JOURNAL OF SURGICAL RESEARCH • DECEMBER 2023 (292) 167–175

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Association for Academic Surgery

Readmission After Lower Extremity Bypass Following Discharge to a Rehabilitation or Nursing Facility

Brianna M. Krafcik, MD, MS,[a,*] *Isabel A. Jarmel, BS,*[b] *Jocelyn M. Beach, MD,*[a,b] *Bjoern D. Suckow, MD,*[a,b] *Jennifer A. Stableford, MD,*[a,b] *David H. Stone, MD,*[a,b] *Philip P. Goodney, MD, MS,*[a,b] *and Jesse A. Columbo, MD, MS*[a,b]

[a] *Section of Vascular Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire*
[b] *Geisel School of Medicine at Dartmouth, Hanover, New Hampshire*

ARTICLE INFO

Article history:
Received 21 November 2022
Received in revised form
23 June 2023
Accepted 23 July 2023
Available online 22 August 2023

Keywords:
Arterial bypass
Discharge
Readmission
Rehabilitation
Vascular surgery

ABSTRACT

Introduction: Hospital readmission after lower extremity arterial bypass (LEB) is common. Patients are often discharged to a facility after LEB as a bridge to home. Our objective was to define the association between discharge to a facility and readmission after LEB.

Methods: We used the Vascular Quality Initiative to study patients who underwent LEB from 2017 to 2022. The primary exposure was discharge location. The primary outcome was 30-d hospital readmission.

Results: We included 6076 patients across 147 centers. The overall 30-d readmission rate was 18%. Readmission occurred among 15% of patients discharged home, 22% of patients discharged to a rehabilitation facility, and 25% of patients discharged to a nursing home. After controlling for patient and procedural factors, there was no significant association between discharge location and 30-d readmission (rehabilitation *versus* home odds ratio: 1.06, 95% confidence interval: 0.87-1.29; nursing facility *versus* home odds ratio: 1.21, 95% confidence interval: 0.99-1.47). Female sex, end-stage renal disease, diabetes, heart failure, pulmonary disease, smoking, preoperative functional impairment, tibial bypass target, critical limb threatening or acute ischemia, and postoperative complications including surgical site infection, change in renal function and graft thrombosis were associated with an increased likelihood of readmission.

Conclusions: Patients discharged home after LEB experienced a similar likelihood of readmission as those discharged to a facility. While discharge to a facility may aid in care transitions, it did not appear to lead to reduced 30-d readmissions. The recommended discharge location should be predicated on patient care needs and not as a perceived mechanism to reduce readmissions.

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* *Corresponding author*. Section of Vascular Surgery, Heart and Vascular Center, Dartmouth-Hitchcock Medical Center, 1 Medical Center Drive, Lebanon, NH 03766.
E-mail address: Brianna.m.krafcik@hitchcock.org (B.M. Krafcik).
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https://doi.org/10.1016/j.jss.2023.07.042

Introduction

Approximately one in five patients are readmitted to the hospital within 30 d after undergoing lower extremity arterial bypass (LEB).[1-5] Early postoperative readmissions represent a significant cost to hospitals, with annual Medicare costs for unplanned readmissions as high as $17.4 billion.[6,7] Among patients undergoing vascular surgery, there is a mean per-patient total cost of readmission within 30 d after LEB of $27,226 per hospitalization or $4167 per day.[8] As such, decreasing readmission rates remains an important focus to reduce healthcare costs and improve the quality of care delivered.

Despite this, proactive interventions to modulate readmission rates after LEB have been elusive and this topic has been the target of numerous research efforts and hospital initiatives over the past 10 y.[1,3,5,9,10] Prior investigators studying readmission after LEB have primarily identified nonmodifiable patient risk factors as drivers of readmission. These include chronic obstructive pulmonary disease (COPD), smoking, renal insufficiency, cardiac ischemia, diabetes, dependent functional status, and malnutrition.[4,5,8,9] Not surprisingly, patients with these comorbidities are often discharged to inpatient rehabilitation or short-term nursing facilities as a transient bridge in care to home.[4,8,9] It remains unclear whether disposition to a care facility prior to going home is associated with increased readmission rates, and accordingly, could serve as a potentially modifiable risk factor to address this costly problem.

Therefore, our objective was to determine whether discharge to a temporary care facility is associated with the likelihood of readmission within 30 d after LEB.

