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*RESEARCH ARTICLE*

# RETROSPECTIVE ANALYSIS OF IMMEDIATE AND LONG-TERM OUTCOMES FOLLOWING LOWER EXTREMITY AMPUTATION PERFORMED FOR VASCULAR INDICATIONS- INSTITUTIONAL EXPERIENCE

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## *Abstract*

**Background:** Major lower limb amputations are essentially disfiguring operations that carries high perioperative mortality and morbidity in elderly patients suffering from chronic limb threatening ischemia (CLTI). Lower limb amputations inevitably result in debilitating conditions that are associated with expensive treatment and often leads to permanent reduction in quality of life of the affected individual. This study seeks to explore the physical and mental health outcomes including post-operative mortality following lower limb amputations for various vascular indications.

**Methods:** All the enrolled patients in this study underwent lower extremity amputation for vascular indications in RGGGH, Chennai in the Institute of Vascular Surgery from February 2017 to February 2018.



## Introduction:-

Major lower limb amputation is a procedure often associated with a high risk of post-operative mortality. The number of people who incur Lower Limb Amputation (LLA) rises annually owing to, an increasing number of older adults and a higher incidence of diabetes and peripheral arterial disease.

Lower limb amputations inevitably result in debilitating conditions that are associated with high costs of treatment, delay or inability to return to daily activities, and often a permanent reduction in quality of life of the affected individual.

## Materials and Methods:-

All the enrolled patients in our study underwent lower extremity amputation for vascular indications in Institute of Vascular Surgery, Madras Medical College, Chennai from 1st February 2017 to 31st January 2018.

Data regarding outcomes were obtained from the follow-up registers at 1st and 6th month post-amputation (last case being followed up till September 2019).

Physical and mental health outcomes following major lower limb amputations for vascular indications and post-operative mortality were analysed. Patients with non-vascular causes of amputations were excluded from the study.

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## Results:-

A total of 143 patients were enrolled in the study, with median age group of 45 years (40-48), with male: female ratio 3:1, diabetes being the major risk factor (55%) and below-knee amputation as the predominant level of amputation (46%). The commonest etiological factor was CLTI (42%) followed by sepsis (21%).

Immediate post-amputation complications included sepsis (21.8%), deep vein thrombosis - DVT (7.4%), pulmonary embolism (1.24%), revision of amputation (13%), conversion (3.7%), wound infection (17.36%), stump necrosis (10%) and neuralgia (28.5%). Mortality rates at 30 days and 6 months were 5% and 11% respectively. The median duration of hospital stay was 14 days (10-16), with 3.3% of patients requiring intensive care. In the long term 33% of the subjects were mobile with prosthesis (33%), crutches (14%) and wheel chair (21%). However, 32% of patients had to remain immobile with no mobility aids. When we analysed the mental health outcomes, it was found that 23 patients (18 %) suffered from depression and 1 patient had bipolar disorder.

During the follow up period 19 patients had expired due to various reasons. Hence, the actual analysis of immediate and long-term outcomes following lower extremity amputation performed for vascular indications was done in remaining 124 patients.

