Medical Therapy Following Urgent/Emergent Revascularization in Peripheral Artery Disease Patients (Canadian Acute Limb Ischemia Registry [CANALISE I])

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ABSTRACT

Background: Following severe limb ischemia requiring urgent/emergent revascularization, peripheral arterial disease patients suffer a high risk of recurrent atherothrombosis.

Methods: Patients discharged from Hamilton General Hospital (Hamilton, Ontario) between April 2016 and September 2017 following severe limb ischemia requiring urgent/emergent revascularization were identified via the Local Health Integration Network CorHealth database, with supplemental information from chart review.

Results: A total of 158 patients admitted for urgent/emergent revascularization were identified (148 alive at discharge). Among patients without a pre-existing indication for anticoagulation, 38.8% (n = 47) were discharged on single-antiplatelet therapy, 27.3% (n = 33) on dual-antiplatelet therapy, 19.8% (n = 24) on anticoagulants plus antiplatelet therapy, 6.6% (n = 8) on anticoagulants alone, and 2.6% (n = 3) on anticoagulants plus antiplatelet therapy. 8.2% of patients were discharged on aspirin alone. The median length of stay was 6 days (IQR 4–12). Of patients, 68% (n = 107) received a prescription for clopidogrel, 60% (n = 95) for dipexidil, 53% (n = 84) for cilostazol, and 22% (n = 34) for enoxaparin. In-hospital mortality 30 days after discharge was 2.6%.

Conclusion: Following urgent/emergent revascularization for PAD, patients are discharged on a variety of medical therapies. In the absence of a pre-existing indication for anticoagulation, a high proportion of patients are discharged on single antiplatelet therapy, while a minority receive anticoagulants alone.

Peripheral arterial disease (PAD) affects an estimated 8 to 12 million Americans, with a worldwide prevalence affecting an excess of 200 million people. PAD is associated with a significant increase in risk for both major adverse cardiac events and major adverse limb events (MALE). Reduced perfusion to the lower limbs owing to flow-limiting atherosclerosis may result in development of ischemic tissue loss, chronic pain at rest, or motor sensory impairment, any one of which warrants revascularization.

Among patients requiring revascularization for PAD, levels of cardiovascular risk can be further stratified based on the urgency of intervention. Limb ischemia requiring urgent/emergent revascularization carries significantly elevated risk compared to elective intervention for subsequent cardiac and limb events. In outpatients with symptomatic PAD who do not have atrial fibrillation, urgent/emergent ischemic events occur at a rate of 1.0% per year, a percentage that doubles among patients presenting with critical limb ischemia...
unknown therapy. Patients who received angioplasty with stenting were more likely be discharged on dual-antiplatelet therapy (hazard ratio [HR]: 7.14; 95% confidence interval [CI]: 2.87-17.76; P < 0.01); patients who received an embolectomy/thrombectomy were more likely be discharged on an anticoagulant alone (HR: 2.61; 95% CI: 1.00-6.81; P = 0.049); and patients who received peripheral bypass grafting were more likely be discharged on single-antiplatelet therapy (HR: 2.28; 95% CI: 1.11-4.69; P = 0.024). Neither statins (60.8% vs 56.3%; P = 0.23) nor renin–angiotensin–aldosterone system inhibitors (48.7% vs 50.6%; P = 0.58) were prescribed at higher rates at discharge, compared with the rate at admission.

Conclusions: Substantial heterogeneity exists in antithrombotic prescription following urgent/emergent revascularization. No intensification of non-antithrombotic vascular protective medications occurred during hospitalization. Clinical trials and health system interventions to optimize medical therapy in peripheral arterial disease patients are urgently needed.

Methods

This study was conducted at the Hamilton General Hospital (Hamilton, Ontario, Canada), a tertiary-level vascular referral centre. We assessed a retrospective cohort of consecutive patients discharged from this hospital between April 2016 and September 2017, following admission for severe limb ischemia, defined as nontraumatic lower ALI or CLI requiring intervention.

