# NON –TRAUMATIC LOWER EXTREMITY AMPUTATIONS IN DIABETICS

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**ABSTRACT: Objective:** The purpose of this study was to estimate the prevalence of non -traumatic lower extremity amputations in diabetic in peripheral teaching hospital catchment area. **Study Design:** Prospective, Cross sectional, Interventional. **Setting:** Surgical Unit II. Aziz Bhatti Shaheed (Teaching) Hospital. Nawaz Sharif medical College, University of the Gujrat. **Study Period:** February 1, 2011 to January 31, 2012. **Results:** A total of 132 patient were subjected to non traumatic lower extremity amputation were enrolled in this study out of which 89 (67.42%) were diabetic, followed by non specific infections n=39 (23.48) Out of 89 total diabetic patients 53 (40.15%) patients were female whereas 36 (27.27%) were male. Both major and minor non traumatic lower extremity amputation rate was more in female diabetic patients than male diabetics. **Conclusions:** The prevalence of non –traumatic below knee amputations at an early age is high in our diabetic patients, especially in female population. By improving primary health care service regarding foot care awareness in diabetics appears to be the main way to reduce the amputation rate.

**Key words:** Diabetic foot, Below knee amputation, Complicated diabetes, Foot Ulcer

## INTRODUCTION

The major adverse outcomes of diabetic foot problems are foot ulcers and amputations. A wide variation in amputation rates has been documented between various countries and geographic regions. Approximately 40-60% of all non-traumatic lower leg amputations are performed in patients with diabetes. In most studies the incidence of lower leg amputations has been estimated to be between 7-206/100000 inhabitant / year. The highest figures have been reported for Indian reservation in the USA and lowest incidences are found in areas in Denmark and Great Britain. However, adequately performed population-based studies regarding incidence of amputation in the lower leg are scare, especially in the less developed countries including Pakistan. The difference in incidence is in many cases due to differences in the design of the study, demographic factors and prevalence of diabetes.

It has been reported that in 15-19% of diabetic patients undergoing an amputation, diabetes was first diagnosed at the time of surgery. Diabetic patients more frequently have below knee amputations than non- diabetic patients. As a consequence, studies which focus primarily on above ankle amputations tend to under estimate the total number of diabetes-related amputations.

Foot ulcers are documented to precede approximately 85% of all diabetic amputations. The proportion of patients undergoing amputation with gangrene in various studies was found to be between 50-70% and infection was found to be present in 20-50% of patients. In most cases amputation had to be performed because of the combination of deep infection and ischemia. The most common indication for amputation described in literature are gangrene, infection and a non –healing ulcer, Although frequently reported as such, a non healing ulcer should not be considered an indication for amputation. It has been estimated worldwide that one lower limb is amputated every 30s as a consequence of this condition. Of all non-traumatic LEAs, 50-70% is associated with diabetes[1].

Diabetic foot ulceration involves a complex underlying pathophysiology and a multifactorial approach to care, including preventive foot care, and aggressive management of acute foot ulceration, control of infection,

and early recognition of vascular disease[2,3].

In 1989, the World Health Organization and International Diabetes Federation initiated a joint program called Saint Vincent Declaration for improving the care of patients with diabetes[5]. The goals set forth included a > 50% reduction in major non-traumatic LEAs caused by diabetes.

District Gujrat is a peripheral under developed district with a large rural catchment area. There is no tertiary care hospital at GT Road from Rawalpindi to Lahore. Most are the patients are being managed in rural area by less experienced doctors having scare exposure with surgical problems that lead to delayed referral of patients to specialized setups. Moreover, above all, quacks are the main culprit in the miss management of patients that is the major factor in increase in the morbidity and mortality.

The aim of present study was to estimate the risk of non-traumatic lower extremity amputations (LEAs) in patients with diabetes presenting in a newly established peripheral teaching hospital, and to provide guideline for management and prevention that will reduce the impact of diabetic foot disease.

