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ORIGINAL RESEARCH

Association of Disease-Specific Health Status With Long-Term Survival in Peripheral Artery Disease

Andy T. Tran, DO, MSc; John A. Spertus, MD, MPH; Carlos I. Mena-Hurtado, MD; Philip G. Jones, MS; Herbert D. Aronow, MD, MPH; David M. Safley, MD; Ali O. Malik, MD, MSc; Poghni A. Peri-Okonny, MD; Mehdi H. Shishehbor, DO, MPH, PhD; Clementine Labrosciano, PhD; Kim G. Smolderen, PhD

BACKGROUND: While peripheral artery disease (PAD) is associated with increased cardiovascular morbidity with mortality remaining high and challenging to predict, accurate understanding of serial PAD-specific health status around the time of diagnosis may prognosticate long-term mortality risk.

METHODS AND RESULTS: Patients with new or worsening PAD symptoms enrolled in the PORTRAIT Registry across 10 US sites from 2011 to 2015 were included. Health status was assessed by the Peripheral Artery Questionnaire (PAQ) Summary score at baseline, 3-month, and change from baseline to 3-month follow-up. Kaplan-Meier using 3-month landmark and hierarchical Cox regression models were constructed to assess the association of the PAQ with 5-year all-cause mortality. Of the 711 patients (mean age 68.8±9.6 years, 40.9% female, 72.7% white; mean PAQ 47.5±22.0 and 65.9±25.0 at baseline and 3-month, respectively), 141 (19.8%) died over a median follow-up of 4.1 years. In unadjusted models, baseline (HR, 0.90 per-10-point increment; 95% CI, 0.84–0.97; P=0.008), 3-month (HR [95% CI], 0.87 [0.82–0.93]; P<0.001) and change in PAQ (HR [95% CI], 0.92 [0.85–0.99]; P=0.021) were each associated with mortality. In fully adjusted models including combination of scores, 3-month PAQ was more strongly associated with mortality than either baseline (3-month HR [95% CI], 0.85 [0.78–0.92]; P<0.001; C-statistic, 0.77) or change (3-month HR [95% CI], 0.79 [0.72–0.87]; P<0.001).

CONCLUSIONS: PAD-specific health status is independently associated with 5-year survival in patients with new or worsening PAD symptoms, with the most recent assessment being most prognostic. Future work is needed to better understand how this information can be used proactively to optimize care.

Key Words: health status ■ mortality ■ peripheral artery disease

Peripheral artery disease (PAD) remains an under-recognized and under-treated condition, despite conferring a high risk of cardiovascular morbidity and mortality with 1-year event rates more than 21%.[1] As the disease advances, patients with PAD may develop intermittent claudication and critical limb ischemia which significantly impair patients' functioning and quality of life.[2] In those with symptomatic disease, symptom relief and improvement of patients' health status are often the primary reason as to why patients seek vascular specialty care.[3]

Health status outcomes are increasingly being recognized as an integral part of quality assessment and improvement, both in clinical research and in routine practice.[4] Beyond the explicit goal of quantifying the impact of a disease on patients' symptoms, function and quality of life, patient-reported outcomes have also been shown to be strongly and independently

Correspondence to: Kim G. Smolderen, PhD, Vascular Medicine Outcomes (VAMOS) Program, Section of Cardiovascular Medicine, Department of Internal Medicine, Yale University, 789 Howard Ave, Dana Clinic Building (DCB), Room 305, New Haven, CT 06519. E-mail: kim.smolderen@yale.edu

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CLINICAL PERSPECTIVE

What Is New?

- Peripheral artery disease-specific health status, assessed by the Peripheral Artery Questionnaire, is independently associated with long-term survival in patients consulting vascular specialists with new or worsening peripheral artery disease symptoms, with the most recent assessment being most prognostic.
- These findings support routine, longitudinal monitoring of health status for updated risk estimation, and future work is needed to better implement such strategies to improve outcomes in patient care.

What Are the Clinical Implications?

- From a clinical perspective, it is important to be able to understand patients' risks and were one to see a patient with very poor health status upon initial presentation and the initial treatment resulted in a substantial improvement in their symptoms, function, and quality of life, it is important to realize that their long-term prognosis has also improved.
- Conversely, if a patients' health status does not improve, then additional treatment strategies might be considered, not only to improve patients' health status (a primary goal of treatment), but also to improve their long-term survival.