Methods

Data sources

We performed a retrospective analysis of prospectively collected data within the Vascular Quality Initiative (VQI).[11] The VQI is the official quality improvement registry for the Society for Vascular Surgery, and collects real-world data on demographics, clinical characteristics, and procedural outcomes after vascular procedures from over 900 centers in the United States and Canada. As part of a focused quality improvement initiative, a subset of 147 centers committed to collect 30-d readmission outcomes on 100% of patients who underwent LEB.[11] Our analysis focused on patients in this subset who underwent infrainguinal lower extremity arterial bypass between 2017 and 2022.

Inclusion and exclusion criteria

We queried all patients who underwent infrainguinal LEB between 2017 and 2022 at one of the 147 quality improvement centers within the VQI database. We included patients with acute limb ischemia (ALI) as well as claudication and chronic limb-threatening ischemia (CLTI). Patients with graft origin of the aorta, common iliac artery, or axillary artery were excluded. Patients with a traumatic indication for bypass were not included. We excluded patients less than 18 y of age or if age information was missing ($n = 12$). Patients were excluded if they expired prior to hospital discharge ($n = 0$) or were transferred to another hospital ($n = 0$). No patients were missing 30-d follow-up information within the study cohort.

Primary exposure

The primary exposure was discharge location after LEB: either to home, a rehabilitation facility, or a skilled nursing facility/nursing home. Home was defined as discharge to preoperative living location, including if patients were living in a facility prior to LEB. Rehabilitation facilities were defined as an acute or subacute facility within or outside of the institution performing the operation. Skilled nursing facilities were defined as assisted living or skilled and regular nursing homes.

Primary outcome

The primary outcome was 30-d hospital readmission. Readmission was defined as an inpatient admission within 30 d following the procedure. For patients readmitted multiple times during 30 d, only the first readmission was included in the analysis.

Statistical analysis

We tested normal distribution using the Skewness and Kurtosis test and have reported normally distributed continuous variables as means with standard deviations (SDs), nonnormally distributed continuous variables as medians with interquartile ranges, and categorical variables as percentages, as appropriate. We compared normally distributed continuous variables with Student's *t*-test, nonnormally distributed continuous variables with a Kruskal–Wallis analysis, and categorical variables with chi-squared analysis. We examined univariate associations between demographic information, preoperative comorbidities, and procedural details and the outcome of 30-d readmission. These included age, race, gender, coronary artery disease, congestive heart failure (CHF), COPD, diabetes, hypertension, smoking, pre-existing end-stage renal disease (ESRD), discharge antiplatelet and anticoagulation medications, bypass conduit, distal bypass target, and surgical indication. We also adjusted for in-hospital complications including surgical site infection (SSI), myocardial infarction (MI), respiratory complication, change in renal function, and return to the operating room for graft thrombosis. Variables with a $P < 0.1$ were then entered into a multivariable regression model for the outcome of 30-d readmission. The associations between patient characteristics and readmission were expressed as odds ratios (ORs) with the corresponding 95% confidence intervals (95% CIs). Testing for effect modification between SSI and discharge location was conducted. Statistical analysis was performed using Stata Version 17 (College Station, Texas). A *P* value of <0.05 was considered statistically significant.

Human Subjects Protection

All data are collected under an Agency for Healthcare Research and Quality designated Patient Safety Organization and were de-identified. All patient personal health information was protected, and records and outcomes were de-identified. No testing or procedures were required for this study. The study was considered exempt from institutional review board approval and the need for written consent was waived.

Results

Study cohort

We identified 6088 patients who underwent LEB between 2017 and 2022 at the 147 centers within VQI with 100% 30-d follow-up. Of these, 12 patients did not meet the inclusion criteria as they were either less than 18 y old or age was not recorded. No patients died while in the hospital during the index admission, were transferred to another hospital prior to discharge, or underwent a bypass in which the aorta, axillary or common iliac artery was the origin of the bypass within the infrainguinal data set. The final study cohort included 6076 patients, of whom 72.1% (n = 4383) were discharged home, 15.8% (n = 959) were discharged to a rehabilitation facility, and 12.1% (n = 734) were discharged to a nursing home (Fig. 1). The most common types of operations included in the study were: common femoral-tibial bypass, 23.2%, (n = 1414), common femoral-below knee popliteal bypass, 22.9%, (n = 1397), common femoral-above knee popliteal bypass, 15.0%, (n = 914), superficial femoral-tibial bypass, 11.6%, (n = 706), superficial femoral-below knee popliteal bypass, 6.2%, (n = 378),below knee popliteal-tibial bypass, 4.0%, (n = 243), and femoral-femoral bypass, 1.5% (n = 92).

