Diabetic Foot Triage
and treatment protocols

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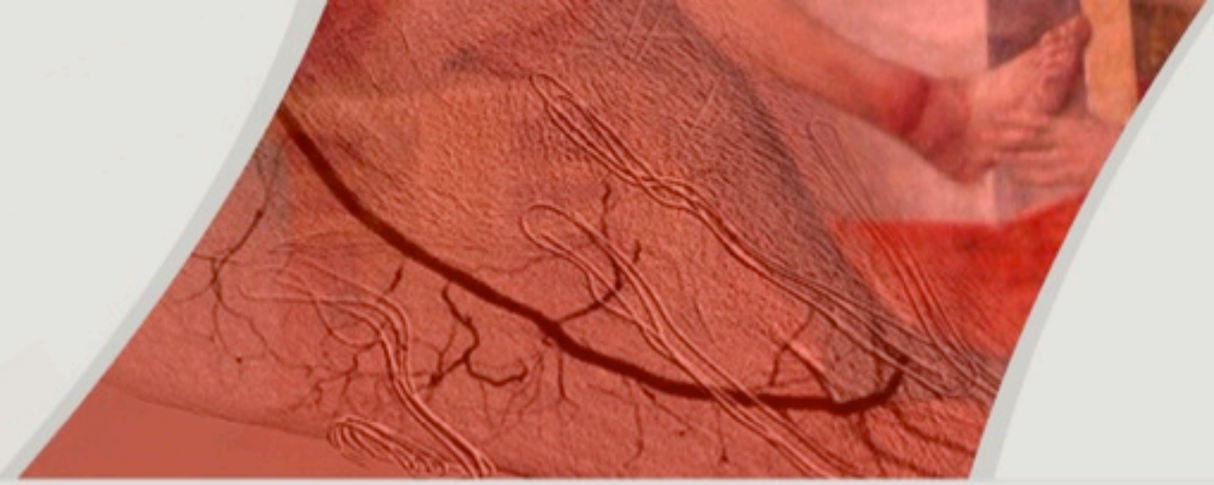
Diabetic Foot Triage

and treatment protocols



Diabetic Foot

University of Texas Wound Classification system

Diabetic Foot Triage

- Patient care level in treating lesions
- TUC C wounds (ischemia without infection)
- TUC D wounds (ischemia & infection)

Diabetic Foot Surgery Classification

Conclusions

Some informations about diabetic foot in the world...

- every 30" in the world a major amputation is performed in diabetic population
- 15 % of diabetic patients will suffer from a foot ulcer during their life
- 50 % of non traumatic major amputations are performed in diabetic patients
- CLI is still the major cause of limb amputation in diabetic patients

"The global burden of diabetic foot disease". Boulton AJM, Vileikyte L, Ragnarson-Tennvall G, Apelqvist J. Lancet 2005;366:*1719-24*

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University of Texas Wound Classification System

Validation of a Diabetic Wound Classification System

The contribution of depth, infection, and ischemia to risk of amputation

DAVID G. ARMSTRONG, DPM
LAWRENCE A. LAVERY, DPM, MPH
LAWRENCE B. HARKLESS, DPM

tion systems that have previously been described in the medical literature to accomplish these tasks either do not provide information about some of the most important

DIABETES CARE, VOLUME 21, NUMBER 5, MAY 1998

Prevalence of amputations within each wound category

		Grade			
		0 Pre or post ulcerative lesion completely epithelialized	I Superficial wound,	II Wound penetrating to tendon or capsule	III Wound penetrating to bone or joint
Stage	A No infection or ischemia	0%	0%	0%	0%
	B Infection present	12.5%	8.5%	28.6%	92%
	C Ischemia present	25.0%	20.0%	25.0%	100%
	D Infection and ischemia present	50.0%	50.0%	100%	100%

Armstrong D. et al. Validation of a diabetic wound classification system. Diabetes Care 1998; 21,(5):855

Why do we still have failure in surgical procedures?

Why do we still perform major amputations in diabetic patients?

?

1. ***Delayed and incorrect***
   treatment of infection in the diabetic foot

2. ***Delayed and incorrect***
   diagnosis of ischemia in diabetic foot lesions, and an

3. ***Uncoordinated***
   diagnostic and treatment approach

How to avoid these obstacles? How to salvage limbs in every patient?

