Timing is all in CLI diabetic patients: planning a winning strategy for limb salvage

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Disclosure

I have the following potential conflicts of interest to report: consulting, travel reimbursement, teaching courses, training, proctoring:

Medtronic, Boston Scientific, Abbott, LimFlow, Terumo, Cook, Biotronik, Asahi, Shire, Kardia, Orbus
1. Create a referral network

2. Create a multidisciplinary team

3. Think different!
Why do we still have failure in surgical procedures?

Why do we still perform major amputations in diabetic population?

**Delayed referral**
- Delayed and incorrect treatment of infection
- Delayed and incorrect diagnosis of ischemia
- Uncoordinated diagnostic and treatment approach
The Dramas of the Delayed Referral

The long duration of the first stages during which limb ischaemia and insensitivity develop, thereby exposing the foot, which is deformed by motor neuropathy, to injuries that suddenly evolve into real dramas together with the virtual absence of any symptom can explain the delay that happens when patients are referred to specialized care [18, 19].

[18, 19]
## Diabetic Foot Triage

<table>
<thead>
<tr>
<th>Code</th>
<th>Where to treat the patient?</th>
<th>lesion</th>
<th>treatment</th>
</tr>
</thead>
</table>
| White         | • General Practitioner     | Ulcer 0A-1A | 1. daily wound dressings  
| Patient does not have any emergency | • Level 1 DFC             |       | 2. dressing shoe  
|               |                           | Referral to a level 2 DFC in case of: | 3. LMWH  |
| Green         | • Level 2 DFC             | Acute Charcot | 1. Total off-bearing of the foot with rigid cast (fiberglass or plaster)  
| Foot lesion which does not require urgent surgery, without involvement of vital functions | | | 2. LMWH  
|               | Ulcer 0-B                 |          | 3. Daily dressing  
|               | 1-B                      |          | 4. Dressing shoe  
|               | 2-A                      |          |                                                             |
| Yellow        | • Level 3 DFC             | Ulcer 0-CD | 1. Broad-spectrum antibiotic therapy  
| Foot lesion which needs urgent surgery, without involvement of vital functions | 1-CD      |          | 2. LMWH  
|               | 2-BCD                    |          | 3. Emergency surgery according to the severity of the local infectious process  
|               | 3-ABCD                   |          |                                                             |
| Red           | • Level 3 DFC             | Patient with lesion/ulcer of the foot of every TUC degree | Regardless of the type of injury patient must be taken immediately to an emergency department for emergency treatment of vital functions. Achieving a stable hemodynamic profile, the patient will be subjected, if necessary, to a surgical treatment of the infection and to revascularization procedures as indicated at the Green and Yellow Code treatment protocol. |

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The Management of Diabetic Foot

Carlo Caravaggi, Adriana Sganzeroli, Paolo Galenda, Matteo Bassetti, Roberto Ferraresi, and Livio Gabrielli
A delay in the surgical debridement of a deep space abscess increases the amputation level. Accuracy in the diagnosis of PAD and immediate revascularization yield similar outcomes in patients with or without peripheral occlusive disease.

Table 4: Final outcome of surgical treatment

<table>
<thead>
<tr>
<th>Surgical intervention</th>
<th>Group A Pts directly hospitalized</th>
<th>Group B Pts from other hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage without amputation</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>One or more rays amputation</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Transmetatarsal amputation</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Chopart amputation</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Above-the-ankle amputation</td>
<td>-</td>
<td>5</td>
</tr>
</tbody>
</table>
The first step towards limb salvage is the creation of a referral network dedicated to diabetic foot.
1. Create a referral network

2. Create a multidisciplinary team

3. Think different!
• Blood Glucose level: 500 mg%
• Low pressure: 90/60 mmHg
• Fever with chills
• White blood cells count: 20,000
• ...and Critical Limb Ischemia
**Protocols**

1° “Medical team”
- Diabetologist
- Nephrologist
- Cardiologist
- Infectivologist
- Neurologist

2° “Toe team”
- Foot surgeon
- Orthopedic
- Plastic surgeon
- Vascular surgeon
- Podiatrist

3° “Flow team”
- Vascular surgeon
- Interventional radiologist
- Interventional cardiologist

1° INFECTION TREATMENT
- ULCE DEBRIDEMENT & URGENT SURGERY (GANGRENE/ABSCESS/PHLEGMON)
- METABOLIC & CARDIOLOGIC TREATMENT
- PRE-MEDICATIONS

2° REVASCULARIZATION
- PTA/Bypass are not the first line therapy in Texas D wounds (infection+ischemia)

3° FINAL TREATMENT
- MEDICAL
- SURGICAL
- ORTHOPEDIC
- REHABILITATION
- Metabolic balance
- Renal function
- Cardiac function
- Anemia correction
- ATB therapy
- Pre-medication \(\rightarrow\) DAPT
The goal of emergency surgery in infected ischemic diabetic foot is the control of local and systemic infection.

Surgery has to be performed as soon as possible: any delay in treating an acute lesion will reduce the possibility to save the limb.

PVD doesn’t modify the timing of emergent surgery in infective ischemic foot.
"The best antibiotic is often a blade n° 10”
"David Armstrong"
The role of the vascular team is essential

The main target is to give blood to the wound: the vascular team must pursue the wound-related artery concept using every technique:

- ATK PTA
- BTK PTA extended to below-the-ankle arteries
- TEA & bypass
Today it is not acceptable a revascularization strategy that does not consider BTK & BTA vessels!
An aggressive surgical treatment (VAC therapy, tissue engineering etc.) is essential to achieve a definitive foot healing after revascularization.

The goal of surgical treatment is to reconstruct a stable foot in terms of:

- Skin integrity
- Structural stability
- Suitability for prosthesis
- Ability to walk
- Blood Glucose level: 500 mg/dL
- Low pressure: 90/60 mmHg
- Fever with chills
- White blood cells count: 20,000
- ....and Critical Limb Ischemia
Working in a multidisciplinary team is a mind attitude!
It doesn’t matter what is the label of a physician, matters what he/she is able to do!
1. Create a referral network

2. Create a multidisciplinary team

3. Think different!
Figure 4. Relative 5-year mortality rates and comparison to major forms of cancer.
Think different!

65 yy old woman → breast nodule
65 yy old man → ↑ PSA blood

65 yy old diabetic → ulcer of one toe

Patient/family/GP

Death atmosphere!!!

Local problem!!!
Think different!

- 65 yy old woman → breast nodule
- 65 yy old man → ↑ PSA blood
- 65 yy old diabetic → ulcer of one toe

Patient/family/GP

- Death atmosphere!!!
- Local problem!!!
Think different!

Do not underestimate the danger of a wound in a diabetic patient!

Every foot lesion must be considered as a serious sign, which needs immediate and careful evaluation!
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