Patient characteristics

The mean age of patients was 67.1 y old (±10.4), 31% were female, and 67% were ambulatory at baseline. A total of 59 patients were documented as living in a nursing home at the time of admission and were discharged to a nursing home. Patients who were discharged to a facility tended to be older (average 70.0 y old for rehabilitation facilities, 71.6 y for nursing homes *versus* 65.6 y for those discharged home, $P < 0.001$), and less likely to ambulate preoperatively (50% and 51% needing assistance to ambulate for rehabilitation and nursing facilities *versus* 26% for home, $P < 0.001$). A relatively lower proportion of males were discharged to facilities (65% to rehabilitation facilities and 60% to nursing homes *versus* 72% discharged home, $P < 0.001$). More patients with pre-existing ESRD on hemodialysis (HD) were discharged to facilities as compared to home (9% *versus* 3%, $P < 0.001$). The mean hospital length of stay for patients discharged home was 6.2 d (SD 8.2), as compared to 16.2 d (SD 95.5) for those discharged to rehabilitation facilities and 13.2 d (SD 10.1) for those discharged to a nursing facility ($P < 0.001$). The mean postoperative length of stay was 4.7 d (SD 4.3) for those discharged home as compared to 9.5 (SD 13.5) and 9.4 (SD 7.1) d for those discharged to rehabilitation and nursing facilities, respectively (Table 1).

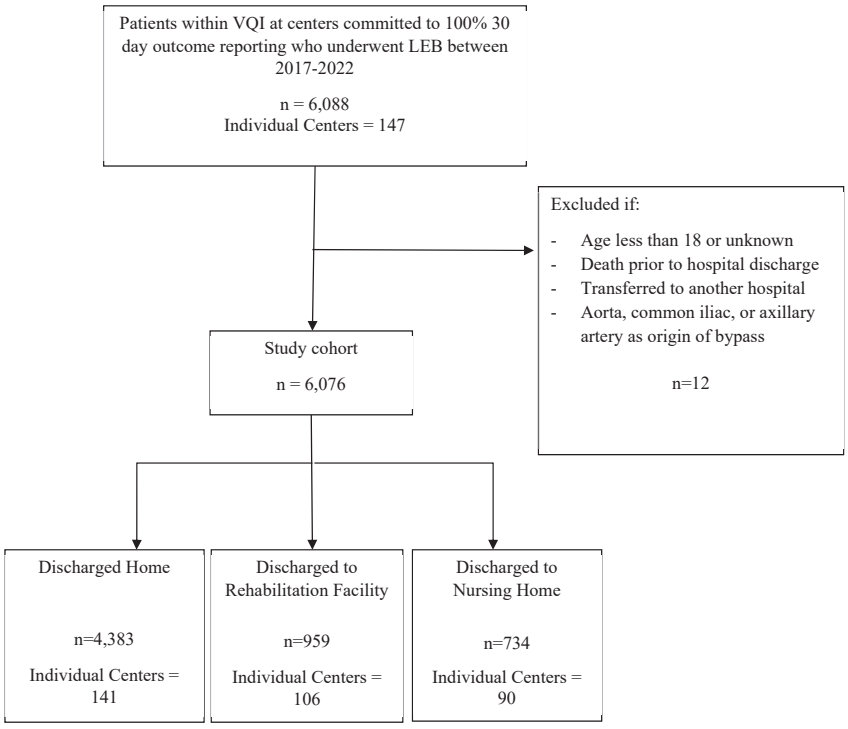

Fig. 1 – Flow diagram of the study cohort. LEB = lower extremity bypass.

Table 1 — Demographics and procedural characteristics of patients within the Vascular Quality Initiative undergoing lower extremity bypass between 2017 and 2022.