Ethics

Ethical approval was obtained for the Canadian Acute Limb Ischemia Registry (CANALISE) from the Hamilton Integrated Research Ethics Board (Hamilton, Ontario, Canada) on February 16, 2018.

Data collection

All cases of severe limb ischemia requiring urgent/emergent revascularization between April 1, 2016 and September 1, 2017 were identified using the Local Health Integration Network (LHIN) CorHealth database. These data were then uploaded to an online secure server (Research Electronic Data Capture [REDCap]).

We included adult patients aged ≥18 years who were admitted to the hospital for lower-extremity revascularization for limb ischemia requiring urgent/emergent revascularization, defined as limb-threatening ischemia, confirmed by limb hemodynamics or imaging, that led to an acute vascular intervention within 30 days of symptom onset. In the absence of confirmation by limb hemodynamics or imaging, absent pedal pulses were acceptable as a hemodynamic criterion for ALI. CLI was defined as severe limb ischemia leading to an intervention, with symptom onset occurring >30 days prior to revascularization. We excluded cases of lower-extremity intervention secondary to trauma, infection, or pseudoaneurysm.

Patient and hospital care information was extracted from the electronic medical records using a standardized case-record
form. This included preadmission information, hospitalization details (including intervention type), and data at 30 days and 1 year following discharge from the hospital.

**Study outcomes**

The primary outcome was antithrombotic therapy following intervention for urgent/emergent limb ischemia or CLI. This therapy was categorized as either: (i) single antiplatelet therapy (SAPT); (ii) dual antiplatelet therapy (DAPT); (iii) full-dose oral anticoagulant (AC); (iv) full- or reduced-dose oral AC + antiplatelet therapy (APT); (v) none; or (vi) unknown. These data were collected at the time of discharge following intervention.

The secondary outcome was use of other established vascular protective medications (ie, statin, angiotensin-converting enzyme inhibition/angiotensin receptor blocker) following intervention for urgent/emergent limb ischemia or CLI.

**Statistical analysis**

Baseline characteristics are reported using either means and standard deviations, counts and proportions, or medians and interquartile ranges, depending on the type of variable and its distribution. We report odds ratios, adjusted odds ratios (aORs) their 95% confidence intervals (CIs) and associated P value.

To investigate the relationship between type of surgical intervention type and antithrombotic therapy choice, we developed univariate and multivariate ordinal logistic regression models. Ordinal categorization of antithrombotic therapy intensity was adjusted for age and according to a comorbidity index that included presence of diabetes, hypertension, dyslipidemia, coronary artery disease, stroke, and chronic kidney disease.

To assess changes in preventative therapy prescription rates before and after limb-related events, McNemar repeated-measure proportion tests of marginal homogeneity were utilized. We report the associated χ² scores (χMN2) and P values. The data analysis for this paper was performed using SAS software, version 8, of the SAS System for Windows SAS Institute, Inc. (Cary, N.C.).

**Results**

A total of 158 patients were identified as hospitalized with ALI or CLI. (Supplemental Fig. S1). Of these patients, 148 (93.6%) were alive at discharge. Modifiable risk factors for vascular disease were common, including previous or current smoking (79.7%; n = 126), hypertension (77.8%; n = 123), dyslipidemia (64.6%; n = 102), and diabetes (41.8%; n = 66). The majority of patients had a history of vascular intervention for PAD, namely previous aorta–femoral or lower-extremity bypass surgery (48.1%; n = 76), previous endovascular intervention for indication of PAD (22.8%; n = 36), or previous limb or foot amputation (3.8%; n = 6). In all, 38.0% of patients (n = 60) had coronary artery disease, and 10.1% (n = 16) had renal insufficiency defined by a low estimated glomerular filtration rate. Despite these histories, established secondary vascular protective medicaments were comparatively less common. β-hydroxy β-methylglutaryl (HMG)-CoA reductase (statin) therapy was utilized in 56.3% of patients (n = 89) at baseline, and renin–angiotensin–aldosterone system modifiers were used in 50.6% of patients (n = 80; Table 1).

