Update on How to Diagnose and Treat Mixed Arterial and Venous Ulcerations: What Does the Data Say?

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Introduction

- Roughly 5% of the population over the age of 65 suffers from non-healing wounds
- Economic cost burden: $50 billion dollars per year
- Impaired wound healing is the leading cause of lower extremity amputation
- 5 year survival following amputation for a foot ulcer is ~46%
  - *Worse than most cancers*

The Chronic Wound Epidemic

- Risk of Amputation in patients with wounds
  - Mixed disease (5-7x the risk)
  - Isolated venous disease
  - Isolated PAD
- Risk of Amputation highest in those with severe PAD (ABI < .5) and mixed arterial/venous leg ulcers (MAVLU)

Venous Insufficiency

- Chronic inflammation due to impaired monocyte/macrophages, excess fibrosis, impaired granulation
- Associated with impaired superficial/deep reflux, incompetent perforators, DVT

Risk of Amputation

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Mixed Venous/Arterial Ulcers

- 15-30% of ulcers have mixed etiologies
- Defined as ABI < .9 with superficial or deep venous insufficiency/reflux or DVT on duplex U/S
- How do we treat these?
  - Revascularize first?
  - Compression therapy?
  - Multi-disciplinary approach improves outcomes
  - First step in algorithm is wound care
    - Remove necrotic tissue
    - Treat infection
    - Keep moist/dressings
  - Second, determine if compression feasible (Based on PAD)
    - If not, revascularize
    - If feasible, determine if venous procedure needed
  - Third, if wounds fail to heal and moderate PAD, then revascularize

Disclosures

- None
Introduction

Suggested Initial Algorithm: Determine Degree of Arterial Ischemia

<table>
<thead>
<tr>
<th>ABI &lt; .5, ankle pressure &lt; 70, Toe pressure &lt; 50</th>
<th>ABI .5 - .8,</th>
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<tbody>
<tr>
<td>Revascularize first, percutaneous versus open first line (unless diabetic), avoid compression</td>
<td>Compression (40 mmHg), may need to modify to 20-25 mmHg, Compression increases arterial flow to wound</td>
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Revascularization

- Data equivocal for endovascular versus open in the mixed ulcer setting.
- In diabetics, endovascular may be associated with worse outcomes because of poor distal runoff/reduced patency
- Better durability with surgery for tibial disease with autogenous vein conduit
- May be benefits to endovascular first to avoid additional wound complications
- 60% of ulcers healed at 1 year post-revascularization

Compression Therapy Options for Mixed Ulcers with Moderate (ABI .5-.8) PAD

- Compression increases transcutaneous oxygen pressure and cutaneous blood flow to the wound
- 40 mmHg compression does not impair blood flow and is associated with 60-70% healing at 36 weeks
- Additional padding near tibia, malleolus, tendons as these areas create more necrosis
- PicoPress® or other sensors
  - Allows sub-bandage pressure measurement, portable, accurate
  - Leave off 3rd layer of profore bandage, if not able to tolerate full compression

Treatment of Venous Disease

- Evaluation for deep, superficial venous reflux
- DVT on duplex is a strong predictor of difficult healing
- EVLT for superficial reflux
- Treatment of perforators > 5mm

Wound Dressings

- Depends on stage of wound
  - Hydrogel – debridement stage
  - Foam – granulation stage
  - Hydrocolloid – epithelialization stage
- Biologic dressings
  - Cell-based (Apligraf, Dermagraft)
    - One layer of live allogenic cells
    - Mimics native skin – stimulate, migration, angiogenesis, epithelialization
  - Acellular (Alloderm, Integra)
    - Scaffold/matrix

Final Algorithm

- Mixed versus/arterial ulcer → Wound Care [Debridement, Dressing]
- Determine degree of PAD
- Severe PAD (ABI < .5, ankle pressure < 60)
- Moderate PAD (ABI .5-.8)
- Revascularization (endo versus open)
- 40 mmHg compression with sensor
- No healing ≥ 25-35 weeks? → Biopsy for wound/fEC
- Revascularization (venous versus open)
Introduction

• Mixed arterial/venous ulcers are on the rise and are much more difficult to treat and thus, are more likely to result in amputation
• Presently, ABI > .5, ankle pressure > 60, need 40 mmHg compression therapy – Does NOT impede arterial perfusion
• Mixed venous/arterial ulcers are increasingly common – RCT needed to determine best therapy

Summary

• Mixed arterial/venous ulcers are on the rise and are much more difficult to treat and thus, are more likely to result in amputation
• Presently, ABI > .5, ankle pressure > 60, need 40 mmHg compression therapy – Does NOT impede arterial perfusion
• Mixed venous/arterial ulcers are increasingly common – RCT needed to determine best therapy