|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
Volume 3, Issue 2; February: 2019; Page No. 180-186
PubMed (National Library of Medicine ID: 101738825)
Index Copernicus Value 2017: 40.03
Original Research Article

STUDY OF SURGICAL MANAGEMENT AND COMPLICATIONS OF DIABETIC FOOT ULCER

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Article Info: Received 11 November 2018; Accepted 24 December. 2018
Cite this article as: Verma, Dr. D. D., & Saxena, Dr. A. K. (2019). STUDY OF SURGICAL MANAGEMENT AND COMPLICATIONS OF DIABETIC FOOT ULCER. *International Journal of Medical and Biomedical Studies*, *3*(2).
DOI: https://doi.org/10.32553/ijmbs.v3i2.607
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Conflict of interest: No conflict of interest.

Abstract

Introduction: Diabetes is one of the most prevalent metabolic chronic diseases due to the imbalance production of insulin. One of the studies reported that in 2010 worldwide 285 million adults had diabetes and this figure may be increase to 439 million by the year 2030. Globally Diabetic foot ulcers (DFUs) constitute major health problem in people that significantly contribute to morbidity and mortality in diabetes patients. Approximate 1.0% to 4.1% of the annual population-based incidences of a diabetic foot ulcer (DFU) were reported. Due to this the lifetime may be as high as 25%. In Asian countries diabetic foot ulcer are major problems which are different from European countries or developing countries. From many studies reported diabetic foot problems in India are infectious and neuropathic in nature as compared to developed countries. According to World Health Organization (WHO) diabetic foot is defined as lower limb of a diabetic patient characterized by infection, potential risk of pathologic consequences ulceration or destruction of deep tissues associated with neurological abnormalities, various changes in peripheral neuropathy vasculopathy and superimposed infection that are mainly responsible foot ulceration. Ulcers are one kind of abscess which is difficult to treat because of poor wound healing that result from a combination of neuropathy, ischemia and hyperglycemia.

Aim: The main objective was to study the outcome of treatment modalities and it's relating factors to complication in diabetic foot ulcer. Material and method: Total 60 diabetic foot ulcer patients with the age range from 20 to 70 years were included. From all the patients' detailed past and present history were recorded. For all the patients, general, physical and local and systemic examinations were also done. Detail laboratory examination like Fasting and Post Prandial Blood sugar levels, blood count, ECG, ESR, complete urine examination for the presence of ketone bodies and sugar, x-ray as well as culture and sensitivity of the discharge from ulcer were also done. Patients were treated with various treatment methods like conservative treatment, split skin grafting and amputation.

Result: In this study male patients were more in proportion as compared to female. This study showed that maximum with the age group 14 -50 (43.3%) years old followed by 18.3% in 31-40 years old, 16.7% in 61-70 years old. 6.7% showed the least age group as 20 -30 years old. Out of total 60 patients, 38.3% of the patients showed diabetic ulcer foot which was more whereas 15% showed diabetic gangrene foot which was least. 25% showed diabetic cellulites foot and 21.7% showed as diabetic abscess foot.

Conclusion: Globally as diabetes mellitus cases are increasing and it became rapidly the public health problem. This may be due to burden on economy, health system and on society to manage the diabetic foot problems. Diabetic foot management guidelines must be made into our practice protocols which may preventing limb loss, and decrease mortality and increase the quality of life of the patient. Hence for this it is only possible with the help of foot care education and health care workers. Hence, foot infection is to put first and care for it like hands.

Keywords: Diabetes, foot ulcers, infections, amputations.

Introduction:

Diabetes is one of the most prevalent metabolic chronic diseases due to the imbalance production of insulin. One of the studies reported that in 2010 worldwide 285 million adults had diabetes and this figure may be increase to 439 million by the year 2030[i]. Globally Diabetic foot ulcers (DFUs) constitute major health problem in people that significantly contribute to morbidity and mortality in diabetes patients[ii]. About 15% to 20% diabetes patients will develop an ulcer on their foot in which surgery is the most appropriate treatment result for many of cases[iii]. Approximate 1.0% to 4.1% of the annual population-based incidences of a diabetic foot ulcer (DFU) were reported. Due to this the lifetime may be as high as 25%[iv].

In Asian countries diabetic foot ulcer are major problems which are different from European countries or developing countries. From many studies reported diabetic foot problems in India are infectious and neuropathic in nature as compared to developed countries[v],[vi]. Diabetic foot ulcer (DFU) is one of the most destructive complications of diabetes that is responsible for >50% non traumatic major limb amputations.

