

Step By Step Treatment of Diabetic Foot-New Treatment Possibilities

Ciprian Constantin^{1*}, Georgiana Constantin², Marinela Sirbu¹ and Cristian Buzoianu¹

¹Carol Davila, Military Hospital, Bucharest, Romania

²Agrippa Ionescu Hospital, Bucharest, Romania

Abstract

This is a case where actual applied statistics will reveal a worse prognosis, despite all therapies that are already applied. Despite this calculated prognosis, the patient decision to save his foot was the best one. New medical therapies and surgical procedures could improve the prognosis for this kind of cases.

Keywords: Type 2 diabetes mellitus; Diabetic foot

Background

There are quite a number of treatments available for the management of diabetic foot ulcers: local therapies, vasodilators, antibiotics, neuropathic and neurotrophic drugs, wound dressings, skin substitutes, growth factors and inflammatory modulators [1]. The majority of therapies target the treatment of diabetic foot ulcer, but a local intervention (surgical intervention) to address the local area and to remove ulcers and necrotic areas is often necessary. However, not only one treatment, but several interventions and serial procedures are necessary to be practiced in this situation in tentative of management of diabetic foot ulcers.

American Diabetes Association is the main professional association that aims to standardize [2] the intervention to prevent this complication of diabetes mellitus, but the spread of this disease is the main reason for increasing incidence and prevalence of minor and major amputation caused by diabetic foot ulcers [3,4].

Lower-extremity peripheral artery disease (PAD) is a complication of diabetes and occurs in 4.3-29% of all patients, not only diabetics, worldwide. In patients with critical limb ischemia (CLI), the resting metabolic need of tissue is not being met by the arterial supply and local gangrene is the main manifestation of this complication of diabetes mellitus. CLI exists in 1-2% of the PAD population and is defined as ischemic rest pain, non-healing wounds, or gangrene [1].

Case Report

This is a case presentation of a 68 years old patient who was hospitalized in our clinic in February of 2015.

This patient with known type 2 diabetes mellitus is presenting wounds in the region of single leg, left side of the plant straight appearance of necrotic ischemic purple of finger 5 and lesions located in region between finger 4 and 5, swelling and redness in the middle plantar region, which progressively worsened (Figure 1).

History of main disease: This patient is 68 years old, with a 20 years history of type 2 diabetes mellitus, treated with insulin from 2002 and with multiple micro and macro-vascular complications (diagnosed over time).

General physical examination: malaise, actual weight = 110 kg, height=180 cm, BMI = 33.95 kg/m², blood pressure 145/83 mmHg, pale skin and mucous membranes, moderately hydrated, normal thorax without crackles, rhythmic cardiac pulse, peripheral pulse diminished in distal arteries, abdomen mobile with breathing, postoperative abdominal scars, liver painless to palpation, normal micturition, Giordano sign negative bilaterally.

Local examination of the foot: figures attached. The local exam



Figure 1: Type 2 diabetes mellitus is presenting wounds in the region of single leg, left side of the plant straight appearance of necrotic ischemic purple of finger 5 and lesions located in region between finger 4 and 5, swelling and redness in the middle plantar region, which progressively worsened.

***Corresponding author:** Ciprian Constantin, Carol Davila, Military Hospital, Bucharest, Romania, Tel: +40 21 319 3051; E-mail: Ciprian_Constantin@yahoo.com

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noticed: peripheral sensory disturbance, wound in the right side region of the plant, ischemic necrotic aspect, purple between finger lesions, edema and erythema at plantar level (Figure 1).

Biochemistry investigations: CBC (cell blood count) is normal, Glycemia = 274 mg/dl, Cholesterol = 100 mg/dl, Creatinine = 0.94 mg/dl, AST = 76 UI/ml, ALT = 43 UI/ml, fibrinogen = 420 mg/dl, HbA1c = 7.4%.

X ray investigation of right foot: Valgus deviation in the right toe, demineralization of the distal and medium phalanx of 5th finger, bone

spur and plantar calcaneal calcification in the achilean tendon insertion, vascular calcification.