1. ***Delayed and incorrect***
   treatment of infection in the diabetic foot

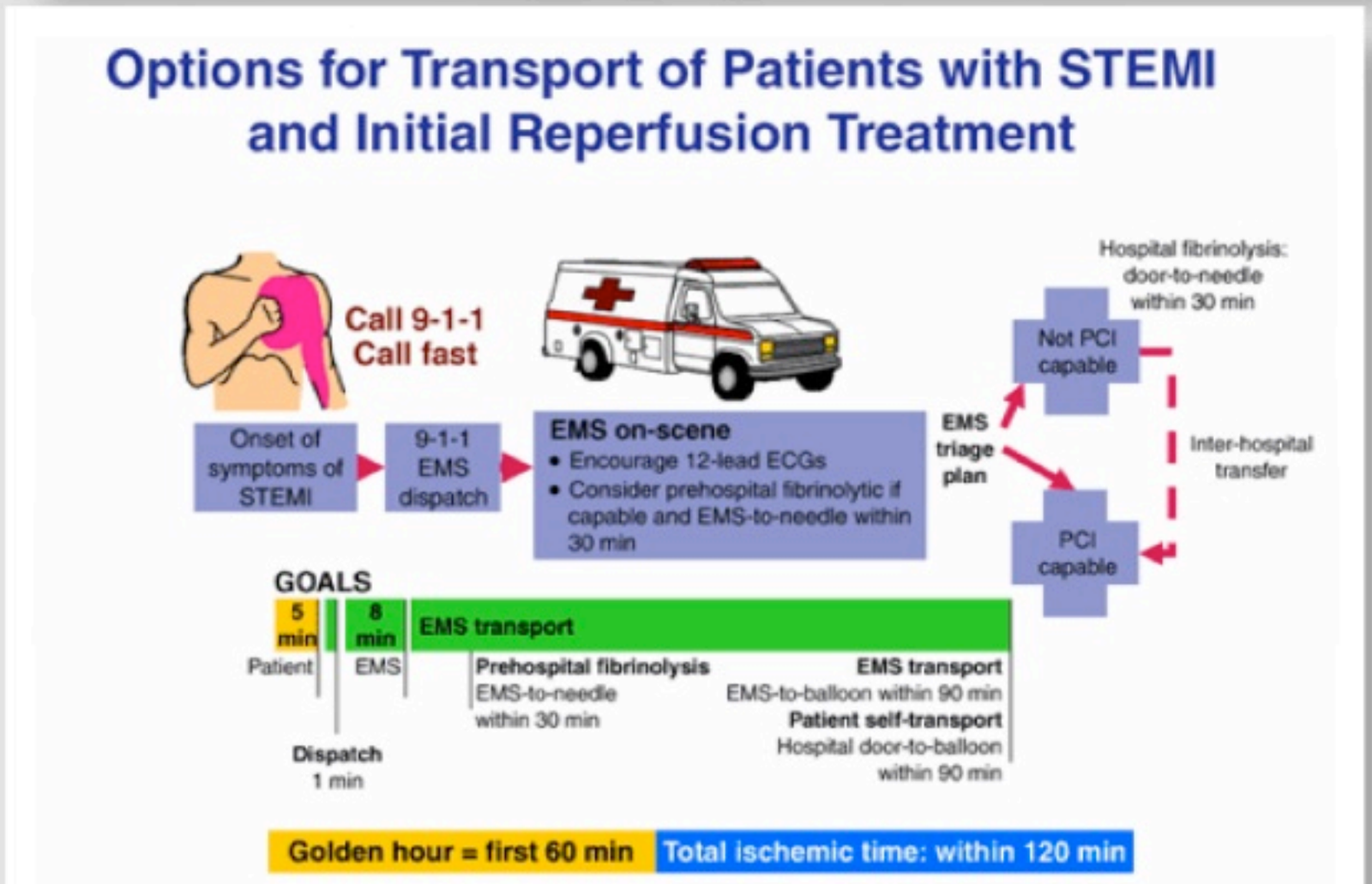
2. ***Delayed and incorrect***
   diagnosis of ischemia in diabetic foot lesions, and an

3. ***Uncoordinated***
   diagnostic and treatment approach

We must change our approach in diabetic foot!

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.



Thrombolysis and primary angioplasty became the standard therapy for AMI

Time is brain…

In 1996, stroke treatment changed dramatically when the FDA approved the use of a new drug called tissue plasminogen activator, or tPA, to treat stroke…

Time is not foot…

These feet have an history of weeks/months of ulcer, infection, pain, inability to walk, misdiagnosis…

In the majority of the cases they arrive to our foot clinic without a diagnosis of CLI

Who makes the diagnosis?

- A diabetologist?
- A cardiologist?
- A podiatrist?
- A vascular surgeon?
- A dermatologist?
- An orthopedist?

CLI diagnosis

In heart & brain disease we have a single specialist → diagnosis is fast, sure and operative.

