Etiologies and Trends of Extremities Amputations: A Ten-Year Single Center Experience

Mishari Alanezi[1], Abdulrahman Alaseem, MOHAMMED NASSER ALHUQBANI, ZYAD AYEDH ALDOSARI, Faisal Alkhunein, Ibrahim S Alshaygy
[1]College of Medicine

INTRODUCTION: Limb amputation is a life-altering event with substantial physical, psychological, and social consequences. Despite advances in healthcare, amputations remain a major global health concern, particularly in regions with high burdens of diabetes and vascular disease. This study aims to analyze the demographic characteristics, etiologies, and trends of amputations over a ten-year period at a tertiary care center.

METHODS:

A retrospective cohort study was conducted on patients who underwent amputation between January 2015 and December 2024. Collected variables included patient demographics, etiology, level of amputation, admission type, and the surgical specialty involved. Statistical analyses included chi-square and t-tests, with a p-value of < 0.05 considered statistically significant.

RESULTS:

A total of 647 patients underwent amputation over the ten-year study period. Among these, 543 patients (84%) underwent a single amputation, while 104 patients (16%) had multiple amputation procedures, resulting in a total of 769 amputations performed. The mean age of patients was 56.1 years (± 21.1), with ages ranging from 1 to 98 years. There was a clear male predominance, with 65% of patients being male. The majority of amputations occurred in older adults aged 60 to 79 years (41.9%), followed by those aged 40 to 59 years (31.7%). Younger patients (0-19 years) accounted for 9% of cases.

Diabetic complications were the most common cause of amputation, accounting for 67.7% of cases, significantly more frequent than trauma (11.7%) and vascular diseases (11.6%). Trauma-related amputations were predominantly observed in younger patients, particularly those under 40 years of age. Amputations due to vascular diseases increased with age, peaking in patients over 80 years old. Infection, deformities, and malignancy contributed to smaller proportions of cases.

Lower limb amputations were far more common than upper limb amputations, comprising approximately 88% of all procedures. Among these, toe amputations were the most frequent (39%), followed by below-knee (25%) and above-knee amputations (20%). Upper limb amputations were less frequent, mostly involving finger amputations (7.6%) and above-elbow amputations (1.2%).

Most amputations (72%) were performed as emergency surgeries, reflecting the urgent clinical status of many patients at presentation. Elective procedures accounted for 28% of cases. Surgical specialties involved varied according to the type and cause of amputation; vascular surgeons performed nearly half (48.8%) of the procedures, followed by orthopedic surgeons (30.9%), plastic surgeons (12.2%), and general surgeons (8%).

Analysis of annual trends revealed an overall increase in the number of amputations over the decade, rising from 28 cases in 2015 to a peak of 95 cases in 2022. A decline was observed in 2020, likely due to healthcare disruptions caused by the COVID-19 pandemic, with numbers rebounding in subsequent years. This rising trend underscores the growing burden of limb loss and the need for enhanced preventive and management strategies.

DISCUSSION AND CONCLUSION: This study reveals a significant and growing burden of limb amputations, predominantly affecting the lower extremities and closely linked to diabetic complications. The predominance of emergency amputations points to delayed presentation and highlights gaps in early diagnosis and preventive care. Addressing these challenges requires focused public health efforts, including enhanced screening programs, patient education, and improved multidisciplinary management of diabetes. By prioritizing early intervention and preventive strategies, healthcare systems in Saudi Arabia can work toward reducing the incidence of amputations and improving the quality of life for affected patients.

Figure 1: Annual trends of amputations during the study period.

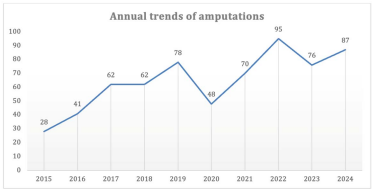

Table 1: Demographic characteristics of patients undergoing amputations (2015–2024)

Demographics		Value	Percentage	P value
Total patient	n	647	-	-
Age	Whole population (mean SD)	56.12 (21.1)	-	-
	Male age (mean SD)	55.47 (20.2)	-	0.143
	Female age (mean SD)	57.34 (22.7)	-	
Gender	Male	423	65.4%	**<0.05**
	Female	224	34.6%	
Nationality	Saudi	546	84.4%	**<0.05**
	Non-Saudi	101	15.6%	
Marital Status	Married	382	59%	**<0.05**
	Single	256	39.6%	
	Divorced	7	1.1%	
	Widowed	2	0.3%	
Age groups	0-19	58	9%	**<0.05**
	20-39	50	7.7%	
	40-59	205	31.7%	
	60-79	271	41.9%	
	80 and older	63	9.7%	

Table 2: Etiology, level of amputation, admission type, and surgical specialty involvement

Variables	Category	n	%	P value
Etiology	Diabetic complications	438	67.7%	**<0.05**
	Trauma	76	11.7%	
	Vascular diseases	75	11.6%	
	Infection	26	4.0%	
	Deformities	17	2.6%	
	Malignancy	15	2.3%	
Distribution of amputation levels (Lower limb)	Above Knee Amputation	128	19.8%	**<0.05**
	Below Knee Amputation	160	24.7%	
	Toe Amputation	254	39.3%	
	Metatarsal Amputation	30	4.6%	
	Lisfranc Amputation	3	0.5%	
	Syme Amputation	2	0.3%	
	Chopart Amputation	5	0.8%	
	Hip Disarticulation	1	0.2%	
Distribution of amputation levels (Upper limb)	Forequarter Amputation	1	0.2%	**<0.05**
	Above elbow Amputation	8	1.2%	
	Below elbow Amputation	3	0.5%	
	Wrist Amputation	3	0.5%	
	Finger Amputation	49	7.6%	
Type of admission	Emergency	466	72.0%	**<0.05**
	Elective	181	28.0%	
Surgical Specialty	Vascular Surgery	316	48.8%	**<0.05**
	orthopedic Surgery	200	30.9%	
	Plastic Surgery	79	12.2%	
	General Surgery	52	8.0%	