



Original Article

Role of conservative management in 50 cases of lower limb peripheral vascular disease

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ABSTRACT

Introduction: Peripheral vascular disease (PVD) is a chronic atherosclerotic condition with a high associated cardiovascular risk. Conservative management, including risk factor modification and medical therapy, is the mainstay of care for non-critical cases. This study evaluates the clinical profile and outcome of conservative management in 50 patients with lower limb PVD.

Material and Methods: This was a prospective study of 50 patients with lower limb PVD admitted to Civil Hospital, Ahmedabad, from February 2023 - March 2025. Patients managed conservatively had chronic limb ischemia with short-segmental, diffuse, or partial thrombosis/stenosis and arterial lumen narrowing of <50%. Management consisted of aggressive risk factor modification (e.g., regular exercise, smoking cessation) and medical therapy, including antiplatelets, vasodilators (cilostazol and pentoxifylline), and targeted co-morbidity treatment. The primary outcome measured was symptom progression (improvement, persistence, or worsening) after one year of follow-up and complication rate.

Results: Out of 50 patients, the majority were male (86%) and were in the 41-60 year age group. Major associated risk factors were diabetes and smoking. Intermittent claudication was the most common symptom. After one year of follow-up, 52% of patients showed improvement in symptoms. The most common complication was an ulcer (10%).

Conclusion: Conservative management, including risk factor modification, medical therapy, and regular follow-up, can significantly improve symptoms and functional outcome in PVD patients, especially in non-critical limb ischemia.

Keywords: Cilostazol, Conservative management, Intermittent claudication, Pentoxifylline, Peripheral vascular disease, Risk factor modification.

INTRODUCTION

Peripheral vascular disease (PVD) is a chronic, progressive, atherosclerotic disorder primarily affecting the arterial blood supply to the lower limbs, the abdominal aorta, and the iliac arteries.^{1,2}

The progression of PVD is significantly accelerated by modifiable and non-modifiable risk factors.^{1,3,4} Clinically, PVD presentation is variable, ranging from asymptomatic disease to the classic symptom of intermittent claudication. In severe cases, patients may progress to critical limb ischemia, presenting with ischemic rest pain, arterial ulceration, or tissue loss (gangrene).⁵⁻⁷ Early diagnosis, confirmed by non-invasive and invasive tools, is crucial for improving outcomes.^{8,9} The core management strategy for PVD involves aggressive risk factor modification and antiplatelet therapy, often coupled with medical agents to improve blood flow and symptoms.^{5,6,8}

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Endovascular or open surgical interventions are reserved for patients with severe disease, lifestyle-limiting symptoms, or critical limb ischemia.^{6,8,10}

MATERIAL AND METHODS

This research was a prospective clinical study conducted on 50 patients with lower limb PVD admitted to Civil Hospital, Ahmedabad. The study period ran from February 2023 - March 2025. The study protocol received approval from the Institutional Ethics Committee (IEC) of B.J. Medical College & Civil Hospital, Ahmedabad. Written informed consent was obtained from all participants.

Inclusion criteria

All cases of PVD diagnosed clinically and via radiological investigation during the study period were included.^{1,2} The cohort focused on patients with chronic limb ischemia (CLI) with short-segmental, diffuse, or partial thrombosis where the arterial lumen narrowing was <50%.

Exclusion criteria

Patients who were hemodynamically unstable and those presenting with acute thromboembolism of the lower limb were excluded.

Data was collected via detailed history and clinical examination using a standardized case record form.

Walking distance was assessed at baseline and at 12-month follow-up using a standardized walking test. The maximum walking distance (in meters) was recorded.^{5,11} Follow-up walking distance was not assessed in patients who progressed to critical limb ischemia due to clinical deterioration.

Routine investigations, such as basic investigations, coagulation profile, lipid profile, and HbA1c, were performed. Peripheral pulses were palpated and graded. Radiological investigations, such as ultrasound sonography (USG) arterial-venous doppler, were performed as the routine first-line investigation in all 50 patients.^{8,12} CT Angiography or MR Angiography was done if required.^{6,8}

Conservative management protocol

All enrolled patients were managed conservatively and discharged after symptomatic relief. Patients were followed up at regular intervals in the outpatient department (OPD) for 1 year. If a patient developed any acute complication, they were excluded from the study.

Risk factor modification

1. Regular Exercise was recommended at least 45 to 60 minutes, 3 times per week, and walking for 30 to 45 minutes, 3-5 times per week, until claudication pain occurs. Patients were advised to perform the Buerger exercise 3 to 5 times per session for 2 to 3 times per day.

2. Smoking cessation and Foot care.
3. Dietary Modification: Low-fat diet, low-sugar diet, and salt restriction according to co-morbidity.

