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Dr. Subbu Rathinam
Professor, Department of
General Surgery, Sree
Mookambika Institute of
Medical Sciences.
Kulashekharan, Tamil Nadu,
India

Dr. Karthick MP
Junior Resident, Department
of General Surgery, Sree
Mookambika Institute of
Medical Sciences.
Kulashekharan, Tamil Nadu,
India

Dr. Mohammed Imram
Junior Resident, Department
of General Surgery, Sree
Mookambika Institute of
Medical Sciences.
Kulashekharan, Tamil Nadu,
India

Dr. Sree Lakshmi
Junior Resident, Department
of General Surgery, Sree
Mookambika Institute of
Medical Sciences.
Kulashekharan, Tamil Nadu,
India

Corresponding Author:
Dr. Subbu Rathinam
Professor, Department of
General Surgery, Sree
Mookambika Institute of
Medical Sciences.
Kulashekharan, Tamil Nadu,
India

Study on prevalence and the contributing factors of lower limb amputation in a tertiary health care centre

Dr. Subbu Rathinam, Dr. Karthick MP, Dr. Mohammed Imram and Dr. Sree Lakshmi

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Abstract

Aim and objectives: Lower Limb Amputation Is the Most Dreadful Complication of Various Factors for the patient as well as his families. This Study is to find the Prevalence of Lower Limb Amputations and factors contributing to amputation in our population.

Method: The Retrospective quantitative study was conducted in Sree Mookambika Institute of Medical Sciences and hospital in the period of June 2018 to November 2019. Each patients are assessed periodically and evaluated. Following parameters are used to evaluate the contributing factors like age, sex, diabetes mellitus, systemic hypertension, chronic kidney disease, coronary heart disease, smoking, level of amputation and its post-operative complications. These parameters help to find the prevalence of lower limb amputations and study about the contributing factors which lead to amputation. Complications we encountered here are infections following the procedure, progression of gangrene due to inadequate blood supply or infective aetiology, uncontrolled diabetes mellitus. Infective cases are treated with appropriate antibiotics according to the culture and sensitivity report. In some cases where below knee amputations are converted to above knee amputations due to inadequate blood supply or progression of infection.

Results: Over the period of 18 months, 124 lower limb amputation are performed (which includes ray amputation, below knee amputation and above knee amputation). Majority of patients in my study group belong to 41-50 years of age with 50% in total population. Male is more predominant with 64% comparing female gender with 34%. Among the total group diabetes were found in 75% of study population. Among those diabetic patients 58% were found to have HBA1C more than 10. Smoking is the only of the modifiable risk factors among the other risk factors which account for 54.8%. Chronic kidney disease with stage 4&5 were noted in 31 patients, majority of the patients were presented with non-healing chronic ulcer with 63%, where remaining presented with gangrene formations. Depending up on the mode of presentation and level of involvement, patients underwent amputation most common amputation we done are ray amputation for 67 patients followed by below knee amputation for 35 and above knee amputation for 14 patients, 8 patients who initially underwent below knee amputation due to inadequate blood supply and ascend of infections which was converted in to above knee amputation.

Keywords: Lower limb amputation, diabetic foot ulcer, smoking, PVD

1. Introduction

Amputation, it is a Latin word “AMPUTARE”. As per the, WHO definition it is defined as the “removal of part or all of a body part enclosed by skin”. Etiological cause for amputation are multifactorial. Among the risk factors diabetes, peripheral vascular disease plays a major role in the formation of ulcer which makes a bench mark in this society. With the high prevalence of diabetes, It makes four times more risk of developing deadly disease than cancers in this whole world [1]. Among the different types of ulcers, diabetic foot ulcer (DFU) is the leading one. If untreated on the early stage, it can progress to major complications from non-healing ulcer to lower limb amputation which alone contributed about of 90% of amputations.

2. Methods

2.1 Eligibility Criteria: All patients attending the general surgery op department with ulcer and gangrene in Sree mookambika institute of medical science between June 2018 to November 2019 were included in the study. Patients above 18 years of age and coexisting DFU were included. Subjects under the age of 18 and those with varying aetiology like trauma related, vasculitis, and neoplastic ulcers were excluded from the study.

2.2 Data Extraction: There were two main processes involved in data extraction, including gathering of clinical and biochemical data from patient profile. A retrospective chart audit was initially performed, focusing on the correspondence and outpatient attendance sections. The proforma sheet was then used to collect information regarding the onset, duration, outcome, and type of ulcer. Furthermore, clinical information on the diagnosis and coexisting macrovascular and microvascular complications, and medication lists of the subjects was recorded. We also obtained biochemical data using the hospital’s pathology system. Main parameters gathered included results of full blood count, urea and electrolyte studies, lipid profiles, HbA1c levels, and serum calcium, phosphate, and C-reactive protein levels, Doppler study of affected limb.