A pre-existing indication for full-dose oral anticoagulation was present in 23.4% of patients (n = 37) admitted for severe limb ischemia, 16.6% (n = 26) with atrial fibrillation, 1.3% (n = 2) with a mechanical valve, and 8.2% (n = 13) with previous venous thromboembolic disease. Among the 121 patients without a pre-existing indication for anticoagulation therapy, the antithrombotic strategies at admission included SAPT (55.4%; n = 67), DAPT (8.3%; n = 10), an AC with an antiplatelet agent (0.8%; n = 1), and AC treatment alone (0.8%; n = 1); in 2 patients (1.7%), the treatment strategy was not recorded. Surprisingly, 33.1% of patients (n = 40) were on neither an antiplatelet agent nor an AC (Fig. 1A; Table 2).

**Surgical strategies during hospitalization**

Surgical bypass was the most commonly utilized surgical strategy (57.0%; n = 90), followed by embolectomy/thrombectomy (50.6%; n = 80), endarterectomy (36.7%; n = 58), angioplasty (with stent: 20.9%; [n = 33]; without stent: 5.1% [n = 8]), and amputation (3.2%; n = 5). Thrombolysis was utilized in a small number of patients, (1.3%; n = 2). These surgical strategies were not mutually exclusive.

Patients undergoing angioplasty with stenting were 7.14 times (95% CI: 2.87-17.76; P < 0.001) more likely to be
prescribed DAPT at discharge, compared with those undergoing other vascular procedures. Patients undergoing embolectomy/thrombectomy were 2.61 times (95% CI: 1.00-6.81; \(P = 0.049\)) as likely to be prescribed anticoagulation alone at discharge. Conversely, patients undergoing embolectomy/thrombectomy were less likely to receive DAPT (aOR:0.38; 95% CI: 0.17-0.89; \(P = 0.026\)). Finally, patients undergoing bypass grafting alone were 2.28 times (95% CI: 1.11-4.69; \(P = 0.024\)) more likely to be discharged on SAPT, compared with those undergoing other vascular procedures, and they had lower rates of DAPT at discharge as well (aOR: 0.34; 95% CI: 0.15-0.79; \(P = 0.011\)). No other operative procedures were associated with particular antithrombotic regimens (Table 3).

Therapies at discharge

Among patients who survived to discharge, and without a pre-existing indication for anticoagulation treatment, SAPT (38.8%; \(n = 47\)); DAPT (27.3%; \(n = 33\)), anticoagulation and antiplatelet treatment in combination (19.8%; \(n = 24\)), and anticoagulation treatment alone (6.6%; \(n = 8\)) were prescribed in descending frequency, with 2.5% (\(n = 3\)) being prescribed unknown antithrombotics (Fig. 1, A and B).

Vascular protective medications

Comparing discharge rates to admission rates, neither statins (60.8% vs 56.3%; \(\chi^{2} = 1.45\) (degrees of freedom = 1); \(P = 0.23\)) nor renin–angiotensin–aldosterone system – inhibitor (48.7% vs 50.6%; \(\chi^{2} = 0.31\); \(P = 0.58\)) prescriptions were increased. Of other medications, only use of the hypertensive category of beta-blockers increased significantly at discharge compared to baseline (44.6% vs 34.38%; \(\chi^{2} = 5.57\) (degrees of freedom = 1); \(P = 0.018\); Fig. 2).

Discussion

CANALISE I demonstrates that, among PAD patients hospitalized for severe limb ischemia, there is heterogeneity in the use of antithrombotic regimens following peripheral
vascular interventions. No antithrombotic regimens were utilized predominantly, although a pre-existing need for anticoagulation, along with procedure type, influenced antithrombotic therapy choices. Although antithrombotic therapy was prescribed to the vast majority of patients upon discharge, the use of other vascular protection medications did not significantly increase at discharge.

