F. PRINCIPLES OF TREATMENT BASED ON ETIOLOGY (TREAT THE CAUSE)

F.6 VENOUS ULCER AND MIXED VENOUS ARTERIAL ULCERS

6.1 Background and Extent of Etiology

6.1.1 CHRONIC VENOUS INSUFFICIENCY (CVI) is a term coined to describe the summation of clinical changes to the skin and subcutaneous tissue occurring in a chronic venous disease (van der Molen 1957). CVI is worse in individuals whose legs are in the dependent position for long periods of time, and in those with persistent immobility (Harding et al. 2008). It is estimated that 1–2% of patients with CVI will develop a venous leg ulcer during their lifetime.

Venous leg ulcers occur as a result of damaged veins which are usually caused by venous hypertension (high pressure). Once healed, venous leg ulcers can reoccur.

- 70-90% of lower extremity ulcers used to be venous in origin, now 30% are VSU (C. Moffat lecture, Toronto, ON. 2008)
- 21% of patients with venous disease also have arterial disease; 40% have 3 comorbidities
- Recurrence rate:
  - 75% in 3 months without compression
  - 15-20% per year with compression
- Lower limb pulses:
  - Patients with normal arterial circulation can have absent pulses due to edema or a fixed ankle joint
  - Palpable pulses in patients with calcified vessels can be misleading (any diabetic is suspect for this condition)

6.1.2 CELLULITIS WITH VENOUS DISEASE:

- Symptoms: may have fever, area painful and may not tolerate current compression esp. elastic types
- Signs: Cellulitis appears as a diffuse, bright red, hot leg with tenderness and often fever. Clear serous exudates will “pour” out of the small openings, saturating the dressings quickly. May have bullae unrelated to venous disease
- Investigations: high WBC, increased ESR and C-reactive protein.
- Blood culture usually negative; swabs C&S usually negative unless necrotic tissue is swabbed (which is inappropriate)

6.1.3 DERMATITIS WITH VENOUS DISEASE:

Stasis dermatitis causes a red, itchy rash on the lower legs. The rash can be dry and scaly or can weep and form crusts. The skin may turn to a brown or purple color, and the lower legs become increasingly edematous.

It may be associated with acute contact dermatitis, which appears as itching, burning red areas on the leg corresponding to an area where a topical product has been used.
6.1.4 MIXED VENOUS/ARTERIAL DISEASE

Mixed symptoms compatible with both venous and arterial disease
- ABI between 0.5 and 0.8 should be healable depending on other co-morbidities
- Symptoms of venous disease but pain is different:
  - Intermittent claudication (early)
  - Night time rest pain (late disease)
  - Pain with elevation
  - Pain may be masked in diabetics (neuropathy)
- Possible cool skin
- Thickened toenails
- Possible edema
- Possible Pallor (on elevation)/Dependant rubor
- Ulcers may have elements of both kinds of disease:
  - Venous shape and location /or ulcer may be circumferential
  - Yellow/black fibrous base
  - Wound bed may be dry

Instructions for use:

6.2 Algorithm
This algorithm has been provided by Systagenix for use in the SWRWC Toolkit. It is based on the Wound Bed Preparation algorithm, but incorporates many of the RNAO Best Practice Guidelines.

6.3 Self-Care Teaching Tool and
6.4 Client/Patient Teaching and Learning Resources
The SWCCAC has worked in collaboration with their contracted service providers to identify and create resources that will aid in the delivery of Best Practices for this client population. The CCAC version of the self-care teaching tool and client handout are presented here. Once this version has been piloted in the SW in the summer of 2011, the Clinical Evaluation subcommittee working with the CCAC and other partners will look at making these into regional tools that can be adapted to all sectors.

6.5 Evidence-Based Clinical Interventions (From SWCCAC Wound Management Program March 2011):
6.5.1 VENOUS STASIS ULCERATION
- Healing Service Plan
  - Utilize highest compression possible:
    - Lower leg assessment & Ankle Brachial Pressure Index (ABPI)- if client has long-standing diabetes, hypertension or advanced age, the vessels may not be compressible and a segmental compression study will need to be ordered through diagnostic imaging in order to accurately determine the arterial status.
South West Regional Wound Care Toolkit

- Appropriate compression therapy based on lower leg assessment.
- Note- if ABPI not done prior to admission or if lower leg assessment does not support the use of the ordered compression in spite of the APBI value (i.e. the nurse has concerns that the client may have mixed venous arterial disease), in the absence of signs of arterial ischemia, consider a simple Unna’s paste boot or use Tubigrip low compression until the ET/WCS can assess

- Wound healing
- Exudate management
- Pain management
- Decrease dressing changes
- “Compression for life”

☐ Maintenance or Palliative Service Plan
*(wound not expected to heal, or due to client resistance to lifestyle adaptations or treatment)
- Maintain wound environment
- Teach client/caregiver wound management
- Goals may be pain, exudate, odour and infection control
- Clients who do not adhere to the treatment plan

Wound Assessment:
- Use a validated and reliable wound assessment tool

Other:
- Optimize nutritional intake and general health status.