2.3 Data Analysis: SPSS 20.0 software was utilised to perform data analysis. Basic descriptive and frequency analyses of the study sample were implemented to obtain demographic characteristics, period prevalence of clinical outcomes and complications, and mean age of the study population. In addition, a combination of nonparametric and chi-squared analyses was performed to identify differences in scaled data and rank risk factors associated with amputation, respectively. *p* Value of less than 0.05 was considered statistically significant and together with odds ratios and confidence intervals was included in our results. All significant values were entered into binary logistic regression analysis and correction for multiple regression

logistic testing was then conducted and factored in as part of our final results.

3. Results

3.1 Age: Age plays an important role in wound healing. Older the age worse the prognosis. In our study out of 124 patients, age distribution was calculated age group of 41-50 have 63 patients accounts for 50% largest group in total study, age group 51-60 have 31 patients 25% of total case population. Patients with less than 60 years are found to have good healing property after amputation when compared to older age groups.

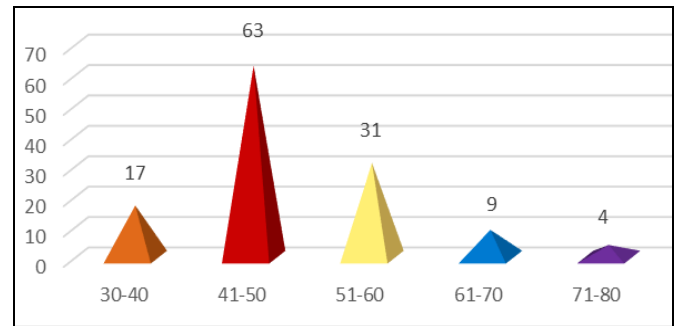


Fig 1: Age Distribution

3.2 Sex: Among the total 124 cases, male patients are found to be more predominant comparing to females accounts for 79 patients (64%) and females account for 45 patients (34%).

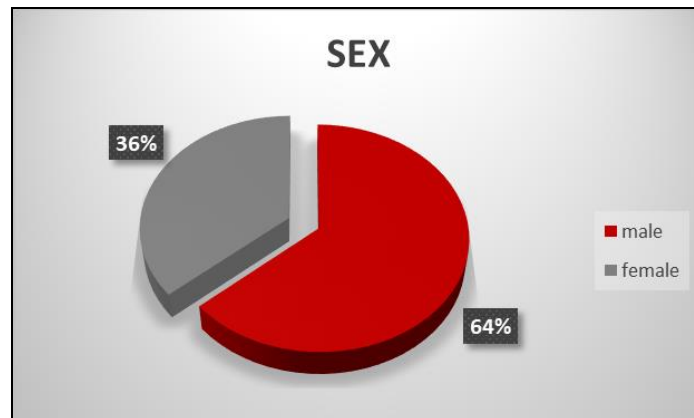


Fig 2: Sex Distribution

3.3 Diabetes and amputation: Diabetic foot ulcer defined as “Any infection involving the foot in a person with diabetes originating in a chronic or acute injury to the soft tissues of the foot, with the evidence of pre-existing neuropathy and / or ischemia”. It is a dreadful disability of the society because it need long stretches of hospitalization, mounting impossible expenses, ever dangling end result in amputation.

In Tamil Nadu, where estimated population of 2018 is 67.4 million peoples. According to Anjana R. M *et al.* [2] in 2018, Tamil Nadu was estimated to 4.8 million individuals with Diabetes and 3.9 million with prediabetes. These patients are at high risk of developing non healing ulcer. Slovenkai MP *et al.* [3] states that nearly 50% of non-traumatic amputation cases are found to have diabetes.

Reiber GE *et al.* [4] Patients with diabetic foot ulcers have high mortality and morbidity following amputation which nearly accounts for 39% to 90% in 5years.

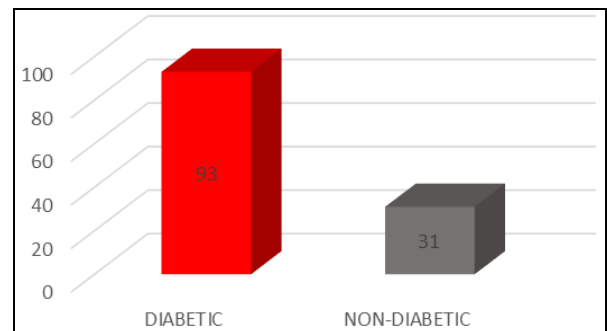


Fig 3: Diabetes and Amputation

In our study out of 124 amputation cases, diabetes was found in 93 cases which accounts for 75% of total cases. Out of these cases, 54 patients (approx 58%) of cases are found to have uncontrolled diabetes whose HBA1C is found to be more than 10.