Patients with PAD have a high risk of both major adverse cardiac events and MALE.16,17 This risk is substantially higher in the first year following an ischemic limb event.11 Antithrombotics are among the most effective medical therapies to reduce this ischemic risk.16,17 In the Effects of Ticagrelor and Clopidogrel in patients with PAD (EUCLID) trial, which compared use of ticagrelor to use of clopidogrel in patients with stable PAD, a subgroup analysis showed that in patients discharged from the hospital after suffering ALI, 41.3% required subsequent revascularization, and 19.4% had a subsequent amputation. Furthermore, approximately half of all deaths following ALI were secondary to cardiovascular causes.17 Patients in the Cardiovascular Outcomes for People Using Anticoagulation Strategies (COMPASS) trial who suffered MALE, such as the need for urgent/emergent revascularization, had a 200-fold increased risk of vascular amputation and a 3-fold increase in death, compared with PAD patients who did not suffer MALE.11 Despite the high risks for these patients, uncertainty remains regarding the optimal antithrombotic strategy. Following MALE in the COMPASS trial, there was enough uncertainty regarding the optimal antithrombotic to use that 63% remained on their blinded randomized drug therapy; 13% were transitioned to SAPT, 10% received DAPT, 2% received an oral AC, and 12% had all antithrombotic therapy discontinued.11 These findings highlight the lack of evidence guiding clinician decision-making regarding antithrombotics following urgent/emergent revascularization for limb ischemia. This uncertainty is particularly significant given that the choice of antithrombotic therapy is not a benign one, with oral AC and DAPT regimens conferring significant risks of bleeding that must be balanced against their potential benefit.10 Vascular surgeons echo this need for more robust evidence, as in a recent survey conducted in Canada, in which 91% were found to believe that significant uncertainty still exists in antithrombotic decision-making following urgent/emergent revascularization.12

In this analysis, only angioplasty with stenting demonstrated a strong and significant signal favoring a particular antithrombotic regimen, namely DAPT. This result is likely a reflection of ambient American Heart Association and European Society of Cardiology guidelines at that time, although even so, 46.4% of patients who received stenting were discharged on antithrombotic therapy other than DAPT. The use of DAPT after endovascular intervention has largely been extrapolated from the coronary trials, and it has been influenced by the manufacturer package insert. The duration of DAPT after an endovascular procedure ranges from 1 month to 6 months.15 The guidelines support the use of DAPT in patients undergoing endovascular procedures, but they do not stratify by elective vs urgent scenarios. The recently published Vascular Outcomes Study of ASA Along with Rivaroxaban in Endovascular or Surgical Limb Revascularization for PAD (VOYAGER PAD) trial has the potential to change antithrombotic practice post–lower limb revascularization. This

### Table 2. Antithrombotic medications at time of discharge

| Antithrombotic therapy | Total | No indication for AC | Indication for AC |
|------------------------|-------|----------------------|-------------------|
| SAPT                   | 51 (34.5) | 47 (40.9) | 4 (12.1) |
| DAPT                   | 33 (22.3) | 33 (28.7) | 0 (0.0) |
| OAC/DOAC               | 23 (15.5) | 8 (7.0) | 15 (45.5) |
| OAC/DOAC + AP          | 38 (25.7) | 24 (20.9) | 14 (42.4) |
| None                   | 0 (0.0) | 0 (0.0) | 0 (0.0) |
| Unknown                | 3 (2.0) | 3 (2.6) | 0 (0.0) |

Values are n (%).

AC, anticoagulant; AP, antiplatelet; DAPT, dual-antiplatelet therapy; DOAC, direct oral anticoagulant; OAC, oral anticoagulant; SAPT, single-antiplatelet therapy.

