ORTHOPAEDIC SURGERY

Diabetic Extremities in Kaduna

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ABSTRACT

A 5-year retrospective review of 35 patients, suffering from diabetes mellitus with complication of the disease affecting the hands and feet is made between November 1994 and October 1999. The age range was 35-70 years with mean age of 48.5 years. M:F ratio was 2:1. The mean blood sugar at presentation was 12.9 mmol/L. There were 4 diabetic hands and 31 diabetic feet. There were 17 amputations, 12 serial wound dressing and 6 debridments. Mean duration of hospitalisation was 47.3 days. Early presentation and aggressive surgical approach to these patients is recommended *(Nig J Surg Res 2000; 2:57-61)*

KEY WORDS: Diabetes, Extremities

Introduction

Diabetic feet are the underlying indication for 75% of all amputations in the Western world. In our environment, it accounts for about 5.3% of major amputations.[5] It is estimated that about 10-15% of diabetics develop foot ulcers at sometime in their lives; this represents about one-fifth of all diabetics requiring surgery[4, 11] and 50% of all diabetics requiring admission.[13] Fifteen to 20% of these ulcers are estimated to result in lower extremity amputations[11] A similar picture is emerging today in the developing world with the adoption of the western life styles.

It is a serious problem to the patients, the surgeon and the public in general. Admission of these patients are usually prolonged and associated with high cost of Medicare. It is associated with social deprivation and lots of negative cultural beliefs.

Peripheral and autonomic neuropathies worsened by obliterative angiopathy are two crucial factors leading to clinical problems in diabetic foot. These pave way to trauma and sepsis, which are secondary pathogenic events. [2,6] In addition, the defective immune system in these patients worsens the process of would healing .[1,12]

Improvement in technological aids helps in screening the patients ,and ensures better selection for the various surgical treatments.[15] Simple preventive methods involving proper use of foot wears would go a long way to reduce the incidence of foot problem in diabetics.

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A diabetic foot clinic with a multi-specialist team to care for these patients is the standard practice in the developed world.[8, 12]

Early and aggressive antibiotic therapy is essential to prevent progression of infection. Limb salvage procedures such as hyperbaric oxygen therapy, [1,9,10] and vascular by-pass aided by intra-arterial digital subtraction angiography is associated with acceptable result.[13] Metatarsal head resection, elimination of weight bearing, aggressive regular debridements, ray amputation and major limb amputation are surgical options [2,7] available to minimize the morbidity in these patients.

This report presents the spectrum of diabetic feet and hands, and evaluates the various treatment options available in our hospital.

Patients and Methods

A hospital-based five year retrospective review of all diabetic feet and hands treated at the Ahmadu Bello University Teaching Hospital between January 1994 and December 1998 has been performed. Clinical data was collected from operation registrars and case folders retrieved from the medical records library. All the ulcers were staged based on the description in the case folders using the modified Wagner's system.[16] Data collected were analysed using simple statistical methods.

Results

Thirty five cases of diabetic feet and hands were managed during the period out of 3301 diabetic patients managed in the hospital. Therefore 1.19% of these patients were found to have diabetic complications involving the extremities. The age range was 35-70 years (mean 48.5 years). The M: F ratio was 2:1. The mean blood sugar level was 12.9 mmol/L.

Table 1: Presenting features and fasting blood sugar level (mmol/L)

Feature	Fasting Blood sugar (mmol/L)			Total
	2.5-8.0	>8-10	>10	
Cellulitis	-	4	2	6
Ulcer	-	-	11	11
Gangrene	5	-	13	18
Total	5	4	26	35

Table 2: Location of symptoms

Region	Right	Left	Total
Foot	20	11	31
Hand	2	2	4
Total	22	13	35

Table 3: Precipitating events

Features	Spontaneous	Trauma	Burns	Total
Cellulitis	4	2	-	6
Ulcer	2	9	-	11
Gangrene	4	10	4	18
Total	10	21	4	35

Table 4: Stage of the extremity and type of diabetes mellitus

Stage (Wagner's) [16]	NID	ID	Total
0 (No ulcer)	-	-	-
I (Superficial ulcer)	3	2	5
II (Deep ulcer)	7	4	11
III (II+ osteomyelitis)	5	4	9
IV (Gangrene of toes)	2	3	5
V (Gangrene of foot or hand)	2	3	5
Total	19	16	35

NID = non insulin dependent, ID = insulin dependent

Table 5: Microbiological spectrum of ulcers

Organism	No.
Klebsiella species	13
Escherichia coli	10
Pseudomonas species	3
Proteus	6
Yeast	3
Total	35

Table 6: Treatment and duration of hospitalisation (Days)

Treatment	Duration of hospitalisation (days)			Total
	1-14	15-28	>28	
Wound dressing	4	4	4	12
Serial debridements	4	-	-	4
Amputation	3	8	6	17
Total	11	12	10	35

Mean duration of hospitalisation = 47.3 days.

