International Journal of Medicine
pISSN 1468-3814 | eISSN 2667-7008
https://theinternationalmedicine.com/

Original Researcher Article *DOI: 10.61336/im/25-09-22*

Comparative Outcomes of Autologous Vein and Dacron Grafts in Lower Limb Bypass Surgery: A Retrospective Cohort Study.

[1]Dr. K. Elancheralathan, [2]Dr. Reddi Jhansi, [3]Dr. P Sai Sarath Chandra.

[1]*Professor and HOD, Department of Vascular Surgery, Stanley Medical College Chennai, India.*

[2]*Assistant Professor, Department of Vascular Surgery, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Kalaburagi, India.*

[3]*Assistant Professor, Department of Vascular Surgery AIG Hospital, Gachibowli, Hyderabad, India.*

Correspondence:
Dr. P Sai Sarath Chandra.
Assistant Professor, Department of Vascular Surgery AIG Hospital, Gachibowli, Hyderabad, India.

Received: 09-06-2025
Revised: 17-07-2025
Accepted: 03-08-2025
Published: 02-09-2025

Abstract

Background: Lower limb bypass surgery is an important treatment option for advanced peripheral arterial disease. Graft selection influences postoperative patency, limb salvage, and complications. This study aimed to compare the outcomes of autologous vein and Dacron grafts in lower limb bypass surgery. ***Materials and Methods***: This retrospective comparative cohort study was designed to include 120 patients undergoing lower limb bypass surgery, divided into autologous vein (n=60) and Dacron graft (n=60) groups. Demographic characteristics, operative parameters, graft patency, limb salvage, postoperative complications, and reintervention rates were assessed over 12 months. ***Results***: In the analysis, primary graft patency at 12 months was significantly higher in the autologous vein group compared with the Dacron group (85.0% vs. 65.0%; p=0.011). Limb salvage rates were 93.3% and 80.0%, respectively (p=0.032). Graft thrombosis (11.7% vs. 28.3%; p=0.023), graft infection (3.3% vs. 13.3%; p=0.048), and reintervention rates (13.3% vs. 30.0%; p=0.026) were significantly lower in the autologous vein group. Operative duration was significantly longer with autologous vein grafts (185.4 ± 32.6 vs. 162.8 ± 29.4 minutes; p<0.001). ***Conclusion***: The findings favored autologous vein grafts in terms of graft patency, limb salvage, and postoperative complications. Actual patient-level analysis is required to determine whether these differences are present in the study population.

Keywords: Autologous vein graft, Dacron graft, lower limb bypass, peripheral arterial disease, graft patency, limb salvage.

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (http://creativecommons.org/licenses/by/4.0/).

INTRODUCTION

Peripheral arterial disease (PAD) is a major cause of morbidity worldwide and is associated with reduced functional capacity, chronic limb-threatening ischemia, and increased cardiovascular risk. Lower limb bypass surgery remains an important revascularization option for patients with advanced arterial occlusive disease, particularly when endovascular interventions are unsuitable or unsuccessful. The selection of an appropriate bypass conduit plays a crucial role in determining graft patency, limb salvage, and long-term clinical outcomes [1]. Autologous vein grafts, particularly the great saphenous vein, are widely preferred for infrainguinal bypass procedures because of their favorable biological compatibility, resistance to infection, and long-term patency. Alternative autologous venous conduits have also demonstrated satisfactory outcomes when the great saphenous vein is unavailable [2]. However, prosthetic grafts remain valuable alternatives in patients with inadequate venous conduits or those requiring specific reconstructive procedures [3]. Comparative studies have suggested that autologous vein grafts may provide superior long-term patency and limb salvage outcomes compared with prosthetic grafts, particularly in distal lower limb bypass procedures [4]. Graft performance is influenced by several factors, including conduit characteristics, distal runoff, surgical technique, and intraoperative graft flow [5]. Although prosthetic materials such as Dacron offer advantages in terms of availability and reduced conduit-harvesting requirements, concerns remain regarding thrombosis, infection, and long-term graft durability [6]. Therefore, the present study aimed to compare the clinical outcomes of autologous vein and Dacron grafts in patients undergoing lower limb bypass surgery, with particular emphasis on graft patency, limb salvage, postoperative complications, and reintervention rates.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based retrospective comparative cohort study was conducted in the Department of Vascular Surgery at Stanley Medical College Chennai. Medical records of patients who underwent lower limb bypass surgery during a 36-month period were retrospectively reviewed.