### Table 3. Antithrombotic medication at discharge, stratified by intervention

| Intervention type          | Antithrombotic therapy at discharge | Univariate analysis OR (95% CI) | P |
|----------------------------|------------------------------------|---------------------------------|---|
| Endarterectomy             | SAPT                               | 1.02 (0.50 to 2.09)             | 0.95 |
|                           | DAPT                               | 0.86 (0.37 to 2.00)             | 0.72 |
|                           | OAC/DOAC                           | 1.54 (0.62 to 3.81)             | 0.35 |
|                           | OAC/DOAC + AP                      | 0.81 (0.37 to 1.80)             | 0.61 |
| Bypass                    | SAPT                               | 2.28 (1.11 to 4.69)             | 0.024 |
|                           | DAPT                               | 0.34 (0.15 to 0.79)             | 0.011 |
|                           | OAC/DOAC                           | 0.44 (0.18 to 1.10)             | 0.08 |
|                           | OAC/DOAC + AP                      | 1.75 (0.81 to 3.78)             | 0.16 |
| Embolectomy/thrombectomy  | SAPT                               | 0.92 (0.46 to 1.83)             | 0.81 |
|                           | DAPT                               | 0.38 (0.17 to 0.89)             | 0.026 |
|                           | OAC/DOAC                           | 2.61 (1.002 to 6.81)            | 0.049 |
|                           | OAC/DOAC + AP                      | 1.31 (0.62 to 2.76)             | 0.48 |
| Angioplasty (without stent)| SAPT                               | 0.59 (0.11 to 3.01)             | 0.52 |
|                           | DAPT                               | 1.22 (0.23 to 6.36)             | 0.81 |
|                           | OAC/DOAC                           | 1.81 (0.34 to 9.58)             | 0.49 |
|                           | OAC/DOAC + AP                      | 0.92 (0.18 to 4.75)             | 0.92 |
| Angioplasty (with stent)  | SAPT                               | 0.54 (0.21 to 1.37)             | 0.19 |
|                           | DAPT                               | 7.14 (2.87 to 17.76)            | 0.000024 |
|                           | OAC/DOAC                           | N/A                             | N/A |
|                           | OAC/DOAC + AP                      | 0.71 (0.26 to 1.91)             | 0.49 |

AP, antiplatelet; CI, confidence interval; DAPT, dual-antiplatelet therapy; DOAC, direct oral anticoagulant; OAC, oral anticoagulant; N/A, not available; OR, odds ratio; SAPT, single-antiplatelet therapy.
trial enrolled patients undergoing infrainguinal revascularization, including 20% of patients with critical limb ischemia, and tested the effectiveness of the combination of low-dose rivaroxaban and aspirin, compared with that of aspirin alone. In addition, investigators could use, at their discretion, short-term clopidogrel, as two-thirds of trial patients underwent endovascular therapy. The VOYAGER PAD trial showed that the combination of low-dose rivaroxaban and aspirin, compared with aspirin alone, reduced rates of incident ALI, major amputation for vascular causes, myocardial infarction, ischemic stroke, and death from cardiovascular causes (hazard ratio 0.85, 95% CI: 0.76-0.96), as well as rates of unplanned index limb revascularization for recurrent ischemia (hazard ratio 0.88; 95% CI 0.79 -0.99). Interestingly, although 50% of patients in the trial also used concomitant short-term clopidogrel (median: 30 days), there was no additional benefit in reduction of ischemic events among patients who received clopidogrel. Therefore, although the evidence from the COMPASS and VOYAGER PAD trials indicates that a reasonable antithrombotic option would be to use low-dose rivaroxaban and aspirin in stable PAD patients, including those undergoing lower-extremity revascularization, it cannot be extrapolated to patients with ALI. Guidelines from the American Heart Association and the European Society of Cardiology do not explicitly address antithrombotic use in this setting, save for the need for intravenous heparin until successful revascularization can be performed. Randomized controlled trials investigating optimal antithrombotic treatments following urgent/emergent limb revascularization, such as comparing full-dose anticoagulation to COMPASS therapy, are urgently needed.