Medical management

Antiplatelets

Tablet Aspirin 75 mg/day and Tablet Clopidogrel 75 mg/day.^{5,6,8,13}

Vasodilators/Other drugs

Tablet Cilostazol 50 mg twice a day and Tablet Pentoxifylline 400 mg thrice a day were given.^{5,11}

Co-morbidity control

Oral hypoglycemic drugs/insulin were used for diabetic patients. Antihypertensive drugs were used for hypertensive patients. Statin therapy was prescribed for hyperlipidemic patients.^{7,14} Data analysis was performed using appropriate statistical software. Continuous variables were assessed for normality. Walking distance data were expressed as median with interquartile range and compared using non-parametric tests. Changes in clinical and biochemical parameters before and after intervention were expressed as mean \pm standard deviation and analyzed using paired t-tests. Categorical variables were expressed as frequencies and percentages. A $p < 0.05$ was considered statistically significant.

RESULTS

A total of 50 patients diagnosed with PVD were enrolled in this prospective study.

1. The study demonstrated a strong male preponderance (86%), with a male-to-female ratio of 6.14:1. The most common age group was 41-60 years.
2. 76% of patients were found to be smokers.
3. The most common co-morbidity was diabetes (70%), followed by hypertension (40%), and hyperlipidemia (30%).
4. The majority of patients presented with intermittent claudication (52%). The most frequent sign was skin changes.
5. The majority of patients (68%) had a hospital stay of 1-7 days.
6. 52% of patients reported an improvement in symptoms. 32% had persistent symptoms, and 16% developed worsening or new symptoms [Table 1].

Table 1: Disease progression over 1 year

Disease progression over 1 year	n = 50
Improvement of symptoms	26
Persistent symptoms	16
Worsening / New symptoms	8

Note: The distribution of patient outcomes (improved, persistent, worsened) was assessed using a Chi-Square Goodness-of-Fit test. The observed frequencies were found to be statistically significantly different from an expected equal distribution ($n = 16.67$ per category), $\text{Chi}^2(2) = 9.76$, $p = 0.008$.

Table 2: Changes in walking distance according to clinical outcome after 12 months of follow-up ($n = 50$)

Clinical outcome	Baseline walking distance (m)	Follow-up walking distance (m)	<i>p</i> value
Improved ($n = 26$)	175 (130-250)	350 (240-400)	<0.001
Persistent ($n = 16$)	143 (110-170)	150 (130-180)	0.21
Worsened ($n = 8$)	95 (80-120)	–*	NA

Data are presented as median (interquartile range).

*Follow-up walking distance could not be assessed due to clinical deterioration.

Patients with improved clinical outcomes ($n = 26$) demonstrated a significant increase in walking distance from baseline to follow-up, with a median improvement of 120 m (95% CI: 102.5-144.1; $p < 0.001$) [Table 2]. In contrast, patients with persistent symptoms ($n = 16$) showed no significant change in walking distance (median change: 2 m; 95% CI: -4.9 to 8.3; $p = 0.21$). Follow-up walking distance was not available for patients with worsened outcomes ($n = 8$) due to progression to critical limb ischemia as illustrated in the box-and-whisker plot [Figure 1].

Chart: Walking distance at baseline and follow-up stratified by clinical outcome

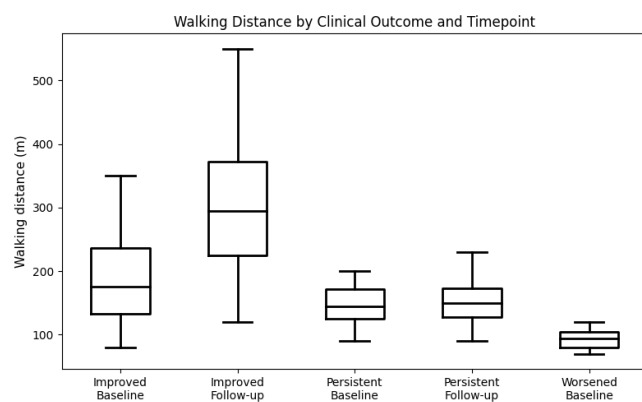


Figure 1: Box-and-whisker plot showing walking distance at baseline and follow-up according to clinical outcome. The central line represents the median, boxes indicate the interquartile range, and whiskers represent the range. Patients with clinical deterioration are shown with baseline values only, as follow-up walking distance could not be assessed due to progression to ischemic rest pain.

Table 3: Comparison of clinical and biochemical parameters before and after the intervention

Variable	Before	After	Paired t-test	<i>p</i> value
SBP-mmHg	142.7 ± 8.24	117.5 ± 6.15	11.42	<0.001
DBP-mmHg	89.6 ± 7.2	80.5 ± 5.8	7.02	<0.001
HbA1c	8.08 ± 1.62	5.39 ± 0.59	10.90	<0.001
Total cholesterol	277.8 ± 15.4	201.6 ± 14.6	15.07	<0.001

SBP: Systolic blood pressure, DBP: Diastolic blood pressure, HbA1c: Glycated hemoglobin

As shown in Table 3, significant improvements were observed in all measured parameters following the intervention. Mean systolic blood pressure decreased by 28.3 mmHg (95% CI: 23.33–33.24; paired t-test, $p < 0.001$), while diastolic blood pressure decreased by 8.7 mmHg (95% CI: 5.14–12.33; $p < .001$). Glycemic control improved significantly, with HbA1c levels showing a mean reduction of 2.76% (95% CI: 1.80–3.72; $p < 0.001$). Total cholesterol levels decreased by 70.5 mg/dL (95% CI: 60.98–79.93; $p < 0.001$).