According to World Health Organization (WHO) diabetic foot is defined as lower limb of a diabetic patient characterized by infection, potential risk of pathologic consequences ulceration or destruction of deep tissues associated with neurological abnormalities, various changes in peripheral neuropathy vasculopathy and superimposed infection that are mainly responsible foot ulceration. Ulcers are one kind of abscess which is difficult to treat because of poor wound healing that result from a combination of neuropathy, ischemia and hyperglycemia[vii]. According to the studied in Iran the prevalence of DFUs was about 20% among hospitalized patients with diabetes[viii]. Similarly, studies in Nigeria showed among individuals with diabetes the prevalence of limb ulcerations was between 11.7% and 19.1%[ix], [x].

Diabetic foot ulceration is more in that part of the world where there are scarce facilities of resource as sophisticated and efficient diagnostic, therapeutic and rehabilitative facilities[xi]. Not only in India, are globally Diabetic foot ulcers increasing problem in diabetic community. Due to increasing population in the world diabetes mellitus has also growing as pandemic proportions about in which 194 million people were affecting worldwide and expected to increasing prevalence to 344 million by the year 2030. In these increasing population about in between 2 and 6% will develop a diabetic foot ulcer (DFU) yearly. The long term infection of DFU can caused a complication in infection that may lead to loss of limb[xii]. As the data recorded in the center for disease control about 50% of diabetic patients had diabetic foot problems and succeeding amputations can be eliminated and help in the proper care of foot measures by the people at risk[xiii]. About 15% were at lifetime risk for foot ulcers with diabetes[xiv].

Till today data according to descriptive regarding demographical and clinical factors in foot ulcers are relatively few though we are all aware of its clinical importance among diabetic patients in Indonesia[xv]. The prevalence of diabetic foot ulcers are 20.4% in Netherlands, 4.6% in Kenya and about in between 1.0% and 4.1% in the United States[xvi], [xvii], [xviii]. Similarly, Nigeria demonstrated prevalence of limb ulcerations

was between 11.7% and 19.1% among people with diabetes and prevalence of DFUs among diabetes hospitalized patients was 20% in Iran[xix],[xx]. The main objective was to study the outcome of treatment modalities and its relating factors to complication in diabetic foot ulcer.

MATERIAL AND METHOD:

This is prospective study which was carried out in the dept. of surgery K. M. Medical College and Hospital, Mathura (UP), India. The duration period of this study was one year in which all patients of diabetic foot attending to Department of Surgery were included in this study. Total 60 diabetic foot ulcer patients with the age range from 20 to 70 years were included. From all the patients' detailed past and present history were recorded. For all the patients, general, physical and local and systemis examination were also done. Detail laboratory examination like Fasting and Post Prandial Blood sugar levels, blood count, ECG, ESR, complete urine examination for the presence of ketone bodies and sugar, x-ray as well as culture and sensitivity of the discharge from ulcer were also done. Patients were treated with various treatment methods like conservative treatment, split skin grafting and amputation.

OBSERVATIONS AND RESULT:

In this study, 41(68.3%) were male and 19(31.7%) were female out of total patients with diabetic foot ulcer cases were carryout in the department of surgery as shown in table no 1 below. Male patients were more in proportion as compared to female. These higher incidents in male gender due to unhygienic foot care, smoking and trauma. These may be due to the low socioeconomic status of family.

Table 1: Showing the distribution of patients according to gender

Gender	Number	Percentage
Male	41	68.3
Female	19	31.7
Total	60	100

Table no 2 showed the distribution of total patients with age wise. This study showed that maximum with the age group 14 -50 (43.3%) years old followed by 18.3% in 31-40 years old, 16.7% in 61-70 years old. 6.7% showed the least age group as 20 -30 years old.

Table 2: Showing the distribution of patients according to age group

Age group	Number	Percentage
20-30	4	6.7
31-40	11	18.3
41-50	26	43.3
51-60	9	15.0
61-70	10	16.7
	60	100

Out of total 60 patients, 38.3% of the patients showed diabetic ulcer foot which was more whereas 15% showed diabetic gangrene foot which was least as shown in table no 3 below. 25% showed diabetic cellulitis foot and 21.7% showed as diabetic abscess foot.

Table 3: showing distribution of patients according to Clinical presentation

Clinical presentation	Number	Percentage
Ulcer	23	38.3
Abscess	13	21.7
Cellulitis	15	25.0
Gangrene	9	15.0
Total	60	100

Among total patients treated, 33.3% of patients were treated conservatively as Slough excision, dressing and skin graft, 26.7% were treated through debridement of diabetic foot, 16.7% were treated with toe amputation, 13.% were treated with I and D. amputation, 3 6.7% were treated with B/K amputation and 3.3% were treated with Mid-thigh amputation was the least treatment modality used as shown in table no 4 below.