Nonstandard Abbreviations and Acronyms

NDI	national death index
PAQ	Peripheral Artery Questionnaire
PORTRAIT	Patient-Centered Outcomes Related Treatment Practices in Peripheral Arterial Disease: Investigating Trajectories

associated with subsequent clinical events.[5–8] Yet, as these tools become increasingly incorporated into clinical practice, there is a need to understand what components of a series of consecutive health status scores—prior scores, changes in scores or most current scores—are most strongly associated with subsequent outcomes. In doing so, this knowledge will help clinicians better interpret these scores, such that treatment pathways could be tailored to patients' projected risk to improve care.

In a real-world cohort of patients with a new or worsening diagnosis of PAD seeking vascular specialty care, we aimed to examine whether serial, prospectively measured PAD-specific health status assessments as measured through the Peripheral Artery Questionnaire (PAQ)[9,10] could be used to prognosticate patients' 5-year mortality risk. We further sought to define which parameters from serial health status assessments are most strongly associated with mortality.

METHODS

Study Design and Population

The PORTRAIT (Patient-centered Outcomes Related Treatment Practices in Peripheral Arterial Disease: Investigating Trajectories) Registry is a multicenter, international prospective registry that enrolled 1275 patients with new or worsening symptoms of PAD presenting to 16 PAD specialty clinics across the US, the Netherlands, and Australia from June 2, 2011 to December 3, 2015. Study details have been described elsewhere.[11] The data that support the findings of this study are available from the corresponding author on reasonable request.

In the PORTRAIT study, patients who presented to a PAD specialty clinic with new or worsening symptoms of PAD, supported by an abnormal ankle-brachial index (ABI) defined as ≤0.90 or a decrease in post-exercise ankle pressure ≥20 mm Hg were included. Patients with a non-compressible ABI ≥1.30, critical limb ischemia, and an ipsilateral lower-limb revascularization in the 12 months prior, those who were incarcerated, hard of hearing, or unable to provide informed consent were excluded. As long-term vital status information was only documented in patients enrolled from US clinics, we restricted our analytic cohort to US patients. The study protocol of the PORTRAIT study was approved by the institutional review boards of all participating sites. All study participants provided either written or verbal (by telephone) informed consent. The present study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.[12]

Measures

The PAQ is a disease-specific health status measure for patients with PAD. The PAQ includes a 20-item questionnaire that assesses PAD-related health status along six domains (PAD symptoms, recent changes in PAD symptoms, physical limitations due to PAD symptoms, PAD treatment satisfaction, social functioning, and quality of life).[9] The PAQ, the variable of interest in this study, is well-validated, reliable, and responsive.[10] The PAQ Summary score is derived by combining the physical limitation, symptom frequency/burden, social function, and quality-of-life domains. Scores range from 0 to 100, with higher scores indicating better health status. Patients with missing PAQ assessments

at baseline and 3-month follow-up were excluded. Furthermore, the PAQ has been shown to be sensitive to detect meaningful clinical change, and the minimum clinically relevant difference is defined as an 8- to 10-point change using a distribution-based and patient anchor-based approach, respectively.[6,13]

The primary outcome of interest was 5-year all-cause mortality as derived from the National Death Index (NDI).[14] The NDI provides vital status of patients through linking patient name, date of birth, and Social Security number.[15] In previous work, the sensitivity of the NDI has been shown to range from 87.0% to 97.9% in ascertaining vital status.[16,17]

Statistical Analysis

To identify patient characteristics that are associated with PAQ scores and that might confound the observed association between health status and 5-year mortality, the PAQ Summary scores were classified into four group scores (0–24, 25–49, 50–74, and 75–100).[18] Baseline characteristics were compared across ranges of PAQ Summary score using χ^2 or Fisher exact test for categorical variables and one-way analysis of variance for continuous variables.

The 3-month follow-up was identified as one of the key follow-up points by patients and clinicians in the design of PORTRAIT,[11] as it broadly coincides with a time when the initial start of a PAD treatment is evaluated. Thus, the conceptual framework of these analyses was that of a clinician evaluating a patient at that time point, who had available their PAQ scores from 3 months earlier and the change between that assessment and the current one. We then used the 3-month assessment from PORTRAIT as "Time 0" and described survival curves for 5-year all-cause mortality with a Kaplan-Meier analysis, stratified by baseline and 3-month PAQ score groups. In these unadjusted analyses, we compared the 25-point ranges of PAQ Summary scores by use of log-rank tests.

