

## Diabetic Septic Foot Lesions in El Obeid, Western Sudan

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### Abstract:

**Objectives:** To study the magnitude, presentations and outcomes of diabetic septic foot lesions in El Obeid, Western Sudan.

**Patients and Methods:** The records of 86 diabetic patients with septic foot lesions admitted to the wards of the University Surgical Unit at El Obeid Teaching Hospital, Western Sudan during the years 2005 and 2006 were studied. The data of 5 patients who were referred to other hospitals were excluded.

**Results:** There were 55 males and 26 females. The mean age was 56.81 years  $\pm$  SD 12. On presentation 60 patients (74.1%) were Wagner's Grade 3, 4 and 5. 20 patients ended with major lower limb amputations (24.7%) and 23 others had minor toe amputations (28.4%). The mortality was 6 patients (7.4%).

**Conclusions:** The late presentation and the poor outcomes necessitate the need to raise the awareness among the society and health providers, about the magnitude of the problem. A multi-disciplinary foot care team approach with the establishment of a local diabetic centre is highly recommended.

**Key words:** Wagner's classification.



### Introduction

Too many of the nearly 200 million people in the world with diabetes suffer from diabetes-related foot complications<sup>1</sup>. Individuals with diabetes have at least a 10-fold greater risk of being hospitalized for soft tissue and bone infections of the foot<sup>2</sup>. Foot infections are the most common diabetes-related cause of hospitalization and are a frequent precursor of amputation<sup>3</sup>. Globally foot ulceration is thought to affect 15% of people with diabetes at some time in their lives<sup>3</sup>. Overwhelming sepsis and metabolic disturbances may lead to multi-organ failure and death.

Diabetes mellitus is a common medical problem in the Sudan and diabetic septic foot infection is a serious complication; with considerable morbidity and mortality<sup>4</sup>. In this study we reported our local experience in El Obeid Teaching Hospital, Western Sudan.

### Patients and Methods

The records of 86 patients admitted with diabetic septic foot lesions to the wards of the University General Surgical Unit, at El Obeid Teaching Hospital, Western Sudan; were studied. Out of these, five patients were referred to other hospitals so they were excluded.

The diagnosis of infection was based on clinical criteria consistent with the International Working Group guidelines<sup>2</sup> i.e. the presence of at least two of the following signs: swelling, indurations, erythema around the lesion, local tenderness, local warmth and presence of pus.

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The clinical presentations of the patients on admission were classified according to Wagner's classification (Table1)<sup>5</sup>.

Table 1: Wagner's classification<sup>5</sup>

Grade 0	High risk foot- No ulceration.
Grade 1	Superficial ulcer.
Grade 2	Ulcer penetration to the subcutaneous tissue.
Grade 3	Deep ulcer + abscess, osteitis or osteomyelitis.
Grade 4	Partial foot gangrene.
Grade 5	Extensive gangrene of foot.

On admission immediate measures were taken for the control of hyperglycaemia with soluble insulin. Local foot care was performed by wound dressings, abscess drainage, surgical wound debridement, and amputation when appropriate. The data was analyzed for age, gender, stage on presentation, treatment offered and outcomes.

### Results

There were 55 males and 26 females, giving a male: female ratio of 2.1:1. The age ranged between 30 and 85 with a mean [ $\pm$ SD] of 56.8 [ $\pm$ 12] years. The mode of presentation according to Wagner's classification was shown on table 2. The type of local foot treatment offered was shown on table 3. Out of the 20 patients who underwent major amputations, 4 were above knee (A.K.) and 16 were below knee (B.K.). Most of the patients who underwent amputations had initial conservative management. The overall mortality was 7.4% (6 patients).

Table 2: Mode of presentation (Wagner's classification)

Grade	No. of patients	%
0	00	00.0
1	03	03.7
2	18	22.2
3	25	30.9
4	23	28.4
5	12	14.8
Total	81	100.0

Table 3: Treatment.