Wound Bed Prep: debridement, bacterial balance, exudate control, protect periwound skin

Common Dressing Supplies:
- *NB-The RNAO BPG’s Assessment and Management of VSU’s Recommendation #20 states to “choose a type of dressing depending on the amount of exudate and phase of healing.”
- Appropriate examples are: alginates, hydrofibers, foams and exudate absorbers. If the dressing adheres to the wound surface, use a non-adherent layer compatible with the secondary dressing (e.g. do not use petrolatum products in combination with silvers.)

AVOID use of adhesive products due to increased sensitivity of people with venous disease

Medical Treatment:
If woody fibrosis and induration are present in the periwound area or in the leg at the initial assessment, speak to physician re: use of Rx Pentoxyfilline 400mg TID (Bull et al. 2009- Cochrane review)
6.5.2 VENOUS DISEASE WITH CELLULITIS

□ Healing Service Plan
  • Support local signs and symptoms while systemic antibiotic therapy treats condition
  • Healing of pre-existing or new wounds

□ Maintenance or Palliative Service Plan
* (wound not expected to heal, or due to client resistance to lifestyle adaptations or treatment)
  • Support local signs and symptoms while systemic antibiotic therapy treats condition
  • Prevent deterioration if possible

Wound Assessment:
  • Use a validated and reliable wound assessment tool

Other:
  • Systemic antibiotic therapy is needed for cellulitis.
  • Mark line of demarcation on leg distally and proximally with soft-tip indelible marker (not pen)
  • The client may find high compression, especially elastic systems, too painful to tolerate until the infection starts to respond to the antibiotic therapy. Do not stop compression entirely, because the edema will increase as a result of the cellulitis. Leg elevation is important.
  • Treat any co-existing conditions such as venous ulcer, venous dermatitis (see next section) or tinea pedis in addition to the systemic antibiotics.
  • Discomfort can be soothed using a compress of Burosol solution or Burrow's solution x 15-20 minutes.
  • Using SWCCAC product 2511 antimicrobial kerlix loose-woven (11.4 cm x 3.7 m) wrap affected leg from base of toe to below knee, overlapping each turn by 50%. If exudate amount is large, cover with absorptive secondary dressing such as SWCCAC code 2602 or 2603 and kling wrap, covered by appropriate lower mmHg compression such as two layers of tubular support bandage Code 2009-2014. Once cellulitis is responding to systemic antibiotics, resume previous level of higher compression.
  • Other Use of topical Dressing Supplies* for infection/bacterial burden management – see Section 3.3.

6.5.3 VENOUS STASIS DERMATITIS

Determine client’s goals

□ Healing Service Plan
  • Resolution of stasis dermatitis a within 2-4 weeks;
  • Identify strategies to prevent recurrence

□ Maintenance Service Plan
  • Prevent deterioration
  • Comfort measures

Wound Assessment:
  • Use a validated and reliable wound assessment tool

Other:
  • Systemic antibiotic therapy is not needed for acute contact dermatitis.
● **Avoid the use of known sensitizers in individuals with venous disease**: products that contain perfume, latex, dyes, lanolin or wool alcohols, balsam of peru, cetylsterol alcohol, parabens, colophony propylene glycol, neomycin, rubber, some adhesives, framycetin or gentamycin (Sibbald et al. 2007).

● Use moisturizers such as Glaxal Base (ask pharmacist if not on shelf), Cliniderm or Moisturel lotions (not cream) or plain Vaseline petrolatum ointment to keep the skin healthy and free of dry scales.

● Products containing urea such as Uremol or Attractain should be used sparingly for severely dry, scaly skin (Xerosis), and stopped if any signs of dermatitis occur.

● Only use topical corticosteroid preparations for two weeks at a time (if being applied more frequently than 2 x/week) because they thin the skin when used for long time periods, making it more likely to break down or develop a rebound dermatitis.

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**Client Education**

- Compression is needed for life
- Rubbing or scratching an involved area (even through the bandage) will make the rash last for 3 more days than it would have (Sibbald et al. 2007)

**Dressing Choices for Venous Stasis Dermatitis**

- Clean the patient's skin thoroughly by washing with tap water (not saline or sterile water) using a mild soap (Dove for sensitive skin) and rinse well. (Harris and Landolt 2008)
- Itching and burning can be soothed using a compress of Burrosol solution or Burrow's solution x 15-20 minutes. Apply prescribed steroidal cream or ung. to all affected areas.
with added Menthol \( \frac{1}{4}\% \) to \( \frac{1}{2}\% \) will aid in soothing and anti-itch effect, and cream can be kept in refrigerator (Sibbald et al 2007).

- Apply Unna’s boot using a medicated zinc paste bandage* SWCCAC Code 2900 wrapped in a spiral wrap using fan-fold pleats to prevent constriction.
- Cover with kling and level of compression appropriate for client, based on complete lower leg assessment including APBI.
- *Note that contact dermatitis can also occur with this product, so be aware for signs of increased irritation.

