ORIGINAL ARTICLE

Limb Salvage in Early Versus Delayed Revascularization of Acute Lower Limb Ischemia

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ABSTRACT

Aim: To compare the limb salvage rate in early versus late presenting patients of Rutherford class IIB acute lower extremity ischemia undergoing revascularization.

Study Design: Comparative/observational study

Place and duration of study: Department of Surgery, CMH Peshawar from January 2019 to March 2021

Methodology: Twenty eight patients of both genders with ages 20 to 70 years presented with Rutherford class IIB acute lower limb ischemia were enrolled in this study. Patients were divided into two groups. Group I (presented after 6 hours of onset of symptoms) consisted of 20 patients and group II (presented within 6 hours of onset of symptoms) consisted of 8 patients. All the patients underwent femoral embolectomy. Limb salvage rate between both groups was examined at postoperative 3rd month. Data was analyzed by SPSS 24.0. P-value <0.05 was taken as significant.

Results: There were 16(80%) male and 4(20%) females with mean age 50.52±11.74 years in group I, in group II 6(75%) were male and 2(25%) were females with mean age 50.08±10.94 years. No significant difference was observed between both groups regarding age and gender with p-value >0.05. In group I, limb salvage found in 19(95%) patients while in group II limb salvage found in 5(62.5%) patients, a significant difference was observed regarding limb salvage rate between both groups (p-value <0.05). Mortality rate was high in group II (delayed presentation) as compared to group I (12.5% Vs 0%) with p-value <0.05.

Conclusion: The limb salvage rate was high in early presenting patients than late presenting patients with a significant difference. 30 days mortality rate and amputation rate were significantly high in delayed presentation as compared to early presented cases.

Keywords: Acute lower limb ischemia, revascularization, limb salvage

INTRODUCTION

A sudden decline in blood flow to a limb is known as Acute Limb Ischemia (ALI), a possible threat to the viability of the limbs¹. ALI is a medical emergency that is particularly morbid and dangerous, while thrombolytic, endovascular or free vascular surgery is urgently revascularization the rates of 30 days of amputation and mortality vary from 10% to 5% and 5% to 15% respectively^{2,3}. The related morbidity and death is exceptionally high, with an average mortality rate of 40% in the USA⁴. This disease is affecting 15-26 people every 100,000 a year.

Systemic anticoagulation and early effective therapy have been used for acute limb ischemia. Class I acute limb ischemia (ALI) of Rutherford is generally treated only with anticoagulation, while category III of Rutherford typically calls for amputational procedures. Revascularization of patients with Rutherford Class II ALI is mostly required. In developed countries, however, the majority of the patients arrive late because of the uncertainty in their diagnosis.^{6,7} We conducted present study to examine the limb salvage rate in patients presented late and compare with early presented patients whom were undergoing

revascularization for Rutherford class IIB acute lower limb ischemia.

The objective of the study was to compare the limb salvage rate in early versus late presenting patients of Rutherford class IIB acute lower extremity ischemia undergoing revascularization.

MATERIALS AND METHODS

This comparative/observational study was conducted at Department of Surgery, CMH Peshawar from 1 January 2019 to 1 March 2021 after approval from IRB. A total of 28 patients of both genders with ages 20 to 70 years presented with Rutherford class IIB acute lower limb ischemia were enrolled in this study. All the patients were divided in to two groups, group I consist of 20 patients who presented early(≤6 hours) and group II had 8 patients whom presented late (>6 hours). Patients detailed demographics including age, sex, body mass index, and co-morbidities were recorded after taking written consent from all the patients. Patients with history of vascular surgery, Rutherford class I, IIA and III, and patients with traumatic acute limb ischemia were excluded from this study.

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Femoral Embolectomy was performed in all the cases under local anaesthesia. Fasciotomy was performed in majority of patients in delayed presentation group and no fasciotomy was done in early presentation group. The patients were carefully examined in the ICU within 6 hours after surgery and then every 12 hours. Detailed clinical examination included examination of distal pulses and hand held Doppler examination in case pulses were not palpable. Postoperatively heparin infusion (80 IU/Kg/hr) was continuously administered. Tab Rivaroxaban 20 mg at bed time was started on second postoperative day. Heparin infusion was stopped on morning of 4th postoperative day. Regular monitoring of heparin anticoagulation was done by 12 hourly PTTK. Patients without fasciotomy were discharged on 5th postoperative day while patients with fasciotomy were discharged between postoperative day 7 and 14. Fasciotomy was closed when swelling settled. Patients were followed up weekly for one month and fortnightly for another 1 months. Limb salvage rate was recorded at 2 months after surgery. All the data was analyzed by SPSS 24.0. P-value <0.05 was taken as statistically significant.

RESULTS

There were 16(80%) male and 4(20%) females with mean age 50.52 ± 11.74 years in group I, in group II 6(75%) were male and 2(25%) were females with mean age 50.08 ± 10.94 years. No significant difference was observed in age and gender between the groups ($P > 0.05$). Also no significant difference was found regarding BMI between both groups I and II ($26.26 \pm 3.82 \text{ kg/m}^2$ Vs $25.92 \pm 3.24 \text{ kg/m}^2$) with p-value > 0.05 . No significant difference was observed regarding co-morbidities between both groups (p-value > 0.05). Comorbidities and associated risk factors are shown in Table 1.

