

A COMPREHENSIVE STUDY ON LOWER EXTREMITY AMPUTATIONS AT A TERTIARY CARE HOSPITAL IN SOUTH INDIA

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ABSTRACT

Background: Lower extremity amputation (LEA) is a major complication of diabetes mellitus, peripheral arterial disease, and trauma, with substantial consequences for patients' functional independence and quality of life, and for healthcare systems. Data describing the demographic and etiological profile of LEA from Indian tertiary care centres remain limited. This study describes the demographic characteristics, indications, and types of procedures among patients undergoing LEA at a tertiary care teaching hospital in South India.

Methods: We conducted a retrospective analysis of all patients who underwent LEA at Saveetha Medical Hospital, Chennai, between January 2023 and January 2024. Patient demographics, indications for amputation, and procedural details were extracted from hospital records and summarised using descriptive statistics.

Results: Fifty patients underwent LEA during the 12-month study period (37 men, 13 women; mean age 56 years, range 18–85). Diabetic foot complications were the leading indication (42%), followed by peripheral arterial disease (22%), trauma (16%), necrotizing soft tissue infection (12%), and chronic osteomyelitis (8%). Below-knee amputation (BKA) was performed in 70% of cases and above-knee amputation (AKA) in the remaining 30%.

Conclusion: Diabetic foot complications were the predominant cause of LEA in this cohort, consistent with patterns reported elsewhere in India. Strengthening diabetes control, structured foot-care education, and early referral pathways for diabetic foot pathology may help reduce the burden of amputation in similar tertiary care settings.

KEYWORDS: Lower extremity amputation; diabetic foot; peripheral arterial disease; trauma; retrospective study; tertiary care hospital; India

INTRODUCTION

Lower extremity amputation (LEA) is one of the most feared and disabling complications of diabetes mellitus, peripheral arterial disease, and trauma, with wide-ranging consequences for patients' mobility, independence, and quality of life. Diabetic foot ulcers are common, frequently recurrent, and remain among the leading precursors of non-traumatic LEA worldwide [1]; patients with diabetic foot disease often report fearing major limb amputation more than death itself, underscoring the urgency of effective prevention [2].

Diabetes mellitus is the single largest driver of this burden. The International Diabetes Federation estimates that 589 million adults worldwide were living with diabetes in 2025, with India accounting for close to 90 million cases — the second-largest national burden after China [3]. Amputation incidence is consistently and substantially higher among people with diabetes than in the general population across geographically diverse settings [4], and diabetic foot infection alone has been estimated to precede roughly four in five non-traumatic lower limb amputations performed in India [5].

Peripheral arterial disease and trauma remain important, and at times overlapping, contributors to LEA, and the relative weight of each cause — together with the balance between below-knee and above-knee procedures — varies considerably across regions and healthcare settings [6,7]. Sociocultural and health-system factors specific to India, including barefoot walking, use of inappropriate footwear, limited public awareness of foot-care practices, and inconsistent access to podiatry and structured diabetic foot services outside major cities, further compound the country's amputation burden [5].

Despite India's disproportionate share of the global diabetes and diabetic foot disease burden, contemporary single-centre data describing the demographic and etiological profile of LEA from Indian tertiary hospitals remain relatively limited, particularly from South India. This retrospective study describes the demographic characteristics, indications, and level of LEA procedures performed at a tertiary care teaching hospital in Chennai, Tamil Nadu, with the aim of informing local diabetic foot care and limb-preservation strategies.

METHODS

Study Design and Setting

This retrospective observational study was conducted in the Department of General Surgery, Saveetha Medical Hospital, a tertiary care teaching hospital in Chennai, Tamil Nadu, India.

Study Period and Population

All patients who underwent lower extremity amputation at the study institution between January 2023 and January 2024 were identified through the hospital's electronic medical records system. Patients with incomplete records precluding extraction of the variables of interest were excluded.

Data Collection

For each patient, data on age, sex, comorbidities, indication for amputation, and level of amputation (below-knee or above-knee) were extracted from the hospital's electronic records by the study investigators.

Statistical Analysis

Continuous variables (e.g., age) are presented as mean $\pm$ standard deviation and range; categorical variables (e.g., sex, indication, procedure type) are presented as frequencies and percentages. Descriptive analysis was performed using SPSS 2023.

RESULTS

Patient Demographics

Fifty patients who underwent LEA during the 12-month study period were included. The mean age was 56 years (range 18–85 years). Men accounted for 37 of the 50 cases (74%) and women for 13 (26%).

Table 1. Patient demographics.

Characteristic	Value
Total patients	50
Mean age (range), years	56 (18–85)
Male, n (%)	37 (74%)
Female, n (%)	13 (26%)

Indications for Amputation

Diabetic foot complications were the most common indication for amputation, accounting for 42% of cases, followed by peripheral arterial disease (22%), trauma (16%), necrotizing soft tissue infection (12%), and chronic osteomyelitis (8%).

Table 2. Indications for lower extremity amputation.