Treatment procedure	No of patients	%
Wound dressings only	09	11.1
Drainage of abscess	11	13.6
Surgical debridement	18	22.2
Minor amputations	23	28.4
Major amputations	20	24.7
Total	81	100.0

## Discussion

Diabetes mellitus is a common medical systemic disease in Sudan<sup>6</sup>. El Mahdi EM et al reported that peripheral neuropathy accounted for 28.1% of their series in Khartoum, the majority of them had uncontrolled diabetes<sup>6</sup>. The diabetic septic foot is one of the most serious complications in this country and else where<sup>1,4</sup>. Predisposing factors like uncontrolled hyperglycaemia, peripheral neuropathy and angiopathy were prevalent<sup>4,6</sup>.

In this study males predominated. The majority of the patients were elderly; similar age pattern was reported before<sup>4,6</sup>.

The clinical presentations of the patients on admission were classified according to Wagner's classification<sup>5,7</sup>. None of the patients was Grade 0, while patients presented as Grade 1 were 03.7% and Grade 2 were 22.2%. Patients classified as Grade 3, 4 and 5 were 30.9%, 28.4% and 14.8% respectively, (= 74.1%). This figure is higher than those reported by Rooh-UI-Muqim, et al [55%]<sup>7</sup> and Al-Ebous AD, et al [42%]<sup>8</sup>, thus reflecting that most of our patients had late presentations with deep ulcers, osteomyelitis or frank gangrene.

The initial management of our patients concentrated on the metabolic control of blood glucose by soluble insulin in addition to local wound care. Although Armstrong DG, et al<sup>9</sup> validate a system for classification of diabetic foot surgery, that was not adopted in the case of our patients. The majority of the patients were offered wound dressings, abscess drainage and surgical debridement. 53.1% of our patients needed

amputation procedures for gangrene. Khammash MR et al, from Jordan, reported similar figures, with amputations in 54% of patients<sup>10</sup>. Rooh-UI-Muqim, et al reported amputations in 48% of their patients<sup>7</sup>, where as O'Rourke I, et al had 60% amputations in their series<sup>11</sup>. In this last experience the patients were elderly and vascular complications accentuated the limb non-viability.

In this study 23 patients (28.4%) had minor amputations mainly of gangrenous toes. 20 patients (24.7%), had major amputations; 16 were below knee and 4 were above knee. Individuals with diabetes have a 30-fold higher lifetime risk of undergoing a lower extremity amputation compared with those without diabetes<sup>3</sup>. It is considered that every 30 seconds a lower limb is lost somewhere in the world as a consequence of diabetes<sup>12</sup>. Singh and Chawla quoted<sup>13</sup>: "Care your feet as your face or you will bury your feet before your face." It is our experience that the skin temperature provides a valuable marker for the level of amputation. Similar observation was also mentioned before<sup>14</sup>.

The mortality in this study was 7.4%. The main cause of death was fulminant sepsis leading to multi-organ failure in patients presenting as Wagner's Grade 4 and 5. Rooh-UI-Muqim reported a mortality of 4% due to sepsis in similar patients<sup>7</sup>. The mortality of 22.1% was reported two decades ago in a study from Khartoum Teaching Hospital<sup>4</sup>.

Identification of risk factors helps to predict patients at highest risk for complications and to plan targeted preventive measures. Integrity of the skin is of paramount importance in protection against infection. A risk factor or an ulcer in a digit or foot draws the attention to meticulous care of the contralateral foot. Kucan reported that 49% of his patients developed severe infection involving the contralateral foot; within 18 months follow up<sup>15</sup>. Diabetics with septic foot lesions need special care in specialized centres<sup>16</sup>, where local treatment protocols can be effectively applied<sup>17, 18</sup>. The Diabetic Centre provides education of the patients by a conservative foot-sparing approach like foot cleansing, nail care and off loading pressure points. Health-care professionals need to examine the feet carefully. It only requires a tuning fork, pin, tendon hammer and a 10-g monofilament; with frequent follow up<sup>19</sup> that includes awareness to other end-organ complications (eye, heart, kidney) and close attention to blood glucose control<sup>20</sup>.

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