelvis, therefore reduces potential of impotence, colon ischemia, and paraplegia</td>
<td>▪ Exclusion of distal aorta, therefore no embolization or aneurysm</td>
</tr>
<tr>
<td></td>
<td>▪ Less kinking or aortoduodenal fistula formation</td>
</tr>
<tr>
<td></td>
<td>▪ Avoids competing c native vessels</td>
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</tbody>
</table>
Aorto-BiFemoral Bypass

EE anastomosis

ES anastomosis
### Average Patency and Complication Rates for Various Techniques for Aortoiliac Revascularization

<table>
<thead>
<tr>
<th>Procedure</th>
<th>5-Year Patency</th>
<th>Complication</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortobifemoral bypass</td>
<td>85%–90%</td>
<td>5%–8%</td>
<td>2%–5%</td>
</tr>
<tr>
<td>Axillofemoral bypass</td>
<td>50%–80%</td>
<td>5%–15%</td>
<td>5%–10%</td>
</tr>
<tr>
<td>Femorofemoral bypass</td>
<td>70%–80</td>
<td>5%</td>
<td>0%–5%</td>
</tr>
<tr>
<td>Iliofemoral bypass</td>
<td>80%–85%</td>
<td>—</td>
<td>0%–5%</td>
</tr>
<tr>
<td>Iliac angioplasty and stenting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Year Patency:</td>
<td>76%</td>
<td>1%–5%</td>
<td>0%–2%</td>
</tr>
</tbody>
</table>

Mortality: 0%–5%
Aorto-BiFemoral Bypass

Complications: Early

- Cardiac complications

- Post op hemorrhage: 1-3% cases, technical or coagulopathy

- Acute limb ischemia (ALI): 1-3%, acute thrombosis or thromboembolism

- Intestinal ischemia: 2%
Aorto-BiFemoral Bypass

- Complications: Late
  - Graft-related: infection (1%), thrombosis, pseudoaneurysm (1-5%)
  - Aortoenteric fistula:
    - Sentinel bleed- 50% risk of death or limb loss
    - Higher incidence with ES anastomosis
Endovascular Intervention

- Balloon angioplasty and stenting proving to be a predominant method to tx AIOD
- Lower risk; hybrid procedures are being done more frequently
- Traditionally for TASC A/B lesions; recent data encourages it for C/D lesions
- Little data on comparing open vs endovascular
- Take notice: renal insufficiency, use gadolinium, mucomyst, US if cannot find pulse
- Access: via brachial or CL femoral arteries
## Endovascular

### Iliac angioplasty
- Primary stenting vs angioplasty and selective stenting
- If $>30\%$ residual stenosis or $>10\text{mmHG}$ pressure gradient
- Nitinol self-expanding stents-tortuous
- Balloon-expandable-for heavily calcified
- Bifurcation lesions-kissing plasty or kissing stenting techniques
- Patency at 3 yrs 76-92%

### Infrarenal Aortic stenosis
- Angioplasty and stenting of focal lesions
- 5 yr patency 70%
- Risk of retrograde embolization if renal arteries after PTA
Endovascular

- **Complications**
  - Access-site related 1-2%
  - Death/major morbidities: 1% cardiac and renal
  - Site of intervention: dissection, rupture, pseudoaneurysm, thrombosis and infection
  - Intimal hyperplasia- >20% within 2 yrs- early non invasive surveillance
References