Characteristic	All patients	Discharge to home	Discharge to rehab	Discharge to nursing home	P value
	N = 6076	N = 4383	N = 959	N = 734	
Mean age, median (IQR)	67 (60-74)	66 (59-73)	71 (63-78)	72 (65-78)	<0.001
Female gender (%)	1862 (31)	1233 (28)	337(35)	292 (40)	<0.001
Race (%)					<0.001
White	4821 (79)	3565 (81)	703 (73)	563 (77)	
Black	915 (15)	592 (14)	204 (21)	119 (16)	
Other	339 (8)	236 (5)	51 (5)	52 (7)	
Smoking (%)					<0.001
Nonsmoker	883 (15)	519 (12)	197 (21)	167 (23)	
Current smoker	2435 (40)	1919 (44)	280 (29)	236 (32)	
Former smoker	2753 (45)	1942 (44)	280 (29)	236 (32)	
Preoperative ambulatory status (%)					<0.001
Fully ambulatory	4089 (67)	3253 (74)	478 (50)	358 (49)	
Ambulatory with assistance	1969(32)	1121 (26)	476 (50)	372 (51)	
Confined to bed	9 (0)	2 (0)	3 (0)	4 (1)	
Preoperative living status (%)					<0.001
Home	5907 (97)	4321 (99)	918 (96)	668 (91)	
Nursing home	141 (2)	49 (1)	33 (3)	59 (8)	
Homeless	18 (0)	6 (0)	5 (1)	7 (1)	
Diabetes (%)	2969 (49)	1996 (46)	547 (57)	426 (58)	<0.001
Hypertension (%)	5264 (87)	3750 (86)	859 (90)	655 (90)	<0.001
Coronary artery disease (%)	1864(31)	1293 (29)	312 (33)	259 (35)	0.0024
Congestive heart failure (%)	1133 (19)	707 (16)	233 (24)	193 (26)	<0.001
ESRD on HD (%)	295 (5)	1443 (3)	82 (9)	70 (10)	<0.001
COPD (%)	1667 (27)	1189 (27)	275 (29)	203 (28)	0.61
Indication for procedure (%)					<0.001
Claudication	1255 (21)	1124 (26)	83 (9)	48 (7)	
Rest pain	1563 (26)	1219 (28)	189 (20)	155 (21)	
Tissue loss	2534 (42)	1554 (35)	553 (58)	427 (58)	
Acute limb ischemia	706 (12)	472 (11)	130 (14)	104 (14)	
Prior carotid intervention (%)	480 (8)	336 (8)	85 (9)	59 (8)	0.44
Target vessel (%)					<0.001
Common femoral	136 (2)	116 (3)	8 (1)	12 (2)	
SFA/Profunda	187 (3)	145 (3)	24 (3)	18 (2)	
Above knee popliteal	1045 (17)	868 (20)	84 (9)	93 (13)	
Below knee popliteal	1958 (32)	1427 (33)	310 (32)	221 (30)	
Tibial/Pedal	2671 (44)	1782 (41)	509 (53)	380 (52)	
Bypass conduit (%)					0.11
Vein	3382 (56)	2423(55)	563 (59)	396 (54)	
Prosthetic	2678 (44)	1949 (44)	395 (41)	334 (46)	
Hospital length of stay, d, median (IQR)	6 (3-10)	4 (3-7)	10 (7-16)	10.5 (6-17)	<0.001
Postoperative length of stay, d, median (IQR)	4 (3-7)	4 (2-5)	7 (5-11)	7 (5-12)	<0.001
ASA on discharge	5155 (85)	3751 (86)	795 (83)	609 (83)	0.04
DAPT on discharge	2347 (39)	1782 (41)	318 (34)	247 (34)	<0.001
Anticoagulation on discharge	2502 (41)	1710 (39)	454 (47)	338 (46)	<0.001

IQR = intraquartile range; SFA = superficial femoral artery; ASA = aspirin.

