AAA and PVD

William B. Newton III, MD
Assistant Professor of Surgery
Department of Vascular and Endovascular Surgery
• Abdominal Aortic Aneurysms (AAA)
• Epidemiology and Natural History
Epidemiology

- Largely a disease of elderly white men
  - Male:Female ~6:1
- Overall prevalence <5%
- Risk Factors
  - Smoking
  - Family History
  - HTN
  - White race

Melton et al
Am J Epidemiol 1984
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking History</td>
<td>5.1</td>
</tr>
<tr>
<td>Family Hx AAA</td>
<td>1.9</td>
</tr>
<tr>
<td>Older Age</td>
<td>1.7</td>
</tr>
<tr>
<td>CAD</td>
<td>1.5</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>1.4</td>
</tr>
<tr>
<td>COPD</td>
<td>1.2</td>
</tr>
<tr>
<td>Height</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Lederle *et al* Arch Intern Med 2000
Progressive Enlargement

- Mean growth 3–4 mm per year
- Accelerates with increasing size
- ‘Staccato’ growth 65%
- Continuous growth in 25%
- Stable size in 10%

Kurvers et al, J Am Coll Surg, 2004
Eventual outcome (AAA >4cm)

- Repair = 65% at 5 yrs
- Rupture
- Death from other causes

• Rupture Risk by AAA size

<table>
<thead>
<tr>
<th>Size</th>
<th>Risk at 1 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 – 5.5cm</td>
<td>&lt; 1%*</td>
</tr>
<tr>
<td>5.5 – 5.9 cm</td>
<td>9%</td>
</tr>
<tr>
<td>6.0 – 6.9 cm</td>
<td>10%</td>
</tr>
<tr>
<td>≥7.0 cm</td>
<td>33%</td>
</tr>
<tr>
<td>≥8.0 cm</td>
<td>51%*</td>
</tr>
</tbody>
</table>

Lederle et al, JAMA, 2002
Clinical Presentation
1. **Asymptomatic**
   - Most Patients (90%)

2. **Symptomatic**
   - Uncommon
   - With or without rupture

3. **Ruptured**
   - Uncommon and catastrophic
Asymptomatic Presentation

Physical exam

• Notoriously unreliable
• 15% PPV
• Pulsatile mass

Incidental finding

• Increasingly common
Screening beneficial and now approved

• “Welcome to Medicare’ physical
  1. Male over age 65
  2. Any time smoker

• Best test for screening or suspected AAA- Ultrasound
SAAVE act-Screening abdominal aortic aneurysms very efficiently

<table>
<thead>
<tr>
<th>Study (Reference)</th>
<th>Patients Invited to Screening, n/n</th>
<th>Uninvited Controls, n/n</th>
<th>OR (95% CI Random)</th>
<th>Weight, %</th>
<th>OR (95% CI Random)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viborg County (21)</td>
<td>6/6339</td>
<td>19/6319</td>
<td>-</td>
<td>7.3</td>
<td>0.31 (0.13–0.79)</td>
</tr>
<tr>
<td>Chichester (20)</td>
<td>10/3205</td>
<td>17/3228</td>
<td>-</td>
<td>10.0</td>
<td>0.59 (0.27–1.29)</td>
</tr>
<tr>
<td>Western Australia (23)</td>
<td>18/19 352</td>
<td>25/19 352</td>
<td>-</td>
<td>16.8</td>
<td>0.72 (0.39–1.32)</td>
</tr>
<tr>
<td>MASS (22)</td>
<td>65/33 839</td>
<td>113/33 961</td>
<td>-</td>
<td>65.9</td>
<td>0.58 (0.42–0.78)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99/62 735</strong></td>
<td><strong>174/62 860</strong></td>
<td><strong>-</strong></td>
<td><strong>100.0</strong></td>
<td><strong>0.57 (0.45–0.74)</strong></td>
</tr>
</tbody>
</table>

Review of screening trials: reduction in AAA mortality with screening

Symptomatic Presentation

1. **Acute expansion-** manifest as pain-possibly from compression of the anterior spinous ligament

