

## INTENSIVE CONSERVATIVE IN CERTAIN COMPLICATED CASES OF DIABETIC FOOT CAN SALVAGE LIMB AND PREVENT AMPUTATION

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### ABSTRACT

**Background:** Foot infection associated with diabetes, the so-called “Diabetic Foot =DF“, is a common problem among diabetics, especially in neglected or uncontrolled cases. Diabetic foot infections require attention to local (foot) and systemic (metabolic) issues and coordinated management, preferably by a multidisciplinary foot care team. In most cases, amputation of a part of a limb is usually applied. In the lower limb, this usually below – knee (BKA) or above –knee (AKA) amputation. In our study try to approach such cases with aggressive conservative management to save the limb.

**Aim:** To show the benefits of intensive conservative management of some patients with diabetic foot (DF) in certain situations and if this management can salvage limb and avoid amputation.

**Patients and Methods:** This study includes (100) patients seen as a specialized center for endocrinology and diabetes (SCED) and Al-Kindy Teaching Hospital (ATH) during the period from February 2008 to December 2011. Average age was 47 years (range 25-89). Males were 63 (63%) and females were 37 (37%). All patients in the study were having type 2 diabetes (T2D) with a server and complicated foot infection (diabetic foot, DF).

**Results:** The end result of treatment was complete wound healing in 30 patients (35.294%), scar or ulcer in 30 patients (35.294%) while in 25 patients (29.412%) needs more than 60 days for complete healing.

**Conclusion:** Intensive conservative management of diabetic foot (DF) can slaving extremity and avoid amputation.

**KEYWORDS:** Types 2 Diabetes, Diabetic Foot, Conservative Management, Insulin Therapy, Amputation

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### INTRODUCTION

George Bernard show said “I am surprised why people and governments spend millions of dollars to amputate a leg, but they spend little to save it<sup>1,2</sup>. Foot infection associated with diabetes, the so-called diabetic foot (DF), is a common problem among diabetics, especially in neglected or uncontrolled cases.

Diabetic foot infections require attention to local (foot) and systemic (metabolic) issues and coordinated management, preferably by multidisciplinary foot care team<sup>3</sup>. The major predisposing factor for these infections is foot

ulceration, which is usually related to peripheral neuropathy. Peripheral vascular disease and various immunological disturbances play a secondary role. Aerobic gram-positive cocci (especially *Staphylococcus aureus*) are the predominant pathogens in diabetic foot infections. Patients who have chronic wounds or who have recently received antibiotic therapy may also be infected with gram-negative rods, and those with foot ischemia or gangrene may have obligate anaerobic pathogens<sup>3</sup>. The treatment of such cases is controversial, and no standard guidelines were available<sup>4</sup>. The inappropriate use of antibiotics with aggressive surgical interference and in most cases, amputation of a part of a limb is usually applied. In the lower limb, this is usually bellow-knee (BKA) or above – knee (AKA) amputation<sup>5-8</sup>. In our study, we try to approach such cases with aggressive conservative management. This aggressive conservative management is composed of frequent wound debridement, dressing, and antibiotics. In recent years, many drug companies marketed many types of lotions, solutions, and ointments to be used in the management of DF.

## PATIENTS AND METHODS

The study involves (100) patients seen at Specialized Center for Endocrinology and Diabetes (SCED) during the period from 1<sup>st</sup> of Feb. 2008 to 31<sup>st</sup> of Dec. 2011.

The average age was (47 years) with an age range of (25-89years).Male's number was 63 (63%) and the female's number was 37(37%). Male: Female ratio was 1.702 :1. All patients in the study were complicating of type 2 diabetes (T2D) These patients were presented to SCED with the complicated DF (severe foot infection with tissue necrosis associated with type 2 diabetes). Surgical consultation was sought for wound care. They exhibited a failure of simple conservative management, which included antibiotic treatment with daily dressing. Amputation of the affected part of the limb was either refused by the patient, his or her family or due to comorbidity (ischemic heart disease, heart failure, severe hypertension, nephropathy leading to impaired renal function) which rendered general anesthesia hazardous to the comorbid patient. The number of patients who showed comorbidity was 64 (64%) with an average age of 45 years and T2D for more than 10 years. A number of males was 40 (62.5%) and females were 24 (37.5%). See table 1.

