My Diabetic Patient Has No Pulses; What Should I Do?
• There are no disclosures.
Background

• Diabetes affects 387 million people worldwide.$^1$
  – Will increase to 592 million by 2035

• As global incidence increases, consequences grow.
  – Hospital costs and amputations ≈ $8.3$ billion$^2$

• **Annual** cost of diabetic foot dz in US >$6$ billion
  – At least $\frac{1}{4}$ of DFU’s will not heal
Background

• 80% of diabetes-related amps are preceded by a foot ulcer

• Up to 55% of diabetic amputees will require amp of the contralateral leg within 3 years.$^2$
Typical Presentation of a Diabetic Foot Ulcer (DFU)

- Top of toes
- Bottom of toes
- Pad of foot
- Heel of foot

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Diabetic Feet

- Risk factors for ulceration:
  - Neuropathy
  - PAD
  - Foot deformity
  - Limited ankle ROM
  - High plantar foot pressures
  - Minor trauma
  - Visual impairment
  - Previous ulceration or amputation

Once an ulcer has developed, infection and PAD are the major factors contributing to subsequent amputation.
Why Does It Matter?

• Prevention is key

Multidisciplinary clinical care teams

Developing guidelines as a standard of care

Cost-effective
**WIfI Classification**

- Wound, Ischemia and foot Infection (WIfI) classification developed in 2014\(^3\)
  - Based on the 3 major factors that impact amputation risk
  - Developed to replace old classification systems
- Recent 2017 data suggests limitations
Recommendation: ALL diabetics to have ABI measurements performed when they reach 50 years of age (Grade 2C).
Prevention of DFUs

• Visits at least 1x / year
• Thorough history
  – Prior ulceration? Amputation?
  – Poor visual acuity?
• Thorough physical
  – Foot deformities
  – Test for neuropathy, assess pulses/signals
  – Pressure points, callus formation
## Prevention of DFUs

Frequency of visits based upon the American College of Foot and Ankle Surgeons recommendations

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk profile</th>
<th>Evaluation frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>Annual</td>
</tr>
<tr>
<td>1</td>
<td>Peripheral neuropathy</td>
<td>Semiannual</td>
</tr>
<tr>
<td>2</td>
<td>Neuropathy with deformity and/or PAD</td>
<td>Quarterly</td>
</tr>
<tr>
<td>3</td>
<td>Previous ulcer or amputation</td>
<td>Monthly or quarterly</td>
</tr>
</tbody>
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*PAD, Peripheral arterial disease.*
Glycemic Control

Achieved with Hgb $A_1c < 7$

- No major benefits noted with macrovascular disease, but benefits seen with peripheral neuropathy in the UK Diabetes Study\(^5\)
- SVS SR *did* associate control with a significant decrease in amputations\(^6\)

- Reduce the risk of DFUs and infection, with subsequent reduction in amputation risk (Grade 2B)
Assessing PAD

• ABI remains the gold standard test for limb blood flow
• Additional non-invasive studies helpful (Grade 1B)
Assessing PAD

- Toe pressures often better due to medial arterial calcification
- ABI or toe-brachial index detection of hemodynamically significant PAD
  - Sensitivity: 63%
  - Specificity: 97%
Making Sense of the Numbers

- Non-invasive vascular lab tests

<table>
<thead>
<tr>
<th>TEST</th>
<th>ABNORMAL VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcutaneous oxygen measurement (TcPO2)</td>
<td>Less than 40 mm Hg</td>
</tr>
<tr>
<td>Ankle-brachial index</td>
<td>Less than 0.9: abnormal</td>
</tr>
<tr>
<td></td>
<td>Less than 0.4: severe, limb-threatening</td>
</tr>
<tr>
<td>Absolute toe systolic pressure</td>
<td>Less than 45 mm Hg</td>
</tr>
</tbody>
</table>
Diabetic Foot Infection

• Caused by neuropathy, vasculopathy, immunosuppression

• Most common...
  – Diabetic complication requiring hospitalization!!
  – Precipitating event leading to lower extremity amputation!!
Infectious Disease Society of America

- In **ALL** patients → serial plain x-rays of the foot (2C)
  - Sn: 68%, Sp: 54% for OM
- **Open wounds** → probe to bone (2C)
  - Sn: 60%, Sp: 91% for OM
  - Specificity: 97%
Which Dressings to Use?

• Dry wounds
  – Hydrogels and hydrocolloids
  – Preserve moisture

• Exudative wounds
  – Foam dressings and alginates
  – Absorb moisture
What About MRI?

• Only if additional imaging is necessary (1B)
  – When soft tissue infection is suspected
  – Diagnosis of OM remains uncertain

• If unavailable, WBC scan combined w/bone scan (2B), Sn: 81%, Sp: 28%
Why Does It Matter?

- Prevention is key

- Multidisciplinary clinical care teams

- Developing guidelines as a standard of care

Cost-effective
Prophylactic Revascularization?

• No trials addressing this question

• Inherent pattern of 1) long-segment and 2) distal arterial disease often present in diabetics

• Risks of invasive procedures outweighs their benefits (Grade 1C against prophylactic revasc)
References

Thank you