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Research Article

Demographics, Operative Profile, and Outcomes of Vascular Trauma and Acute Extremity Occlusions in Emergency Surgical Practice

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ABSTRACT

Objective: Emergency vascular surgical conditions—including acute limb ischemia (ALI), vascular trauma, and infected gangrenous lesions—present severe risks of limb loss and patient mortality. We analyzed patient demographics, surgical interventions, limb salvage outcomes, and statistical predictors of major amputation in an emergency vascular surgery cohort. **Methods:** A retrospective observational cohort study was conducted on 61 consecutive emergency vascular surgery procedures. Baseline demographics, underlying pathology, revascularization procedures, and amputation outcomes were analyzed. Statistical comparisons utilized Welch's *t*-test, Mann–Whitney *U* test, chi-square goodness-of-fit test, and one-way analysis of variance (ANOVA), with $\alpha = 0.05$. **Results:** The mean cohort age was 54.7 ± 15.3 years, with a statistically significant male predominance (78.7% vs. 21.3%; $\chi^2 = 20.08$, $p < 0.001$). Pathologies included peripheral arterial occlusive disease and acute limb ischemia (47.5%), vascular trauma (16.4%), aneurysmal/arteriovenous fistula lesions (19.7%), and diabetic gangrene (13.1%). Patient age differed significantly across pathology categories ($F = 7.14$, $p < 0.001$), with trauma patients presenting at a significantly younger age (36.4 ± 16.4 years) than those with chronic ischemia (60.3 ± 11.2 years). Amputations/debridements comprised 68.9% (n = 42) of interventions, driven by non-salvageable limbs at presentation. Revascularization procedures, including thrombectomy, bypass, and interposition vein grafting, achieved a 73.7% initial limb preservation rate in viable limbs. **Conclusions:** Delayed emergency presentation with non-salvageable ischemia remains the primary determinant of major limb amputation. Trauma procedures demonstrate high revascularization success in younger patients, whereas elderly patients with multilevel occlusive disease require aggressive limb-salvage protocols to prevent primary major amputation.

Keywords: Acute Limb Ischemia; Vascular Trauma; Revascularization; Above-Knee

Amputation; Peripheral Arterial Disease; Emergency Vascular Surgery; Limb Salvage.

INTRODUCTION

Emergency vascular surgical conditions represent some of the most time-critical problems encountered in acute surgical practice. If proper treatment is delayed, acute limb ischaemia (ALI), traumatic arterial injuries, thrombosis of previously diseased or reconstructed arteries, aneurysmal complications, arteriovenous fistula-related vascular complications, and severe diabetic foot infection with tissue necrosis can quickly progress to irreversible tissue damage, major amputation, systemic complications, and death [1]. A abrupt decrease in arterial perfusion that endangers the survival of an extremity is known as acute limb ischaemia, and it necessitates prompt clinical evaluation and, if necessary, urgent revascularisation [1,2].

Arterial embolism, in situ thrombosis over atherosclerotic disease, thrombosis of vascular grafts or stents, aneurysmal thrombosis, trauma, and iatrogenic vascular damage are some of the processes that can cause ALI [1,2]. In addition to the site and degree of arterial blockage, collateral circulation and pre-existing peripheral arterial disease can affect the clinical severity. Compared to individuals without sufficient collateralization, those with well-developed collateral arteries may be able to withstand an acute arterial blockage for a longer amount of time. However, persistent ischaemia can cause systemic ischemia–reperfusion consequences, skeletal muscle damage, tissue necrosis, metabolic problems, and progressive neurological dysfunction [1,3].

As a result, managing ALI is essentially time-sensitive. According to current standards, patients with suspected ALI should have an emergency evaluation performed by a physician who can determine limb viability, start definitive therapy, or arrange for an immediate transfer to a suitable vascular facility [2,4]. Although the exact period of tissue viability varies depending on the severity of ischaemia, collateral circulation, and underlying vascular illness, skeletal muscle and peripheral nerves have a limited tolerance to ischaemia, generally estimated at roughly 4–6 hours [2,3]. Therefore, rather than being an objective biological barrier, the conventional idea of a set "6-hour golden window" should be viewed as a clinical warning. Recent evidence indicates that ischemic duration interacts with the underlying vascular status and the degree of limb ischemia, making early recognition and individualized assessment essential [3].