3.4 Smoking: Smoking is the major and avoidable risk factor of peripheral arterial disease. Smoking cause endothelial dependent vasodilation which leads to impairment of nitric oxide availability in the blood. But development of ulcers is directly dependent on the severity of endothelial dysfunction and cigarette pack years [5]. In our study out of 124 amputees, smoking habit is noted in 68 patients (54.8%) is significant. Each patient is clinically assessed and underwent arterial Doppler study to find the level of occlusion and amputations were done according to the level of occlusion.

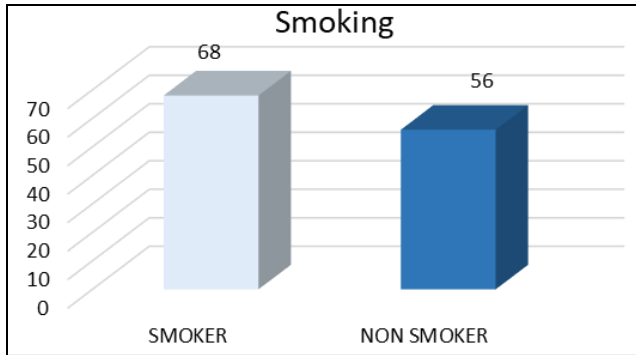


Fig 4: Smoking

3.5 Hypertension: Hypertensive ulcers are special type of ulcer named as Martorell’s ulcers occurring in the lower extremities of the person with uncontrolled blood pressure. Most common cause of ulcers in lower extremities are mainly due to atherosclerotic changes either due to arterial insufficient or venous stasis. But hypertension also is a minor cause of formation of ulcers. By correcting hypertension with adequate antihypertensive is the primary role in management of these ulcers [6]. In our study out of 124 amputees, hypertension was noted in nearly 79 patients (63%), these patients are prescribed antihypertensive by assessing their blood pressure by serial monitoring.

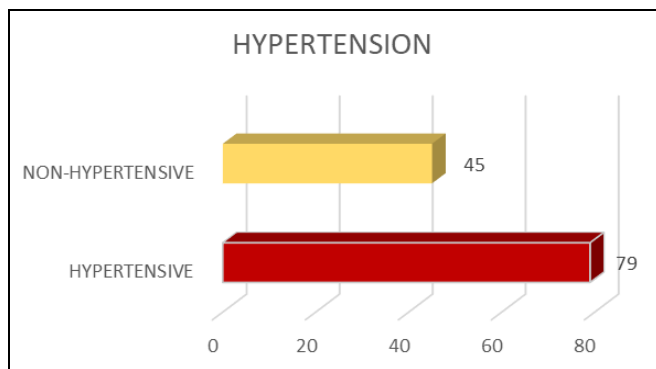


Fig 5: Hypertension

3.6 Chronic Kidney Disease: Ulcer formation in patients with chronic kidney disease especially with stage 4 & 5 on dialysis treatment is more common when compared with non-dialysis patients. This is mainly due to reduction in serum albumin level and most of the cases in stage 4&5 where found to have diabetes Based on the IWGDF classification, dialysis patients were 3 times more likely to be classified as having a high risk of diabetic foot ulcers compared with patients not on dialysis [7]. In our study population, 31 cases were found to have chronic kidney disease with stage 4 & 5.

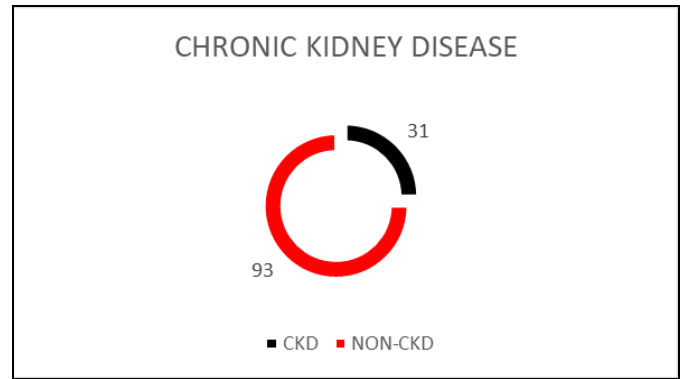


Fig 6: Chronic Kidney Disease

3.7 Mode of presentation: Out of 124 study population 79 patients were presented with chronic non healing ulcers while 29 patients with gangrene and pre gangrenous lesions involving below ankle level and remaining 16 patients with gangrene extending above the ankle joint.