Ultrasound doppler exam for distal artery: Charge buildup broadcast, severe level with numerous superficial femoral artery seriously stenoses in Hunter channel, in 1/3 distal average: subocclusion- Flow redness at the distal posterior tibia artery-requires arteriography (Figures 2 and 3).

Arteriography Result

Right arterial axis: common femoral artery: deep and superficial calcified plaque with a maximum of 50% on the whole length; Popliteal Artery presents proximal aneurismal dilatation, otherwise no injuries; Anterior Tibial Artery: crosse occlusion, occlusion of tibial-peroneal trunk distal posterior and peroneal tibia artery reload after a few centimeters. Peronier Artery is permeable by distal occlusion. Occlusion of tibia artery is located back to ankle.

Left arterial axis: Common and Profound Femoral arteries present plaque with a flux altered 30-40%; Occlusion of the superficial femoral artery at origin with a slow distal reload. Popliteal Artery and Ankle Axis without injuries, Paddies Artery is gracile.

The Arteriography was performed and the conclusion of radiologist and vascular surgeon-there is no therapeutic resolve for this level of lesion.

At the same time, local culture from plague reveals Methicillin-resistant Staphylococcus aureus.

At this time the prognostic was unfavorable and an imminent distal amputation of limb was presented. ECG exam is attached (Figure 4).

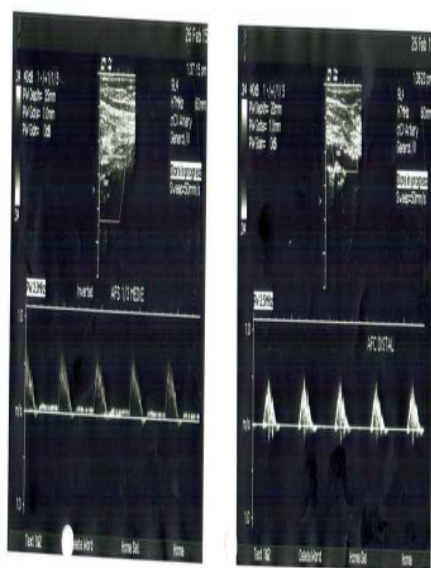


Figure 2: Ultrasound Doppler Exam for distal artery: - Charge buildup broadcast, severe level with numerous superficial femoral artery seriously stenoses in Hunter channel, in 1/3 distal average: subocclusion- Flow redness at the distal posterior tibia artery - requires arteriography.

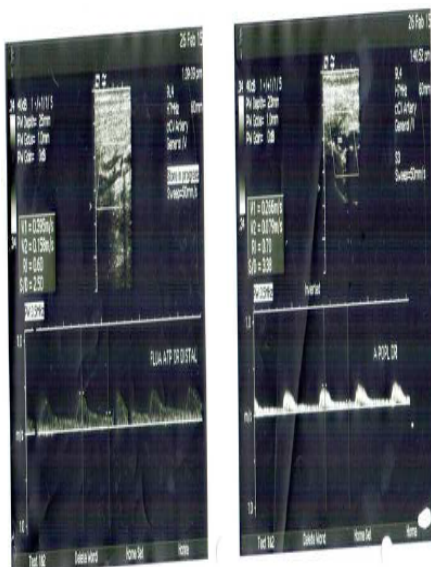


Figure 3: Ultrasound Doppler Exam for distal artery: -Charge buildup broadcast, severe level with numerous superficial femoral artery seriously stenoses in Hunter channel, in 1/3 distal average: subocclusion- Flow redness at the distal posterior tibia artery - requires arteriography.