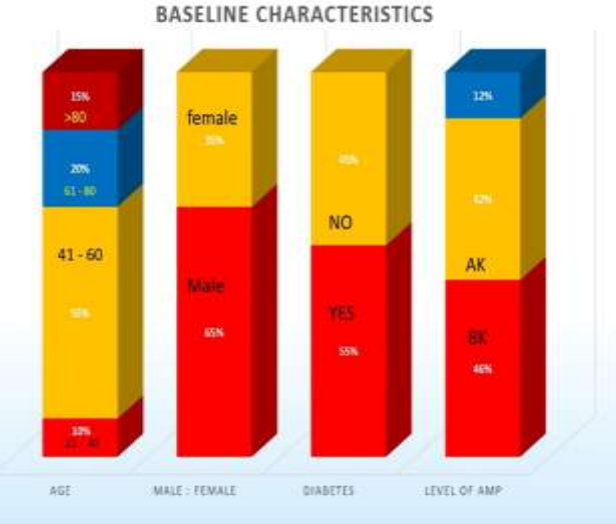


**Fig 1:-** Distribution of Baseline Characteristics

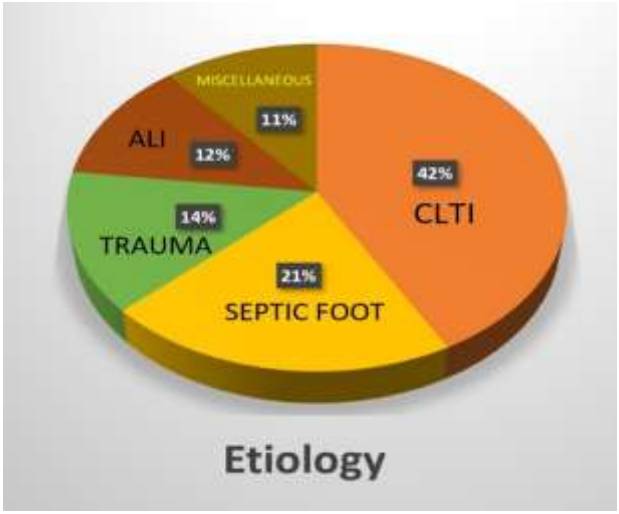


**Fig 2:-** Distribution based on Etiology.

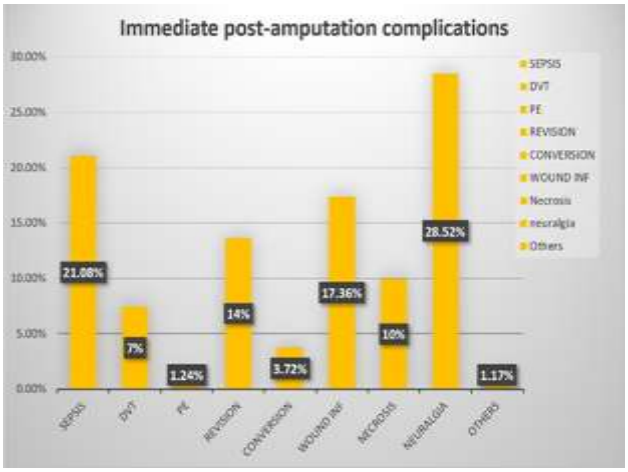


**Fig 3:-** Distribution of complications & outcomes

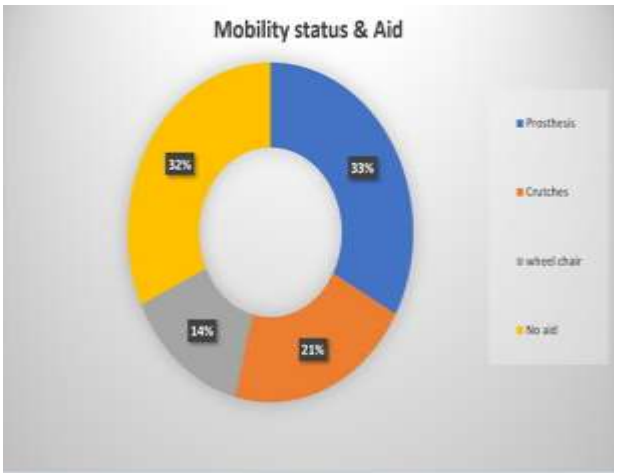


**Fig 4:-** Distribution of post amputee mobility aid

**Table 1:-** Results of the study:

| Sl. No | Parameter | Number | Percentage |
|---|---|---|---|
| **1.** | Age in Years | 45 | 40-48 |
| **2.** | Male patients | 81 | 65% |
| **3.** | Diabetic | 68 | 55% |
| **4.** | Level of Amputation: - | | |
| | Below Knee (BKA) | 57 | 46% |
| | Above Knee (AKA) | 52 | 42% |
| | Hip disarticulation | 15 | 12% |
| **5.** | Etiology: - | | |
| | Chronic limb threatening ischemia (CLTI) | 52 | 42% |
| | Septic limb | 26 | 21% |
| | Trauma | 17 | 14% |
| | Acute limb ischemia | 15 | 12% |
| **6.** | Mortality: - | | |
| | 30day mortality | 06 | 05% |
| | 6 months | 13 | 11% |
| **7.** | Immediate medical complications: - | | |
| | Sepsis | 17 | 21.08% |
| | Deep vein thrombosis (DVT) | 06 | 07.44% |
| | Pulmonary Embolism | 01 | 01.24% |
| **8.** | Immediate surgical outcomes: - | | |
| | Revision of Amputation | 11 | 13.6% |
| | Conversion of amputation | 03 | 03.7% |
| | Wound infection | 14 | 17.3% |
| | Stump necrosis | 08 | 09.9% |
| | Neuralgia (Phantom Limb) | 23 | 28.5% |
| **9.** | Rate of re-amputation | 04 | 03.3% |
| **10.** | Mobility Status: - | | |
| | Prosthesis | 41 | 33% |
| | Crutches | 17 | 14% |
| | Wheel Chair | 26 | 21% |
| | No aid | 40 | 32% |
| **11.** | Mental outcomes: - | | |
| | Depression | 23 | 18% |
| | Bipolar Disorder | 01 | 01% |

