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

F.1. DIABETIC FOOT ULCER (DFU)

1.1 DFU Background and Extent of Etiology (from the SWCCAC Wound Management Program March 2011)

Neuropathy of the feet in people with diabetes leads to changes in muscle and bone alignment. Pressure over bony prominences leads to callus formation and the absence of sensation predisposes the area to skin breakdown and ulcer formation. This pressure must be offloaded (relieved) to prevent further damage and to promote healing. The risk of lower extremity amputation is 15 to 46 times higher in diabetics than in persons who do not have diabetes mellitus (Armstrong and Lavery 1998).

Greater than 85% of lower leg amputations are precipitated by diabetic foot ulcers (Jones 2006) while 15% of DFUs end in amputation (Snyder et al. 2010).

- 50% have opposite leg amputated in 5 years.
- 5-year mortality rates were 46% for those with DFU and PVD compared to 48% for those patients who did have an amputation (Robbins et al. 2008)
- Early detection and appropriate treatment of these ulcers may prevent a significant percentage of amputations.
- Most DFU’s occur at areas of increased pressure - 90% of diabetic plantar ulcers are attributed to pressure (Orsted, Searles, Trowell et al 2006).

Information and Instructions for use:

1.2. DFU Algorithm (PDF)

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.

1.3 University of Texas Wound Classification System of Diabetic Foot Ulcers

This Classification system appears as a recommendation in both the RNAO Assessment and Management of Foot Ulcers for People with Diabetes, and the Canadian Association of Wound Care’s Wound Care Canada: Best Practice Recommendations for the prevention, diagnosis and treatment of diabetic foot ulcers: Update. 2010. The Grade refers to the depth or condition of the ulcer, while the Stage refers to the presence of complications of Infection &/or Ischemia.
The University of Texas Staging System for Diabetic Foot Ulcers (Armstrong et al, 1998)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Grade 0</th>
<th>Grade I</th>
<th>Grade II</th>
<th>Grade III</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pre- or post-ulcerative lesion completely epithelialized</td>
<td>Superficial ulcer, not involving tendon capsule or bone</td>
<td>Ulcer penetrating to tendon or capsule</td>
<td>Ulcer penetrating to bone or joint</td>
</tr>
<tr>
<td>B</td>
<td>Infection</td>
<td>Infection</td>
<td>Infection</td>
<td>Infection</td>
</tr>
<tr>
<td>C</td>
<td>Ischemia</td>
<td>Ischemia</td>
<td>Ischemia</td>
<td>Ischemia</td>
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<tr>
<td>D</td>
<td>Infection &amp; Ischemia</td>
<td>Infection &amp; Ischemia</td>
<td>Infection &amp; Ischemia</td>
<td>Infection &amp; Ischemia</td>
</tr>
</tbody>
</table>

Score: Grade_____ Stage_____

1.4 DFU Self-Care Teaching Tool (PDF) and
1.5 Client/Patient Teaching and Learning “My Diabetic Foot Ulcer” (PDF)
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. This resource was also created in partnership with CarePartners, one of the nursing service providers who is currently an RNAO Best Practice Spotlight Organization candidate. 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 this a regional tool that can be adapted to all sectors.

1.6 Evidence-Based Clinical Interventions (from the SWCCAC Wound Management Program April- May 2011)
Determine client’s goals
- **Healing Service Plan**
  - Blood sugar control (HgA1C)
  - Wound Healing
  - Teach Client/Caregiver wound management and prevention education
  - Decrease dressing changes
- **Maintenance Service Plan**
  - Prevent or delay amputation
  - Prevent or delay deterioration of the wound
  - Client/Caregiver education about wound care

**Wound Assessment:** Use a validated and reliable general wound assessment tool (e.g. BWAT see section B.6.1) plus one specific to severity of DFU (see University of Texas Wound Classification System of Diabetic Foot Ulcers in table above).
Interventions
Ideally, a multi-disciplinary team should be involved including but not limited to:

