Limb salvage in diabetic foot

Muhammad Rafique Memon, Shakeel Ahmed Abbasi, Altaf Ahmed Shaikh

Department of Surgery, Ghulam Muhammad Mahar Medical College Sukkur, Pakistan

Objective
To determine the outcome of conservative management of diabetic foot as limb salvage.

Patients and Methods
This descriptive prospective study was conducted in the department of General and Orthopedic surgery, Ghulam Mohammad Mahar Medical College Hospital, Sukkur, Pakistan from January 2010 to December 2011. Sixty five patients with diabetic foot were included in the study. The treatment regimens consisted of conservative debridement or surgery, two to four weeks of i/v and oral antibiotics and multiple aseptic dressing. All the patients were assessed by the Wagner's grading system of diabetic foot and the most common grade of diabetic foot in this study were grade ii and iii. Follow up after hospital discharge was 6-12 months. Failure of conservative treatment was the main outcome measure.

Results
A total of 65 diabetic patients were admitted for foot lesions with contiguous osteomyelitis, deep tissue involvement and/or gangrenous lesions. There were 47 (72.3%) male and 18 (27.69%) female patients, with male to female ratio of 3:1. Age ranged from 30 to 70 years (average 52). Initial conservative procedures were wound debridement (41 patients), excision of necrotic bone (03 patients), small and/or big toe amputation (15 patients) and below and above knee amputations (6 patients) after failure of initial debridement. Conservative treatment was successful for 59 (90.76%) patients and six (9.23%) patients underwent major amputation after failure of conservative measures. There was 1.5% mortality.

Conclusion
It is concluded that conservative surgical intervention, long term empiric antibiotics and interdisciplinary wound care is a safe and effective alternative to amputation in selected patients. (Rawal Med J 2012;37:300-303).

Keywords
Diabetic foot, limb salvage, amputations.

INTRODUCTION
Diabetic foot is the most feared complication of diabetes, ultimately resulting in amputation and is associated with high morbidity and mortality. Major amputation in the diabetic foot in the western world is frequent and is associated with high human and financial costs. Patients with diabetic foot require more than 50,000 lower extremity amputations annually in the united states. Despite efforts to control diabetes and improve limb salvage rates, the number of amputations performed in the united states continues to rise. Quality of life is poor for the patient with a chronic foot ulcer, but it is still worse after an amputation. Early recognition and proper management of risk factors may prevent amputations.

People with diabetes are 20 times more likely to undergo an amputation than rest of the population. Good diabetic control and detection of early diabetic foot complication will reduce the number of patients undergoing limb amputation as well as number of amputees. In our local circumstances, diabetic foot is a neglected entity which can be prevented by adequate care and awareness of public and timely referral to special units. Therefore, we conducted a prospective study of diabetic patients admitted in our surgical and orthopedic department for foot ulcers and infection with or without osteomyelitis with more foot sparing and less aggressive surgical ablation as first line treatment and reducing the number of major amputations.
PATIENTS AND METHODS
This prospective study included 65 patients with diabetic foot and was conducted in the departments of surgery and orthopedics, Ghulam Mohammad Mahar Medical Collage Hospital Sukkur, Pakistan during a period of two years from January 2010 to December 2011. All the patients after history and clinical examination were investigated by CBC, Blood Sugar level, and renal function. Blood sugar was controlled mostly by insulin injections. Anteroposterior and lateral radiographs of feet were taken to evaluate bone involvement of bone. The diagnosis of osteomyelitis was made on clinical grounds, grossly infected or exposed bone or by X-rays.

All the patients were assessed according to wagner's classification.

After achieving blood sugar control, patients were operated for wound debridements, small or big toe amputation, incision and drainage and below or above knee amputations. All the patients were treated with I/V antibiotics according to culture and sensitivity reports and were then followed by oral antibiotics for a period of 2-6 weeks. They were admitted for 1-2 weeks. Multiple dressings with povidone solution and gel or duoderm were performed till the complete healing of the wound. Skin grafting or secondary wound closures were also performed. Follow up of the patients were done weekly for a period of 6-12 months to assess the outcome of conservative surgery. Out of 65 patients, eight were lost to follow up after initial 2-3 visits Statistical analysis was carried out using SPSS.

RESULTS
In this study, out of total of 65 patients, 57 (87%) were males and 18 (13%) were females with male to female ratio of 3:1. Age ranged from 30-70 years (average 52). Common age group was 5th and 6th decade of life. All were assessed according to wagner's classification: Grade i were 14 (21.53 %) patients presented with foot ulcer, Grade ii were 19 (29.23%) with cellulitis foot, Grade iii, 21(32.30%) with small or big toe gangrene, Grade iv,08 (12.30%) patients with fore-foot gangrene and heel abscess and Grade v, 03 (4.6 %) with foot and leg gangrene (Table 1).

