

Surgical Management of Diabetic Foot Syndrome: A Retrospective Study

Mohamed Hnesh^{1,3}, Malak Elazerag², Idris Nagib^{1,3}, Ibrahim Jabeal^{1-3@} and Laila Bshara³

¹Department of Surgery, Faculty of Medicine, University of Tripoli- Tripoli Libya;

²Department of Medical Endocrine Surgery, Tripoli Medical center;

³Department of Endocrine and Breast, Tripoli Medical center

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ABSTRACT

Diabetes mellitus is a chronic disorder characterized by impaired metabolism of glucose and it has many complications affecting the micro vascular level of the eye and kidneys and a variety of clinical neuropathy. It is associated with premature macro vascular diseases such as myocardial infarction and stroke, and peripheral vascular complications leading to ischemia and necrosis with putrefaction of the lower limbs.

The objective of this study is to describe the clinical, pathophysiological findings and surgical management of diabetic foot and how we can improve our outcomes and develop a guideline for the management of diabetic foot. It is a retrospective study of data on a total number of 33 patients admitted to Breast and Endocrine Department at Tripoli Medical Center over a one year period (from first of January 2014 to thirty one of December 2014).

We conclude that diabetic foot syndrome is a major complication of non-controlled diabetes mellitus which can be prevented by education and proper management of diabetes mellitus. Amputation can be minimized in diabetic patients by controlling blood sugar level, along with the administration of antibiotic and Debridement. Meropenem (Meronem) was found to be more effective than any other antibiotics used in our study in treating diabetic foot syndrome.

Keywords - Diabetes mellitus; Foot complications; Surgical Managements.

INTRODUCTION

Diabetes mellitus is a chronic disorder characterized by impaired metabolism of glucose and by complication that include micro vascular disease of the eye and kidneys and a variety of clinical neuropathy.¹ Diabetes is also associated with premature macro vascular diseases such as myocardial infarction and stroke, and peripheral vascular complications such as amputation. The world Health Organization (WHO) expert committee on diabetes² defined diabetes mellitus as a state of chronic hyperglycemia which may result from several interacting and environmental processes. Mortality in diabetes is 42%.³ Macro vascular complication are the major cause of mortality in patients with diabetes mellitus.³⁻⁵Foot complications occur in both forms of diabetes and are related more to the period of time that the illness has been present than to the age of onset.⁶ Foot complications now constitute a major public health problem for diabetic patients in various African countries. Foot complication in African patients are generally infective in origin rather than due to peripheral vascular disease.^{7,8} Foot ulcers are common in the older diabetics and community surveys have shown that 15% will develop a foot ulcer at some point in their lives.⁹⁻¹¹

The purpose of this study is to describe the clinical, pathophysiological findings and surgical management of diabetic foot to compare it with other studies and how we can improve our outcome and develop our guidelines for the management of diabetic foot.

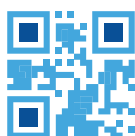
MATERIALS AND METHODS

A retrospective study of data on a total number of 33 patients admitted to the Breast and Endocrine Department at Tripoli Medical Center and treated with a collaboration of consultants from the Department of Medical endocrine at Tripoli Medical Center over a one year period (from 1st January 2014 to 31 December 2014) was conducted. The study included: demographic distributions, age, sex, race, type of diabetes, type of diabetic foot pathology, line of management, duration of hospital admission, HbA1c, Doppler ultrasound, result of the swab and culture and sensitivity random and fasting blood sugar level, medical and surgical management.

RESULTS

A total number of 33 patients admitted to the Endocrine and Breast Department at Tripoli Medical Center over a one year period (from 1st January 2014 to 31 December 2014) was studied and only 11 of the cases were found to have complete files. After analysis of the data it was found that all subjects had type II diabetes mellitus and that male patient diagnosed with diabetes mellitus were more than female by a ratio of (7:4).

The age of patients ranged between 43 to 80 years with a mean of 62 years. The time period the patients had suffered



from diabetes ranged from 15 to 40 years and the duration of hospital admission was 3 to 55 days with a mean of 27 days. At the time of admission all patients had the symptoms and signs of inflammation including (swelling, hotness, tenderness and loss of function's) with discharge and pus collection. Blood pressure was controlled in 3 patients, 3 cases were hypertensive, and 5 cases were hypotensive.

Analysis of HbA1c showed a mean result of 8% with 7 cases > 10%, one patient < 6%, and the remaining 3 patients had no results.

