



ORIGINAL RESEARCH PAPER

General Surgery

DEMOGRAPHIC PROFILE AND SURGICAL OUTCOME OF VARIOUS TYPES OF LOWER LIMB AMPUTATIONS'

KEY WORDS: amputation ,surgical outcome

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ABSTRACT

Background- Amputations is one of the oldest surgery known to mankind.Knowledge on the current trends in amputation is necessary to devise effective preventive measures at community level and to reduce this devastating event. **Aim And Objectives:** - 1)To know the incidence of various types of lower-limb amputations in our hospital.2)To study the demographic pattern in lower limb amputations in our hospital.3)To know the various risk factors leading to lower limb amputations.4)To know the immediate postoperative complications associated with lower-limb amputations. **MATERIALS AND METHODS-**This study is a prospective observational study.All patients who have undergone lower limb amputation during 1 year period fulfilling the inclusion criteria were included in the study.Main outcome measures were patient's age, gender, limb affected, indication for amputation, complications, reamputation rate,associated procedure performed, duration of hospital stay and outcome. **Results-** Of the 96 patients who have underwent lower limb amputations,the mean age was 57.34 with male:female ratio 3:1.Hospital stay ranged from 3 days to 90days.The presence of comorbidities such as Diabetes Mellitus,Peripheral vascular disease and osteomyelitis were associated with an increased rate of complications postoperatively.The most common complication was stump infection , followed by phantom limb. 10 patients died during the hospital stay.Sepsis with MODS was the main cause of death.Reamputation rate in this study was 5%. **Conclusion-** Diabetic foot and its complications is the leading cause of amputations.Thus educating diabetics on proper foot care can prevent diabetic patients from ending up with amputations. Prevention is better than cure.

INTRODUCTION

The lower extremity enables mobility.Amputation of lower limb is a life-changing incident.Minor amputation may not bring significant changes in lifestyle,whereas major lower limb amputation can hamper patients day to day chores .

Thus a decision to amputate a leg or a part of it is made only when all other methods to save the limb has failed.Lower limb amputation not only has its impact on the health and daily activity of the individual ,it leaves a burden on the society and economy as well.

Thus knowledge on the causes of lower limb amputation , its complications and morbidity can help in developing effective community oriented programmes in oder to educate the patients regarding the measures to be taken for saving the limb.

AIM OF THE STUDY

1. To know the incidence of various types of lower-limb amputations in our hospital.
2. To study the demographic pattern in lower limb amputations in our hospital.
3. To know the various risk factors leading to lower limb amputations.
4. To know the immediate postoperative complications associated with lower-limb amputations.

MATERIALS AND METHOD

This study is a prospective observational study. All cases of lower limb amputations admitted in Yenepoya Medical College Hospital Mangalore during 1 year period from October 2019 to October 2020.who are above 18 years and are willing to participate in the study were included in the study.Informed consent was taken.Those below 18 yrs of age were excluded from the study. Sample size for the study was 96.

All data was collected in a prospective manner, from the admission of the patient, the amputation performed, till the discharge of the patient from the hospital.Main outcome measures were patient's age, gender, limb affected, indication for amputation, complications, reamputation rate,

associated procedure performed, duration of hospital stay and outcome.

Statistical Analysis

SPSS (Statistical Package for Social Sciences) version 20. [IBM SPSS statistics (IBM corp. Armonk, NY, USA released 2011)] was used to perform the statistical analysis.Descriptive statistics of the explanatory and outcome variables were calculated by mean, standard deviation for quantitative variables, frequency and proportions for qualitative variables. ANOVA test was applied to test the statistical significance for hospital day with respect to level of amputation.The level of significance was set at 5%.

RESULTS

The youngest patient is 24 yrs and oldest 85 years.Most of the patient were in the 5-6th decade(mean- 57.34). The is a significant male preponderance seen.Male : female ratio is 3:1. Most common presentation was pain of the part involved .It was associated with swelling of limb followed by blackish discoulouration of the limb.

