FREQUENCY OF DIFFERENT LEVEL OF AMPUTATIONS IN TYPE-2 DIABETICS

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ABSTRACT

Objective: To determine the frequency of different levels of amputations in type-2 diabetics.
Study Design: Cross sectional study.
Place and Duration of study: Department of Surgery Combined Military Hospital, Peshawar, from 27 Aug 2012 to 27 Feb 2013.
Material and Methods: Non probability consecutive sampling technique was used to enroll 158 type-2 diabetics undergoing amputations satisfying inclusion/exclusion criteria. Data regarding level of amputation, glycosylated Hb% and duration of diabetes mellitus (DM) was recorded followed by analysis using SPSS version 17.
Results: Total 158 patients were enrolled, 102 (64.5%) male and 56 (35.44%) female, with male female ratio of 1.8:1. Mean age of presentation was 54.99 ± 7.84 years in males and 55.14 ± 8.99 years in females respectively, the difference being statistically insignificant (p=0.912). Mean duration of DM was found 10.88 ± 3.16 years in males and 10.03 ± 2.50 years in females while mean level of glycosylated hemoglobin was 7.54 ± 0.68 and 7.35 ± 0.63 in males & females respectively, both values statistically insignificant. Below knee amputation (BKA) was done in 55 (34.8%) patients, above knee amputation (AKA) 34 (21.5%), Toe amputation (TA) 42 (26.6%) and foot amputation (FA) in 27(17.1%).
Conclusion: Majority of the patients underwent major amputations and most frequent level of amputation was below knee amputation.

Keywords: Amputation, Diabetic foot, Diabetic foot ulcers, Glycemic control.

INTRODUCTION

Diabetes Mellitus (DM) is one of the most common, chronic non communicable disease occurring in epidemic proportions[1]. The International Diabetes Federation (IDF) has predicted that the number of individuals with DM will increase from 382 million in 2013 to 592 million in 2035[2]. China, ahead of India now, has become the country with largest number of individuals with DM (92.4 million) and prediabetes (148.2 million)[3]. DM is a major national health problem and Pakistan is among top ten countries of the world having greatest number of diabetics. According to the Pakistan National Diabetes Survey (PNDS), 9.3% males and 11.1% females suffer from DM while other surveys showed slightly higher proportions[4]. DM is the 3rd leading cause of death and major cause of blindness, end stage renal disease and non-traumatic amputations. Disease and its complications cause significant morbidity and mortality resulting in mammoth economic burden to individuals, families, health system and of course nations[5]. In 2007, the estimated direct medical cost of this grave problem was $26 billion in China (18.2% of total health budget)[6].

Diabetic Foot ulcers (DFU) are one of the most common, serious, costly and incapacitating sequel of the disease. Life time risk of developing DFU varies from 15-25%, the risk being more in diabetics with neuropathy[7]. DFU are the most common preventable precursors of more than 85% of non-traumatic lower extremity amputations in Europe and USA[8]. After amputation of lower limb, the incidence of a new ulcer and/or contralateral amputation at 2-5

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years is 50%[9]. Alarmingly only 40-50% of amputee survive 5 years and prognosis further worsens as level of amputation goes up. The overall population burden of amputations is increasing in diabetics in contrast to decreasing incidence among non-diabetic population. Prevalence of amputation is 3% in type-2 diabetic patients in India[10]. Level of amputation has impact on rehabilitation and far reaching effects upon the quality of life. The study will not only help in creating awareness regarding good diabetic control but will also provide framework for formulating management strategies in these patients.

In this study frequency of different levels of amputations as well as burden of amputations in type-2 diabetics has been studied in local population.

MATERIAL AND METHODS

This cross sectional study was conducted from 27 Aug 2012 to 27 Feb 2013 over a period of six months at the Department of Surgery Combined Military Hospital, Peshawar and consisted of 158 patients. Non probability consecutive sampling technique was used to include known type-II. Diabetics having gangrene, undergoing amputations irrespective of the age and gender. Patients undergoing all other amputations (trauma, PVD and malignancies) as well as re-amputations were excluded from the study. HbA1c level was measured to gauge average control of diabetes among patients.

After approval from hospital ethical committee, written informed consent was obtained from all patients thoroughly explaining purpose of the study. Clinical information performa was filled by author himself or equivalent trainee colleague against each patient recording hospital registration number, demographic profile, duration of diabetes mellitus, HbA1c and the level of amputation. All the data collected through the performa was entered in to SPSS version 17.0 and analyzed through its statistical package. Descriptive statistics like frequencies and percentage were calculated for different amputation levels and gender. Mean and standard deviation were calculated for duration of Diabetes, age and HbA_{1c}. Independent sample t-test (quantitative data like age)and chi square test (qualitative variables like gender) was applied. A *p*-value <0.05 was considered significant.