1. Compression (very uncommon)
   - Vertebra, IVC, duodenum

1. Peripheral embolization
   - Occurs in less than 2-5%
• Ruptured = emergency
  • Abdominal/ back pain
  • Hypotension/ syncope
  • Abdominal distension
  • Shock
  • Sudden Death
Treatment
Treatment Options

1. Medical Management and Surveillance
   - Every 6 months US
   - No medical therapy proven to reduce or slow aneurysm growth

2. Open Surgical Repair

1. Endovascular Repair
• When to treat?
  • “Old” Cutoff: 5 cm
  • “New” Cutoff?

• ADAM and UK Small Aneurysm Trials (Open Repair vs. Ultrasound)
  • Randomized pts to early tx or surveillance
  • 4-5.5 cm AAA
  • Extended follow-up
  • Best medical care in both arms

• Surgical Mortality
  • 2.7% in ADAM
  • 5.5% in UK Trial

  Powell JT, Br J Surg, 2007; Lederle FA, NEJM 2002
No survival benefit: open repair vs. surveillance in 4-5.5 cm AAAs
Do these results apply to endovascular therapy?

- PIVOTAL trial
  - Industry sponsored-Medtronic
  - 4-5cm AAA
  - Eligible for EVAR
  - Randomized
  - No difference seen for early endovascular repair

**Bottom Line- Size Threshold should be 5.5cm**

- Maybe less with rapid expansion, small female pt.
• **Endovascular Repair**
  • Performed using bilateral femoral artery cutdown or percutaneous approach
  • Performed with high resolution X-ray imaging
  • ICU optional
  • Short hospital stays common
• **Open Surgery**
  • The ‘Gold Standard’
  • Laparotomy
    • Midline
    • Transverse
    • Flank
  • Proximal and distal clamping
  • Interposition graft
  • ICU postoperatively
Outcomes
Early

- **Open complications**
  - Adverse CVD events
  - Acute renal injury
  - Colonic Ischemia
  - MSOF
  - Spinal cord injury
  - Embolization

- **Endo complications**
  - Access related
  - Limb ischemia
  - Renal toxicity
  - Embolization
  - Acute conversion
Late

- **Open complications**
  - Hernias
  - Graft occlusion
  - Pseudoaneurysm formation
  - Aortoenteric fistulae
  - Graft infection

- **Endo complications**
  - Endoleaks
  - Device Migration
  - Limb occlusion
  - Graft infection
Open vs. Endo which is better

- EVAR and Dream Trial addressed
EVAR 1
• British
• Sep 1999- Dec 2003
• 1082 patients
• >5.5 cm
• >60 year old

• EVAR mortality 1.7% vs 4.7% for open (P<0.05)
• More secondary interventions 9.8% (open) vs 5.8% (EVAR)
• Median length of stay less for EVAR
Acute complications higher in open repair and delayed complication much higher in EVAR group
Midterm results

Early survival for EVAR

Long term results

EVAR survival benefit over time

DREAM

- Dutch
- Nov 2000- Dec 2004
- Enrollment target 400- enrolled 351
- AAA >5cm
- Life expectancy >2 years

- Perioperative mortality higher in open (4.6%) vs EVAR (1.2%) (p=0.10)
- EVAR had shorter surgery, less blood loss, fewer transfusions, decreased time on vent and shorter ICU and hospital stays
- More moderate & severe complications with open (10.9%) than EVAR (2.9%) (p<0.001)
• DREAM Trial
  • Long term results
    • HRQOL after 6 months favors open repair
    • Early mortality advantage for EVAR lost by 1 year
    • High rate of secondary interventions in EVAR group
    • Much higher costs for the EVAR group
  
  • DeBruin et al, NEJM, 2010;362:1881-89.
Midterm 2-year results

![Graph showing survival rates with and without endovascular repair](image.png)

**No. at Risk**
- Open repair: 178, 164, 160, 133, 97
- Endovascular repair: 173, 166, 163, 134, 98

**P = 0.86**

*Months after Randomization*

Long term results

No mortality benefit long term

EVAR=more reinterventions

OVER

• US VA Coop
• Oct 2002-2008
• 881 patients
• AAA >5cm or selected >4.5cm
• Life expectancy >2 years