Only 12.5% of the cases had history of trauma.Only in 2 of these cases trauma(RTA) alone was the casuse of amputation of the limb. 75% of the cases had Diabetis mellitus.60.4%had vascular insufficiency associated . An attempt for revascularization was done in 11.5% of the cases in the present study. Majority of the cases had undergone minor amputations such as Ray amputation of toes.It was followed by Above Knee amputation . Only 5% of the cases had to undergo revision amputations.The cause for revision being spread of gangrenous changes and infection to adjacent toes.Of the 5 patients who underwent revision amputation, 2 had PVD, and 1 had osteomyelitis. All 5 had diabetis mellitus with poor glycemic control with HbA1C > 6.5. Most common indication was diabetic foot complications such as wet gangrene of toes/foot; chronic non healing ulcer .Vascular in sufficiency mostly presented as Dry gangrene was the 2nd common indication for amputation seen in this study. Stump infection was the most common complication identified in this study.Of the 26 patients who had developed stump infection , 21 patients had diabetis of which 14 of them had HbA1C more than 7mg/dl. 17 patients had PVD. 16 out of 26 patients had low

albumin levels (<3mg/dl) and 11 out of 26 patients had Haemoglobin less than 10gm/dl. Thus indicating a low nutrition status of the patient being an important factor in wound healing.

22.9% of the patients complained of pain and phantom limb sensation following amputation which was relieved after analgesics. 9 of the 96 patients had flap necrosis. 1 patient had to undergo above knee amputation following flap necrosis of BK amputation.

In all other cases of stump infection and flap necrosis, wound debridement was done. 10 patients split skin grafting was done to close the wound. 3 patients underwent secondary suturing. In the remaining 20 patients, wound was allowed to heal by secondary intention. 10 patients died during the hospital stay. Of which 3 died due to Covid Pneumonia. In others sepsis with MODS was the cause of death.

Table 1 Indication for amputation

INDICATIONS FOR AMPUTATION	FREQUENCY	PERCENT
DIABETIC FOOT	26	27
PVD	66	68.7
TRAUMA	3	3.1
MALIGNANCY	1	1.0
	96	100

Table 2 Analysis of level of amputation.

LEVEL OF AMPUTATION	FREQUENCY	PERCENT
AKA	22	22.9
BKA	19	19.8
FOREFOOT	2	2.1
RAY	50	52.1
TRANSMETATARSAL	3	3.1
Total	96	100.0

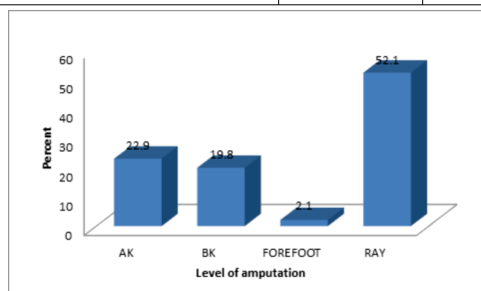


Figure 1 Analysis of level of amputation.

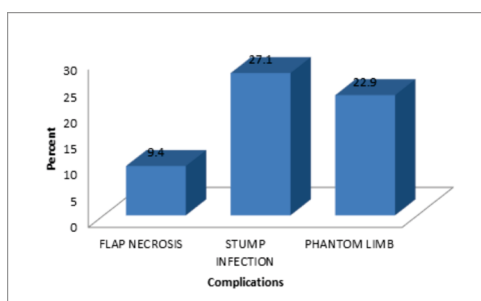


Figure 2 Complication following amputation.

