Managing Legs with Mixed Arterial and Venous Disease

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Disclosures

Speaker’s Bureau:
• Medtronic

Consultant:
• Medtronic

Site Principal Investigator:
Cook Vena
Bard Vernacular

Medical/Scientific Boards:
• NCDR Research and Publications Committee
78 yo male, ulcer on medial malleolus. Stasis dermatitis. ABI 0.6. (80% SFA stenosis, 85% PTA stenosis.)

• A. Apply 30mmHg compression and follow.

• B. Fix arterial component, then apply compression.

• C. Fix both arterial obstruction and any venous insufficiency, plus compression.
Knowledge, Attitude, and Practice in the Management of Mixed Arteriovenous Leg Ulcers

• Survey of 436 wound care clinicians (RNs, OT, PT, podiatrists and MDs)
• 80% “would use compression”
• ~1/2 said “ABI 0.8 safe cutoff for compression.”

LIMITED EVIDENCE
### Venous Ulcer vs. Arterial Ulcer

<table>
<thead>
<tr>
<th></th>
<th>Venous Ulcer</th>
<th>Arterial Ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow, superficial</td>
<td>Punched out</td>
<td>Distinct borders</td>
</tr>
<tr>
<td>Irregular</td>
<td>Stasis dermatitis, lipodermatosclerosis</td>
<td>Dependent rubor, cold</td>
</tr>
<tr>
<td>Gaiter zone</td>
<td>Toes/feet</td>
<td>Painful, gangrene</td>
</tr>
</tbody>
</table>

**“Definition” of Mixed Ulcer:**

- $\text{ABI} < 0.8$, absent pulses
- Inflow arterial stenosis
- Venous reflux, obstruction, DVT

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Clinical Characteristics of Mixed Arteriovenous Leg Ulcers

A Descriptive Study

Mixed AV ulcers more likely in:

- Diabetics
- Co-existing CAD / CHF
- Known PAD.
- Diminished pedal pulses
- Reddish blue
- Dependent rubor
- Shiny taut skin

Studies of Compression / Wound Care for Venous Leg Ulcers

- **1416 VLUs**: 14% ABI 0.5-0.85

Lower healing rates with PAD!

Gold standard therapies:

“Wound Care”

+  

**Venous Disease:** Compression

**Arterial Disease:** Revascularization
• Higher pressure venous compression (>40mmHg) appears better for ulcer healing.
• Compression necrosis can occur (bony prominences).
• Wound Healing Society “degree of compression must be lowered with mixed AV disease.”

• n=25 ”mixed ulceration”

• ABI 0.5-0.8, ankle pressure 60+, toe pressure 30+, superficial (+/- deep) leg venous reflux leading to ulcer.

Inelastic multi-layer (padded) bandage base of toe to popliteal.

- Doppler Flowmetry wound area & distal
- TcPO₂ dorsum of foot, distal to bandage
- Leg EF (strain gauge plethysmography)
- Interface pressure

Layers adjusted to change pressure.
Laser Doppler flux distal to the bandages (toe)

PU

baseline 20-30 31-40 41-50

n.s. +3% n.s. -4% * -20%
Periwound skin Laser Doppler

![Box plot showing blood pressure measurements at different intervals with significance levels.]

- Baseline
- 20-30
- 31-40
- 41-50

Significance levels:
- n.s.
- ***

Blood pressure measurements in mm Hg.
Ejection fraction

- Normal range
- Baseline
  - +72%
  - ***
- 20-30
  - +103%
  - ***
- 31-40
Study Conclusion & Implication

• Inelastic compression <40mmHg appears to improve venous function and arterial perfusion.
• Similar finding to Top (2009)

• Improved AV pressure gradient by lowering venous pressure
• Increased arteriolar vasodilation
• Massaging effect (IPC → vasoactive mediators?)

However

• Not CLI. Claudicants.
• Inelastic compression.
• No long term clinical follow-up.

• Ladwig (2014) 30 mmHg inelastic 2-layer bandage in ABI 0.5-0.8, safe and tolerated over 14-days.

Recalcitrant Venous Leg Ulcers May Heal by Outpatient Treatment of Venous Disease Even in the Presence of Concomitant Arterial Occlusive Disease

• Retrospective n=180 recalcitrant leg ulcers.
• 109 venous, 71 also had PAD (ABI 0.5-0.8) ie “mixed”.
• Wound dressing + inelastic compression <40mmHg + foam sclero to saphenous veins / varicosities.
• Median ulcer healing time: 28 weeks in mixed Vs 25 weeks in pure venous.

Figure 1. Ulcer healing rate of pure venous recalcitrant leg ulcers (pvRLU; blue line) and mixed arterial and venous recalcitrant leg ulcers (mavRLU; green line). The survival curves were generated by considering all patients, including those lost to follow up, identified by (+).
Protocol: Ulcer of Mixed Etiology

ABI > 0.5
Ankle pressure > 60 mmHg
Toe pressure > 30 mmHg

Compression < 30 mmHg + Ablation of Reflux

Look for & treat venous outflow obstruction

YES

Treat arterial inflow disease

Vasculitis eval, Ulcer biopsy

YES
Concluding Remarks

• Compression (pref inelastic) can be utilized in PAD; cushion bony prominences, follow closely.

• If ABI <0.5 or toe pressure <30: arterial revasc first before compression.

Thank You

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