

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



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Disclosure

Roberto Ferraresi, MD

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

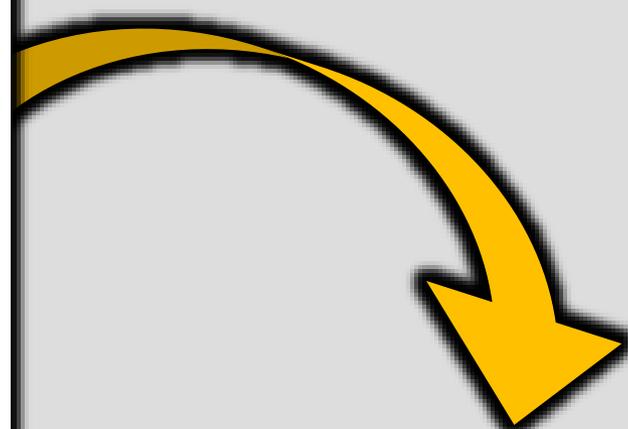
Medtronic, Boston Scientific, Abbott, LimFlow, Terumo, Cook, Biotronik, Asahi, Shire, Kardia, Orbus

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

- 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**

Piaggese A, Apelqvist J (eds): The Diabetic Foot Syndrome.
Front Diabetes. Basel, Karger, 2018, vol 26, pp 83–96 (DOI: 10.1159/000480054)

The Organization of Care for the Diabetic Foot Syndrome: A Time-Dependent Network

Alberto Piaggese • Lorenza Abbruzzese • Alberto Coppelli •
Elisabetta Iacopi • Nicola Riitano • Chiara Goretti

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].

Diabetic Foot Triage

Code	Where to treat the patient?	lesion	treatment
White Patient does not have any emergency	<ul style="list-style-type: none"> • General Practitioner • Level 1 DFC 	Ulcer 0A-1A	<ol style="list-style-type: none"> 1. daily wound dressings 2. dressing shoe 3. LMWH
	Referral to a level 2 DFC in case of: <ul style="list-style-type: none"> • non-progression of ulcer healing after one week • plantar ulcer needing off-loading 		
Green Foot lesion which does not require urgent surgery, without involvement of vital functions	• Level 2 DFC	Acute Charcot	<ol style="list-style-type: none"> 1. Total off-bearing of the foot with rigid cast (fiberglass or plaster) 2. LMWH
		Ulcer 0-B 1-B 2-A	<ol style="list-style-type: none"> 1. Broad-spectrum antibiotic therapy 2. LMWH 3. Daily dressing 4. Dressing shoe
Yellow Foot lesion which needs urgent surgery, without involvement of vital functions	• Level 3 DFC	Ulcer 0-CD 1-CD 2-BCD 3-ABCD	<ol style="list-style-type: none"> 1. Broad-spectrum antibiotic therapy 2. LMWH 3. Emergency surgery according to the severity of the local infectious process
Red Foot lesion with partial impairment of the function of the circulatory or respiratory system	• Level 3 DFC	<p>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.</p>	

Current Diabetes Reviews, 2012, 9.

The Management of Diabetic Foot

Carlo Caravaggi^{1*}, Adriana Sganzaroli¹, Paolo Galenda¹, Matteo Bassetti², Roberto Ferraresi³ and Livio Gabrielli³

The Role of Early Surgical Debridement and Revascularization in Patients with Diabetes and Deep Foot Space Abscess: Retrospective Review of 106 Patients with Diabetes

Ezio Faglia, MD,¹ Giacomo Clerici, MD,² Maurizio Caminiti, MD,³ Antonella Quarantiello, MD,⁴ Michela Gino, MD,⁵ and Alberto Morabito, PhD⁶

J Foot Ankle Surg. 2006 Jul-Aug;45(4):220-6.

Table 4: Final outcome of surgical treatment

Surgical intervention	Group A Pts directly hospitalized	Group B Pts from other hospitals
Drainage without amputation	9	4
One or more rays amputation	21	21
Transmetatarsal amputation	12	10
Chopart amputation	1	23
Above-the-ankle amputation	-	5

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.

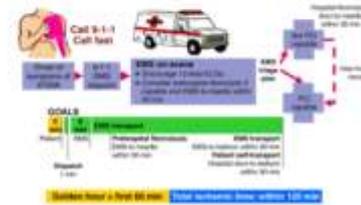
p < 0.001

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Time is muscle...

