

Wet Gangrene and Transmetatarsal Amputation: How and Why?

Konstantinos M Nikolakopoulos*, Chrysanthi P Papageorgopoulou, Spyros I Papadoulas, Stavros Kakkos, Ioannis Ntouvas, Ioannis A Tsolakis

Department of Vascular Surgery, University Hospital of Patras, Patras, Greece

***Corresponding author:** Konstantinos M Nikolakopoulos, Department of Vascular Surgery, University Hospital of Patras, Patras, Add: University General Hospital of Patras, 26504, Rio, Patras, Greece. Tel: +30 6972452643; Email: konstantinosn@yahoo.com

Citation: Nikolakopoulos KM, Papageorgopoulou CP, Papadoulas SI, Kakkos S, Ntouvas I, et al. (2016) Wet Gangrene and Transmetatarsal Amputation: How and Why? Cardiolog Res Cardiovasc Med 1: 107. DOI: 10.29011/2575-7083.000007

Received Date: 16 August, 2016; **Accepted Date:** 26 August, 2016; **Published Date:** 31 August, 2016

Abstract

Diabetic foot ulcer occurs in up to 25% of diabetic patients. Foot ulcer affects patients' quality of life, results to disability and increases morbidity and mortality. In cases of wet gangrene, amputation is the only real solution. Unfortunately, amputation rates among diabetic patients reach 11%. In this case, a 57-year old diabetic male presented with wet gangrene and abscess of right lower limb. Past medical history included a successful angioplasty of right common iliac artery for critical stenosis. We present the typical case of diabetic foot, which was treated with transmetatarsal amputation, antibiotics and daily cleansing and addressing changes for eighteen (18) months.

Keywords: Amputation; Angioplasty; Diabetic foot; Gangrene

Introduction

One in four diabetic patients presents with foot ulcers [1]. Many factors contribute to the development of diabetic foot ulceration. Neuropathy and peripheral vascular disease, are considered some of the most determining factors. Approximately half of diabetic foot wounds develop an infection [2] and 90% of the cases are attributed to neuroischaemic ulceration [3]. Despite the development of invasive radiology and antibiotics, wet gangrene of diabetic foot ulcer has, most of the time, one real solution, amputation [4].

Case report

A 57-year-old diabetic (Diabetes Mellitus type II) Caucasian male presented to the emergency department of our hospital (University Hospital of Patras, Greece) with high fever and pain of the right foot due to severe local infection with abscess formation (Figure 1, 2).



Figure 1: Abscess formation on the plantar surface of the foot.



Figure 2: Wet gangrene of the dorsal surface of the foot.

Past medical history included angioplasty of the right common iliac artery for critical stenosis. Physical examination revealed palpable peripheral pulses of the right foot (Ankle-Brachial Index: $140/150 = 0.93$). The laboratory testing revealed raised white cell count (30.42 k/ml) and serum creatinine levels (1.5 mg/dl). He started i.v. antibiotics, meropenem 2gr TID and vancomycin 1gr BID. A surgical draining procedure was immediately performed (Figure 3,4).



Figure 3: Drainage of the dorsal surface.



Figure 4: Surgical draining of the abscess.

Because of persisting fever, an emergency foot transmetatarsal amputation procedure was required the following day (Figure 5,6). This led to clinical improvement without the need for further debridement.



Figure 5: Transmetatarsal amputation.



Figure 6: Transmetatarsal amputation of the right foot and debridement.

Wound cultures isolated *E. coli*, and antibiotics were administered according to the antibiogram. The patient was discharged on post-operative oral antibiotics (ciprofloxacin 500mg BID and clindamycin 300mg TID) for an initial period of three months and daily wound care with dressing changes for a period of eighteen months. After the end of approximately two-year period (Figure 7a-9b) the wound was successfully and completely healed, with no need of negative pressure wound healing technique.



Figure 7: Healing procedure after 6 months.



Figure 8a: Healing procedure after 12 months.



Figure 8b: Healing procedure after 12 months.



Figure 9a: Healing process after 18 months.



Figure 9b: Healing process after 18 months.

Discussion

The procedure of transmetatarsal amputation was first described by Bernard and Heute [5] for the treatment of trench foot. Today it is used as a limb salvaging procedure used for severe diabetic foot complications. It involves removal of the forefoot at the level of the metatarsal shafts. In this way a significant portion of the foot is maintained, in order to maximise limb function. Transmetatarsal amputation is generally accepted as an effective salvage procedure in cases of gangrene, forefoot infection, and/or chronic ulceration. It is also considered preferable to traditional below knee amputation or to amputation through the hind foot. The advantage of the transmetatarsal amputation is that it preserves a viable weight-bearing platform, which allows early ambulation, and in this way, it allows the patients to maintain their independence and at the same time it provides a more acceptable appearance, as it may be disguised with footwear. Thus, the transmetatarsal amputation gives the patients more independence and mobility and is a more favourable and satisfying option.

The success of the wound healing process depends, not only on sufficient blood flow and proper antibiotic therapy according to microbial susceptibility, but also on multiple factors such as the domestic circumstances of individual patients, their financial situation and the influence of the family environment and the health providers. Particularly in situations where patients may have reduced mobility, patients should probably remain in hospital postoperatively for a longer period. While still in hospital physiotherapy can also improve ambulation and walking aids can be introduced, in order to increase body strength. In our case, after the transmetatarsal amputation the wound of the patient was completely healed after 2 years.

Conclusively, when the forefoot is rendered nonviable, transmetatarsal amputation is a relatively common and effective limb salvage procedure. The aim of the transmetatarsal amputation is to remove nonviable tissue and preserve the maximum length of mid foot distal to the ankle joint. Thus, transmetatarsal amputation helps maintain limb functionality and allows a larger surface area for mobility and weight-bearing.

Acknowledgments

The authors thank Mr K.A. for providing detailed information about his medical history.

Declaration of conflicting interests

The authors report no financial relationships or conflicts of interest regarding the content herein.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

1. Bates MC, Aburahma AF (2004) An update on endovascular therapy of the lower extremities. *J Endovasc Ther Suppl* 11: 107-127.
2. Hartemann-Heurtier A, E. Senneville (2008) Diabetic foot osteomyelitis. *Diabetes Metab* 34: 87-95.
3. Boulton AJM (2006) The diabetic foot. *Medicine* 34: 87-90.
4. Eldor R, Raz I, Ben Yehuda A, Boulton AJ (2004) New and experimental approaches to treatment of diabetic foot ulcers: a comprehensive review of emerging treatment strategies. *Diabet Med* 21: 1161-1173.
5. Schwindt CD, Lulloff RS, Rogers SC (1973) Transmetatarsal amputations. *Orthop Clin North Am* 4: 31-42.