Hospitalization for PAD intervention serves as an opportunity to optimize vascular protective therapies in this accessible population. The importance of vascular protective medications following urgent/emergent revascularization is recognized by the practitioners taking care of these patients; we note in our study that all patients were discharged on some form of antithrombotic therapy, compared with 33.1% of patients who were not administered any antithrombotic leading up to admission. However, we demonstrate that this has not translated into increased use of other vascular protective medications, with no significant increase in the prescription of statins or renin-angiotensin-aldosterone system -inhibitors upon discharge from the hospital.

Our findings challenge the long-term management strategies for PAD patients and demonstrate a missed opportunity for vascular optimization in PAD patients admitted for limb ischemia. Patients with PAD are undertreated for their comorbidities, with utilization of antithrombetics, statins, and renin-angiotensin-aldosterone system -inhibitors at a rate approximately half that for their counterparts with coronary artery disease. On a population basis, treating the risk factors for PAD is the most effective strategy to reduce the global burden of disease. Simple guideline-based treatment of comorbidities can reduce major adverse cardiac events, MALE, and even overall mortality by 65% with the use of antiplatelet, statin, and angiotensin-converting enzyme/angiotensin receptor blocker, as estimated in the National Health and Nutrition Examination Survey (NHANES) cohort. Beyond randomized trials investigating optimal antithrombotic therapy, systematic innovations are critical in improving outcomes in PAD patients. Although digital or process-based solutions are prudent, the roles of vascular medicine, vascular surgery, vascular rehabilitation, and primary care must expand, in order to address the medical and lifestyle gaps contributing to the poor outcomes in PAD patients.

This investigation is limited by the fact that it includes only one academic health system in Canada. However, the
large catchment area of Hamilton Health Sciences, and the tertiary nature of the care provided likely enhances the generalizability of the study. The fact that this sample is drawn from a large academic centre may also have led to different results, based on the availability of consultation services, such as those for thrombosis and vascular medicine, compared to what might have been found with community practices where these specialists may not exist. Thus, the study may overestimate the rate of antithrombotic intensification and the degree of risk-factor reduction pursued, as compared to those for typical care after urgent/emergent limb revascularization. Our results indicating suboptimal use of vascular protective medications are also congruent with other Canadian and US studies that collectively show no increase in use of vascular protective medications over time.\(^{18,22,23}\)

**Conclusion**

Patients requiring urgent and emergent limb revascularization for severe PAD face significant morbidity and mortality despite advances in peripheral interventions and medical therapy.\(^{11,24}\) This investigation demonstrates the large heterogeneity in prescribing practices following these vascular interventions, which are only partially influenced by pre-existing need for anticoagulation and procedure type. Significant uncertainty regarding the optimal antithrombotic regimen after intervention for severe limb ischemia remains. This investigation also shows, using contemporary data, that even those at highest risk for ischemic events are not receiving adequate, proven, preventative medications, and it identifies a missed opportunity for such optimization during hospital admission. Randomized controlled trials informing antithrombotic therapy following urgent/emergent revascularization, as well as large-scale quality improvement measures to optimize proven secondary prevention therapies in PAD patients, are urgently needed for this high-risk patient population.