In CLI we have not defined single specialist: diagnosis is late, uncertain and passive.

For this reason we proposed the Diabetic Foot Triage with the aim of speeding diagnosis and to referring the patient to the proper center for the proper treatment.

Diabetic Foot Triage

Integrated surgical protocol for the treatment of the infected diabetic foot
Caravaggi C.
J Cardiovasc Surg 2012;53:23-30

Current Diabetes Reviews, 2012, *9*, 000-000

The Management of Diabetic Foot

Carlo Caravaggi[1 *], Adriana Sganzaroli[1], Paolo Galenda[1], Matteo Bassetti[2], Roberto Ferraresi[3] and Livio Gabrielli[4]

Diabetic Foot Triage

University of Texas Wound Classification System (TUC)		Grade			
		0 Pre or post ulcerative lesion completely epithelialized	I Superficial wound,	II Wound penetrating to tendon or capsule	III Wound penetrating to bone or joint
Stage	A No infection or ischemia	0A	IA	IIA	IIIA
	B Infection present	0B	IB	IIB	IIIB
	C Ischemia present	0C	IC	IIC	IIIC
	D Infection and ischemia present	0D	ID	IID	IIID

+ patient clinical condition: limb threatening/life threatening

Diabetic Foot Triage

Code	*Where to treat the patient?*	lesion	treatment
WHITE **Patient does not have any emergency**	• General Practitioner • Level 1 DFC	Ulcer 0A-1A	1. daily wound dressings 2. dressing shoe 3. LMWH
	Referral to a level 2 DFC in case of: • nonprogression of ulcer healing after one week • plantar ulcer needing off-loading		
GREEN **Foot lesion that does not require urgent surgery, without involvement of vital functions**	• Level 2 DFC	Acute Charcot	1. Total off-bearing of the foot with rigid cast (fiberglass or plaster) 2. LMWH
		Ulcer 0-B 1-B 2-A	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	1. Broad-spectrum antibiotic therapy 2. LMWH 3. Emergency surgery according to the severity of the local infectious process 4. Revascularization in CD lesions
RED **Foot lesion with partial impairment of the function of the circulatory or respiratory system**	• 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.**	

Treatment protocol in TUC C wounds (ischemia without infection)

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+ patient clinical condition: limb threatening/life threateninging

Treatment protocol in TUC C wounds (ischemia without infection)

1°

Urgent medical therapy

- Metabolic balance
- Anemia correction
- Heart evaluation
- Pre-medications:
  - Double anti-PLTs therapy
  - Renal protection

2°

Revascularization

PTA/Bypass performed before the surgical treatment of the foot lesion

3°

Final treatment

- Medical
- Surgical
- Orthopedic
- Rehabilitation

Treatment protocol in TUC D wounds (ischemia + infection)

University of Texas Wound Classification System		Grade			
		0 Pre or post ulcerative lesion completely epithelialized	I Superficial wound,	II Wound penetrating to tendon or capsule	III Wound penetrating to bone or joint
Stage	A No infection or ischemia	0A	IA	IIA	IIIA
	B Infection present	0B	IB	IIB	IIIB
	C Ischemia present	0C	IC	IIC	IIIC
	D Infection and ischemia present	0D	ID	IID	IIID

+ patient clinical condition: limb threatening/life threatening

Treatment protocol in TUC D wounds (ischemia + infection)

1°

Infection treatment

- Ulcer debridement
- Urgent surgery for gangrene, abscess, phlegmon
- Identification of bacterial strains → appropriate antimicrobial therapy

2°

Urgent medical therapy

- Metabolic balance
- Anemia correction
- Heart evaluation
- Pre-medications:
  - Double anti-PLTs therapy
  - Renal protection

3°

Revascularization

PTA/Bypass are not the first-line theraphy in Texas D wounds

4°

Final treatment

- Medical
- Surgical
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Treatment protocol in TUC D wounds (ischemia + infection)