**Table 1: Summarizes the Data of the Study**

	Males(%)	Females (%)	Total No.(%)
No. of patients	63 (63%)	37 (37%)	100 (100%)
No. of comorbid patients	40 (62.5%)	24 (37.5%)	64 (100%)

Each patient was assessed clinically (for vital signs, peripheral pulses, peripheral nerve examination (sensory and motor), presence of neuropathy and local foot examination, and biochemically (fasting blood sugar, 2-hours after food “postprandial” blood sugar, blood urea, serum creatinine, Hb ESR), CXRay, X-Ray of the affected foot and wound swab if needed.

### We try to Treat All Patients Conservatively to Avoid Amputation of the Affected Part. The Treatment was Consisting of

- Control of blood sugar (BS) by soluble insulin subcutaneously 3 times daily. The dose was adjusted according to BS level, with daily estimation of BS.
- Regulation of patients' diet with consumption of 3 main meals and 2 snacks, one at early morning and second at bedtime.

- Antibiotics cover against gram-positive, gram-negative and anaerobic bacteria. The antibiotic used was Ceftriaxone 1gm twice daily +/- Metronidazole 500gm twice daily. Those with sensitivity we used Amikacine 500gm twice daily. We continue treatment for 2 weeks or until the wound is clean.
- Debridement of wound and excision of dead and necrotic tissues. Then the wound was irrigated by normal saline and /or 10% povidone iodine (Betadine). The wound was left open, to be covered only during movement.
- The wound was revised daily or every other day, according to the circumstances. Recleaning of the wound was given for better control for some patients.
- If the bone (a phalanx) was found to be involved, it is removed under local anesthesia.
- Education of the patient about foot care by Chiropodist in the SCED was done.
- In some cases, post -treatment X-Ray of the affected part was performed.
- Photographs of each patient were taken before and after wound healing to document the results of the treatment.
- A patient who finally failed to respond to the conservative treatment and needed amputation were excluded from the study.

## RESULTS

The study of Patients showed complete wound healing were 35 days (range (15-55 days

### The End Results of Our Management Are as Follows

- Ñ Number of Patients showed complete wound healing was 35 Patients (35%). See case no.2 below.
- Ñ Number of Patients who end with a residual scar or ulcers were 35 patients (35%). The ulcer were easily treated by simple surgical procedures, or by skin graft. See case no.3 below.
- Ñ Thirty Patients (30%) needed a longer period of management for complete resolution of infection and healing (more than 2 months). See case no.1. See table 2.

**Table 2: Shows the Results of Management**

	No. of Patients (%)
Complete healing	35(35%)
Scar, Ulcer or Surgical procedure needed	35(35%)
Long Period for complete healing	30(30%)
Total No.(%)	100 (100 %)

## DISCUSSIONS

All the Patients were referred to a chiropodist for advices for wound care during the period of treatment and where Patients were at home.

## DISCUSSIONS

Some argue that many apparently uninfected diabetic foot ulcers are actually subclinically infected –that is, they contain a high “ bioburden” of bacteria (usually defined as  $10^5$  organisms per gram of tissue) that results in “critical colonization “ level and impairs wound healing<sup>9,10-15</sup>. Available published evidence does not support the use of

antibiotics for the management of clinically uninfected ulcerations, either to enhance wound healing or as prophylaxis against infection<sup>16-17</sup>. They now account for the largest number of diabetes-related hospital beds, are the most common proximate, no traumatic cause of amputations. Diabetic foot infections require careful attention and coordinated management, preferably by a multidisciplinary foot – care team. Optimal management of diabetic foot infections can potentially reduce the incidence of infection–related morbidities, the need for the duration of hospitalization, and the incidence of major limb amputation<sup>18,19</sup>. Patients with infections that are either severe or complicated by critical limb ischemia should generally be hospitalized, with a restoration of the fluid and electrolyte balance; correction of hyperosmolality, acidosis, and azotemia; and treatment of the exacerbating disorders. As the infection improves, hyperglycemia may be easier to control. Many infections require surgical procedures that range from drainage and excision of infected and necrotic tissues to revascularization of the lower extremity and reconstruction of soft – tissue defects or mechanical misalignment<sup>20-24</sup>.