About 35 years ago, Eugene Braunwald, postulated a revolutionary hypothesis: **time is muscle**. He proposed that acute MI is a dynamic process and that its clinical outcome is determined largely by infarct size.

Options for Transport of Patients with STEMI and Initial Reperfusion Treatment



The Role of Early Surgical Debridement and Revascularization in Patients with Diabetes and Deep Foot Space Abscess: Retrospective Review of 106 Patients with Diabetes

Annals of the Royal College of Surgeons in Great Britain and Ireland, 2006; 88(1): 229-34.

The purpose of the study was to evaluate the outcome of diabetic patients with deep space abscess who underwent an **immediate surgical debridement versus patients in whom the surgical debridement was delayed**, as well as the influence of PAD disease when an accurate diagnosis and an immediate revascularization were performed

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p < 0.001

The first step towards limb salvage is the creation of a referral network dedicated to diabetic foot

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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**

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

Protocols

1°

INFECTION TREATMENT

- ULCER 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

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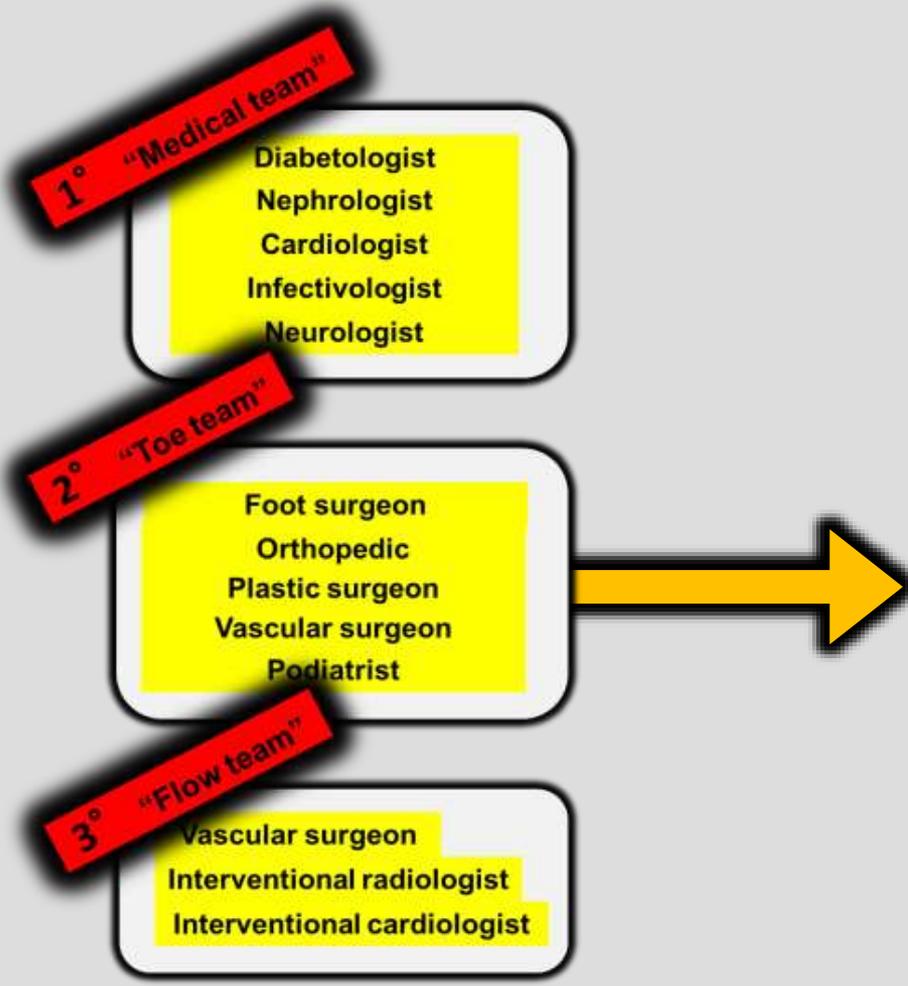
3°

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- Metabolic balance
- Renal function
- Cardiac function
- Anemia correction
- ATB therapy
- Pre-medication → 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

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"The best antibiotic is often a blade n° 10"
"David Armstrong"



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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**

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Today it is not acceptable a revascularization strategy that does not consider BTK & BTA vessels!