DISCUSSION

Amputations is a global problem. The incidence and indications for amputation varies from according to different regions. In most developed countries such as The UK, USA, Germany, peripheral vascular disease constitute the main reason for amputation. In a study in Germany, done by Knut Kroger and et al (Kröger et al., 2017) 10, peripheral arterial disease with associated diabetes Mellitus contribute to the majority of cases of lower limb amputations in the Germany. The observations made by Dr. Battilal Jadeja and et al (Meena

et al., 2016) in a tertiary hospital in Rajasthan India report that the most common cause of amputations is trauma, followed by vascular diseases and then diabetes mellitus. These observations are consistent with the results from similar studies in other developing countries such as Nigeria done by DC Obalum et al (Obalum & Okeke, 2009). Whereas in our study the leading indication for amputation was PVD (68.7%) followed by diabetes foot (27%), trauma (3.1%) and malignancy (1%). Diabetes Mellitus and PVD are coexistent conditions and differentiating these are two absolutely independent conditions would be difficult. Hence diabetes with PVD is the main indication for the majority of the lower limb amputations in our hospital.

The male to female ratio in the present study is 3:1. This can be attributed to smoking which is mostly associated with males, is a major risk factor for PVD. This obvious male predominance is seen in other studies irrespective of the socioeconomic status.

The majority of the study subjects were in their 5th to 6th decade. In a study done by Tao et al in Australia (Lim et al., 2006) shows the highest incidence of amputations in the 7-8th decade of life. Whereas in similar studies conducted in other parts of India, show that the largest population affected due to amputations in India were in their 5-6th decade of life. (Kumar et al., 2018; Meena et al., 2016; Tariq et al., 2015)

The most common presentation was pain associated with gangrene. About 75% of the study population had diabetes mellitus. The prolonged duration of diabetes results in microvascular complications, such as peripheral neuropathy, which can lead to loss of sensation in the foot and thus predispose the foot to chronic non healing ulcers and gangrene warranting amputations. It also predisposes the atherosclerotic changes in the arteries.

Peripheral vascular disease was the second common coexisting disease in this study. Of the 58 candidates with PVD, diagnosed based on clinical examination and Doppler study, 20 had underwent angiogram and 11 among them had revascularization procedures done before amputation. The lower rate of revascularization procedures tried may be due to the advanced grade of gangrene at presentation which could not give any scope for salvage of the limb. In the present study, 11% of the subjects with PVD had underwent revascularization procedure. In a study by Joji et al (Varghese et al., 2021) and others the, after revascularization procedure, 38% had underwent major amputations and 28% had minor amputation. According to observations done by Louise S Londero et al (Londero et al., 2019) in Danish, the strongest predictor for major amputations was ulcers/gangrene at the time of revascularization.

Majority of the patients underwent ray amputation of the toes followed by above-knee amputation and then by below-knee amputation. The rate of revision amputation during their hospital stay was 5%. Robert Beaulieu and et al (Beaulieu et al., 2015) and others have put forth in their study that inpatient with h/o minor amputations, Reamputation occurred in 95%, including major limb amputation in 64% of the patients. The most common indication for revision amputation is flap necrosis followed by proximal extension of infection in our study.

In this study, out of the 96 patients, 57 had developed significant complications, such as flap necrosis in 9, stump infection 26, phantom limb in 22. The overall complication rate is 59%. In comparison to other studies such as Gandala et al in Mangalore India (Kumar et al., 2018), the complication rate is much lower that is 23%, and DC Oblam et al (Obalum & Okeke, 2009) in Nigeria is 33%. The higher rate of complications can be attributed to the late presentation to hospital, increased number of people were in sepsis during

presentation. Mortality rate was 10%. Out of which 3 had died due to Covid pneumonia. The complications in our study were found to be more among subjects with Diabetes and PVD.

CONCLUSION

Lower limb amputations in majority of the cases is a life saving procedure, done to eliminate the source of sepsis. Diabetic foot and its complications is the leading cause of amputations. Thus educating diabetics on proper foot care can prevent diabetic patients from ending up with amputations.

In spite of various revascularization procedures available, the incidence of amputations is still high among the general population. Patient education regarding life style modifications, cessation of smoking, adequate glycemic control, proper foot care among diabetics, early detection of vascular insufficiency has to be implemented in the community. As said prevention is better than cure, a prosthesis can never replace an anatomical limb.

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