• Perioperative mortality higher in open (2.3%) vs EVAR (0.2%) (p=0.006)
• EVAR had shorter surgery, less blood loss, fewer transfusions, and shorter ICU and hospital stays
Early/midterm results

There was no significant difference in cumulative mortality for open vs endovascular repair (hazard ratio, 0.7; 95% confidence interval, 0.4-1.1; log-rank $P = .13$).
OVER review

• Early mortality benefit, does not translate into benefit at 2 years
• Similar quality of life
• Similar reintervention rate
ACE

- French
- 2003-2008
- Low risk
- 299 patients
- >5 cm

- EVAR mortality 0.6% vs 1.3% for open (P=NS)
  Lower ICU, vent, LOS, OR time and transfusion
Open Surgery- Strengths

• Proven
• Durable
• Versatile
• Definitive

Endovascular- Strengths

• Less invasive
• Lower M&M
• Shorter recovery
• Caters to patient preference
<table>
<thead>
<tr>
<th>Open Surgery- Weaknesses</th>
<th>Endovascular-Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Maximally invasive</td>
<td>• Incompletely proven efficacy</td>
</tr>
<tr>
<td>• Significant M&amp;M</td>
<td>• High reintervention rates</td>
</tr>
<tr>
<td>• Prolonged recovery</td>
<td>• Lifelong surveillance</td>
</tr>
</tbody>
</table>
Endovascular Grafting for AAA

- **Another Tool** For the Vascular Surgeon
- Excellent results in well selected patients
- Minimizes serious morbidity and perioperative mortality
- Allows for treatment of individuals unfit for open repair
- Constantly improving

Open Surgical Repair

- Excellent, durable results
- Significant morbidity and recovery times
Take Home Points

- Screening for
  - Male
  - Age 65-75
  - History of smoking
- Size in excess of 4 cm
  - Every 6 months surveillance
- Size for repair 5.5cm
FUTURE IS HERE
Thoracic aortic dissections

DeBakey I  DeBakey II  DeBakey III
Stanford Type A  Stanford Type B
Thoracic aortic dissections

• Type A - emergent repair
• Type B
  • Uncomplicated - HTN control, monitoring, early stent graft
  • Complicated - Endovascular versus open repair
Peripheral Vascular Disease
Peripheral Vascular Disease

• What is it?
  • Problems of reduced perfusion
  • Reduced perfusion due to increased impedance
  • Secondary to atherosclerotic ‘blockages’
  • Acute or chronic problems
Peripheral Vascular Disease

• What types of ‘problems’ are we talking about?
  1. Acute Ischemia
  2. Chronic Ischemia
     • Intermittent Claudication
     • Ischemic Rest Pain
     • Ischemic Ulceration
     • Gangrene
        1. Dry
        2. Wet
Risk Factors and Demographics
Peripheral Vascular Disease

• Risk Factors
  • CIGARETTE SMOKING
  • DIABETES
  • Other atherosclerotic risk factors
    • Hyperlipidemia
    • Hypertension
  • Chronic renal insufficiency
Peripheral Vascular Disease

- Different disease distributions
  - **Smokers**
    - Aortoiliac occlusive disease
    - Superficial femoral artery disease
  - **Diabetics**
    - Profunda femoris disease
    - Tibioperoneal and small vessel disease
  - **Combination**
    - Frequently unreconstructable
    - High risk for limb loss
Acute Limb Ischemia
Peripheral Vascular Disease

• Acute Ischemia
  • Characterized by Six “P’s”
    • Pulselessness
    • Pain
    • Pallor
    • Poikilothermia
    • Paresthesias
    • Paresis/Paralysis
  • Always an emergency
Peripheral Vascular Disease

• Acute Limb Ischemia
  • Due to acute circulatory occlusion
    • Minimizes salutary effect of collaterals
  • Causes
    • Emboli (cardiac most common)
    • Thrombosis (in setting of chronic disease)
    • Iatrogenic (access site and injuries)
    • Aortic dissections
Peripheral Vascular Disease