We then developed a series of models to examine the independent association of PAQ Summary scores with time to all-cause 5-year mortality using hierarchical Cox proportional hazards regression (including study site as random effect). These included the following analyses: (1) baseline PAQ Summary score alone; (2) 3-month PAQ Summary score alone; (3) change from baseline to 3-month PAQ Summary scores alone; (4) the combination of baseline and 3-month PAQ; and (5) the combination of change and 3-month PAQ Summary scores.

To define the independent association of PAQ Summary scores, we then examined fully adjusted Cox proportional hazards models to examine if other patient-level factors would attenuate the association of patients' health status with long-term mortality. These factors, selected a priori, included demographics (age, sex, race, ethnicity, and body mass index), comorbidities (hypertension, diabetes, congestive heart failure, chronic obstructive pulmonary disease, chronic kidney disease, prior stroke/transient ischemic attack, prior myocardial infarction, prior percutaneous coronary intervention/coronary artery bypass grafting, and smoking status), PAD characteristics (ABI, PAD location [proximal disease versus distal disease versus bilateral disease], PAD presentation [new diagnosis versus exacerbation]), and socioeconomic status. Socioeconomic status was determined using patient responses to questions regarding their level of education (above high school; yes or no), avoidance of care due to costs (yes or no), and monthly financial reserves (some, just enough, or not enough).[19] We explored nonlinear relationships between PAQ Summary scores and log-hazard for all-cause mortality by incorporating restricted cubic spline terms, but found no appreciable departures from linearity (P=0.21–0.96). Tests of the proportional hazards assumption of Cox regression based on the scaled Schoenfeld residuals on all models were met (P=0.06–0.99).

Missing Data

Of the 797 eligible patients for our analysis, 10.8% had missing PAQ Summary scores at baseline (N=1) and 3-month (N=85) and were thus excluded. We compared the baseline characteristics by missing health status using the standardized difference; a standardized difference >0.1 is suggestive of imbalance between groups.[20] Among the remaining patients in the analytic cohort, the clinical data were quite complete, with only 5.1% of baseline data missing; ie, body mass index (3.1% missing); ABI, avoidance of care due to cost, monthly financial reserves and ABI (each <1% missing). Before the development of the final adjusted models, data were imputed with random forest multiple imputation (missForest package version 1.4 in R).[21,22]

All tests are 2-tailed, and an alpha level of 0.05 was considered statistically significant. All analyses were conducted using R statistical software version 4.1.0 (R Project for Statistical Computing).

RESULTS

The final analytic cohort consisted of 711 patients; a STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) diagram is presented in Figure 1. No patient died between baseline and 3-month follow-up. The mean age was 68.8 (standard deviation [SD] ± 9.6) years; 40.9% were female and 72.7% were white. The mean±SD PAQ Summary scores at baseline and 3-month were 47.5±22.0 and 65.9±25.0,

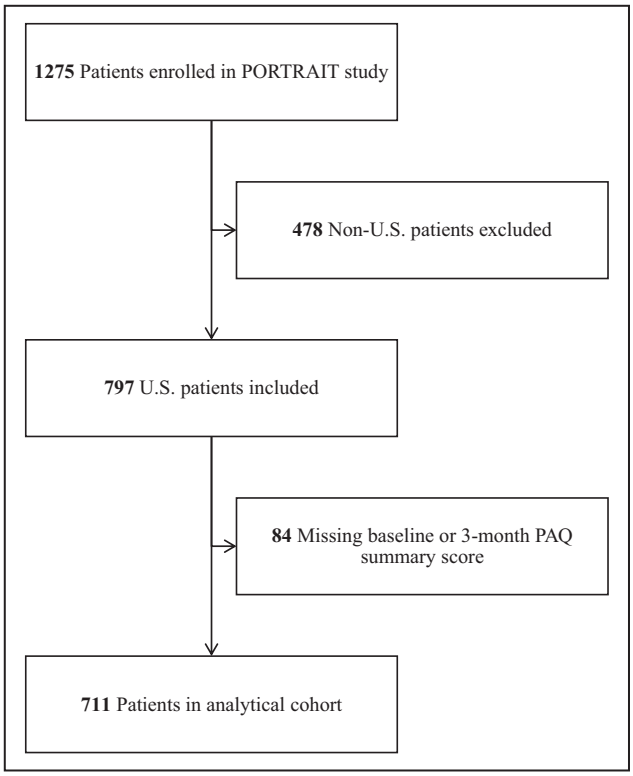

Figure 1. STROBE diagram of the study cohort.
PAQ indicates Peripheral Artery Questionnaire; PORTRAIT, Patient-Centered Outcomes Related to Treatment Practices in Peripheral Arterial Disease: Investigating Trajectories; and STROBE, Strengthening the Reporting of Observational Studies in Epidemiology.

respectively. Baseline characteristics are presented in Table 1. Patients with worse health status at baseline were more likely to be younger, female, have a higher body mass index, avoid care due to cost, have poor monthly financial reserves, and have diabetes.