Determining whether the limb is viable, endangered, or permanently ischaemic is the main goal of clinical evaluation of ALI. While sensory and motor deficiencies are particularly significant indications of limb danger, pain, pallor, pulselessness, paraesthesia, paralysis, and poikilothermia continue to be significant clinical symptoms [2,3]. While revascularisation should not be tried in a clearly non-viable extremity because reperfusion of irreversibly damaged tissue may expose the patient to additional systemic complications without providing significant limb benefit, patients with a salvageable limb require immediate restoration of arterial blood flo[w] [4].

In recent decades, there has been a significant evolution in the treatment approach to acute arterial occlusion. Open surgical techniques such thrombectomy, embolectomy, arterial repair, bypass, and autologous vein interposition grafting are still crucial, especially for patients with traumatic arterial disruption or those who need to restore flow right away. At the same time, certain patients now have more therapy choices thanks to catheter-directed thrombolysis and contemporary endovascular thrombectomy or aspiration devices [1,5]. Therefore, the underlying cause, anatomical location, degree of ischaemia, patient comorbidities, accessible competence, and anticipated

durability of revascularisation all influence modern care.

Another crucial aspect of emergency vascular surgery is vascular trauma. Penetrating or blunt trauma can result in peripheral artery injuries, which can be linked to fractures, soft-tissue destruction, nerve damage, venous injury, or compartment syndrome. Despite being less prevalent than chronic occlusive arterial disease, vascular trauma often affects younger individuals and can cause significant morbidity if arterial flow restoration or diagnosis is delayed [6]. Rapid clinical evaluation, identification of both hard and soft symptoms of vascular damage, suitable imaging in some stable patients, and timely surgical or endovascular therapy when necessary are all stressed in current trauma recommendations [7].

The cause of injury, degree of arterial destruction, contamination, anatomical position, and related soft-tissue damage all influence the repair option for traumatic arterial injury. Autologous vein interposition grafting is still a crucial reconstructive alternative, especially in cases where an arterial segment has been extensively damaged or destroyed. Because restoration of arterial flow during prolonged ischaemia may produce considerable tissue oedema and compartment pressure increase, early detection and treatment of compartment syndrome are equally crucial [8]. Therefore, a thorough evaluation of the entire wounded extremities is necessary for the effective therapy of vascular trauma in addition to the restoration of arterial continuity.

The clinical phenotype of peripheral arterial occlusive disease is different. Acute-on-chronic ischaemia, rest discomfort, tissue loss, gangrene, or superimposed acute thrombosis can all be present in patients with chronic atherosclerotic disease, who are often older. Significant risks of amputation, cardiovascular events, death, and reduced quality of life are linked to chronic limb-threatening ischaemia. The Global Vascular Guidelines propose interdisciplinary care targeted at limb preservation wherever possible and place a strong emphasis on objective assessment of limb danger and anatomical disease severity [9].

The complexity of emergency vascular presentations is further increased by diabetes. When peripheral artery disease, neuropathy, tissue loss, or compromised host defences are present, diabetes-related foot infections can spread quickly. In addition to antimicrobial therapy and vascular evaluation, severe infection, necrosis, wet gangrene, and ischaemia may need immediate surgical debridement or amputation. The current diabetic foot recommendations place a strong emphasis on prompt surgical management for severe or complicated infections, adequate microbiological examination, early detection of infection severity, and antibiotic medication where necessary [10].

Patients with aneurysmal and arteriovenous fistula-related problems make up another clinically significant category. Emergency surgical or endovascular intervention may be necessary for pseudoaneurysm development, thrombosis, haemorrhage, steal phenomena, and other vascular-access issues. These problems can manifest as acute ischaemia, haemorrhage, infection, or limb-threatening vascular compromise, and they may be more common in individuals who have had several vascular access surgeries.

The time of presentation and the early viability of the afflicted limb continue to have a significant impact on the results of emergency vascular surgery, despite advancements in vascular imaging, endovascular technology, perioperative monitoring, anaesthesia, and postoperative care. Patients may not get to tertiary referral institutions in underdeveloped and resource-constrained healthcare settings until they have developed gangrene, significant tissue necrosis, or protracted symptoms. Such delayed presentation may raise the need for first major amputation

and significantly decrease the chance of successful limb revascularisation.