• Acute Limb Ischemia
  • Natural History
    • Limb loss if not treated expeditiously
    • Major complications tied to timing of treatment
      • Compartment syndromes
      • Muscle breakdown
        • Myoglobinuria - Renal dysfunction
        • Acidosis/Hyperkalemia - Cardiac dysfunction
    • Fatal if threatened limb untreated
Profunda and tibial vessel emboli
Peripheral Vascular Disease

• Acute Limb Ischemia

• Treatment

  • Immediate Heparinization
  
  • Assess tissue viability
    • ? Primary amputation
  
  • Define problem and re-establish arterial perfusion
    • Angiography
    • Thromboembolectomy
    • Bypass
    • Dissection repair
    • Thrombolitics*
  
• Fasciotomy as needed

Wake Forest Baptist Medical Center
Chronic Limb Ischemia: Intermittent Claudication
# Peripheral Vascular Disease

<table>
<thead>
<tr>
<th>Stage</th>
<th>Presentation (Fontaine classification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms</td>
</tr>
<tr>
<td>I</td>
<td>Non-limiting claudication</td>
</tr>
<tr>
<td>II</td>
<td>Disabling claudication, skin/hair/nail changes</td>
</tr>
<tr>
<td>III</td>
<td>Ischemic rest pain, dependent rubor</td>
</tr>
<tr>
<td>IV</td>
<td>Ischemic tissue loss, ulcers/gangrene</td>
</tr>
</tbody>
</table>
Peripheral Vascular Disease

• Intermittent Claudication
  • From the Latin term ‘to limp’
  • Definition- muscular pain induced by exercise and relieved by rest (inadequate flow reserve)
  • Most frequent sites
    • Calf
    • Buttock/thigh

• NOT LIMB THREATENING
Peripheral Vascular Disease

• Intermittent Claudication
  • Symptoms produced by ‘upstream’ lesions
  • Most common in smokers, less so in diabetics
  • Usually single level occlusive disease
    • Most common sites
      • Distal SFA
      • Iliac vessels
  • Collaterals adequate to meet resting needs
    • Fixed resistance
Buttock and thigh claudication
Note absence of disease in his legs
Peripheral Vascular Disease

- Intermittent claudication

- Natural History
  - **Not limb threatening (<0.5% per year)**
  - Associated risk of CVD death is high
    - 8%-10% per year
  - Low rate of progression to critical ischemia
    - 1%-3% per year
Peripheral Vascular Disease

• Intermittent Claudication
  • Risk of limb loss or progression increased by
    • Continued smoking
    • Diabetes
    • Lower initial ABI
Peripheral Vascular Disease

- Intermittent Claudication

- Diagnosis
  - Physical exam (pulses, bruits)
  - Take care to examine other vascular beds
  - Non-invasive testing
    - ABI’s
    - Pulse volume recordings
    - Duplex mapping

- Arteriography has no role
**BILATERAL CIA STENOSIS.**

**Exercise**

<table>
<thead>
<tr>
<th></th>
<th>Rest</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brachial BP</td>
<td>120</td>
<td>131</td>
<td>128</td>
<td>118</td>
<td>117</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R Ankle BP</td>
<td>87</td>
<td>52</td>
<td>55</td>
<td>59</td>
<td>64</td>
<td>77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L Ankle BP</td>
<td>94</td>
<td>59</td>
<td>59</td>
<td>73</td>
<td>82</td>
<td>83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R ABI</td>
<td>0.73</td>
<td>0.40</td>
<td>0.43</td>
<td>0.50</td>
<td>0.55</td>
<td>0.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L ABI</td>
<td>0.78</td>
<td>0.45</td>
<td>0.46</td>
<td>0.62</td>
<td>0.70</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INTERPRETATION:**