- Certified perdorthist/ chiropodist/ podiatrist to be fitted for pressure offloading orthotic devices –this is absolutely essential. Off-loading device must be worn every time their foot touches the floor.
- **Dietitian**: Optimize nutritional intake
- Vascular assessment to determine if wound is healable.
- **Orthopedic surgeon** for recurrent forefoot ulcerations should be referred to assessment re: surgical interventions (e.g. may have shortened Achilles tendon 2° to neuropathy)
- **Surgical assessment** needed for Neuropathic wound, Acute Charcot joint, or Infected diabetic foot if non-surgical interventions not achieving healing (Lavery et al 1996)
- **Endocrinologist/ Diabetologist**: Correlation between poor diabetic control and increased risk of complications, optimize general health status
- **Infectious diseases**: Infected wounds may require Infectious diseases consult. NB* Pain in an insensate foot can signify deep infection/osteomyelitis.
- **Vascular Consult** if Peripheral Arterial Disease present (ABPI less than 0.5)
- **Wound care specialist, pharmacist** as indicated
- **Physio therapy** if adjunctive therapy indicated

**Education:**

- Health teaching to prevent infection and deterioration of wound, improve nutrition and general health status.

**General**

- Limit foot soaks to 5 minutes 3 x weekly

**Wound Bed Prep:**

- Debridement, bacterial balance, exudates control, protect periwound skin.
- VAC assessment for acute surgical wounds in diabetic foot

*NB- Note that the RNAO BPGs for Assessment and Management of Foot Ulcers for People with Diabetes recommend the following:

- **Assess the wound bed for bacterial balance, exudate level and the need for debridement.**
- **Select a dressing or combination of dressings that can manage and or control the above wound environment.**
- **Use a dressing that will keep the wound bed continuously moist and the peri-wound skin dry.**
- **Choose a dressing that controls exudate but does not dry the ulcer bed.**
- ** Eliminate wound dead space by loosely filling all cavities with dressing material.**

**Warning**: Occlusive dressings such as hydrocolloids are not recommended for ulcers on the plantar foot - Mulder et al 2003, Keast 2009).
For healing dry DFU wounds
- Hydrogel (to rehydrate) covered with non-occlusive exudate absorber or foam dressing.

For healing exudating wounds
- Hydrofiber or alginate covered with exudate absorber or foam Note - Foam dressings do NOT reduce the interface pressure. Off-loading devices and orthotics are required.

*NB- Note that the RNAO BPGs for Assessment and Management of Foot Ulcers for People with Diabetes state that “Application of moisture retentive dressings in the context of ischemia and or dry gangrene can result in a serious life- or limb-threatening infection”.

For maintenance wounds
- Paint with betadine, prevent exudate from soaking through the outer dressing.
- Comfort measures i.e. analgesia

For infection/bacterial burden management—
- Diabetic ulcers require close evaluation. Signs of an infection in a diabetic foot ulcer can be masked due to the immuno-compromised status of the individual.
- Topical antimicrobials can be used to reduce bacterial burden in the presence of superficial wound infection, but never take the place of systemic antibiotics when those are needed for deeper infections. See Section 3.3

- If you are not sure of the nature of the infection, choose a non-occlusive dressing as the cover dressing. Dressing frequency for infected DFU should be increased until symptoms of infection are resolved.

*If client is unwilling to make lifestyle changes that will allow the wound to heal (control blood glucose level, obtain and wear pressure offloading devices, keep dressing clean and dry etc.) their risk of catastrophic outcomes is high. In the CCAC sector, a Case Management Conference should be held with the Case Manager, primary nurse, ETN/WCS, client and physician if possible to outline risk of lower leg amputation due to catastrophic consequences. Nursing agencies are encouraged to use risk identification forms to alert the Case Manager to risk.

1.7 Resources

References:


Jones R. Exploring the complex care of the diabetic foot ulcer JAAPA 2006. 19 (26)