In order to assess disease trends, identify populations at higher risk of limb loss, and enhance referral and treatment pathways, it is crucial to comprehend the demographic and operational features of patients coming for emergency vascular surgery. Comparing younger patients with traumatic arterial injuries with older patients with atherosclerotic occlusive disease, in particular, may shed light on the various causes and therapeutic needs of emergency vascular diseases.

In this study, patients having emergency vascular surgery at a tertiary referral hospital were evaluated for their demographic profile, range of vascular pathology, operational treatments, revascularisation methods, and limb-salvage results. Additionally, the study evaluated age disparities within diagnostic categories and investigated the connection between severe amputation and emergency surgical presentation. The study intends to give clinically useful information on the burden of limb-threatening vascular disease and the significance of prompt surgical intervention by characterising these trends in a sequential cohort of 61 emergency vascular surgical procedures.

MATERIALS AND METHODS

Study Design

A retrospective observational cohort study was conducted to evaluate the demographic characteristics, clinical indications, operative profile, revascularization procedures, and immediate outcomes of patients undergoing emergency vascular surgical procedures.

The study included 61 consecutive patients/procedures presenting with emergency vascular surgical conditions. The retrospective design allowed assessment of routinely documented demographic, diagnostic, operative, and outcome-related information from the clinical surgical registry.

Study Population

The study population consisted of patients who underwent emergency vascular surgical intervention for acute or limb-threatening vascular conditions. The clinical spectrum included acute arterial occlusion and acute limb ischemia, vascular trauma and arterial injury, aneurysmal and arteriovenous fistula-related complications, diabetic foot infection/gangrene, and other vascular pathologies requiring emergency intervention.

The final cohort comprised 61 emergency vascular surgical procedures.

Data Collection

Relevant clinical and operative information was extracted from the available clinical surgical records. The variables assessed included:

- Age at presentation.
- Sex.
- Primary vascular diagnosis.
- Anatomical site of vascular compromise.
- Clinical indication for emergency intervention.
- Type and urgency of operative procedure.
- Type of vascular reconstruction performed.
- Revascularization procedure.
- Amputation or debridement performed.
- Primary versus secondary amputation status.
- Immediate limb-preservation outcome.

The source dataset specifically included demographic characteristics, clinical diagnosis at admission, anatomical site of vascular compromise, urgency and nature of operative intervention, type of vascular reconstruction, and primary versus secondary amputation outcomes.

Diagnostic Classification

Patients were categorized according to the principal vascular pathology responsible for the emergency procedure. The major diagnostic categories included:

1. **Peripheral arterial occlusive disease and acute limb ischemia (PAD/ALI).**
2. **Vascular trauma and arterial injury.**
3. **Aneurysmal and arteriovenous fistula-related lesions.**
4. **Diabetic foot disease and gangrene.**
5. **Venous and other vascular pathologies.**

This categorization was used to compare demographic characteristics, particularly age, across the major diagnostic groups.

Clinical Assessment and Limb Viability

Patients presenting with suspected acute limb ischemia or acute arterial compromise were clinically assessed for the severity of ischemia and the potential for limb salvage. Clinical symptoms such pain, sensory impairment, motor dysfunction, irregular pulse, tissue viability, and the appearance of gangrene or established necrosis were given special attention.

Patients were grouped based on the degree of limb ischaemia and the possibility of revascularisation when it was clinically acceptable. Limbs deemed permanently ischaemic or non-salvageable were treated based on the degree of tissue damage and the necessity of amputation or debridement, whereas salvageable ischaemic limbs were candidates for revascularisation. This strategy aligns with current guidelines that prioritise quick assessment of limb viability and prompt revascularisation for patients with salvageable ALI [2,5].

Operative Management

Emergency procedures were broadly classified into:

A. Open Revascularization and Vascular Repair

The revascularization group included:

- Transfemoral thrombectomy.
- Transbrachial thrombectomy.
- Autologous vein interposition grafting.
- Arterial bypass procedures.
- Direct vascular repair.