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**References**

1. Allison MA, Ho E, Denenberg JO, et al. Ethnic-specific prevalence of peripheral arterial disease in the United States. Am J Prev Med 2007;32:328-33.
2. Sidawy AN, Perler BA. Rutherford’s Vascular Surgery and Endovascular Therapy. 9th ed. Philadelphia: Elsevier, 2019.
3. Anand SS, Eikelboom JW, Dyal L, et al. Rivaroxaban plus aspirin versus aspirin in relation to vascular risk in the COMPASS Trial. J Am Coll Cardiol 2019;73:3271-80.
4. Bonaca MP, Gutierrez JA, Creager MA, et al. Acute limb ischemia and outcomes with vorapaxar in patients with peripheral artery disease: results from the Trial to Assess the Effects of Vorapaxar in Preventing Heart Attack and Stroke in Patients with Atherosclerosis-Thrombolysis in Myocardial Infarction 50 (TRA2P-TIMI 50). Circulation 2016;133:997-1005.
5. Baril DT, Ghosh K, Rosen AB. Trends in the incidence, treatment, and outcomes of acute lower extremity ischemia in the United States Medicare population. J Vasc Surg 2014;60:669-677.e2.
6. Bonaca MP, Bauersachs RM, Anand SS, et al. Rivaroxaban in peripheral artery disease after revascularization. N Engl J Med 2020;382:1994-2004.
7. Fukuda I, Chiyoya M, Taniguchi S, Fukuda W. Acute limb ischemia: contemporary approach. Gen Thorac Cardiovasc Surg 2015;63:540-8.
8. Creager MA, Kaufman JA, Conte MS. Clinical practice. Acute limb ischemia. N Engl J Med 2012;366:2198-206.
9. Norgren L, Hiatt WR, Dormandy JA, et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). J Vasc Surg 2007;45(suppl S):S5-67.
10. Gerhard-Herman MD, Gornik HL, Barrett C, et al. 2016 AHA/ACC guideline on the management of patients with lower extremity peripheral artery disease: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation 2017;135:e686-725.
11. Anand SS, Caron F, Eikelboom JW, et al. Major adverse limb events and mortality in patients with peripheral artery disease: the COMPASS trial. J Am Coll Cardiol 2018;71:2306-15.
12. McClure GR, Kaplovitch E, Chan N, et al. A national Canadian survey of antithrombotic therapy following urgent and emergent limb revascularization. Can J Cardiol 2021;37:504-7.
13. Agarwal S, Sud K, Shishhebhour MH. Nationwide trends of hospital admission and outcomes among critical limb ischemia patients: from 2003-2011. J Am Coll Cardiol 2016;67:1901-13.
14. CorHealth Ontario data. Toronto: CorHealth Ontario. Available at: https://www.corhealthontario.ca/. Accessed February 3, 2020.
15. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform 2009;42:377-81.
16. Kaplovitch E, Rannelli L, Anand SS. Antithrombotics in stable peripheral artery disease. Vasc Med Lond Engl 2019;24:132-40.
17. Hess CN, Huang Z, Patel MR, et al. Acute limb ischemia in peripheral artery disease. Circulation 2019;140:556-65.
18. Berger JS, Hiatt WR. Medical therapy in peripheral artery disease. Circulation 2012;126:491-500.
19. Armstrong EJ, Chen DC, Westin GG, et al. Adherence to guideline-recommended therapy is associated with decreased major adverse cardiovascular events and major adverse limb events among patients with peripheral arterial disease. J Am Heart Assoc 2014;3:e000697.
20. Welten GMJM, Schouten O, Hoeks SE, et al. Long-term prognosis of patients with peripheral arterial disease: a comparison in patients with coronary artery disease. J Am Coll Cardiol 2008;51:1588-96.

21. Pande RL, Perlstein TS, Beckman JA, Creager MA. Secondary prevention and mortality in peripheral artery disease: National Health and Nutrition Examination Study, 1999 to 2004. Circulation 2011;124:17-23.

22. Anand SS, Kundi A, Eikelboom J, Yusuf S. Low rates of preventive practices in patients with peripheral vascular disease. Can J Cardiol 1999;15:1259-63.

23. Kundhal KK, Chin SL, Harrison L, et al. Patterns of medical therapy in patients with peripheral artery disease in a tertiary care centre in Canada. Can J Cardiol 2007;23:357-61.

24. Mahoney EM, Wang K, Keo HH, et al. Vascular hospitalization rates and costs in patients with peripheral artery disease in the United States. Circ Cardiovasc Qual Outcomes 2010;3:642-51.

**Supplementary Material**

To access the supplementary material accompanying this article, visit CJ C Open at https://www.cjcopen.ca/ and at https://doi.org/10.1016/j.cjco.2021.06.006.