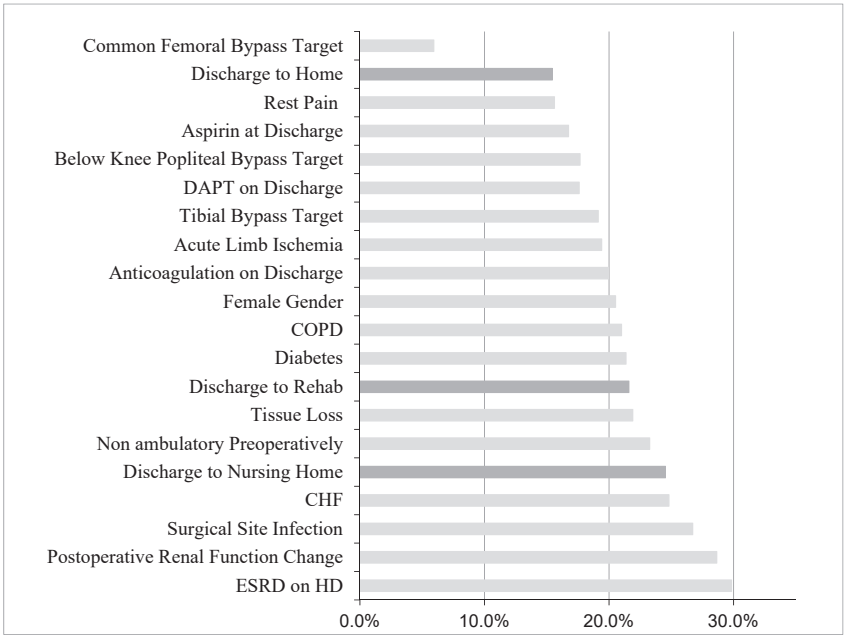

Fig. 2 – Frequency of readmission based on patient and procedural characteristics.

Readmission and other complications

Among all patients, the rate of readmission at 30 d was 17.5%. Patients discharged to home had a rate of readmission of 15.5% *versus* 21.6% for those discharged to a rehabilitation facility and 24.5% for those discharged to a nursing home ($P < 0.001$) (Fig. 2). The most common reasons for readmission were SSIs (26.2% of readmissions), wound complications (18.0%), and vascular complications including treated artery thrombosis, embolism, and bleeding (12.0%). The indication for readmission was not statistically different among the three discharge locations (Table 2).

The most frequent in-hospital complication was new change in renal function (3.3%), which occurred more frequently in patients who were subsequently discharged to facilities (5.9% *versus* 2.3%, $P < 0.001$). Patients discharged to a rehab facility or nursing home had a higher rate of postoperative MI (2.9-3.7% *versus* 1.1%, $P \leq 0.001$), respiratory complications (2-2.5% *versus* 1%, $P < 0.001$), and return to the operating room for graft thrombosis (4.0-4.4% *versus* 2.2%, $P < 0.001$) (Supplemental Table 1).

In the unadjusted models, several factors were associated with an increased likelihood of readmission within 30 d (Table 3). Compared to patients who were discharged to home, those discharged to rehabilitation facilities (OR 1.51, 95% CI 1.27-1.79, $P \leq 0.001$) and nursing homes (OR 1.78, 95% CI 1.47-2.14, $P \leq 0.001$) were more likely to be readmitted. Comorbidities such as pre-existing ESRD on HD (OR 2.12, 95% CI 1.64-2.74, $P < 0.001$), diabetes (OR 1.68, 95% CI 1.47-1.93, $P < 0.001$), and coronary artery disease (OR 1.38, 95% CI 1.20-1.59, $P < 0.001$) were associated with an increased risk of readmission. Of patients with prior ESRD on HD undergoing LEB, 29.8% were readmitted and 21.4% of patients with diabetes were readmitted. Patients requiring assistance with ambulation preoperatively were more likely to be readmitted as compared to those who were fully ambulatory (OR 1.76, 95% CI 1.57-2.02, $P < 0.001$), with a readmission rate of 23.3%. Patients who sustained a postoperative complication including postoperative renal function change (OR 1.95, 95% CI 1.42-2.66, $P < 0.001$), MI (OR 1.81, 95% CI 1.16-2.81, $P = 0.008$), SSI (OR 1.75, 95% CI 1.22-2.49, $P = 0.002$), or graft thrombosis requiring reintervention (OR 1.52, 95% CI 1.06-2.17, $P = 0.02$) were more likely to be readmitted.

Multivariable analysis adjusting for the patient and procedural characteristics revealed that discharge to a rehabilitation or nursing facility was no longer significantly associated with increased likelihood of readmission (OR 1.06, 95% CI 0.87-1.29 and OR 1.21, 95% CI 0.99-1.47, respectively). Factors that remained independently associated with readmission within 30 d were requiring assistance to ambulate preoperatively (OR 1.31, 95% CI 1.13-1.52, $P < 0.001$), female gender (OR 1.23, 95% CI 1.06-1.43, $P = 0.006$), and anticoagulation (OR 1.21, 95% CI 1.03-1.42, $P = 0.02$) or dual antiplatelet therapy on discharge (OR 1.18, 95% CI 1.00-1.39, $P = 0.05$). Comorbidities predictive of readmission included COPD (OR 1.40, 95% CI 1.21-1.64, $P < 0.001$), diabetes (OR 1.39, 95% CI 1.20-1.62, $P < 0.001$), pre-existing ESRD on HD (OR 1.34, 95% CI 1.01-1.78, $P = 0.04$), and CHF (OR 1.28, 95% CI 1.07-1.52, $P = 0.006$). After adjustment, procedural factors such as a tibial (OR 1.25, 95% CI 1.02-1.54, $P = 0.03$) or below knee popliteal target (OR 1.25, 95% CI 1.01-1.54, $P = 0.04$) were associated with increased risk of readmission as was rest pain (OR 1.42, 95% CI 1.11-1.82, $P = 0.005$), tissue loss (OR 1.87, 95% CI 1.49-2.36, $P < 0.001$), and ALI (OR 1.92, 95% CI 1.45-2.54, $P < 0.001$) as compared to claudication. In-hospital postoperative complications such as SSI (OR 1.48, 95% CI 1.01-2.17, $P = 0.04$) or change in renal function (OR 1.40, 95% CI 1.01-1.96, $P = 0.05$) were associated with increased likelihood of readmission. No