Doppler ultrasonography was performed on 7 of the subjects and showed one case to have weak blood flow, one case with severe calcified stenosis of both the anterior and posterior tibial arteries, and 5 cases showed normal blood flow.

Culture and sensitivity tests were performed many times on the patients during their stay in the hospital and a total of 5 types of bacterial pathogens, mostly Gram positive, were found in the culture which were: *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, and *Klebsilla*. Culture and sensitivity tests revealed 5 cases with mixed heavy growth of *Escherichia coli* and *Proteus mirabilis* which were sensitive to Ceftriaxacin, 2 cases with *Pseudomonas aeruginosa* and *Enterococcus faecalis* which were sensitive to Meropenem, 3 cases with *Pseudomonas aeruginosa*, *Proteus mirabilis* and *Enterococcus faecalis* which were sensitive to Meropenem as well, and one case with *Enterococcus faecalis* and *Pseudomonas aeruginosa* which was sensitive to Ciprofloxacin. The result of one the culture was *Pseudomonas aeruginosa* which was sensitive to Doxycycline and two culture there were *Klebsilla* sensitive only to Meropenem.

All the patients in this study were found to be anemic with haemoglobin levels ranging between (9-13.3) with a mean value of 11.19 mg/dl. Other parameters measure such as fasting blood sugar were found to be between (81-304 mg/dl) with a mean value of 208 mg/dl and the random blood sugar ranged between (81-451) with a mean value of 266 mg/dl.

In relation to foot complications, 6 cases were affected in their left foot whereas the remaining 5 cases were affected in their right foot. Partial amputation was performed on 8 cases with 4 of the partial amputations carried out on the left foot and 4 on the right foot. Furthermore, incisional and drainage was performed on 2 cases.

Treatment was initiated by controlling blood sugar levels and using a broad spectrum antibiotic such as Rocephine at the time of admission until being substituted by the appropriate antibiotic as determined from the results of the culture and sensitivity tests. From this study it was found that 4 cases out of 11 cases when treated with Meropenem, had a good response with minimal surgical intervention and a short stay in the hospital in comparison with the other 7 cases who treated by other antibiotics such as Augmentin, Clarithromycin, Gentamycin, Ceftriaxone, Cloxaciline, Penicillin, Metranidazole, Ciprofloxacin, and Vancomycin.

DISCUSSION

The fundamental cause of lower extremity complications in diabetes is chronic hyperglycemia leading to hyper glycosylation of the various body tissues. HemoglobinA1c is a molecule. It is probably the most readily recognized example of hyper glycosylation in diabetes hemoglobin A1c is used to measure blood glucose control during an extended period e.g., several weeks.¹²

The predominant of type II diabetes in patients suffering from diabetic foot is: Type I: Type II in different studies being 0.12,¹³ 0.023¹⁴ and 0.19.¹⁵ All the cases in present study were type II. The late middle-age group is naturally more liable to diabetic complication because of longer duration of the disease.¹⁶ The male preponderance is also reported in literatures¹⁶⁻¹⁷, the ratio between male: female was 3:8 1:8 and while in Libya male: female ratio was 3:1.¹⁸ In other study in Libya male: female ratio was 1:1.2.¹⁹ In this study male are more than female the ratio was 2:1.7.

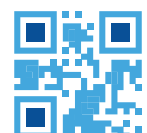
Basic principles of wound care including surgical and nonsurgical components are essential to effective healing of these wound. The therapy should be directed toward the causes including chronic tissue hypoxia, nerve injury and pressure trauma. The majority of ulcers can be healed with proper care and if tissue hypoxia can be controlled then prevention of foot ulcers is possible, with the most cost-effective and desirable means of preventing morbid complication of diabetes.¹² A study of expenses performed in America in 1998 indicated that the cost to treat one simple ulcer was from \$5000 to \$8000. The cost of treating an infected ulcer upon hospital admission is approximately between \$50000 to \$150000 in direct expenses.¹² Indirect costs, as those related to family support, disability, and loss of independence, are many times the cost of direct expenses. It is more expensive to treat diabetic complications than to treat a simple diabetes mellitus where in the present study patients admitted to the hospital with diabetic foot syndrome stayed between (3-55) days with a mean stay of 27 days.

CONCLUSION

From this study it can be concluded that diabetic foot syndrome is a major complication of non-controlled diabetes mellitus which can be prevented by education and proper management. Meropenem was found to be more effective than any other antibiotic in treatment of Diabetic Foot Syndrome. Amputation can be minimized and prevented in diabetic patients by controlling blood sugar levels, antibiotic use, and debridement.

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