**SIGNIFICANT BILATERAL PRESSURE DROP WITH EXERCISE. GREATER ON THE RIGHT THAN LEFT. TRACINGS DID NOT DROP.**

**RT. HIP CRAMPING AT 30 SEC**
**BIL. CALF CRAMPING AT 1:30**
**RT. HIP PAIN AT 3 MIN**
**STOPPED AT 5 MIN.**

**Exercise induced change with severe claudication**
Peripheral Vascular Disease

• Intermittent Claudication

• Treatment
  • Currently very controversial
    • Risk Factor Modification/Medical Treatment
    • Open surgical/Endovascular
  • Best published guidelines are the TASC II
    • Journal of Vascular Surgery 2007;31:S1-S70
Peripheral Vascular Disease

• Intermittent Claudication

• Medical Treatment

  1. Risk Factor Modification
     • SMOKING CESSATION
     • Diabetes management/FOOT CARE
     • Hypertension/Lipids

  2. Antiplatelet therapy
     • Clopidogrel/Aspirin

  3. Pharmacologic therapy
     • Cilostazol (avoid in CHF patients)

  4. Exercise program

From Hiatt JVS 2002
Peripheral Vascular Disease

• Bottom Line For Treatment Indications

  • ONLY PATIENTS WHO HAVE FAILED
    • RISK FACTOR MODIFICATION
    • SMOKING CESSATION
    • EXERCISE PROGRAM
    • SEVERE RESIDUAL SYMPTOMS

  • SHOULD BE CONSIDERED FOR INTERVENTION
**TASC Guidelines: Aorto-Iliac Disease**

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

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

**Type C lesions**
- Bilateral CIA occlusions
- Bilateral EIA stenoses 3–10 cm long not extending 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 lesions**
- Infra-renal aortoiliac occlusion
- Diffuse disease involving the aorta and both iliac arteries requiring treatment
- Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA
- Unilateral occlusions of both CIA and EIA
- Bilateral occlusions of EIA
- Iliac stenoses in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery

*Fig. F1. TASC classification of aorto-iliac lesions. CIA = common iliac artery; EIA = external iliac artery; CFA = common femoral artery; AAA = abdominal aortic aneurysm.*
TASC Guidelines: Fem-Pop Disease

Type A lesions
- Single stenosis ≤10 cm in length
- Single occlusion ≤5 cm in length

Type B lesions:
- Multiple lesions (stenoses or occlusions), each ≤5 cm
- Single stenosis or occlusion ≤15 cm not involving the infrageniculate popliteal artery
- Single or multiple lesions in the absence of continuous tibial vessels to improve inflow for a distal bypass
- Heavily calcified occlusion ≤5 cm in length
- Single popliteal stenosis

Type C lesions
- Multiple stenoses or occlusions totaling >15 cm with or without heavy calcification
- Recurrent stenoses or occlusions that need treatment after two endovascular interventions

Type D lesions
- Chronic total occlusions of CFA or SFA (>20 cm, involving the popliteal artery)
- Chronic total occlusion of popliteal artery and proximal trifurcation vessels

F2. TASC classification of femoral popliteal lesions. CFA — common femoral artery; SFA — superficial femoral artery.
Peripheral Vascular Disease

• Intermittent Claudication

• OPEN Surgical Treatment
  • Techniques
    • Endarterectomy, bypass, patch angioplasty
    • Aortoiliac, Aortofemoral, Femoral-Femoral, Femoral-Popliteal
      • Prosthetic or autogenous conduit
Fig. F3. Bilateral bypass from infra renal abdominal aorta to both femoral arteries.
Fig. F4. Axillo (bi) femoral bypass.
Fig. F5. Cross-over femoral bypass.
Fig. F6. Above-knee femoral popliteal bypass.

Fig. F7. Femoral tibial bypass.
Peripheral Vascular Disease

- Intermittent Claudication
  - Surgical Treatment
    - Follow-up
      - Long-term graft follow-up with duplex
      - Failing grafts much easier to fix than failed ones
    - Results
      - 75-95% 5 year patency
    - Failures associated with significant risk of limb loss
Peripheral Vascular Disease

- Intermittent Claudication

- Endovascular Treatment
  - Technique
    - Femoral access
    - Retrograde and antegrade approaches
    - Iliac lesions
      - PTA alone when possible
      - Balloon expandable stents - CIA
      - Self expanding stents - EIA
    - SFA lesions
      - PTA alone when possible
      - **Self expanding stents**
      - Covered stents
Peripheral Vascular Disease