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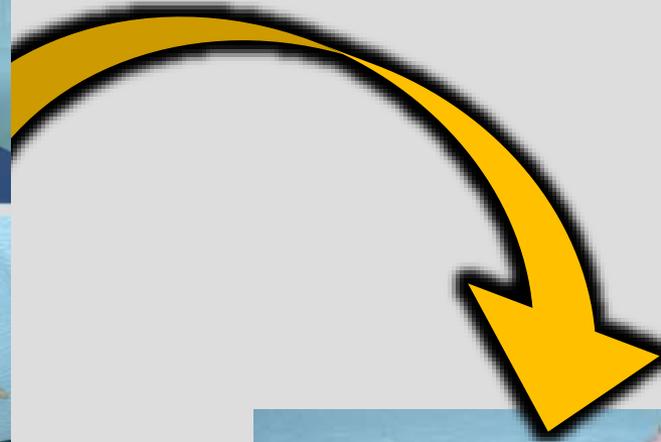
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An aggressive surgical treatment (VAC therapy, tissue engineering etc.) is essential to achieve a definitive foot healing after revascularization

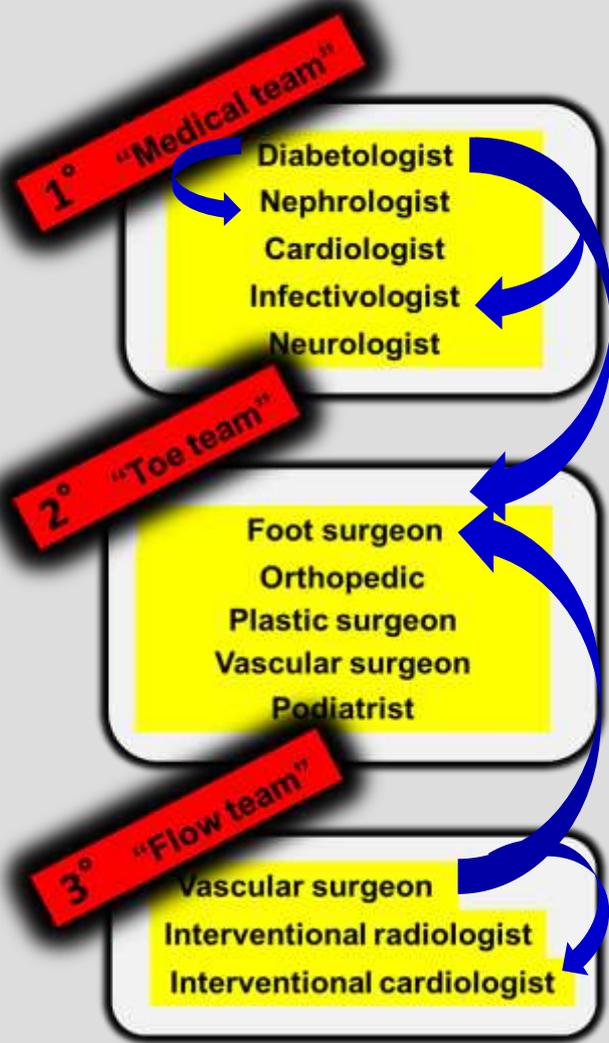
The goal of surgical treatment is to reconstruct a stable foot in terms of

- **Skin integrity**
- **Structural stability**
- **Suitability for prosthesis**
- **Ability to walk**



- Blood Glucose level: 500 mg%
- 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!

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Diabetic Foot Ulcers and Vascular Insufficiency: Our Population Has Changed, but Our Methods Have Not

David G. Armstrong, D.P.M., M.D., Ph.D.,¹ Kelman Cohen, M.D.,² Stephane Courric, Ph.D.,³ Manish Bharara, Ph.D.,¹ and William Marston, M.D.⁴