Table 4: showing distribution of patients according to treatment modalities.

Treatment modalities	Numbers	Percentage
Debridement	16	26.7
Toe amputation	10	16.7
Slough excision, dressing and skin graft	20	33.3
I and D	8	13.3
B/K amputation	4	6.7
Mid-thigh amputation	2	3.3
Total	60	100

DISCUSSION:

Globally Diabetic foot infection (DFI) is the major health problem with vast proliferate of socioeconomic on health care system of society. DIF is main cause of non-traumatic lower limb amputations[xxi, xxii &xxiii]. According to the many articles diabetic foot infection is multidisciplinary which involving several important roles of vascular surgeons, plastic surgeons, orthopedician etc without any involvement of firm confirmation in the cases. Diabetic foot was under vascular division in some centers[xxiv].

According to the study of Abbott et al[xxv] annually more than 2% of diabetic patients will develop new foot ulcers. The prevalence of the DIF varies between the individuals with diabetes according to the area, living place and geographical regions. It also varied between 4% and 20.4% among hospital-based studies[xxvi]. In this study total 60 patients with diabetic foot were included which was significance on surgical management its complications. In this study the ratio of patients with the gender were found that male sex were more than female with the ratio approximately 2:1. The age group 41-50 years old patients were highest number seen in this study. Because of increased in smoking, alcoholism and susceptibility to trauma surgical complications are maximum in males.

Diabetic ulcer feet were commonest clinical lesion present in this study followed by diabetic cellulites foot, diabetic abscess foot and diabetic gangrene foot. Dorsum's of foot were most common site of lesion followed by fore foot and toes. In this study also in the laboratory test for the microbial infection it showed staphylococcus aureus was the most common microorganism growth in the culture from the lesion. In the part of treatment beside the antibiotics conservative treatment consists of control of diabetes with Glaring or actrapid or human mixtard or lente insulin was effective in most of the patients. Other treatments modalities as Wound debridement, slough excision, followed dressing with povidine-iodine; collagens, mupirocin and metronidazole were also used. In most of the cases dressing helps in healing of ulcers.

Besides theses disarticulation, split skin grafting, above and below knee amputation were also performed as other modes of treatment. According to the studied of Wong et al[xxvii] rate about 87% success in limb salvage after using repeated 'piecemeal' debridements and herbal drinks. The study of Lock W et al[xxviii] showed that DIF were most common in the young age as 32 years old and in the oldest age as 89 years old which were about to be similar in the young age group and different in the oldest age and also similar to studied of Singh and Chawla et al[xxix]. This may be due to patients more than 70 years were excluded in this study. Another studied carried by Mayfield et al[xxx] showed that male were maximum in number as compared with female gender which was almost equivalent to this study.

Aamir et al[xxxi] studied from Pakistan showed that 46 % of DFI were caused by staphylococcus aureus which were also similar to this study and study of Chopdekaret al[xxxii]. in this study ulcer were the most common complication of diabetes ulcer and followed by cellulites which was different from the study of Bell et al[xxxiii] and Viswasnathan et al from diabetic research center study[xxxiv] . In many studies done by Reiber et al[xxxv] and Apelquist et al[xxxvi] showed that involvement of the toes in the patients with diabetic foot ulcer was maximum followed by dorsum of foot and plantar heel which was similar to this study. In this study treatment with

debridement of diabetic foot were 26.7% and 33.3% received slough excision, dressing and skin graft and 16.7% received toe amputation as treatment modality. 3.3% received Mid-thigh amputation as least used treatment modality which was much different from the studied of Collen et al[xxxvii] and Miyajima S et al[xxxviii].

CONCLUSION:

Globally as diabetes mellitus cases are increasing and it became rapidly the public health problem. This may be due to burden on economy, health system and on society to manage the diabetic foot problems. Diabetes mellitus is a disease of lifelong and in foot infection in those diabetes people its complications can be life threatening, physically incapacitating, costly to treat and result in extensive morbidity. Nowadays one limb is lost every 30 seconds due to the diabetic foot complications. Therefore there is need to prevent and minimize the diabetic foot infections for reduction of number of lower extremity amputations.

Screening, early identification, proper evaluation and treatment of the 'at risk foot' can reduce complications. Diabetic foot management guidelines must be made into our practice protocols which may preventing limb loss, and decrease mortality and increase the quality of life of the patient. Hence for this it is only possible with the help of foot care education and health care workers. Hence, foot infection is to put first and care for it like hands.

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