6.6 Principles of Compression Bandaging

*Compression bandaging is an added skill for clinicians and there must be an educational component and mentoring to ensure safety and efficacy in application.

Agency policy should reflect that compression bandaging is not initiated until assessment is completed and patient is assessed to be appropriate for bandaging.

Agency policy should include level of staff education and training necessary to perform compression bandaging.

Benefits of Compression bandaging include the following:

- Stimulates fibrinolysis
- Removes sodium from subcutaneous tissue and reduction of edema
- Facilitates fluid movement due to the pressure gradient
- Creates an environment suitable for wound healing

Compression therapy should create a pressure gradient extending from ankle to the knee

- Must overcome the gravitational effects
- Highest pressure must be at the lowest aspect and progressively diminish as it extends up the leg
- The combined effect of the graduated compression plus the calf muscle pump moves fluid towards the heart.

Definitions:

- Tension- amount of force used to apply the bandage
- Extensibility- ability to stretch in length with applied force
- Power- the force required to increase the length of the elastic bandage, which determines the level of pressure exerted by the bandage
- Elasticity- ability of the bandage to return to its original length after reducing tension
- Stiffness- increase in pressure per square cm. increase in circumference

Compression utilizes both Pascal’s and LaPlace’s Law

Pascal’s Law:

- “Pressure exerted anywhere in a confined incompressible fluid is transmitted equally in all directions throughout the fluid such that the pressure ratio (initial difference) remains same”
The change in pressure between two elevations is due to the weight of the fluid between the elevations.

Any change in pressure applied at any given point of the fluid is transmitted undiminished throughout the fluid.

LaPlace’s Law
- “the pressure in a cylinder exerted by uniform tension in the wall is inversely proportionate to the radius”
- gradient compression therapy delivers higher pressures at the ankle where the radius is smaller, and lower pressures at the calf where the radius is higher, using the same amount of pressure all the way up.

Modified LaPlace’s Law used for bandaging:
- Pressure = Tension (KgF) x # of layers x 4620
  (mmHg) Circumference (cm) x band. width (cm)

The pressures provided by compression bandages are the result of a very complex interaction between:
- the properties of the materials used,
- the size and shape of the leg,
- the technique of the bandager and
- the activities of the patient. (Thomas 2003)

Compression choices include single layer and multi-layer choices (See SW CCAC Catalogue Sections 42,43 and 70), elastic and inelastic, with various applications to provide a range of 20 to 40 mm Hg compression, based on the client’s vascular status and tolerance.
- **Inelastic bandages:** Provide support and resistance: high pressures with exercise, minimal pressure at rest eg. Viscopaste and kling wrap, Circaid® Boot, Short stretch Comprilan®, Coban 2™, Coban 2 Lite™
- **Elastic bandages:** Provide compression with high pressures at rest but less with muscle contraction e.g. Profore™, Surepress™, Coban™ Self Adherent Wrap.

<table>
<thead>
<tr>
<th>INTERPRETATION OF ABPI AND RECOMMENDED COMPRESSION THERAPY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABI &amp; Description</strong></td>
</tr>
<tr>
<td>Abnormal ABPI &gt;1.2 or unable to compress arteries</td>
</tr>
<tr>
<td>ABPI 0.8 - 1.2 in the presence of signs and symptoms of peripheral arterial disease, rheumatoid arthritis, diabetes mellitus or systemic vasculitis,</td>
</tr>
<tr>
<td>Normal = 1.0 to 1.2 Acceptable ABPI 0.8 to 0.9</td>
</tr>
</tbody>
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### Ankle circumference > 18 cm.

(Peter Staudinger method)

<table>
<thead>
<tr>
<th>Abnormal ABPI 0.5 to 0.8 Mixed Venous/Arterial Ulcer—may be associated with claudication</th>
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<tbody>
<tr>
<td>Warrants referral for further medical assessment e.g. segmental compression studies &amp;/or Toe Brachial Pressure Index. May be mixed venous/arterial ulcers Implement reduced compression bandaging with Physician agreement Profore Lite (0.6 to 0.8) Coban 2 Lite (0.5-0.79) Viscopaste fanfolded and Kling figure of 8 wrap (0.5-0.79) Parkwood Comprilan method (0.6 to 0.8 with no ischemic s&amp;s) Tubigrip / Tubifast (LOW - 5-10 mm Hg)</td>
</tr>
</tbody>
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**< 0.5 Arterial ulcer**

Urgent vascular surgery consult. NO compression to be used.

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**Important Considerations:**

Prevent pressure damage in clients with impaired peripheral perfusion, thin or altered limb shape, foot deformities or dependent edema, Rheumatoid Arthritis, reduced sensation, long-term steroid use and loss of calf muscle pump by choosing an inelastic (rigid) bandaging system, and applying extra padding or foam over bony prominence (Harding et al. 2008) also to the achilles and tibialis anterior tendon areas.

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### 6.7 Resources and References


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### References


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