Table 2 — Postoperative complications within 30 d after lower extremity bypass within the Vascular Quality Initiative database between 2017 and 2022 stratified by discharge location.

Postoperative complication	Total	Discharge to home	Discharge to rehab	Discharge to nursing home	P value
30-d readmission (%)	1064 (17.5)	677 (15.5)	207 (21.6)	180 (24.5)	<0.001
Reason for readmission (%)*					0.43
Surgical site infection	287 (26.2)	189 (27.3)	53 (24.8)	45 (24.1)	
Other infection	61 (5.6)	35 (5.0)	11 (5.1)	15 (8.0)	
Wound complication	197 (18.0)	121 (17.5)	46 (21.5)	30 (16.0)	
Cardiac complication	51 (4.7)	38 (5.5)	5 (2.3)	8 (4.3)	
Vascular complication	131 (12.0)	91 (13.1)	21 (9.8)	19 (10.2)	
Respiratory complication	29 (2.7)	15 (2.2)	5 (2.3)	9 (4.8)	
Gastrointestinal complication	43 (3.9)	24 (3.5)	9 (4.2)	10 (5.4)	
Other	261 (23.9)	161 (23.2)	57 (26.6)	43 (23.0)	

*Readmission for venous thromboembolic complications, central nervous system complications, and renal complications were excluded from the table due to total incidence of less than 20 people.

effect modification was noted between in-hospital SSI and discharge location. Aspirin at the time of discharge (OR 0.77, 95% CI 0.63-0.95, $P = 0.02$) and a common femoral artery distal bypass target (OR 0.39, 95% CI 0.18-0.86, $P = 0.02$) were protective against readmission (Fig. 3).

Discussion

This study documents that although readmissions were common following LEB, discharge location was not associated with a change in readmission. Conversely, we determined that females, patients with pre-existing diabetes, CHF, COPD, ESRD on HD, patients undergoing bypass for CLTI or ALI, patients with preoperative functional impairment, those discharged on dual antiplatelet therapy or anticoagulation, and those who sustained an in-hospital SSI or change in renal function experienced an increased likelihood of readmission within 30 d. Reasons for readmission did not significantly vary by discharge location. These findings suggest that while the disposition to a care facility is multifactorial, it does not appear to have a significant impact in ameliorating readmission rates.

Readmission after LEB constitutes a substantial resource burden on the healthcare system and has accordingly been an important focus of investigation. Specifically, vascular surgery readmissions remain among the highest of the surgical specialties, with rates approaching 25%, highlighting the at-risk nature of this population.[6] Among vascular procedures, lower extremity arterial bypass is associated with the greatest observed readmission rates.[12] Furthermore, when readmission events occur, it is often associated with a prolonged hospital stay and ensuing costs.[8] Due to this clinical and financial burden, readmission represents an important quality measure for hospitals and healthcare systems alike.

Despite investigation into the burden of readmissions following vascular surgery, the rate of readmissions has not appreciably changed over time.[5] In a single-center study from 1995 to 2011, rates of readmission ranged from 15 to 42% with no specific trend in either direction.[5] During this time period, several investigators sought to identify risk factors for readmission. Preoperative baseline comorbidities such as smoking, COPD, dialysis, CHF, malnutrition, dependent functional status, and diabetes have each been documented to be associated with increased rates of readmission after LEB.[4,5,8,9] Additionally, patients undergoing intervention for tissue loss or rest pain as compared to claudication have been shown to experience increased readmission rates.[2] Likewise, postoperative complications associated with increased risk of readmission include MI, SSI, renal failure, and graft failure.[5] These prior findings remain consistent with our results, which confirmed that patients with these comorbidities or procedural factors are susceptible to increased risk for readmission. Notably, bypass conduit was not an independent predictor of readmission in our study, and the only procedural factor which increased the risk of readmission was a tibial bypass target. These data may facilitate proactive interventions to modify such factors to reduce the number of patients returning to the hospital.