## Discussion:-

While there is no doubt that limb salvage and retaining its function should always be the primary goal of the surgeon, there are some situations in which limb salvage is neither feasible nor indeed desirable. Although a high perioperative morbidity occurs in an unsuccessful revascularization procedure, primary amputation should only be offered when revascularization is deemed inappropriate, in situations like functionally useless limb, necrosis of a major part of the limb, life-threatening septicemia, no distal landing vessels (rare), and where revascularization is inadvisable due to severe medical comorbid conditions. Decreasing mortality and morbidity and improve the quality of life in both the short and long term should be our primary goal.

In our study there was a male predominance [male – female ratio of 3:1] with majority falling in the age group of 40 – 60 yrs. This male predominance could be due to the increased prevalence of smoking and higher propensity to trauma in young males. Majority of the patients in our study were of 30-50 years age group, which is the prime productive age group of an individual. But unfortunately, physical and psychosocial disability that accompanying amputation would hamper the productivity which could be a hindrance to the economic growth of a developing country like India.

The commonest indication for amputation in this study was CLTI leading to ischemic gangrene and non-salvageable limb. This was due to delay in either presentation or reference to expert care, besides financial crunches. The next common indication for amputation was septic limb, predominantly of diabetic etiology.
Neither age & sex of the patient nor different comorbidities (except for diabetic foot) had any significant association with the level of limb amputation in our study. Most patients with diabetic foot syndrome (DFS) in this study was BK Amputees. However, in other etiologies, both AKA (52%) & BKA (57%) were almost equal in number with very minor number of hip disarticulations (12&).

The most frequent overall complication in our study was neuralgia (phantom limb pain) constituting 28%, with the most common immediate complication being sepsis (21%) and wound infection (17%). We observed that infection and impaired wound healing occurred in patients who had predisposing factors like diabetes.
An intense emotional response is common following major limb amputation and forms part of the psychological adjustment. Grief, disbelief, numbness and anger are expected, followed by a period of acceptance where sadness and despondency prevail. Depression and substance abuse are the most common, and often coexist. In our study we encountered 23 (18%) patients with depression and 1(1%) patient with post procedure bipolar disorder.

Rehabilitation and long-term follow-up of traumatic amputees is critical to optimize outcome and minimize morbidity. In our study, mobility after amputation was restored in 68% of patients with the aids such as crutches (21%), wheel chair (14%) and prosthesis (33%). However, 32% of patients had to remain immobile post amputation, owing to their comorbid conditions and financial constraints.
Amputees should do regular follow-up for at least 2 years after injury, and remain under long-term surveillance for evidence of either ongoing or new physical or mental ill health. The treating surgeon must often take the lead in initiating and coordinating care. There are several key aspects in the management and follow-up that should be addressed. One of the crucial factors is the expertise of a good vascular surgery team which is often unavailable in developing countries. The other parameters that are vital for successful post-operative outcome are ancillary care, appropriate pre-operative diagnostic evaluation, postoperative support, and therapeutic options like prosthetic and effective rehabilitation.

## Conclusion:-

Lower limb amputation is a significant cause of long-term ill-health and disability, primarily in young and previously active individuals. In this current era of increasing life expectancy with rising number of elderly population, it is unreasonable to hope for a successful limb salvage outcome every time.

Only through a thorough interprofessional team effort, involving physicians, surgeons, mental health professional, physical and occupational therapists, specialized nursing, and pharmacists with proper long term follow up of patients can we achieve optimal results in both physical and mental out comes with optimal levels of quality of life.

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