VENOUS ULCER & COMPRESSION

Tsang Ka Kit
NC O&T QEH
BACKGROUND INFORMATION
VENOUS SYSTEM

- The venous system is made up of superficial and deep veins
  - Superficial veins are located between skin and muscles
  - Deep veins are located between muscles
  - Communicated by perforators
VENOUS SYSTEM

- Superficial and deep vein systems are connected to each other by veins that have one-way valves
- These valves ensure that blood flows from the superficial veins to the deep system
ETIOLOGY

- Venous pressure ~ 80-100 mmHg
- During walking, blood flow is accelerated by the combined action of the calf muscle pump and the foot pump
- Patients with competent valves, decreases the volume of venous blood in the foot and reduces venous pressure to about 10-20 mmHg
ETIOLOGY

• For valve incompetency, blood will oscillate up and down in those segments

  • backward flow in the veins of the lower leg (venous reflux) leads to a reduced fall in venous pressure during walking (ambulatory venous hypertension).

  • causes fluid loss into the tissues and the formation of odema
ETIOLOGY

Vein Anatomy

- Femoral Vein (Deep Vein)
- Saphenous Vein (Superficial Vein)
- Perforator Vein (Communicating Vein)
- Varicose Veins
- Reticular Vein (Feeder Vein)
- Spider Veins

Normal veins vs. Varicose veins:
- Deep vein
- One-way valve
- Muscle sheath
- Calf muscle pump
- Normal superficial vein
- Failed valve
- Varicose vein
ASSESSMENT OF PATIENT

• Assess sign of venous disease
  • varicose vein
  • haemosiderin deposition
  • venous dermatitis
  • lipodermatosclerosis
  • atrophie blanche
ASSESSMENT OF PATIENT

- All patients with chronic venous ulcer should have an ABPI prior to treatment

D - Measurement of ABPI should be performed by appropriately trained practitioners who should endeavour to maintain their skills

D - Compression therapy may be safely used in leg ulcer patients with ABPI \( \geq 0.8 \)

D - Patient with an APBI < 0.8 should be referred for a specialist vascular assessment

- Patient with an abnormal APBI should have their cardiovascular risk factors treated on the management of PAD
TREATMENT

- Cleansing and debridement
- Dressings
- Surrounding skin care
  - Latex free brands of compression bandages should be used routinely
- Compression
- +/- manual lymphatic drainage
Compression works against filtration and encourages reabsorption.

Compression of the leg veins leads to a shift in blood volume with an increase in the preload of the heart.
COMPRESSION

• Compression therapy aims to improve venous return and reduce venous hypertension

• Cochrane review (2009) Compression for venous leg ulcer

  • 7 clinical trials with small sample size and poor design

  • Conclusion: compression increases ulcer healing rates compared to no compression
COMPRESSION

• The use of compression in patients with ABPI less than 0.8 should be initiated under specialist advice and requires very close monitoring and review.

• It should also be used with caution in patients with diabetes, who may have unreliable ABPIs due to arterial calcification as well as an underlying sensory neuropathy.
COMPRESSION THERAPY

• Compression therapy is divided into 2 categories
  • Long stretch
  • Short stretch
    • relatively inextensible fibres
• Elastic compression works via constant compressive forces
• Inelastic compression actually functions as a rigid strut the calf muscles contract against for effective edema control
• Single layer vs multiple layers
COMPRESSION BANDAGE CLASSIFICATION

• Type 1
  • Retention, light weight, elastic bandage

• Type 2
  • Inelastic support bandage

• Type 3
  • Type 3A to 3D
  • Elastic and long stretch
  • Bandage is applied with a 50% overlapping between successive layers
COMPRESSION BANDAGE CLASSIFICATION

• Type 3

<table>
<thead>
<tr>
<th>Group RAL-GZ</th>
<th>Type BS 7505</th>
<th>Level of compression</th>
<th>Pressure British standard (mmHg)</th>
<th>Pressure German standard (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3A</td>
<td>Light</td>
<td>Up to 20</td>
<td>18.4-21.2</td>
</tr>
<tr>
<td>2</td>
<td>3B</td>
<td>Light</td>
<td>21-30</td>
<td>25.1-32.1</td>
</tr>
<tr>
<td>3</td>
<td>3C</td>
<td>Moderate</td>
<td>31-40</td>
<td>36.4-46.5</td>
</tr>
<tr>
<td>4</td>
<td>3D</td>
<td>High</td>
<td>41-60</td>
<td>&gt;59</td>
</tr>
</tbody>
</table>

SHORT STRETCH PRESSURE

Resting pressure

Working pressure
LONG VS SHORT STRETCH BANDAGE

<table>
<thead>
<tr>
<th></th>
<th>COMPRESSION</th>
<th>SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of system</td>
<td>Elastic</td>
<td>Inelastic</td>
</tr>
<tr>
<td>pattern of pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest</td>
<td>High pressure</td>
<td>Low pressure</td>
</tr>
<tr>
<td>Muscle Contraction</td>
<td>High pressure</td>
<td>High pressure</td>
</tr>
<tr>
<td></td>
<td>but less</td>
<td></td>
</tr>
</tbody>
</table>

Short stretch

Resting pressure    Working pressure
COMPRESSION THERAPY

- General consideration
  - frequency of dressing
  - ankle movement
  - body weight
  - costing
DOUBLE LAYER SHORT STRETCH BANDAGE

• Rosidal K made from 100% cotton (contains no elastic yarns) that minimize the risk of allergy

• Advantage

  • low risk of skin allergy

  • low resting pressure improving compliance
DOUBLE LAYER SHORT STRETCH BANDAGE

• Putter flex
  • textile elasticity and high compression
  • flexible in all directions that adapts better in difficult areas
    • Make application easier
  • increase wearing comfort
DOUBLE LAYER SHORT STRETCH BANDAGE

- Static stiffness index
  
  - the pressure difference between active standing and lying
LAPLACE’ S LAW

• Pressure of the bandage acting on the leg surface is proportional to the tension of the applied bandage

• Body parts with small diameters may receive additional padding to increase the radius and to decrease the excessive pressure

• Pre-malleolus diameter
  
  • > 18cm : 2 layers of padding
  
  • 18 – 25cm : 1 layer of padding
  
  • > 25 : no padding
DOUBLE LAYER SHORT STRETCH BANDAGE

- Pütter technique

- Apply the bandage under even tension at full stretch following the natural contours of the limbs

- On reaching the top of the calf, secure the bandage with one circular turn

- Bandage back down the limb filling in the previous gaps

- If apply a second bandage, apply from the opposite direction i.e. lateral to medial
DOUBLE LAYER SHORT STRETCH BANDAGE

- Pütter technique
  - prevent bandage from slip down
  - Provide shear force between 2-layer bandage and adhere well each other
DOUBLE LAYER SHORT STRETCH BANDAGE
THANK YOU