Prior studies have also investigated the association between discharge to a rehabilitation or skilled nursing facility and readmission after LEB. Historical results have demonstrated an increased risk for readmission among patients discharged to facilities as compared to those discharged home.[1,5] However, these studies were limited in their granularity and not able to adjust for important characteristics such as procedure type or disease severity. Our results herein add to this work suggesting that there is not a contemporary real-world association between discharge location and readmission. However, the interpretation of these results is nuanced. Specifically, patients discharged to facilities are more likely to be comorbid and are accordingly at an intrinsically higher risk for readmission. Therefore, one might infer that an additional level of care prior to returning home could potentially decrease a patient's baseline risk of readmission. If this were the case, discharge to a care facility might offer a net benefit in reducing readmissions among more comorbid patients, although this study was unable to substantiate this hypothesis. Furthermore, we did not observe that the additional medical oversight at a care facility increased readmission rates due to earlier detection of clinical complications, contrary to the perception that it might.

Table 3 — Unadjusted univariate analysis assessing effect of patient and procedural characteristics on odds of readmission for patients undergoing lower extremity bypass within the Vascular Quality Initiative database between 2017 and 2022.

Characteristic	Odds ratio for readmission	95% confidence interval	P value
Indication for procedure: tissue loss *versus* claudication	2.52	2.05-3.10	**<0.001**
Indication for procedure: acute limb ischemia *versus* claudication	2.17	1.67-2.82	**<0.001**
ESRD on HD	2.12	1.64-2.74	**<0.001**
Postoperative renal function change	1.95	1.42-2.66	**<0.001**
Postoperative MI	1.81	1.16-2.81	**0.01**
Discharge to nursing home *versus* home	1.78	1.47-2.14	**<0.001**
Ambulatory with assistance preoperatively *versus* fully ambulatory preoperatively	1.76	1.54-2.02	**<0.001**
Congestive heart failure	1.75	1.50-2.05	**<0.001**
Postoperative SSI	1.75	1.22-2.49	**0.002**
Diabetes	1.68	1.47-1.93	**<0.001**
Indication for procedure: rest pain *versus* claudication	1.67	1.33-2.10	**0.001**
Hypertension	1.61	1.29-2.02	**<0.001**
Postoperative graft thrombosis	1.52	1.06-2.17	**0.02**
Discharge to rehabilitation facility *versus* home	1.51	1.27-1.79	**<0.001**
Distal target: tibial artery *versus* above knee popliteal	1.43	1.17-1.74	**<0.001**
Coronary artery disease	1.38	1.20-1.59	**<0.001**
COPD	1.38	1.19-1.59	**<0.001**
Distal target: femoral artery *versus* above knee popliteal artery	1.35	1.02-1.78	**0.04**
Anticoagulation on discharge	1.33	1.17-1.52	**<0.001**
Female gender	1.33	1.16-1.53	**<0.001**
Distal target: below knee popliteal *versus* above knee popliteal target	1.29	1.05-1.59	**0.02**
Current smoker *versus* nonsmoker	0.80	0.65-0.98	**0.03**
ASA on discharge	0.73	0.61-0.86	**<0.001**
Distal target: common femoral artery *versus* above knee popliteal artery	0.38	0.18-0.79	**0.01**
Postoperative graft infection	1.58	0.51-4.89	0.43
Postoperative respiratory complication	1.56	0.91 -2.66	0.11
Homeless preoperatively *versus* home preoperatively	1.36	0.45-4.13	0.59
Nursing home preoperatively *versus* home preoperatively	1.28	0.86-1.93	0.23
Distal target: SFA/Profunda *versus* Above knee popliteal artery	1.28	0.84-1.93	0.25
African American race *versus* White race	1.16	0.97-1.41	0.11
Prosthetic bypass conduit *versus* vein conduit	1.13	0.99-1.29	0.07
Race other than White/African american *versus* White	1.06	0.80-1.41	0.69
Prior carotid intervention	1.05	0.82-1.33	0.71
DAPT on discharge	1.03	0.89-1.18	0.72
Former smoker *versus* nonsmoker	1.00	0.82-1.21	0.06

SFA = superficial femoral artery; ASA = aspirin.
Statistical significance defined as $P < 0.05$.