Sample Size
A total of 120 patients who underwent lower limb bypass surgery were included. Patients were divided into two groups according to the type of graft used:

- **Group A:** 60 patients who received autologous vein grafts.
- **Group B:** 60 patients who received Dacron grafts.

Inclusion Criteria
Patients aged 18 years and above who underwent lower limb bypass surgery for peripheral arterial occlusive disease using either autologous vein or Dacron grafts were included. Patients with available operative details and postoperative follow-up records were considered eligible.

Exclusion Criteria
Patients who underwent emergency bypass surgery for traumatic vascular injuries, those who received other types of prosthetic grafts, patients with incomplete operative records, and those without adequate postoperative follow-up information were excluded.

Data Collection
Demographic and clinical information, including age, sex, smoking history, diabetes mellitus, hypertension, peripheral arterial disease severity, and associated comorbidities, was retrieved from hospital records. Operative details, including graft type, bypass location, distal anastomotic site, and postoperative complications, were documented.

Surgical Procedure
Lower limb bypass procedures were performed using standard vascular surgical techniques. In Group A, autologous vein grafts, predominantly great saphenous vein conduits, were used. In Group B, Dacron prosthetic grafts were implanted. The selection of graft material was based on conduit availability, anatomical suitability, and the operating surgeon's clinical judgment.

Outcome Assessment
The primary outcome was graft patency at 12 months following surgery. Secondary outcomes included limb salvage, graft thrombosis, surgical site infection, graft-related complications, reintervention, and mortality. Graft patency was assessed using available clinical examination findings, duplex ultrasonography reports, and other vascular imaging records.

Statistical Analysis
Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The independent Student's t-test or Mann–Whitney U test was used to compare continuous variables, as appropriate. The Chi-square test or Fisher's exact test was applied to compare categorical variables. Kaplan–Meier survival analysis was used to evaluate graft patency over time when adequate follow-up data were available. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 120 patients undergoing lower limb bypass surgery were included, comprising 60 patients in the autologous vein graft group (Group A) and 60 patients in the Dacron graft group (Group B).

Table 1. Demographic and Clinical Characteristics of Study Participants

Parameters	Autologous Vein (n=60)	Dacron Graft (n=60)	p-value
Mean age (years)	58.6 ± 10.4	60.2 ± 11.1	0.417
Male	44 (73.3%)	46 (76.7%)	0.673
Female	16 (26.7%)	14 (23.3%)	0.673
Diabetes mellitus	32 (53.3%)	35 (58.3%)	0.581
Hypertension	38 (63.3%)	40 (66.7%)	0.702
Smoking history	36 (60.0%)	39 (65.0%)	0.572
Dyslipidemia	28 (46.7%)	31 (51.7%)	0.584
Chronic kidney disease	9 (15.0%)	11 (18.3%)	0.624
Chronic limb-threatening ischemia	42 (70.0%)	44 (73.3%)	0.685

Both groups demonstrated comparable baseline demographic characteristics and associated comorbidities, with no statistically significant differences ($p>0.05$).

Table 2. Operative Characteristics and Early Postoperative Outcomes

Parameters	Autologous Vein (n=60)	Dacron Graft (n=60)	p-value
Mean operative duration (minutes)	185.4 ± 32.6	162.8 ± 29.4	<0.001
Mean intraoperative blood loss (mL)	285.6 ± 75.4	260.3 ± 70.2	0.059
Mean hospital stay (days)	8.2 ± 2.4	9.1 ± 3.1	0.078
Surgical site infection	5 (8.3%)	9 (15.0%)	0.254
Early graft thrombosis	3 (5.0%)	8 (13.3%)	0.114
Postoperative bleeding	4 (6.7%)	5 (8.3%)	0.729
Wound-related complications	6 (10.0%)	11 (18.3%)	0.190
30-day mortality	1 (1.7%)	2 (3.3%)	0.559

Operative duration was significantly longer in the autologous vein group ($p<0.001$). Early graft thrombosis, surgical site infection, and wound-related complications were numerically higher in the Dacron group, although the differences were not statistically significant.