The most common local complication was Ulcer (10%), followed by gangrene (6%) and 4% of patients experienced major cardiovascular events.

DISCUSSION

The results of this prospective study on 50 patients highlight the feasibility and efficacy of a structured conservative management protocol for non-critical lower limb PVD over a 12-month follow-up.

Our patient demographics, characterized by a predominance in the 41-60 year age group (58%) and a strong male preponderance (86%), are consistent with the natural history of atherosclerotic PVD reported globally.^{1,2,15} The high prevalence of key modifiable risk factors in our cohort (76% smokers and 70% diabetic patients) underscores that PVD is primarily a lifestyle-driven disease.^{3,4,7} This finding is crucial, as it provides a clear target for primary therapeutic intervention, supporting the emphasis placed on aggressive risk factor modification in our management protocol.

The majority of patients presented with symptoms in the form of (52%) Intermittent Claudication. The clinical signs were also highly diagnostic, with 80% exhibiting skin or nail changes and 60% having an abnormal pulse, confirming the utility of a thorough physical examination for initial screening. Furthermore, the study validates the use of USG arterio-venous color duplex as the optimal first-line diagnostic modality, having been successfully used in all of our cases.¹²

The core finding of this study is that 52% of patients experienced symptomatic improvement after one year of conservative therapy, underscoring the effectiveness of a structured, non-invasive treatment strategy in appropriately selected patients.¹¹ The observed clinical improvement appears to be attributable to strict adherence to a comprehensive medical regimen, which included antiplatelet therapy, cilostazol, and pentoxifylline in all patients, combined with targeted lifestyle modifications. These pharmacologic agents are known to improve microcirculatory flow, reduce platelet aggregation, and enhance walking capacity, thereby contributing to symptomatic relief.^{5,6,8,13} The significant increase in walking distance among patients with improved outcomes further supports the functional benefit of this approach and aligns with previous reports highlighting the role of optimal medical therapy in improving exercise tolerance and quality of life.

In contrast, 32% patients with persistent symptoms demonstrated minimal change in walking distance, suggesting that conservative therapy may have a limited functional impact in individuals with more advanced or less reversible disease. Importantly, only 16% of patients experienced disease progression, with a relatively low incidence of complications such as ulceration (10%) and gangrene (6%). This low progression rate reinforces the safety of conservative management, particularly when applied early and accompanied by careful follow-up.^{6,10}

Patients who progressed to worsening clinical status developed critical limb ischemia, precluding assessment of follow-up walking distance. This finding highlights the heterogeneous nature of the disease and emphasizes the importance of early risk stratification to identify patients who may require closer monitoring or earlier escalation of care.

Significant improvements were also observed in key cardiovascular and metabolic parameters, including systolic and diastolic blood pressure, HbA1c, and total cholesterol levels. These changes are clinically meaningful, as optimal control of these risk factors is known to slow atherosclerotic progression, improve endothelial function, and reduce symptom burden.^{8,7,14}

Importantly, the short average hospital stay of 1-7 days for the majority of patients (68%) demonstrates the cost-effectiveness and outpatient potential of this approach.

This study supports the established guidelines that risk factor modification and medical management must be the primary therapeutic approach in chronic PVD patients who do not present with critical limb ischemia (Rutherford Categories I-III).^{6,8}

LIMITATIONS

Despite these favorable outcomes, this study has limitations, including a modest sample size, a single-center design, and the absence of a control group. Additionally, the inability to assess walking distance in patients with disease progression may underestimate functional decline in this subgroup. Future studies with larger cohorts, longer follow-up, and comparative treatment arms are warranted to validate these findings and identify predictors of response to conservative therapy.

CONCLUSION

A multi-faceted conservative management approach comprising meticulous risk factor modification and comprehensive medical therapy is highly effective as a primary management strategy for patients with chronic PVD without critical limb ischemia, leading to symptom improvement and delaying progression with a low incidence of complications.

Author contributions: HKD: Conceptualization, methodology, supervision of the entire research, research administration and writing – review & editing; RKP: Validation, resources and critical review of the manuscript; DPG: Investigation (conducting the study, patient enrollment and follow-up), data curation, formal analysis and writing – original draft preparation; RRP: Resources, validation and critical review and editing of the final manuscript.

Ethical approval: The research/study was approved by the Institutional Review Board at B.J. Medical College, number 202/2024, dated 14/08/2024.

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