Finally, it is possible that discharge location simply does not play a role in readmission and there are other factors responsible for the observed high rates of readmission after LEB. Regardless, our results highlight the high rate of readmission after LEB and establish that patients who were discharged to a facility after their index hospitalization appear to have a similar likelihood of readmission within 30 d after risk adjustment compared to those discharged home.

Modifiable factors to reduce readmission remain elusive, highlighting important areas for future research. One such area is the impact of other factors associated with the post-hospital experience following LEB, such as visiting nurses and family member support for those discharged to home. Patients receiving home care nursing after lower extremity arterial bypass have been shown to be less likely to return to the emergency department or be readmitted within 30 d compared to those with no home nursing.[13] Despite this finding, studies have also shown that less than half of the patients discharged home actually receive formal home nursing visits.[13] Although the current data set does not

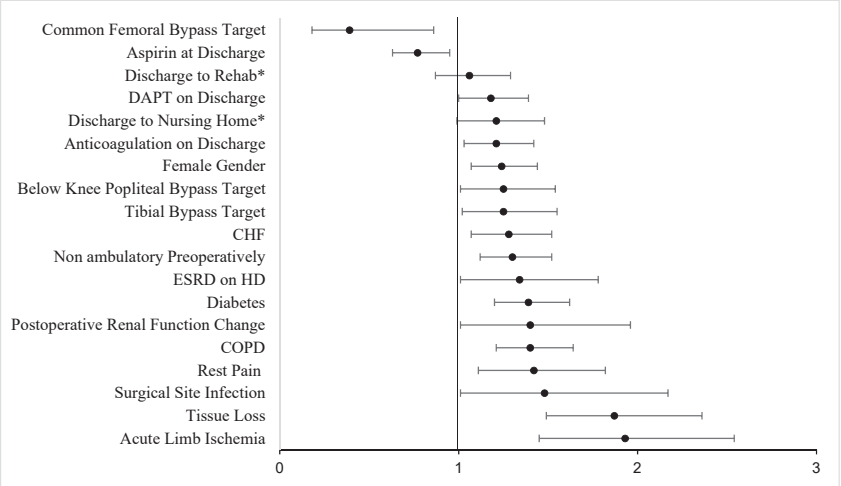

Fig. 3 – Forest plot of multivariable logistic regression adjusted for significant patient and procedural factors. * = not statistically significant.

include information regarding postdischarge home care, future prospective data collection surrounding the type of care received after discharge could be useful in clarifying whether such resources can effectively reduce readmissions. Additionally, a prospective analysis of the specific reasons for choosing discharge to a facility as opposed to home may be useful in understanding the role a facility might have in reducing the readmission rate.

This study is not without limitations. As a retrospective database review, we have limited information about the specific reasons individual patients were discharged to facilities. Similarly, we do not have information regarding certain measures, such as the level of support at home or home nursing. Additionally, we included patients readmitted for any reason within 30 d, and it is not clear from the data how many of these were planned readmissions or staged interventions. Nevertheless, this study effectively leveraged a subset of VQI real-world data with complete 30-d follow-up regarding readmission for all included patients, further informing this knowledge gap.

Conclusion

Readmission after LEB remains common in real-world practice. Discharge to a facility following LEB may aid in care transitions, however, it did not attenuate readmission rates, contrary to a perception that they might. Risk factors associated with an increased likelihood of readmission included diabetes, CHF, COPD, dialysis, female gender, needing assistance for ambulation, CLTI or ALI, and postoperative wound infection or change in renal function. The recommended discharge location should be based primarily on patient care needs and preferences and not as an aid to reduce readmission rates. Efforts to modify comorbidities such as wound or SSI and preoperative frailty may offer a more effective approach to reduce readmissions, improve patient satisfaction, and save money.

Supplementary Materials

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jss.2023.07.042.

Author Contributions

BK: Conceptualization, methodology, investigation, writing – original draft. IJ: Investigation, writing – original draft. JB: Writing – review and editing. BS: Writing – review and editing. JS: Writing – review and editing. DS: Writing – review and editing. PG: Conceptualization, writing – review and editing, supervision. JC: Conceptualization, writing – review and editing, supervision.

Disclosure

None declared.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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