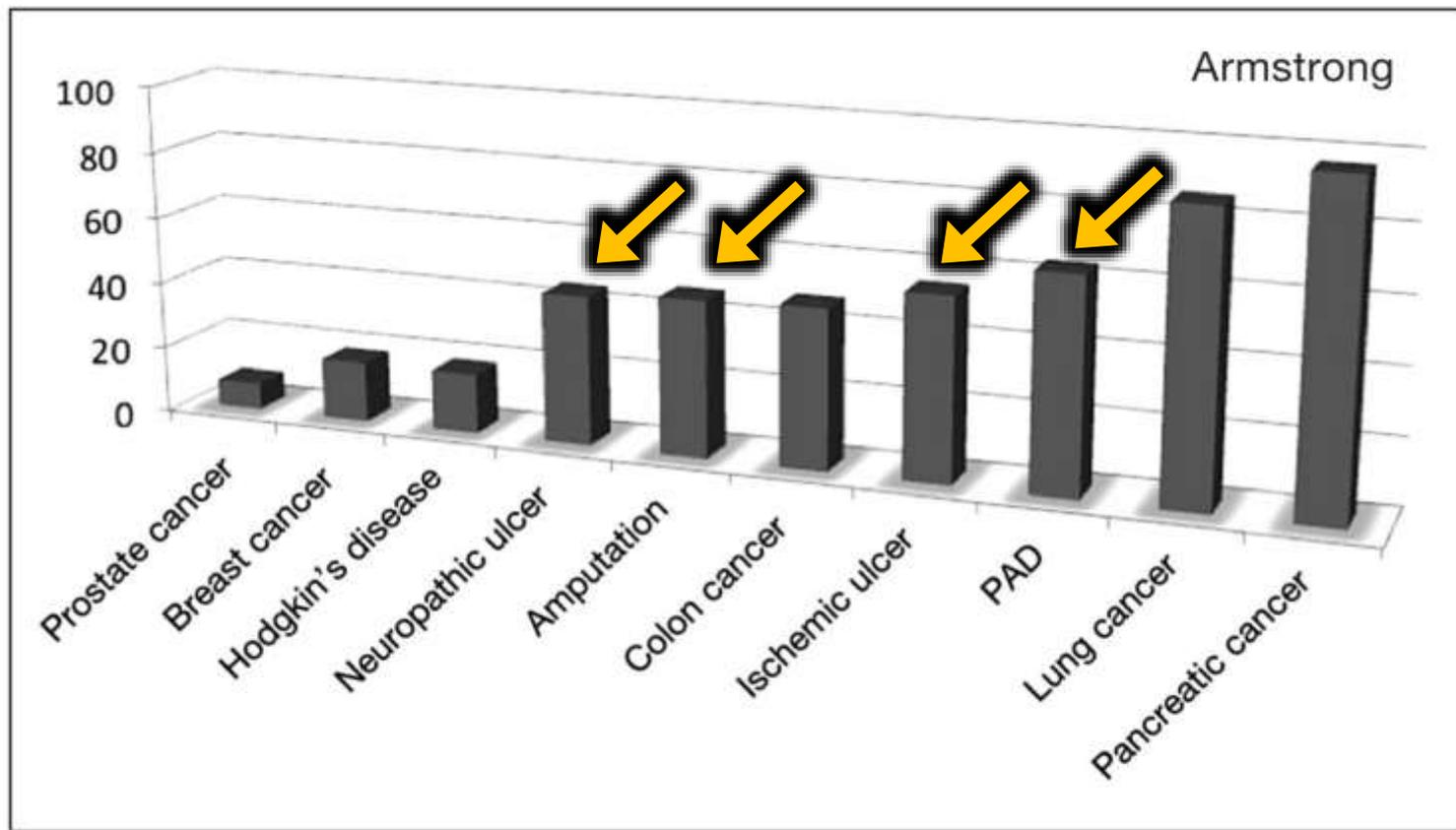


Figure 4. Relative 5-year mortality rates and comparison to major forms of cancer.

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!

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Change our way of thinking!

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!

Diabetes Foot Ulcers and Vascular Insufficiency: Our Population Has Changed, but Our Methods Have Not
Lynch JT, Armstrong DJ, et al. *Diabetes Care* 2007; 30(10): 1957-1962

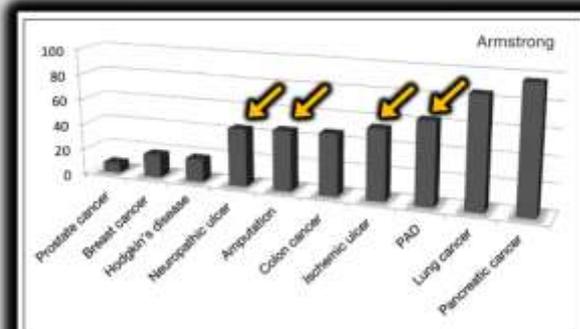


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