Table- I: Demographic variables of patients undergoing amputation at different levels (n=158).

	Male (n=102)	Female (n=56)	*p*-value
Age in years (Mean ± SD)	54.99 ± 7.84	55.14 ± 8.99	0.912
Duration years (Mean ± SD)	10.88 ± 3.16	10.03 ± 2.50	0.086
HbA1c (%) (Mean ± SD)	7.54 ± 0.68	7.35 ± 0.63	0.095

Table-II: Frequency of various types of amputations performed in type II diabetics.

	Male (n=102) (64.6%)	Female (n=56) (35.4%)	Total (n=158) (100%)	*p*-value
Below Knee Amputation	34 (33.3%)	21 (37.5%)	55 (34.8%)	0.796
Toe Amputation	29 (28.4%)	13 (23.2%)	42 (26.6%)	
Above Knee Amputation	23 (22.5%)	11 (19.6%)	34 (21.5%)	
Foot Amputation	16 (15.7%)	11 (19.6%)	27 (17.1%)	

RESULTS

Out of total 158 patients, 102 (64.5%) patients were males and 56 (35.44%) were females with male to female ratio of 1.8:1. Mean age of amputee was 55.04 ± 8.24 years (male 54.99 ± 7.84 female 55.14 ± 8.99 statistically insignificant *p*-value 0.912). Patients had diabetes mellitus for a mean duration of 10.88 ± 3.16 years in males while 10.03 ± 2.50 in females (*p*-value 0.086). Statistically insignificant glycosylated

hemoglobin level was seen in both gender (table-I).

Total 158 patients underwent various amputations. Below knee amputation (BKA) was most common procedure performed both in male as well as female (34 vs 21 respectively). Thirteen female while 29 male were subjected to toe amputation (TA). Frequency of various level of amputations in both gender was comparable being insignificant statistically (table-II).

DISCUSSION

Diabetes mellitus is a major national health problem and Pakistan is among top ten countries of the world having greatest number of diabetes. Prevalence of type-2 is rising worldwide[11]. The consequent complications of diabetes, such as cardiovascular disease, peripheral vascular disease, stroke, diabetic neuropathy, amputations, renal failure and blindness result in increasing disability, reduced life expectancy, and enormous health costs[12]. For instance, DM caused 5.1 million deaths and consumed $548 billion in 2013 only[2].

DFU are common, serious, costly and incapacitating sequel and their life time varies from 15-25%, the risk being more in diabetics with neuropathy[7]. It is the most common preventable precursor of more than 85% of non-traumatic lower extremity amputations in Europe/USA[8] and Pakistan observes similar figures[13]. Alarmingly only 40-50% of amputee survive 5 years and prognosis further worsens as level of amputation goes up[9]. However, the general surgical principles involved in the management remain the same irrespective of the level of amputation[14].

Various studies done abroad and in Pakistan show variegated prevalence of different level of amputation in diabetic patients. Papanas N et al[15] in his study showed higher frequency of toe and foot amputations (35% and 29% respectively) while that of AKA and BKA was 18% each. Laghari et al1[6] carried out a study in Liaquat university of Medical and Health Sciences Jamshoro to assess the frequency of amputations in diabetic foot (total 58 patients were included in the study, male to female ratio was 3:1, mean age was 52 years. BKA was done in 12 (20.69%) patients, AKA in 09 (15.52%), TA in 7 (12.06%) and FA in 11 (18.96%) patients). Studies carried out by Imran et al[17] and Ali SA et al[18] revealed similar results.

Our study also revealed that frequency of different level of amputation has a similar pattern in both the genders (*p*-value 0.796). Comparison of our study with the work of Papanas et al[15] revealed higher prevalence of major amputation in our population which is due to delay in presentation of patient and lack of awareness in general population regarding diabetic foot care[19]. However, almost parallel results were obtained in term of mean age, duration of diabetes mellitus and the level of amputations in locally conducted studies. The most common level of amputation was below knee amputation, which not only appears to be due to late presentation but also reveals preference for this level due to good fitting prosthesis, early mobilization and better rehabilitation.

CONCLUSION

Diabetic foot, a common sequel of diabetes mellitus, leads to high amputation rate. BKA is the most frequent level in our set up. It is recommended that resources be spent on public awareness regarding good glycemic control and foot care in diabeties. Early detection and timely referral to the specialists and multidisplinary approach can significantly reduce the potential complications of diabetes mellitus[19].

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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