## MATERIAL AND METHODS

This is a prospective, interventional study conducted at Surgical Unit II, Aziz Bhatti Shaheed (Teaching) Hospital (ABSTH) Gujrat. ABSTH is a newly designated 400 bedded tertiary care hospital affiliated with Nawaz Sharif Medical College, Gujrat University, from February 1, 2011 to January 31, 2012. All the diabetic patients with non traumatic foot ulcer of all age groups and gender were included in this study. The patients were admitted in Surgical Ward both through, out patient and Emergency department. Patients were evaluated by through history and clinical examination. Co-morbidities were recorded. Local examination of foot was recorded, photographed and ulcers were categorized from grade I-V according to Wegner's classification. Diabetic control was achieved in coordination with physician. Base line investigation including RFTs, were performed. Blood sugar was monitored. X- Ray foot was taken in all patients to see the status of underlying bone. Pus / discharge culture sensitivity was performed in all patients. Vascular status of the limb was evaluated with Duplex Scan where there was clinical suspicion of vascular insufficiency. Type of surgical intervention, debridement, minor amputation, major amputation were planned and performed after informed consent. Wound was left open after surgical intervention for delayed primary closure. Extent of foot involvement was categorized according to Maggit-Wegner's classification of diabetic foot. Data was recorded in a preformed Performa, and results were formulated, analyzed and compared with literature.

## RESULTS

A total of 132 all patients with non-traumatic foot ulcer were included in the study. Age ranges from 20 year to 75 years with mean age of 43 years. Out of 132 patients 89 (67.42%) patients were diabetic. Out of 89 diabetic patients 63 (70.78%) were known diabetic and 26 (29.21%) were diagnosed after admission. 31 (23.48%) patients were admitted with foot ulcer due to non diabetic causes. Out of total 89 diabetic patients 53 (59.56%) were female and 36 (40.44%) patients were male. 35 patients (39.32%) were smoker where as 03 female (03.37%) were hookah smoker. Out 0f 132 patients, 43 (32.57%) patients had history of hospitalization and surgical intervention like debridement / major or minor amputation. 09 (10.11%) out 89 patients have had major amputation and 17 (19.10%) patients had minor amputations in the past. Out of 132 patients, 53 (40.15%) patients were taking treatment from general practitioners where as 79 (59.84%) patients had taken some sort of traditional treatment, and 'Dam Drood'. Clinically vascular insufficiency was found in 21 (23.59%) out of 89 diabetic patients, out of which 13 were smokers.

Table I showing break down of etiology of foot ulcer.

**Table-I. Etiology of foot ulcer (total patients)**

| Pathology of foot ulcer | No. of patients | %age |
|---|---|---|
| Diabetes | 89 | 67.42% |
| Non-specific infection | 31 | 23.48% |
| Chronic arterial disease | 07 | 5.30% |
| Venous Ulcer | 03 | 2.27% |
| Trophic Ulcer | 02 | 1.51% |

| Maggit-Wegner classification of Diabetic Foot | |
|---|---|
| Grade | Description |
| 0 | High risk foot with no ulceration |
| I | Skin involvement |
| II | Skin & soft tissue involvement |
| III | Skin, soft tissue & bone involvement |
| IV | Localized gangrene (Forefoot, heal, toes) |
| V | Gangrene of entire foot |

**Table-II. Gender based Causes of foot ulcers**

| Gender | Diabetic | %age | Non-diabetic | %age |
|---|---|---|---|---|
| Male | 36 | 27.27% | 31 | 23.48% |
| Female | 53 | 40.15% | 12 | 09.09% |

**Table-III. Break down of Patients according to Maggit-Wegner's classification (N=89)**

| Grade of Ulcer | Total patients | Male | Female |
|---|---|---|---|
| 0 | - | - | - |
| I | 09 (12.35%) | 06 | 03 |
| II | 13 (14.60%) | 08 | 05 |
| III | 29 (32.58%) | 12 | 17 |
| IV | 27 (30.33%) | 11 | 16 |
| V | 11 (12.35%) | 04 | 07 |

**Table-IV. Surgical intervention**

| Procedure | Male | Female | Total # | %age |
|---|---|---|---|---|
| Antiseptic dressing | 06 | 03 | 09 | 10.11% |
| Minor Debridement | 08 | 05 | 13 | 14.60% |
| Major Debridement | 19 | 15 | 34 | 49.43% |
| Minor Amputations | 05 | 16 | 21 | 23.59% |
| Minor Amputations | 09 | 37 | 46 | 51.68% |

## DISCUSSION

Ulceration of the foot in diabetes is common and disabling and frequently leads to amputation of the leg. Mortality is high and healed ulcers often recur. The pathogenesis of foot ulceration is complex, clinical presentation variable, and management requires early expert assessment. Interventions should be directed at infection, peripheral ischemia, and abnormal pressure loading caused by peripheral neuropathy and limited joint mobility. Despite treatment, ulcers readily become chronic wounds. Diabetic foot ulcers have been neglected in health-care research and planning, and clinical practice is based more on opinion than scientific fact. Furthermore, the pathological processes are poorly understood and poorly taught and communication between the many specialties involved is disjointed and insensitive to the needs of patients.