Unfortunately, surgical treatment of diabetic foot infections is based on even less-structured evidence than that of antibiotic therapy<sup>25</sup>.

Seek urgent surgical consultation for life-or limb – threatening infections. Such as those presenting with necrotizing fasciitis, gas gangrene, extensive soft – tissue loss, or evidence of compartment syndrome, or those in the limbs with critical ischemia. Timely and aggressive surgical debridement, including limited resections or amputations, may reduce the need for more – extensive amputation<sup>26-27</sup>.

It may be appropriate to delay surgery to carefully observe the effectiveness of medical therapy or to determine the demarcation line between necrotic and viable tissue<sup>28</sup>. The surgical approach should optimize the likelihood of healing and should attempt to preserve the integrity of the walking surface of the foot<sup>32</sup>. In addition to manual dexterity, the surgeon must have sufficient knowledge and experience to judge when and how to intervene. In most instances, the surgeon should continue to observe the patient until the infection is under control and the wound is healing<sup>33</sup>. In some cases, and amputation is the best or only option<sup>34-35</sup>.

Urgent amputation is usually required only when there is extensive necrosis or life –threatening infection<sup>35</sup>. Elective amputation may be considered for the patient who has recurrent ulceration (despite maximal preventive measures), has irreversible loss of foot function, or would require unacceptably prolonged or intensive hospital care. Generally, the surgeon should attempt to save as much of limb as possible on the heel, until they soften enough to be more easily removed, provided there does not appear to be an underlying focus of infection. The wound may require additional after the debridement performed during the initial assessment. The goal is to physically excise dead and unhealthy tissue, thereby enabling wound healing and removing a reservoir of potential pathogens. This can usually be undertaken as a clinic or bedside procedure and without anesthesia, especially for a neuropathic foot. Sharp debridement with a scalpel, scissors, or tissue nippers is generally preferable to hydrotherapy or topical debriding agents, which are less definitive and controllable and may require prolonged and repeated applications.

All patients in our study were complaining of type 2 diabetes (T2D). These patients were presented to SCED with the complicated DF (severe foot infection with tissue necrosis associated with type 2 diabetes). Surgical consultation was sought for wound care. They exhibited failure of simple conservative management, which included antibiotic treatment with daily dressing. Amputation of the affected part of the limb was refused either by the patient, his or her family or due to comorbidity (ischemic heart disease, heart failure, severe hypertension, nephropathy leading to impaired renal function)

which rendered general anesthesia hazardous to the comorbid patient. The Patient was conservatively treated to avoid amputation of the affected part. The treatment consisted of:

- Ñ Control of blood sugar and regulation of patient's diet.
- Ñ Education of the antibiotics covers and debridement of wound and excision of dead and necrotic tissues.

We used ceftriaxone 1gm twice daily +/- metronidazole 500mg twice daily. The treatment continues for 2 weeks, or until the wound is clean.

Although 30% of patients need two months or complete resolution, most 70% of patients, need less than this long period.

Lipsky *et al* (2004) advocated trying conservative management (debridement and antibiotics) and they report good result in their study<sup>2</sup>. Ramsey (1999) *et al* reached the same results as regarded to avoid amputation in the treatment of DF<sup>2</sup>. Chantelau (1996) *et al* treated DF ulcers with antibiotics and daily wound care and they obtain good results in their trail<sup>16</sup>. Calhoun (1988) *et al* reported controversial results about DF management and their results were to rather to treat conservatively<sup>32,33</sup>.

## **CONCLUSIONS AND RECOMMENDATIONS**

Diabetic foot is a major problem among diabetics, especially if blood sugar is not well controlled. Most these neglected cases proceed to gangrene and end in amputation with patience and patient education, we can avoid amputation of whole or part of a limb. This can be achieved by a strategy outlined above.

We recommend to try the best to avoid amputation of the affected limb by trying conservative approach. To reach this goal the physician should stick to the following points.

- Ñ Selection of patients.
- Ñ Good control of blood sugar.
- Ñ Aggressive conservative approach, i.e. debridement of the wound and excision of dead and necrotic tissues.
- Ñ Good and proper antibiotic cover.
- Ñ Close patient observation and follow-up.

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## **APPENDICES**



**Case No 1 Picture 1-5**



Case No 2 Picture 6-8



Case No 3 Picture 9-15



Case No 4