The uploaded study recorded 19 procedures (31.1%) as open revascularization/repair, including 8 thrombectomies, 6 autologous vein interposition grafts, 3 arterial bypass procedures, and 2 direct vascular repairs.

B. Amputation and Debridement

Patients with non-salvageable ischemic or necrotic extremities underwent appropriate amputation or surgical debridement. The procedures included:

- Above-knee amputation.
- Below-knee amputation.
- Ray or forefoot amputation.
- Wound/tissue debridement.

The decision for major amputation was based on the clinical condition of the extremity, particularly the presence of irreversible ischemia, extensive tissue necrosis, or established gangrene.

C. Trauma-Related Procedures

Traumatic vascular injuries were managed by procedures appropriate to the location and extent of arterial injury, including:

- Interposition vein grafting.
- Direct arterial repair.
- Fasciotomy when indicated.
- Associated vascular reconstruction.

Current trauma literature supports prompt restoration of arterial continuity and early recognition and management of compartment syndrome in significant extremity vascular injuries [7,8].

D. Aneurysmal and Arteriovenous Fistula-Related Procedures

Patients with aneurysmal or arteriovenous fistula-related vascular complications underwent procedures such as:

- Pseudoaneurysm ligation.
- Arteriovenous fistula revision.
- Other appropriate vascular repair procedures.

Assessment of Limb Salvage

Immediate limb preservation was assessed among patients undergoing revascularization for potentially salvageable ischemic limbs. Successful limb preservation was defined as maintenance of the affected extremity following the initial revascularization procedure without immediate major

amputation. The original study reported an immediate limb-preservation success rate of 73.7% among patients presenting with salvageable ischemic limbs.

Assessment of Amputation Outcomes

Amputation outcomes were categorized according to the level and timing of amputation. Major amputations included:

- Above-knee amputation (AK).
- Below-knee amputation (BK).

Minor amputations and debridement procedures were considered separately from major limb amputation where applicable. The study specifically evaluated primary versus secondary amputation outcomes to determine the operative burden associated with non-salvageable extremities.

Demographic Stratification

Patients were stratified according to age to evaluate the demographic distribution of emergency vascular presentations. The age categories used in the study were:

- Pediatric: <18 years.
- Young adult: 18–39 years.
- Middle-aged: 40–59 years.
- Elderly: 60–74 years.
- Aged/geriatric: ≥75 years.

Sex distribution was also assessed, and demographic characteristics were compared across diagnostic categories.

Statistical Analysis

Continuous variables were assessed for distribution and summarized as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate. Categorical variables were summarized using absolute frequencies and percentages. These methods were consistent with the original statistical analysis of the cohort. For comparison of continuous variables between two independent groups, Welch's two-sample *t*-test was used for parametric data. The Mann–Whitney *U* test was used for non-parametric comparisons.

For comparison of mean age across multiple diagnostic categories, one-way analysis of variance (ANOVA) was performed. Categorical variables, including sex distribution and proportions across diagnostic categories, were evaluated using the chi-square (χ^2) goodness-of-fit test and contingency-table analysis. A two-tailed *p*-value <0.05 was considered statistically significant. The statistical analyses were performed using Python, with the SciPy and Pandas statistical libraries.

Statistical Outcomes of Interest

The principal outcomes assessed were:

- Demographic distribution of emergency vascular surgical patients.
- Distribution of underlying vascular pathologies.
- Differences in age between diagnostic categories.
- Distribution of operative procedures.
- Frequency of major amputation.
- Immediate limb-preservation rate following revascularization.
- Association between clinical presentation and limb salvage or amputation.

Ethical Considerations

The source material provided for this manuscript does not specify the institutional ethics committee approval number, waiver of consent, or individual informed-consent procedure. These details should therefore be inserted from the original institutional records before submission to a journal.

RESULTS

Patient Demographics and Baseline Characteristics

A total of 61 patients undergoing emergency vascular surgical procedures were included in the analysis. The study population ranged in age from 12 to 90 years, with a mean age of 54.7 ± 15.3 years. With 48 men (78.7%) and 13 women (21.3%), there was a clear masculine majority. The sex distribution difference was statistically significant ($\chi^2 = 20.082$, $p < 0.001$). Male and female patients had similar mean ages. The mean age of female patients was 54.2 ± 14.8 years, whereas that of male patients was 54.8 ± 15.6 years; this

difference was not statistically significant (t = 0.126, p = 0.901). Similarly, the median age was 55.0 years (IQR: 20.0) for females and 58.0 years (IQR: 21.0) for men; the Mann–Whitney U test revealed no significant difference (U = 328.5, p = 0.816).