The increasing rate of diabetes mellitus diagnosis in the United States is cause for alarm. The data shows the total annual cost of diabetes treatment in 2002 was estimated at 132 Billion Dollars or one out of every 10 healthcare dollars spent in the United States[5]. Other studies have suggested that diabetes related amputations cost approximately three billion dollars per year ,( 38077 dollars per procedure)[6]. With the rise of diabetes diagnosis, there is also an expected rise in the number of amputees. In 1997, a total of 87720 out of 131,218 LEAs hospital discharges 67% were diabetes related[7]. The age related rate for people with diabetes was 28 times that of people without diabetes[7].

In Asian region , countries like Hong Kong , diabetes is a prevalent disease. In a community based Hong Kong Chinese population , the age standardized prevalence for person aged 35-64 years was 10.6% and it was marked greater 29.3% among the women aged 65 to 74 years[8]. In Pakistan, Diabetes mellitus is also a prevalent disease; unfortunately we do not have demographic data of most of diseases including diabetes. In our small cross sectional study, we also found that diabetes and diabetes related complications are common health problem. in our study we found most of patients presenting with diabetic foot ulcer are female n=53 (40.15%) . As for as age related LEAs is concerned, mean age of the patients with

non traumatic amputation of 43 years as compared to developed countries like United States, it was 66 years[7], and in Singapore it was 72 years[9]. We found that our patients develop diabetic complications including diabetic foot ulcer at an early age, our youngest patient was of 29 years old. (Mean age 43 years). This was due to poor awareness of people and delayed referral of patients to specialized health care facility. Our patients have phobia of an operation / Incision and drainage , they refuse to give consent for early incision and drainage , and doctors working at rural area are not well trained in wound and ulcer management, they fail to recognize the complication at an early phase, leading to delayed referral of patients to secondary / tertiary care facility. This is also true for quacks. This fact is reflecting in our study, District Gujrat is an underdeveloped district with a large rural catchment area. Gujrat is also a city of saints, 'Darbars and Mazars", people have rigid faith on traditional ways of treatment including Damm & Daroods. In our study we found that 53 patients were taking treatment from general practice doctors, before presenting to tertiary health care facility. Similarly 79 out of total 89 patients took some sort of such traditional treatment before presenting to us, and among them 41 were females. 31 out 89 patients gave history of previous hospital admissions for diabetic foot ulcers, and average frequency was two admissions per year. We found no seasonal variation in development of diabetic foot ulcers in our study, however in a study conducted in Hong Kong-Chinese diabetic patients, they showed a strong relationship between seasonal variation and diabetic foot infection. The warm and humid weather of Hong Kong exerts a seasonal variation on diabetic foot infection. Warm temperature aggravates the severity of infection and precipitate amputation.

Primary prevention is the aim of diabetes management, but secondary prevention is the goal of good foot-ulcer care. The recurrence rate is high 13 and ulcer healing should be followed by a well coordinated program of secondary prevention. Sadly, this approach is beyond the capacity of health services in most countries including Pakistan. Surgery to correct deformities and abnormalities of posture, gait, and load-bearing lengthening the Achilles tendon has a place in both primary and secondary prevention, but is probably under used.

Education should focus on foot care, regular podiatry, self-examination[10], and provision of emergency contacts. Education improves knowledge and illness-related behavior, and led in one trial to a three-fold reduction in re-ulceration and amputation within 13 months, whereas another study showed reduction in amputation but not in new ulceration[10,11]. We suggest public awareness program of primary prevention of diabetes related problems, should be launched with the help of both print and electronic media which are an effective tool of communication.

## CONCLUSIONS

We found incidence of non-traumatic below knee amputations is high in our diabetic patients, especially in female population, Improvement in primary health care services regarding foot care awareness in diabetics appear to be the main way to reduce the amputation rate.



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