Of the 711 patients, 141 (19.8%) died over a median follow up of 4.1 years. When stratified by the baseline PAQ score groups of 0 to 24, 25 to 49, 50 to 74, and 75 to 100, a total of 25.2%, 22.5%, 15.7%, and 16.8% patients died, respectively (P=0.085). When stratified by the same 3-month PAQ score groups, a total of 31.5%, 32.3%, 17.8%, and 14.2% patients died, respectively (P<0.001; Figure 2). Figure 3 shows Kaplan–Meier survival curves for patients by baseline PAQ score groups (log-rank P=0.05) and 3-month PAQ score groups (log-rank P<0.001). This is demonstrated graphically in the Kaplan-Meier survival curves for patients by baseline PAQ score groups (log-rank P=0.05) and 3-month PAQ score groups (log-rank P<0.001; Figure 3). The curves separate, especially in patients with the worst function (ie, 0–24 and 25–49 PAQ score groups), almost immediately and continues throughout the 5-year follow up.

When analyzed as continuous variables in unadjusted Cox proportional hazards models (Table 2), higher scores on the baseline PAQ (HR per 10-point increments, 0.90; 95% CI, 0.84–0.97; P=0.008), change from baseline to 3 months (HR per 10-point change, 0.92; 95% CI, 0.85–0.99; P=0.021) and 3-month PAQ (HR per 10-point increments, 0.87; 95% CI, 0.82–0.93; P<0.001), were each associated with a lower risk of all-cause mortality. However, when the 3-month PAQ was included in the model with either the baseline PAQ or change in PAQ Summary scores, only 3-month PAQ Summary score was associated with all-cause mortality, indicating that the most recent PAQ assessment following a new or worsening of PAD diagnosis was most strongly associated with long-term survival.

Results were also consistent in fully adjusted Cox proportional hazards models (Table 2). Only 3-month PAQ was significantly associated with mortality when combined with baseline PAQ (3-month HR, 0.85; 95% CI, 0.78–0.92, P<0.001; C-statistic, 0.771) (Figure S1) and when combined with change in PAQ (3-month HR, 0.79; 95% CI, 0.72–0.87, P<0.001).

DISCUSSION

With the increasing prevalence of PAD,[23] and the growing importance of measuring patients' health status outcomes in clinical research and real-world practice, it is critical to understand how serially collected PAD-specific health status information can be used to prognosticate patients' long-term survival. Following a diagnosis of new or worsening PAD symptoms for which patients sought vascular specialty care, we found that 1 in 5 patients died within 5 years. Using the repeated health status information measured at the time of, and shortly after, their PAD diagnosis, we found that while all assessments of PAD-specific health status were associated with long-term mortality, the most recent health status assessment was most strongly associated with 5-year mortality, independent of patients' demographics, major comorbidities, and socioeconomic status.

This is the first work, to our knowledge, that has described serial PAD-specific health status information for patients presenting with new or worsening PAD symptoms and its association with long-term mortality. Previous work used single assessments of generic health status[24] or PAD-specific health status assessed in a cohort that was already triaged to undergo endovascular treatments.[10] Furthermore, advantages of using disease-specific over generic health status assessments include the focus on specific symptoms of a disease and providing a better discriminative ability to detect changes in clinical indices in PAD patients.[25] Lastly, repeated assessments following PAD diagnosis may help capture the true base state of patients' functioning, both upon presentation and after initiating treatment. From a clinical perspective, it is important to be able to understand patients' risks and were one to see a patient with very poor health status upon initial