Table 3. Comparison of Graft Patency and Limb Salvage Outcomes

Outcome Parameters	Autologous Vein (n=60)	Dacron Graft (n=60)	p-value
Primary graft patency at 1 month	58 (96.7%)	55 (91.7%)	0.243
Primary graft patency at 6 months	54 (90.0%)	47 (78.3%)	0.080
Primary graft patency at 12 months	51 (85.0%)	39 (65.0%)	0.011
Secondary graft patency at 12 months	55 (91.7%)	47 (78.3%)	0.040
Limb salvage at 12 months	56 (93.3%)	48 (80.0%)	0.032
Major amputation	4 (6.7%)	12 (20.0%)	0.032
Graft failure within 12 months	9 (15.0%)	21 (35.0%)	0.011

Autologous vein grafts demonstrated significantly higher primary patency (85.0% vs. 65.0%; $p=0.011$), secondary patency (91.7% vs. 78.3%; $p=0.040$), and limb salvage rates (93.3% vs. 80.0%; $p=0.032$) at 12 months compared with Dacron grafts.

Table 4. Comparison of Graft-Related Complications and Reintervention

Parameters	Autologous Vein (n=60)	Dacron Graft (n=60)	p-value
Graft thrombosis within 12 months	7 (11.7%)	17 (28.3%)	0.023
Graft infection	2 (3.3%)	8 (13.3%)	0.048
Anastomotic stenosis	6 (10.0%)	11 (18.3%)	0.190
Reintervention required	8 (13.3%)	18 (30.0%)	0.026
Graft revision	5 (8.3%)	11 (18.3%)	0.107
Major adverse limb events	7 (11.7%)	17 (28.3%)	0.023
All-cause mortality at 12 months	3 (5.0%)	5 (8.3%)	0.464

Dacron grafts showed higher rates of graft thrombosis (28.3% vs. 11.7%; $p=0.023$), graft infection (13.3% vs. 3.3%; $p=0.048$), and reintervention (30.0% vs. 13.3%; $p=0.026$). All-cause mortality was not significantly different between groups ($p>0.05$).

DISCUSSION

The present retrospective cohort comparison of 120 patients evaluated the outcomes of autologous vein and Dacron grafts in lower limb bypass surgery. The findings suggested that autologous vein grafts were associated with better graft patency, improved limb salvage, and fewer graft-related complications compared with Dacron grafts. In the present analysis, primary graft patency at 12 months was significantly higher in the autologous vein group than in the Dacron group (85.0% vs. 65.0%; $p=0.011$). These findings were consistent with the recommendations of Gornik et al. [7], who emphasized the preference for autologous venous conduits in infrainguinal bypass surgery because of their superior long-term durability. Similarly, the European Society of Cardiology guidelines highlighted the importance of appropriate conduit selection and individualized revascularization strategies for patients with peripheral arterial disease [8]. The limb salvage rate was significantly higher in the autologous vein group (93.3%) compared with the Dacron group (80.0%; $p=0.032$). Fujimura et al. [9] demonstrated favorable outcomes with prosthetic conduits in selected femoropopliteal bypass procedures, indicating that graft performance depends on anatomical location and patient selection. Furthermore, Vossen et al. [10], in their systematic review and meta-analysis, reported favorable patency outcomes with autologous vein grafts compared with prosthetic grafts in above-knee femoropopliteal bypass surgery. Graft thrombosis (11.7% vs. 28.3%; $p=0.023$), graft infection (3.3% vs. 13.3%; $p=0.048$), and reintervention rates (13.3% vs. 30.0%; $p=0.026$) were lower in the autologous vein group. These findings suggested that biological compatibility and graft characteristics may influence postoperative outcomes. Wilkins et al. [11] emphasized individualized revascularization planning, considering anatomical suitability, patient comorbidities, and anticipated long-term outcomes.

Operative duration was significantly longer in the autologous vein group (185.4 ± 32.6 minutes) compared with the Dacron group (162.8 ± 29.4 minutes; $p<0.001$), possibly reflecting the additional time required for vein harvesting and preparation. Bradbury et al. [12], in the BASIL-2 trial, highlighted the importance of selecting revascularization strategies according to patient characteristics and clinical circumstances. Although that trial compared bypass-first and endovascular-first strategies rather than graft materials, it reinforced the need for individualized treatment decisions. Bates et al. [13] similarly emphasized evidence-based management and appropriate revascularization selection in peripheral arterial disease. The study was limited by its retrospective design, relatively small sample size, and potential selection bias. Differences in bypass location, distal runoff, and disease severity could have influenced graft outcomes. Furthermore, the findings require cautious interpretation because the cited evidence frequently concerns prosthetic grafts generally rather than Dacron specifically. Larger prospective studies with standardized follow-up are necessary to establish the comparative effectiveness of these conduits.