According to age classification, 28 patients (45.9%) fell into the middle-aged group (40–59 years). The geriatric group (60–74 years old) included 16 patients (26.2%), followed by young adults (18–39 years old) with 10 patients (16.4%), patients (≥75 years old) with 5 patients (8.2%), and paediatric patients (<18 years old) with 2 patients (3.3%). Sex did not substantially affect the distribution of age categories (χ^2 = 1.238, p = 0.872).

Table 1. Baseline Patient Demographics and Statistical Comparisons (N = 61)

Characteristic	Overall Cohort (N = 61)	Male (n = 48)	Female (n = 13)	Test Statistic	*p*-value
Sex, n (%)	61 (100.0)	48 (78.7)	13 (21.3)	χ^2 = 20.082	<0.001*
Age, years					
Mean ± SD	54.7 ± 15.3	54.8 ± 15.6	54.2 ± 14.8	*t* = 0.126	0.901
Median (IQR)	58.0 (21.0)	58.0 (19.0)	55.0 (20.0)	U = 328.5	0.816
Range	12–90	12–90	31–85	—	—
Age group, n (%)				χ^2 = 1.238	0.872
<18 years	2 (3.3)	2 (4.2)	0 (0.0)		
18–39 years	10 (16.4)	8 (16.7)	2 (15.4)		
40–59 years	28 (45.9)	21 (43.8)	7 (53.8)		
60–74 years	16 (26.2)	13 (27.1)	3 (23.1)		
≥75 years	5 (8.2)	4 (8.3)	1 (7.7)		

*Statistically significant at $p < 0.05$. SD = standard deviation; IQR = interquartile range.

Diagnostic Spectrum and Age Distribution

The diagnostic spectrum demonstrated considerable heterogeneity in the underlying vascular conditions requiring emergency surgical intervention. With 29 patients (47.5%), peripheral arterial occlusive disease with acute limb ischaemia (PAD/ALI) was the most prevalent diagnostic group. With 12 patients (19.7%), aneurysmal and arteriovenous fistula-related problems made up the second-largest group. Vascular trauma and arterial damage came in second with 10 individuals (16.4%). Two patients (3.3%) had venous and other vascular diseases, whereas eight patients (13.1%) had gangrene and diabetic foot disease. Age varied statistically significantly among the diagnostic categories (one-way ANOVA, F = 7.14, p < 0.001). With a mean age of 36.4 ± 16.4 years, patients with vascular trauma were significantly younger than those with diabetic foot/gangrene (63.3 ± 10.4 years) and arterial occlusion/ALI (60.3 ± 11.2 years). Patients with aneurysmal/AV fistula pathology had a mean age of 56.3 ± 18.0 years, while those with venous and other pathologies had a mean age of 46.5 ± 6.4 years. Sex distribution did not differ significantly across the diagnostic categories (χ^2 = 2.85, df = 4, p = 0.584), despite the overall male predominance.

Table 2. Diagnostic Categories, Demographics, and Primary Surgical Procedures

Diagnostic category	n (%)	Mean age ± SD (years)	Male/Female	Primary procedures
Arterial occlusion & ALI	29 (47.5)	60.3 ± 11.2	22/7	Thrombectomy, bypass, major amputation

Vascular trauma & injury	10 (16.4)	36.4 ± 16.4	8/2	Interposition vein graft, repair, fasciotomy
Aneurysm & AV fistulae	12 (19.7)	56.3 ± 18.0	9/3	Pseudoaneurysm ligation, AVF revision
Diabetic foot & gangrene	8 (13.1)	63.3 ± 10.4	7/1	Debridement, ray/forefoot amputation
Venous & other pathologies	2 (3.3)	46.5 ± 6.4	2/0	Radiofrequency ablation, sclerotherapy

*Overall comparison by one-way ANOVA: F = 7.14, $p < 0.001$.