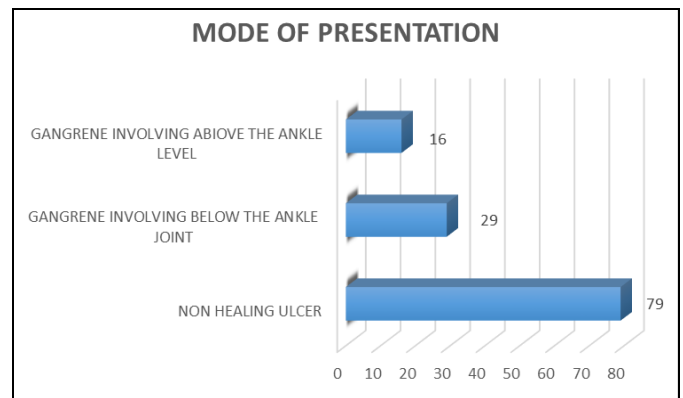


Fig 7: Mode of Presentation

3.8 Treatment: During the study period, 124 amputations were done among them ray amputation accounts for 54% (67 cases) followed by below knee amputation of about 28.2% (35 cases), above knee amputation of 11% (14 cases), 8 cases (6.4%) underwent below knee amputation and which was converted to above knee amputation.

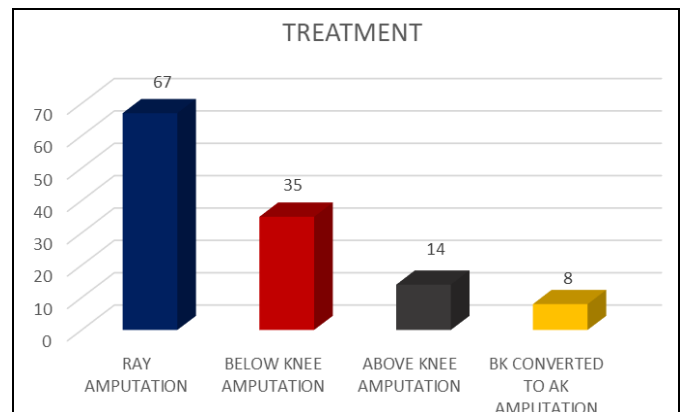


Fig 8: Treatment

4. Discussion

In the allotted study period, 124 amputation were done in dept. of general surgery at Sree mookambika institute of medical science, most of the patients were presented with chronic non healing ulcers involving the digits or the soles.

While 45 patients presented directly with gangrenous lesions or gangrene involving either above ankle or below ankle levels. All the patients were evaluated completely and their co morbidity conditions and the management details are obtained. We classified the patients depending on the co-morbidity conditions. In the study group majority of the person's belonging to age group of 41-50 years with 50% followed by 51-60 years with 25%. Male genders are more predominant in my study population with 64% comparing female gender. On analysing the study population nearly 75% of patients are diabetic and among them approx 58% were found to have HBA1C more than 10.

Another potential risk factor is smoking, majority of the study populations have history of smoking for more than 20 years approx 54.8% of the population. Even though hypertensive ulcers are rare entity but when it combines with other co morbidity it have significant effect in the endothelial lining and produce a non-healing chronic ulcers. Chronic kidney disease especially with stage 4 & 5 have higher risk of developing ulcers comparing the non-dialysis patients. Each and every one are evaluated and depending on the level of occlusion and level of gangrene, they underwent amputations. Most of the amputations were done in view of life saving procedure to reduce the septic foci. After successful procedure wounds are irrigated and broad spectrum antibiotics were given. In the cases of ischemic ulcer due to occlusion of vessels medical management were tried using Tab. Trental. Daily saline dressing and appropriate antibiotics according to the culture sensitivity reports were prescribed.

5. Conclusion

Chronic non healing ulcers are one of the major warning sign when it was encountered by the surgeons. Comparing the previous decade percentage of amputations were reduced. But when the person carries more than one co morbidity conditions along with non-healing ulcer, early intervention is needed. Recent advances like minor amputation and revascularisation procedures (particularly surgical) have made the amputations to decline. However, rates of major amputation in diabetics and chronic kidney disease patients are still high. Patients with uncontrolled diabetes have six times higher chances for complications. We suggesting continued vigilance is essential. We suggest early intervention and try to control all modifiable risk factors like smoking and advising proper exercise and diet control is the essential tool in most of the management.

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