- Intermittent Claudication
  - Endovascular Treatment
    - Results
      - Iliac: 85% 3 year patency
      - SFA: Results highly variable
        - Generally less durable than surgery
        - Less severe complications too
    - Follow-up
      - Long-term follow-up with duplex needed
      - Re-intervention common
      - Surgical cross-overs common
TASC A CIA: Angioplasty and stenting
Chronic Limb Ischemia: Critical Ischemia Syndromes
Peripheral Vascular Disease

- Ischemic Rest Pain
  - Due to inadequate flow to match resting metabolism
  - Constant pain = metatarsal heads
  - Dull ache
  - Worsened by elevation (e.g. bedtime, sleep)
  - Improved with dependent position
    - e.g. Hanging foot over side of bed
  - Limb threatening
Peripheral Vascular Disease

- Ischemic Ulceration
  - Inadequate flow to preserve cutaneous integrity
- Most frequent sites
  - Over ‘contact’ areas on feet and toes
- Can be quite painful
- Definitely limb threatening
Peripheral Vascular Disease

• Gangrene
  • Essentially dead tissue
    • Dry gangrene- mummified tissue (‘scab’)
      • Not threatening in and of itself
    • Wet gangrene- infected necrotic tissue
      • Acutely limb and life threatening
      • Surgical emergency
Peripheral Vascular Disease

• Critical Limb Ischemia

• Natural History
  • Outcome largely dependent upon presentation and severity of ischemia
  • Overall, >50% die or undergo amputation within six months
  • Five year survival <<50%
  • Over 20% have contralateral amputation within 2 years
  • BKA ~50-60% walk again
  • AKA <20% walk again
Peripheral Vascular Disease

• Critical Limb Ischemia

• Diagnosis
  • Physical Exam (pulses, skin/nail changes)
  • **Complete foot examination**
  • Ankle Brachial Indices/Pulse Volume Recordings
    • Potential false values in diabetics (use toe pressures)
Peripheral Vascular Disease
• Critical Limb Ischemia
  • Treatment
    • Limb salvage or ablation
  • Limb Salvage
    • Requires angiography or direct arterial imaging
      • Duplex
      • Contrast Arteriography
      • MRA
      • CTA
    • Requires conduit in most cases
Peripheral Vascular Disease

• Critical Limb Ischemia

• Treatment
  • Adequate ‘inflow’ must be obtained
    • More common problem in smokers
  • Multiple techniques available
    • Aortoiliac endarterectomy
    • Aortic based bypass (AFBG,AIBG)
    • Femoral to femoral bypass
    • Axillary to femoral bypass
    • Iliac PTAS
Peripheral Vascular Disease

• Critical Limb Ischemia

• Treatment
  • Adequate outflow must be identified
    • Ideally healthy vessel crossing into foot
    • Less than ideal alternatives
      • Pedal targets
      • Non ankle crossing (i.e. peroneal artery)
      • Blind segment popliteal
Peripheral Vascular Disease

• Critical Limb Ischemia

• Treatment - Surgical
  • Most frequently require bypass of some variety
  • Conduit must be available
    • Vein best alternative
      • Greater saphenous best alternative
      • Other alternatives (spliced, LSV, arm vein)
  • PTFE can be used
    • Much lower patency and limb salvage rates
  • Adjunct measures
Peripheral Vascular Disease

- Critical Limb Ischemia
  - Treatment: Surgical
  - Results
    - Five year primary patency: 65%-85%
    - Limb Salvage rates: 70%-90%
    - Poor patient survival though
Peripheral Vascular Disease

- Critical Limb Ischemia

- Treatment - Endovascular
  - Lack of durability lessens role
    - Except for provision of inflow (Iliac)
  - May be a preferred option in certain groups
    - Extreme co-morbidities
    - Lack of conduit for bypass
    - Hostile sites
Peripheral Vascular Disease

- Follow-up
  - PE
  - Wound Healing (If fail may need amputation)
  - Noninvasive studies (ABIs and Duplex)
Questions

• ?