Operative Profile and Revascularization Procedures

The operative profile demonstrated that emergency vascular procedures were predominantly directed toward management of non-salvageable ischemic or necrotic limbs. In all, 19 treatments (31.1%) involved open vascular revascularisation or direct vascular repair, whereas 42 procedures (68.9%) needed major or minor amputation and/or wound debridement. The most common method among the 19 open revascularization/repair surgeries was thrombectomy (n = 8), which was followed by autologous vein interposition grafting (n = 6), arterial bypass (n = 3), and direct vascular repair (n = 2). There were a total of 29 significant amputations, comprising 22 above-knee and 7 below-knee amputations. Presentation with significant non-salvageable necrotic alterations or Rutherford Class III irreversible acute limb ischaemia was the greatest predictor of primary amputation. An initial limb-preservation rate of 73.7% was attained by open surgical revascularisation in patients with salvageable ischaemic limbs categorised as Rutherford Class IIa/IIb.

Distribution of Major Operative Outcomes

The operative outcomes can be summarized into three broad groups: open revascularization/repair, major amputation, and minor amputation/debridement. Of the 61 surgeries, 42 (68.9%) involved amputation and/or debridement, while 19 (31.1%) involved open revascularisation or vascular repair. There was a significant burden of irreversible limb illness at the time of emergency presentation, as evidenced by the 29 recorded above-knee and below-knee amputations, which accounted for 47.5% of the total cohort. Of these, 11.5% (7/61) had below-knee amputations and 36.1% (22/61) had above-knee amputations.

Table 3. Operative Procedures and Major Amputation Profile (N = 61)

Operative outcome/procedure	Number (n)	Percentage of cohort (%)
Open revascularization/vascular repair	19	31.1
Transfemoral/transbrachial thrombectomy	8	13.1
Autologous vein interposition grafting	6	9.8
Arterial bypass	3	4.9
Direct vascular repair	2	3.3
Amputation/debridement procedures	42	68.9
Above-knee amputation	22	36.1
Below-knee amputation	7	11.5
Other amputation/debridement procedures*	13	21.3
Total cohort	**61**	**100.0**

*The "other amputation/debridement" category is calculated as 42 − 22 − 7 = 13 and represents the remaining procedures within the reported

amputation/debridement group; the source data do not provide a further breakdown of these 13 procedures.

Evaluation of the immediate treatment results showed a distinct variation based on the damaged limb's initial viability. Urgent open revascularisation, such as thrombectomy, bypass, or vein interposition grafting, was used to treat patients with salvageable ischaemic extremities. The reported success rate for immediate limb preservation in this category was 73.7%. On the other hand, individuals with significant necrotic alterations or permanent ischaemia often needed initial major amputation. Therefore, rather than the general availability of revascularisation techniques, the high amputation load was mostly linked to the state of the limb at the time of presentation. Overall, the results show that the emergency vascular cohort exhibits two different clinical trends. The majority of younger patients had traumatic vascular damage, and autologous vein interposition grafting or artery repair were more common treatments. Acute limb ischaemia, diabetic gangrene, and arterial occlusive disease were more prevalent in older patients, and they required more tissue debridement or amputation. This differentiation is further supported by the statistically significant age difference across diagnostic groups ($F = 7.14$, $p < 0.001$), with vascular trauma occurring at a much younger mean age than diabetic limb disease and chronic occlusive limb illness.

DISCUSSION

The present study demonstrates the substantial clinical and operative burden associated with emergency vascular surgical disease in a tertiary-care setting. Men made up 78.7% of the group, indicating a clear male preponderance (Table 1). Although the current study did not precisely evaluate individual cardiovascular or occupational risk factors, this conclusion may represent the combined impact of trauma-related processes and atherosclerotic vascular disease. While vascular trauma is a significant source of acute extremities ischaemia in younger patients, peripheral arterial disease is significantly linked to substantial unfavourable limb and cardiovascular outcomes [11,12].

The substantial age variation between diagnostic categories was a particularly noteworthy observation (Table 2). The mean age of patients with vascular trauma was 36.4 ± 16.4 years, whereas that of patients with arterial occlusion/ALI was 60.3 ± 11.2 years, and that of patients with diabetic foot/gangrene was 63.3 ± 10.4 years. As a result, the cohort shows two clinically different populations: older patients who come with atherosclerotic occlusive or diabetes-related limb illness, and younger patients who mostly arrive with traumatic vascular damage. The research on vascular trauma has reported similar age-related disparities, with peripheral vascular injuries often affecting otherwise younger trauma patients [12, 13].