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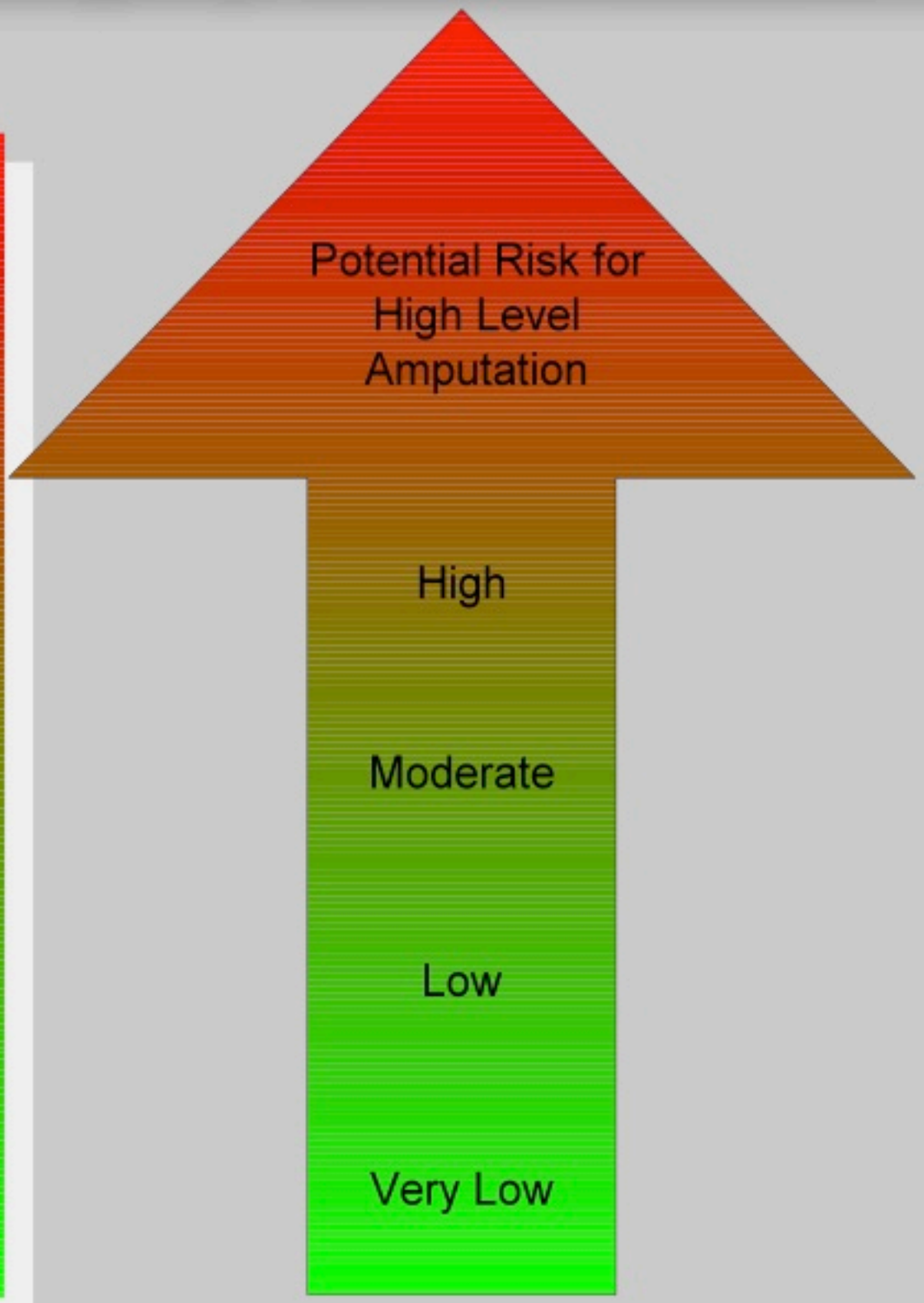
The goal of emergent surgery in infected ischemic diabetic foot is the control of local and systemic infection

Diabetic Foot Surgery Classification

Diabetic Foot Surgery Class	Description
Class IV: Emergent	Procedure performed to limit progression of acute infection
Class III: Curative	Procedure performed to assist in healing open wound
Class II: Prophylactic	Procedure performed to reduce risk of ulceration or reulceration in person with loss of protective sensation but without open wound
Class I: Elective	Procedure performed to alleviate pain or limitation of motion in a person without loss of protective sensation



Armstrong DG, Frykberg RG, Diabetic Med 2003;20(4):329-31.

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, PhD[6]

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

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 PAOD disease when an accurate diagnosis and an immediate revascularization were performed .

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

$p < 0.001$

Treatment protocol in TUC D wounds (ischemia + infection)

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

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Infection

- *Hyperglicemia*
- *Anemia*
- *Hypercatabolism*
- *Hypoproteinemia*
- *Heart failure*
- *Impending sepsis*

Treatment protocol in TUC D wounds (ischemia + infection)

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We give every patient (without contraindications) double anti-PLTs therapy and renal protection (saline, bicarbonate, acetilcystein)

Treatment protocol in TUC D wounds (ischemia + infection)

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Treatment protocol in TUC D wounds (ischemia + infection)

An aggressive surgical treatment (VAC therapy, tissue engineering, etc.) is essential to achieve 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

4°

Final treatment

- Medical
- Surgical
- Orthopedic
- Rehabilitation