Neurovascular status of the patients was evaluated and no co-existing peripheral vascular disease found in the study group.

Table 1. Wagner's grading of diabetic foot (n=65).

<table>
<thead>
<tr>
<th>Wagner's grade</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0</td>
<td>Nil</td>
<td>00</td>
</tr>
<tr>
<td>Grade 1</td>
<td>14</td>
<td>21.53 %</td>
</tr>
<tr>
<td>Grade 2</td>
<td>19</td>
<td>29.23%</td>
</tr>
<tr>
<td>Grade 3</td>
<td>21</td>
<td>32.30%</td>
</tr>
<tr>
<td>Grade 4</td>
<td>08</td>
<td>12.30%</td>
</tr>
<tr>
<td>Grade 5</td>
<td>03</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

Out of 65 diabetic foot lesions, wound debridement was done in 41 (63.07 %) patients, incision and drainage with excision of necrotic bone in 03 (4.6 %) patients, small and/or big toe amputation in 15 (23.07 %) patients as initial first aid conservative treatment; while below knee amputations in 04 (6.15%) and above knee amputations in 02 (3.07 %) patients after failure of initial debridement (Table 2).

Table 2. Different operative procedures (n=65).

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound debridement</td>
<td>41</td>
<td>63.07%</td>
</tr>
<tr>
<td>I/D and Excision of Necrotic bone</td>
<td>03</td>
<td>4.6%</td>
</tr>
<tr>
<td>Small and/or big toe Amputation</td>
<td>15</td>
<td>23.07%</td>
</tr>
<tr>
<td>Below Knee amputation</td>
<td>04</td>
<td>6.15%</td>
</tr>
<tr>
<td>Above knee amputation</td>
<td>02</td>
<td>3.07%</td>
</tr>
</tbody>
</table>

Overall failure rate (major amputations) of conservative surgical treatment was 9.23% in the study. One patient expired due to septicemia with necrotizing fascitis during postoperative period of 20-30 days as this patient was not willing for major amputation. The mortality rate was 1.5% in the study. Foot salvage was 90.76% in this study and wounds healed completely after conservative surgical treatment and no relapse was found during the follow up period. These patients were managed by multidisciplinary team comprised of general surgeons, orthopedic surgeon and physician, who attended the patients twice in a week and educated the patients for proper foot care, diabetic control and other precautions.
DISCUSSION
Diabetic foot infections and gangrene result in high morbidity and mortality. The treatment of diabetic foot lesions now has been increasingly modified to a more conservative foot sparing approach. All over the world, the conservative surgical treatment is attempted with debridement of necrotic tissues along with antimicrobial therapy and limb salvage with better long term outcome. Pittet et al reported a study of diabetic foot infection with better results. Our findings support this conservative management, especially as an initial intervention. Only six of our 65 patients required major amputation. 59 (90.76 %) patients collectively fared well with either soft tissues and bone debridement, or partial amputation in our study. In one study, only two out of 50 patients required major amputation on their first admission. In our study, the patients with Wagner's grade i and ii were cured completely; whereas in grade iv and v patients conservative treatment failed and most of them ended up with major amputation. A significant number of amputations in diabetic patients can be prevented by patient education, foot care and increased awareness on the part of diabetes care teams of effective strategies in ulcer management. Not all diabetic foot lesions, however, are amenable to successful conservative limb salvage treatment; a number of patients require amputation. Muqueem et al in the study of 100 patients with diabetic foot reported 48% total amputation rate. Mivajima S et al presented a series of 210 diabetic foot patients; 52% of patients required limb amputation. In a series by Ghanassia E et al, out of 94 diabetic patients, 39 (43.8%) patients underwent amputation, 24 major and 15 minor.

In our series, only six major and 15 minor amputations were done. Thus, major amputation rate in our study is low as compared to other studies. Major amputations can be reduced by combined efforts and management by multidisciplinary diabetes foot care team. Improved foot care and diabetic education can reduce the rate of diabetes related amputations by 50% to 70%. Eneroth et al demonstrated healing deep foot infections, including osteomyelitis without amputation in 39% of their large series of 223 patients. The authors emphasize aggressive initial soft tissue surgical debridement. Conservative therapy by another multidisciplinary diabetic foot clinic and long term oral antibiotics resulted in resolution of bone infection in 17 out of 21 patients with chronic foot ulcers without bone resection. Pittet et al reported successful conservative treatment of diabetic foot ulcers with osteomyelitis.

CONCLUSION
We conclude that early conservative, foot-sparing surgery, under cover of antibiotic therapy, is safe in selected patients and may be an alternative to early amputation, especially as an initial intervention.

REFERENCES