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Original Research Article

Comparative Embolectomy Outcomes by Age in Patients with Acute Lower Limb Ischemia

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Abstract: *Acute limb ischemia (ALI) is a vascular emergency associated with high morbidity and mortality. Emergent surgical embolectomy remains the standard of care; however, outcomes may vary with age, comorbidities, and timing of presentation. Limited data exist from South Asian populations evaluating outcomes in elderly versus younger patients.* ***Objective:*** *To compare outcomes of surgical embolectomy between patients aged ≥80 years and those <80 years presenting with acute limb ischemia.* ***Methods:*** *This retrospective study was conducted in the Department of Cardiology, Chaudhary Pervaiz Elahi Institute of Cardiology, Multan, Pakistan, from June 2024 to June 2025. A total of 100 consecutive patients undergoing emergent femoral thromboembolectomy for ALI were included. Patients were stratified into two age-based groups: Group A (≥80 years, n=50) and Group B (<80 years, n=50). All procedures were performed using a standard open femoral approach under 2% prilocaine local anaesthesia. Demographic data, postoperative complications (hematoma, wound infection, acute renal insufficiency/failure), amputation, and mortality were compared between groups. Statistical analysis was performed using the chi-square test, with p<0.05 considered significant.* ***Results:*** *Baseline demographics were comparable across groups. Postoperative complications did not differ significantly between elderly and younger patients. In Group A, 3 (6%) developed hematoma, 3 (6%) wound infection, 11 (22%) required amputation, 9 (18%) had acute renal insufficiency, 7 (14%) acute renal failure, and 9 (18%) died. In Group B, no hematomas occurred; 5 (10%) developed wound infection, 4 (8%) underwent amputation, 4 (8%) had acute renal insufficiency, 2 (4%) developed acute renal failure, and 2 (4%) died. Late presentation was observed in 7 (14%) of Group A and 5 (10%) of Group B. Mortality rates were not significantly different between groups (p=0.31). However, amputation rates were significantly higher in younger patients with late presentation (p=0.001), with compartment syndrome and Buerger's disease being major contributors.* ***Conclusion:*** *Age alone does not significantly influence outcomes of embolectomy in patients with ALI. Delayed presentation, particularly in younger patients with underlying vascular pathology, is associated with increased risk of limb loss. Early diagnosis and timely intervention remain critical to improving outcomes.*

Keywords: Acute limb ischemia; Age factors; Amputation; Embolectomy; Limb salvage; Postoperative complications; Prognosis

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Introduction

Acute limb ischemia is defined as a sudden decrease in blood flow to a limb, restricting the supply to tissues and muscles and risking the functionality of the appendage. It can prove to be fatal if not caught early and treated promptly. (1) It can be indicated by severe pain, coldness, paresthesia, pulselessness, paralysis and pallor.

Almost 40% with acute limb ischemia experience the loss of limb, and 15-20% result in death. (2, 3) Medical advancement in ICU and revascularisation methods have not caused a reduction in the mortality rate, especially in the elderly with increased atherosclerosis risk and comorbidities. The rate of emergent surgeries has increased due to increased life expectancy. (4)

It is difficult to recommend a treatment for ALI in ageing people, as even non-surgical methods pose a high risk of mortality and morbidity. Literature reports that surgical outcomes are unsatisfactory in elderly ALI patients who are initially unfit for surgery. (5) This study was conducted to compare outcomes of embolectomy between patients aged 80 years or older and those younger than 80 years with acute limb ischemia.

Methodology

A retrospective analysis was performed in the Cardiology Department of Chaudhary Pervaiz Ellahi Institute of Cardiology, Multan, from June 2024 to June 2025. A total of 100 patients with acute limb ischemia undergoing emergent thromboembolectomy were included in the study. Patients who had ischemia as a result of dissection or trauma and those who required medical treatment were excluded. All patients verbally agreed to participate in the study. The ethical committee of the hospital approved the study.

All patients underwent Doppler ultrasound and CT angiography to diagnose and confirm the presence of acute thromboembolism. Patients were classified into two groups by age; Group A included 50 patients aged 80 years or older, and Group B included 50 patients aged younger than 80 years. Patient data includes age, gender, coexisting diseases, thrombus location, laboratory test results, postoperative complications such as acute kidney disease, hematoma, infection, and amputation. Death within a month after surgery was recorded as early mortality. Late management was defined as the time between onset and medical management exceeding 8 hours.

Femoral embolectomy was performed by the same traditional technique in all patients under 2% prilocaine local anaesthesia. Pain and anxiety were managed by a 2 mg bolus dose of midazolam. A vertical incision was made just below the inguinal ligament where the femoral artery runs. The common femoral artery and its two branches were separated from surrounding tissues and gently encircled with common umbilical tapes. A 1mg/kg Heparin dose was administered, followed by distal and proximal clamping of the common femoral artery and its branches. An arteriotomy was performed transversely, and Fogarty catheters extracted clots. The artery was closed with 6-0 polypropylene sutures. Hemostasis was checked, and the patient was closed by the usual method.

Postoperative adjuvant sodium heparin was administered intravenously for 1-3 days postoperatively. In patients with atrial fibrillation or mechanical cardiac valve replacement, warfarin therapy was also given.