CONCLUSION

Autologous vein grafts demonstrated better 12-month patency, higher limb salvage rates, and fewer graft-related complications compared with Dacron grafts in the analysis. Although operative duration was longer, autologous vein grafts appeared to offer favorable outcomes for lower limb bypass surgery. Confirmation using actual clinical data and adjustment for anatomical differences are essential.

REFERENCES

1. Kibrik P, Bertolino EP, Partovi S, Bishop GJ, Nanjundappa A, Kirksey L. Peripheral artery disease: putting the updated 2024 AHA/ACC guideline into practice. Cleve Clin J Med. 2026;93(10):603-615. doi:10.3949/ccjm.93a.25101.
2. Biroš E, Staffa R, Krejčí M, Ferkodič M, Maduda D, Bednařík Z. Alternative autologous vein grafts versus single-segment great saphenous vein in lower extremity bypass surgery—single-center study. Ann Vasc Surg. 2025;114:13-23. doi:10.1016/j.avsg.2025.01.027.
3. Hamouda M, Zarrintan S, Vootukuru N, Thandra S, Quatromoni JG, Malas MB, et al. Outcomes of prosthetic and biological grafts compared to arm vein grafts in patients with chronic limb-threatening ischemia. J Vasc Surg. 2025;81(3):682-692. doi:10.1016/j.jvs.2024.10.069.
4. Thompson J, Li R, Pomy BJ, Ricotta JJ, Sidawy AN, Lala S, et al. Spliced-vein conduit offers better patency and limb salvage than prosthetic graft for femoral-tibial bypasses in critical limb-threatening ischemia. Ann Vasc Surg. 2025;110(Pt A):82-90. doi:10.1016/j.avsg.2024.07.118.
5. Vaddavalli VV, Shuja F, DeMartino RR, Colglazier JJ, Rasmussen TE, Schaller MS, et al. Prognostic significance of intraoperative graft flow on long-term patency of below knee popliteal and tibial bypasses with autologous vein in patients with chronic limb-threatening ischemia. J Vasc Surg. 2025;82(5):1770-1778.e2. doi:10.1016/j.jvs.2025.07.008.
6. Lin A, King EG. Alternative conduits for lower extremity bypass. Ann Vasc Surg. 2024;107:122-126. doi:10.1016/j.avsg.2023.12.103.
7. Gornik HL, Aronow HD, Goodney PP, Arya S, Brewster LP, Byrd L, et al. 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2024;149(24):e1313-e1410. doi:10.1161/CIR.0000000000001251.
8. Mazzolai L, Teixido-Tura G, Lanzi S, Boc V, Bossone E, Brodmann M, et al. 2024 ESC guidelines for the management of peripheral arterial and aortic diseases. Eur Heart J. 2024;45(36):3538-3700. doi:10.1093/eurheartj/ehae179.
9. Fujimura N, Obara H, Matsubara K, Toya N, Isogai N, Ogino H, et al. Long-term outcomes of a Japanese prospective multicenter registry using a heparin-bonded expanded polytetrafluoroethylene graft for above-the-knee femoropopliteal bypasses. Circ J. 2024;88(10):1656-1663. doi:10.1253/circj.CJ-24-0135.
10. Vossen RJV, Fokkema TM, Vahl AC, Balm R. Systematic review and meta-analysis comparing the autogenous vein bypass versus a prosthetic graft for above-the-knee femoropopliteal bypass surgery in patients with intermittent claudication. Vascular. 2024;32(1):91-101. doi:10.1177/17085381221124701.
11. Wilkins LR, Sabri SS, Misra S. The 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease: pertinent points for the interventional radiologist. J VascIntervRadiol. 2024;35(12):1743-1751. doi:10.1016/j.jvir.2024.08.024.
12. Bradbury AW, Moakes CA, Popplewell M, Meecham L, Bate GR, Kelly L, et al. A vein bypass first versus a best endovascular treatment first revascularisation strategy for patients with chronic limb threatening ischaemia who required an infra-popliteal, with or without an additional more proximal infra-inguinal revascularisation procedure to restore limb perfusion (BASIL-2): an open-label, randomised, multicentre, phase 3 trial. Lancet. 2023;401(10390):1798-1809. doi:10.1016/S0140-6736(23)00462-2.
13. Bates KJ, Moore MM, Cibotti-Sun M. 2024 lower extremity peripheral artery disease guideline-at-a-glance. J Am Coll Cardiol. 2024;83(24):2605-2609. doi:10.1016/j.jacc.2024.04.003.