Table 7: Outcome of treatment

Outcome	No.
Well	8
Upper limb amputee	3
Unilateral lower limb amputee	14
Bilateral lower limb amputee	5
Deaths	5
Total	35

Discussion

Diabetes mellitus and its complications were underestimated in the past based on paucity of information from this part of the world.[9] The productive age of 48.5 years recorded in this study compares with similar studies from many parts of the world. The high blood sugar level associated with higher degrees of complications reveals the importance of metabolic derangement in the aetiology of these surgical emergencies.

Trauma in the form of bad pedicure habits and thorn pricks are significant precipitating events observed in this review. The feet are mainly traumatised as compared with the hands (in which case the manual workers are usually affected). The role of insulin in the care of these patients is well highlighted, though majority of our patients presented late due to cultural beliefs, ignorance, poverty and patronage of the alternative Medicare. This accounts for high amputation rate, mainly of the lower limbs (below knee) and digital amputations in the upper limbs; though an optimal level of amputation is usually determined by combination of certain factors.[14] These patients despite their late presentations do not readily accept amputation of any sort; this account for the mean duration of hospitalisation of 43.7 days.

Prompt and aggressive radical surgical decision will ensure short hospital stay, lower medical bills and better quality of life. [11,12] Complication rates from this review is small as good surgical principles were strictly adhered to by early intervention, selective antibiotic policy and multi-disciplinary approach.

Conclusion

Enlightenment programmes on diabetes mellitus to the entire public and the patients will reduce the incidence of this disease and it's complications. Good surgical judgment is required to achieve a better quality of life.

References

1. Loder RE. Hyperbaric oxygen therapy in acute trauma. Ann R Coll Surg Engl 1979; 6: 472-473.
2. Ward JD. The Diabetic foot – a world wide problem. Progress in diabetes 1991; 2: 1-5.
3. Morain WD, Colen LB. Wound healing in diabetes mellitus. Clin Plastic Surg 1990; 17:493-501.
4. Grant IS. The diabetic patient. Surgery 1987; 1036-1040.

5. Garba ES, Deshi PJ, Ihejirika KE. The role of traditional bone setters in limb amputations in Zaria. Nig J Surg Res 1999; 1: 21-24.
6. Landsman AS. High strain rate tissue deformation. A theory on the mechanical actiology of diabetic foot ulcerations. J Am Podiatr Med Assoc 1995; 85: 519-527.
7. Armstrong D G, Liswood PJ, Todd WF. Prevalence of mixed infections in the diabetic pedal wound. A retrospective review of 112 infections. J Am Podiatr Med Assoc 1995; 85: 533-537.
8. Shenq SM, Klebuc MJ, Vargo D. How to help diabetic patients avoid amputation. Prevention and management of foot ulcers. Postgrad Med 1994; 96: 177-180, 183-186, 191-192.
9. McDermott JE. The diabetic foot: evolving technologies. Instructional course lecturers. 1993; 42: 169-171.
10. Doctor N, Pandya S, Supes A. Hyperbaric oxygen therapy in diabetic foot. J Postgrad Med 1992; 38:112-114.
11. Saders L J. Diabetis mellitus. Prevention of amputation. J Am Podiatr Med Assoc 1994; 84: 322-328.
12. Bridges RM. Jr. Dietch EA. Diabetic foot infection: Pathophysiology and treatment. Surg Clin Nor Am 1994; 74: 537-555.
13. Lumley LS. Vascular management of the diabetic foot – a British view. Ann Acad Singapore. 1993; 22: 912-916.
14. Pinzur MS. Amputation level selection in the diabetic foot. Clin Orth 1993; 296: 68-70.
15. Cook TA, Rahim N, Simpson HC, Galland RB. Magnetic resonance imaging in the management of diabetic foot ulceration. Br J Surg 1996; 83: 245-248.
16. Wagner FW. Jr. Orthopaedic rehabilitation of dysvascular lower limb. Orth Clin Nor Am 1978; 9: 325-350.