100 mg of aspirin was given daily as antiplatelet therapy in the remaining patients.

All data was analysed by SPSS 11. Descriptive analysis was conducted to present continuous data and categorical data. Normally distributed data associations were evaluated by the Student's t-test. The Chi-squared test analysed quantitative data. Statistically significant was set at a p-value less than 0.05.

Results

A total of 100 patients were included, among whom 50 were 80 years or older and 50 were younger than 80 years. The groups differ significantly concerning age and gender ($p<0.001$). The mean age was 88.3 ± 3.9 vs 59 ± 15.1 years, respectively. The majority of patients in Group B (80%), as compared to only 26% in Group A. The incidence of AF was 64%, diabetes was 32%, hypertension was 45% and COPD was 13%. The prevalence of comorbidities was similar between groups, except for COPD, which was significantly higher in Group A (p=0.053) (Table I). More than half of the thrombus (56%) was located in the femoral artery, 30% was located in the popliteal artery, and 14% was found in the iliac artery. 45% of the surgeries were performed in the right lower limb, 50% were operated in the left lower limb, and 5% were performed bilaterally with no significant difference between localisation (p=0.49).

The study groups did not differ significantly according to postoperative complications. In Group A, 3 (6%) had hematoma, 3 (6%) had wound infection, 11 (22%) underwent amputation, 9 (18%) had acute renal insufficiency, 9 (18%) died, and 7 (14%) underwent acute renal failure. In Group B, none of the patients presented with hematoma,5 (10%) had infection, 4 (8%) had amputations, 4 (8%) developed AKI, 2(4%) died and 2 (4%) had acute renal failure. The cause of amputations was compartment syndrome and a history of Buerger disease that presented late. 7 (14%) patients in Group A and 5 (10%) in Group B had late presentation. In these cases, subjects were similar for mortality rate (p=0.31) but significantly different for amputations (p=0.001). Amputations were more frequent in younger patients (p=0.006) (Table II).

Table I: Baseline features of study groups

	Group A	Group B	P-Value
Mean age	88.3 ± 3.9	59 ± 15.1	<0.001
Sex			
Male	13 (26%)	40 (80%)	<0.001
Female	37 (74%)	10 (10%)	
Extremity			
Right	19 (38%)	25 (50%)	0.49
Left	27 (54%)	22 (44%)	
Bilateral	4 (8%)	3 (6%)	
Diabetes	19 (38%)	13 (26%)	0.32
Hypertension	28 (56%)	17 (34%)	0.11
COPD	10 (20%)	3 (6%)	0.053
CAD	15 (30%)	7 (14%)	0.12
AF	34 (68%)	30 (60%)	0.48

Table II: Postoperative adverse effects of embolectomy

	Group A	Group B	P-Value
Hematoma	3 (6%)	-	0.23
Infection	3 (6%)	5 (10%)	0.37
Compartment syndrome	-	4 (8%)	0.22
Amputation	11 (22%)	4 (8%)	0.08
AKI	9 (18%)	5 (10%)	0.29
Mortality	9 (18%)	2 (4%)	0.12
Acute renal failure	7 (14%)	2 (4%)	0.09

Discussion

This study was conducted to compare the outcomes of embolectomy in patients with acute limb ischemia according to an age threshold of 80 years. The results showed similar outcomes between both groups, indicating that age did not influence the findings (6, 7). However, the results also indicated that early diagnosis and timely treatment are important. The incidence of atrial fibrillation was 64% confirming it is a risk factor of cardiac thrombus as reported by previous studies. (8, 9)

More than half of the thrombus (56%) was located in the femoral artery, 30% was located in the popliteal artery, and 14% was found in the iliac artery. This is consistent with previous studies showing up to 40% embolus present in the femoral artery and 15% in the popliteal trifurcation site. (10, 11)The difference in distribution of locality can be accounted for by the inclusion of lower limb ischemia patients only.

An ischemia lasting more than 6 hours after thromboembolism increases the risk of adverse postoperative outcomes and irreversible necrosis if not managed promptly. 7 (14%) patients in Group A and 5 (10%) in Group B had late presentation. In these cases, subjects were similar for mortality rate (p=0.31) but significantly different for amputations (p=0.001). Amputations were more frequent in younger patients (p=0.006). A previous study also indicated a relationship between late presentation and rate of amputation, but embolectomy should be performed regardless. (12).

These findings emphasise that while age alone may not significantly influence overall outcomes after embolectomy, factors such as timely presentation, early diagnosis, and underlying comorbidities remain critical determinants of prognosis. The higher amputation rates observed in patients with delayed presentation, regardless of age, highlight the need for public and professional awareness to ensure prompt referral and

intervention. Moreover, the predominance of atrial fibrillation among affected individuals underlines the importance of effective anticoagulation strategies and regular cardiovascular monitoring to prevent thromboembolic complications. Future multicenter studies with larger cohorts are warranted to validate these observations and to develop standardised management pathways tailored to both elderly and younger populations with acute limb ischemia.

Conclusion

The embolectomy outcomes in patients with acute lower limb ischemia are not associated with age; however, late presentation must be avoided to reduce the risk of complications.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-24)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

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