With 47.5% of patients, PAD and ALI made up the biggest diagnostic group (Table 2). The significance of acute arterial occlusion as a significant emergency vascular presentation is highlighted by this discovery. According to current recommendations, ALI is defined as acute arterial hypoperfusion that poses a danger to limb viability. They place a strong emphasis on prompt clinical evaluation and categorisation based on the salvageability of the limb. For viable and endangered but salvageable limbs, revascularisation is advised; however, irreversible ischaemia necessitates extensive amputation rather than revascularisation [11].

The effects of advanced limb ischaemia upon presentation are further shown by the surgical results. 31.1% of treatments required open revascularisation or vascular repair, whereas 68.9% involved amputation and/or debridement (Table 3). The most common revascularisation technique was thrombectomy, which was followed by arterial bypass and autologous vein

interposition grafting. In 73.7% of patients with ischaemic limbs that might be saved, immediate limb preservation was accomplished. This demonstrates the significance of quickly restoring arterial flow in individuals who have been carefully chosen. The source of ischaemia, anatomy, clinical severity, and available expertise are taken into consideration when choosing a therapy, and current recommendations acknowledge both open and endovascular methods as successful options [11,14].

The high prevalence of major amputation was the most alarming result. Twenty-nine patients, or 47.5% of the sample, had amputations above or below the knee (Table 3). Rutherford Class III irreversible ischaemia or significant non-salvageable necrosis were the main causes of primary major amputation in the current study. Rutherford III limbs are regarded as irreversible, with significant tissue loss or irreversible neurological damage inevitable, according to the 2024 ACC/AHA guideline [11]. Timely management and postoperative care are crucial because prolonged ischaemia can further raise the risk of compartment syndrome and reperfusion damage when blood flow is restored [11].

13.1% of patients were in the diabetic foot/gangrene category (Table 2). Peripheral artery disease should be actively evaluated in diabetic patients because ischaemia significantly impacts the risk of amputation and wound healing. In individuals with diabetes, PAD, and foot ulcers or gangrene, the IWGDF advises vascular evaluation and, if clinically suitable, revascularisation [10].

Overall, these results imply that early limb viability and prompt presentation are important factors influencing emergency vascular outcomes. Opportunities for limb salvage may be increased by early detection, quick referral to vascular services, immediate evaluation of limb viability, and swift revascularisation, especially in patients with possibly reversible ischaemia. On the other hand, in order to control tissue necrosis and avoid potentially fatal systemic consequences, patients who exhibit significant gangrene or developed permanent ischaemia may need primary amputation. Therefore, the results encourage improving emergency vascular services and early referral routes, especially in environments where delayed presentation is still prevalent.

LIMITATIONS

This study has several limitations. First, its retrospective design limits the ability to establish causal relationships between clinical characteristics, treatment strategies, and outcomes. Second, the study was conducted at a single tertiary-care center, which may limit the generalizability of the findings to other institutions and healthcare settings. Third, the relatively small sample size of 61 emergency vascular procedures may reduce the statistical power for subgroup analyses and identification of independent predictors of amputation. Additionally, the study primarily evaluated immediate operative and limb-preservation outcomes. Long-term functional outcomes, patient survival, quality of life, and prosthetic rehabilitation were not systematically assessed. Therefore, larger prospective multicenter studies with long-term follow-up are required to validate these findings and better determine factors associated with durable limb salvage.

CONCLUSION

Younger individuals with severe vascular injuries who need quick arterial repair and older patients with advanced multivascular occlusive disease who come with acute limb ischaemia or tissue loss make up the bimodal population of emergency vascular surgery. The current cohort's high rate of major amputation highlights the significance of early detection, prompt referral, and quick evaluation of limb viability. While permanent ischaemia and severe necrosis often need initial amputation, patients with salvageable ischaemic limbs may benefit from timely revascularisation. There may be more

chances for limb salvage and fewer avoidable major amputations if emergency referral routes are strengthened, vascular crises are better understood, and presentation and treatment delays are decreased.

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