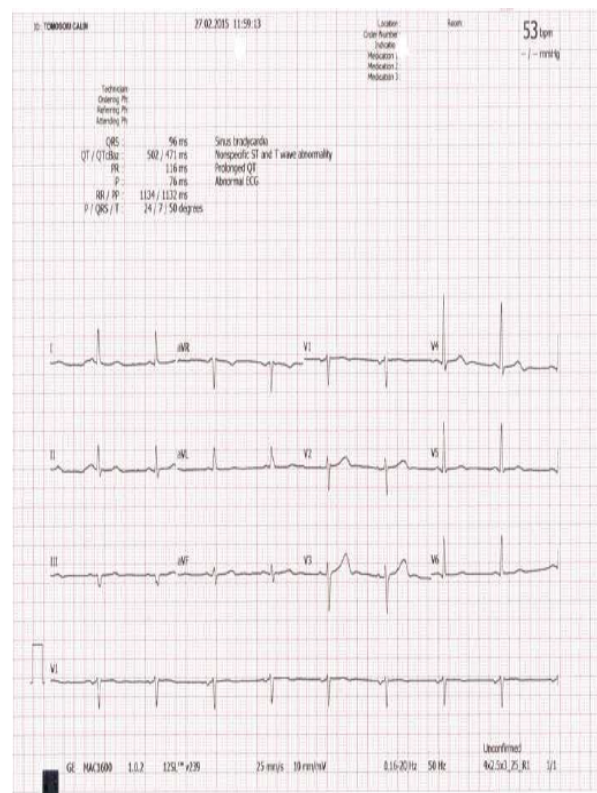


Figure 4: ECG exam.



Figure 5: Amputated 5th finger.



Figure 6: Amputated 5th finger.

Final positive diagnostic (From past medical history and actual facts):

- Fingers amputation right foot. Peripheral Arterial Disease stage 4 Fontaine
- Treated with insulin, poor controlled, complicated type 2 diabetes mellitus
- Distal symmetric diabetic sensitive polyneuropathy
- Chronic Heart Failure stage 2 NYHA. High Blood Pressure stage 2 JNC8
- Parkinson's disease stage 4M. Mixed Dyslipidemia

Actual and standardised treatment was presented and adequately adapted for a better quality of life to this complex patient. The treatment applied was: parenteral antibiotics using local culture (Ciprinol and Cefuroxime using dose adaptation considering renal function), vasodilators (pentoxifylline), angioregic substances (Vessel Due), chronic treatment for cardiovascular risks (statin, hypotensor adapted treatment), aspirin, neurotrophic drugs (complex of B vitamins and thiotic acid). The treatment of type 2 diabetes mellitus is with insulin analogs for a HbA1c, as better as possible, without hypoglycemic events.

Evolution

The patient refused an ample surgical intervention. Given the unfavorable wound evolution, the surgeon intervened and amputated 5th finger (Figures 5 and 6). Later evolution was still unfavorable and it was decided amputation of 4th finger too, with favorable local

evolution. Wound toilet and local dressing were practiced daily with general support of antibiotics. General treatment was the same that is presented above.

Discussions

Despite unfavorable initial prognostic and despite the medical advice to amputate a large part of the limb, the patient was recovered with a minimal intervention. Actual stage of disease and actual risk factors expose this patient to a new amputation [5,6]. As vascular surgery is not applicable-this was the surgeon decision, only the medical treatment could help this patient to maintain actual state for a long time, as long as possible.

Some new therapies (as growth factors or stem cells) could be an innovative solution for this kind of patient [7], ideally before this stage of disease is diagnosed. We need a lot of other markers to diagnose this kind of pathology before the stage when a large amputation is necessary.

There are obviously advantages and disadvantages to each kind of wound treatment and multiple solutions for wound dressing are present (Miculickz pomade, 1% silver sulfadiazine cream, zinc hyaluronate solution, bovine collagen, hyperbaric oxygen therapy, hydrocolloid dressing or synthetic skin substitutes). Most of them need a real confirmation in randomised studies. Adjuvant care of diabetic foot ulcers implies: systemic factors-control of hyperglycemia, control of infection, treatment of vasculopathies (sulodexide, cilostazol) or local factors-peripheral neuropathies, control of pressure at foot level (custom-made orthosis and shoes) [8].

The Particularity of Case

This is a case with a classic evolution for this kind of patients and with a limited actual treatment solutions (medical and surgical too). We need, as we already say, beside the markers for a real prognosis, for innovative therapies such as growth factors, stem cells, and- in the same time- for real prevention actions for type 2 diabetes mellitus control. The best actual solution seems to be yet the control and the prevention of the micro and macrovascular complications of type 2 diabetes mellitus.

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