Indication	n	%
Diabetic foot complications	21	42%
Peripheral arterial disease	11	22%
Trauma	8	16%
Necrotizing soft tissue infection	6	12%
Chronic osteomyelitis	4	8%
Total	50	100%

Types of Procedures

Below-knee amputation (BKA) was performed in 70% of patients, and above-knee amputation (AKA) in the remaining 30%.

Table 3. Level of amputation.

Level of amputation	n	%
Below-knee amputation (BKA)	35	70%
Above-knee amputation (AKA)	15	30%
Total	50	100%

DISCUSSION

In this single-centre series, diabetic foot complications accounted for the largest share of LEAs (42%), consistent with the broader Indian literature. In a multicentric study of 1,985 patients with type 2 diabetes drawn from 31 centres across India, Viswanathan and Kumpatla identified diabetic foot disease as the dominant cause of both major and minor amputation

[8], a pattern echoed by the estimate that diabetic foot infection precedes roughly four in five non-traumatic amputations nationally [5]. Peripheral arterial disease, present in 22% of our cohort, is well recognised to coexist with and worsen the prognosis of diabetic foot ulcers, which can blur the distinction between ‘diabetic’ and ‘vascular’ aetiology in routine practice [9]. Taken together, these findings reinforce diabetic foot disease — whether acting alone or alongside vascular insufficiency — as the principal, and most preventable, cause of LEA in Indian tertiary care settings.

The relative contribution of individual causes varied across comparable studies from the region. At a tertiary hospital in Karachi, Pakistan, diabetic complications accounted for 84% of non-traumatic LEAs, considerably higher than the 42% observed in our cohort, while peripheral arterial disease and infection made up smaller proportions [6]. In a decade-long series from a teaching hospital in Togo, a history of diabetes was documented in roughly two-thirds of patients undergoing LEA, alongside a substantial contribution from infectious and vascular disease [7]. These differences likely reflect variation in diabetes prevalence, referral patterns, and how consistently trauma or peripheral arterial disease are captured as distinct causes across settings, and they highlight the value of benchmarking local audit data such as ours against comparable cohorts rather than relying on aggregated regional statistics alone.

Below-knee amputation predominated in our series, accounting for 70% of procedures. This is consistent with a general clinical preference for preserving the knee joint whenever the vascular and soft-tissue status of the limb permits, since patients undergoing transtibial amputation typically achieve better ambulatory and prosthetic outcomes than those undergoing transfemoral amputation. The relatively high proportion of below-knee procedures in our cohort may reflect earlier presentation or less extensive disease at the time of surgery, although this could not be confirmed without detailed wound-severity data (see Limitations).

Multidisciplinary diabetic foot care has repeatedly been shown to reduce major amputation rates. Krishnan and colleagues reported a sustained reduction in diabetes-related amputations over an 11-year period in a UK population following the introduction of a dedicated multidisciplinary diabetic foot team and continuous prospective audit, illustrating the impact that coordinated vascular, endocrinology, podiatry, and wound-care input can have on limb salvage [10]. Similar multidisciplinary models, adapted to local resource constraints, may offer one of the most effective levers for reducing diabetes-related amputation in Indian tertiary centres such as ours.

Addressing the sociocultural and structural barriers described earlier — including limited foot-care awareness, inappropriate footwear, and inconsistent access to podiatry services outside major urban centres — through community-level education, structured foot-screening programmes, and clearer referral pathways to tertiary diabetic foot services, could meaningfully reduce the proportion of patients who present only after limb-threatening complications have developed [5].

Longer-term outcomes after LEA, including wound healing, risk of re-amputation, and survival, were not captured in the present dataset but are known to be substantial. In a large UK population-based cohort, approximately one in ten patients undergoing minor lower limb amputation required an ipsilateral major amputation within a year, and roughly half had died within five years [11]. Prospective follow-up of patients from our own setting would be needed to characterise these outcomes locally and to evaluate whether earlier diabetic foot intervention and multidisciplinary care improve them.

Limitations

This study has several limitations. It was conducted at a single tertiary care centre over a 12-month period, which limits the sample size ($n=50$) and may not capture seasonal or year-to-year variation in case mix. Its retrospective design relies on the completeness and accuracy of hospital records and did not allow systematic assessment of glycaemic control, vascular status, or wound severity using standardised systems such as the Wagner classification [12]. Long-term outcomes — including wound healing, re-amputation, prosthetic rehabilitation, and mortality — were beyond the scope of this analysis but represent important directions for future prospective research. Findings from a single South Indian centre may also not generalise to other regions of India with differing healthcare access, disease prevalence, or referral patterns.

CONCLUSION

Diabetic foot complications were the leading cause of lower extremity amputation in this South Indian tertiary care cohort, followed by peripheral arterial disease and trauma, with below-knee amputation predominating over above-knee procedures. These findings are consistent with the broader Indian literature identifying diabetic foot disease as the principal, and largely preventable, driver of LEA in the country. Strengthening diabetes management, expanding structured diabetic foot care and multidisciplinary limb-preservation services, and improving public awareness of foot-care practices are important strategies to reduce the burden of amputation in similar tertiary care settings.

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