Superficial femoral artery was most commonly affected vessel in group I while popliteal artery was most commonly affected in group II (Table 2).

Mean hospital stay in group I was 5.45 ± 1.8 days and in group II it was 10.76 ± 3.56 days, the difference was statistically significant ($P = 0.002$). Major amputation rate within 60 days was high in group II, 3(37.5%) patients as compared to group I 1 (5%) (Table 3).

Table 1: Co-morbidities and risk factors

Variable	Group I (Early)	Group II (Late)	Total
Diabetes Mellitus	3 (15%)	2 (25%)	5
Smoking	5 (25%)	3 (37.5%)	8
Hypertension	9 (45%)	4 (50%)	13
Obesity	2 (10%)	1 (12.5%)	3
Ischemic heart disease	3 (15%)	2(25%)	5
Atrial fibrillation	4(20%)	1 (12.5%)	5

Table 2: Arteries affected

Variables	Group I (Early)	Group II (Late)
Ext iliac artery	1 (5%)	-
Common femoral artery	5 (25%)	2 (25%)
Superficial femoral artery	6 (30%)	1 (12.5%)
Popliteal artery	5 (25%)	4 (50%)
AT/PT artery	3 (15%)	1 (12.5%)

Table 3: Hospital stay and amputation rate between both groups

Variables	Group I (Early)	Group II (Late)	P-value
Hospital stay	10.76 ± 3.56	5.45 ± 1.8	0.002
Amputation	1 (5%)	3 (37.5%)	0.024

DISCUSSION

Acute lower limb ischemia is one of the commonest vascular emergency encountered all over the world and associated with higher morbidity and mortality rate. Early presentation and accurate diagnosis can reduce the complications and mortality associated with ALI⁸. Revascularization is considered a treatment of choice for the management of acute lower extremity ischemia due to its higher limb salvage rate and fewer rate of complications.⁹ Majority of patients in the present study were males 78.57% as compared to females 21.42%. These results are similarity to the previous studies in which male predominance of 65% to 75% was seen^{10,11}.

We found that the mean age of patients in late group was 50.52 ± 11.74 years and in early group, it was 50.08 ± 10.94 years. No significant difference ($P < 0.05$) was observed between both groups regarding age and gender. Also no significant difference ($P > 0.05$) was found regarding BMI between both groups I and II ($26.26 \pm 3.82 \text{ kg/m}^2$ Vs $25.92 \pm 3.24 \text{ kg/m}^2$). These results were comparable to the study by Chaudhari et al¹².

In the our study, hypertension was the commonest co-morbid condition in both early and late presented patients followed by smoking, diabetes, ischemic heart disease and arterial fibrillation. In a study conducted by Baril et al¹³ regarding outcomes of lower extremity bypass for acute lower limb ischemia, diabetes mellitus was the most frequent comorbidity found in ALI patients followed by hypertension and smoking.

In present study, hospital stay was longer in late presenting patients (10.76 ± 3.56 days) as compared to early presenting patients (5.45 ± 1.8). The difference was statistically significant. Previous studies demonstrated that patients who presented late for revascularization for acute limb ischemia had longer hospital stay (above 10 days) as compared to patients presented early (mean 5 days).^{14,15} We found that 30 days amputation rate was high in late presented patients as compared to early presented patients (37.5% Vs 5%). The difference was statistically significant. Rothenburg et al¹⁶ reported in their study that delayed fasciotomy is highly associated with major amputation in patients with acute lower extremity ischemia as compared to early fasciotomy 50% Vs 5.9%.

In our study, limb salvage was found in 19 (95%) patients in group I while in group II limb salvage was found in 5 (62.5%) patients. A significant ($P < 0.05$) difference was observed regarding limb salvage rate between both groups. Chaudhary et al¹² reported that the limb salvage rate was 91.67% in the early presenting group, whereas in the delayed presenting group, it was 72.73%. No significant difference was observed regarding limb salvage rate between early and late presenting patients of acute lower limb ischemia. In a study by Sidique et al¹⁷ to examine the outcome of embolectomy in late presenting patients of acute lower limb ischemia, limb salvage rate was 85.7%.

In current study, mortality rate was high in group II as compared to group I (12.5% vs 0%) with p-value < 0.05 . A study conducted by Kempe et al¹⁸ included 170 acute lower extremity ischemia patients with majority (83%) presenting beyond 6 hours. They reported 85% limb salvage rate at 3 months. In their study, 52% of the patients were in

Rutherford Class IIB. The median time to amputation was 1 day and the 30-day mortality was 18%. Another study conducted by Khan et al⁶ reported that patients who presented after 72 hours for revascularization for ALI the limb salvage rate was 80% and mortality was 5%. Some other previous studies demonstrated that patients who presented late (more than 72 hours to 15 days) had higher mortality rate as compared to early presenting patients^{19,20}.

CONCLUSION

Revascularization for acute lower limb ischemia showed better outcomes in early presenting patients as compared to late presenting patients. Limb salvage rate was high in early presenting patients than late presenting one and the difference was statistically significant. Moreover, hospital stay, 30 day mortality and amputation rate was significantly high in late presenting patients.

Conflict of interest: Nil

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