Table 1. Baseline Characteristics by Baseline PAQ Summary Score Ranges

	0–24 (n=127)	25–49 (n=240)	50–74 (n=249)	75–100 (n=95)	Total (n=711)
Age, y	64.19±10.47	68.58±9.34	70.49±8.72	70.75±9.19	68.75±9.59
Female	76 (59.8)	103 (42.9)	82 (32.9)	30 (31.6)	291 (40.9)
Body mass index, kg/m^2	30.66±7.24	29.82±6.69	29.05±5.70	27.69±5.02	29.42±6.31
Race					
White	82 (64.6)	179 (74.6)	184 (73.9)	72 (75.8)	517 (72.7)
Black	32 (25.2)	48 (20)	59 (23.7)	21 (22.1)	160 (22.5)
Other*	13 (10.2)	13 (5.4)	6 (2.4)	2 (2.1)	34 (4.8)
Above high school education	99 (78)	209 (87.1)	220 (88.4)	82 (86.3)	610 (85.8)
Avoiding care due to cost	38 (29.9)	39 (16.2)	28 (11.2)	9 (9.5)	114 (16)
Missing	1 (0.8)	3 (1.2)	1 (0.4)	0 (0)	5 (0.7)
Monthly financial reserves					
Has money	44 (34.6)	120 (50)	144 (57.8)	56 (58.9)	364 (51.2)
Just enough money	55 (43.3)	92 (38.3)	83 (33.3)	32 (33.7)	262 (36.8)
Not enough money	27 (21.3)	27 (11.2)	20 (8)	7 (7.4)	81 (11.4)
Missing	1 (0.8)	1 (0.4)	2 (0.8)	0 (0)	4 (0.6)
Presentation					
New PAD diagnosis	63 (49.6)	88 (36.7)	104 (41.8)	32 (33.7)	287 (40.4)
PAD exacerbation	64 (50.4)	152 (63.3)	145 (58.2)	63 (66.3)	424 (59.6)
Ankle brachial index	0.67±0.18	0.64±0.20	0.70±0.20	0.68±0.17	0.67±0.19
Smoking status					
Never smoker	8 (6.3)	32 (13.3)	37 (14.9)	13 (13.7)	90 (12.7)
Former smoker	60 (47.2)	137 (57.1)	161 (64.7)	54 (56.8)	412 (57.9)
Current smoker	59 (46.5)	71 (29.6)	51 (20.5)	28 (29.5)	209 (29.4)
Hypertension	114 (89.8)	220 (91.7)	216 (86.7)	85 (89.5)	635 (89.3)
Diabetes mellitus	62 (48.8)	87 (36.2)	87 (34.9)	33 (34.7)	269 (37.8)
Congestive heart failure	18 (14.2)	39 (16.2)	34 (13.7)	10 (10.5)	101 (14.2)
COPD	26 (20.5)	38 (15.8)	36 (14.5)	11 (11.6)	111 (15.6)
Chronic kidney disease	15 (11.8)	42 (17.5)	31 (12.4)	18 (18.9)	106 (14.9)
Prior stroke/TIA	19 (15)	30 (12.5)	26 (10.4)	12 (12.6)	87 (12.2)
Prior MI	37 (29.1)	62 (25.8)	40 (16.1)	17 (17.9)	156 (21.9)
Prior PCI/CABG	61 (48)	117 (48.8)	104 (41.8)	42 (44.2)	324 (45.6)
Disease location					
Proximal disease	38 (29.9)	62 (25.8)	59 (23.7)	10 (10.5)	169 (23.8)
Distal disease	43 (33.9)	81 (33.8)	101 (40.6)	53 (55.8)	278 (39.1)
Bilateral disease	45 (35.4)	95 (39.6)	89 (35.7)	30 (31.6)	259 (36.4)
Missing	1 (0.8)	2 (0.8)	0 (0)	2 (2.1)	5 (0.7)

Values are mean±SD or n (%). CABG indicates coronary artery bypass grafting; COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; PAD, peripheral artery disease; PAQ, Peripheral Artery Questionnaire; PCI, percutaneous coronary intervention; and TIA, transient ischemic attack.

*Other is defined as Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Unknown.

presentation and the initial treatment resulted in a substantial improvement in their symptoms, function, and quality of life, it is important to realize that their long-term prognosis has also improved. Conversely, if a patients' health status does not improve, then additional treatment strategies might be considered, not only to improve patients' health status (a primary goal of treatment), but also to improve their 5-year survival.

Accordingly, while all the PAQ assessments (baseline, 3 months, and change from baseline to 3-month) were significantly associated with the risk of mortality in unadjusted and adjusted analyses, the 3-month PAQ was the only robust predictor when combined with baseline PAQ or change in PAQ. These findings coincide with the clinical pathway as it broadly coincides with a time when the initial PAD treatment had been started since initial work-up and evaluations about responsiveness of the initial treatment are following. Similar patterns of predictability of serial health status scores have been seen among other conditions,

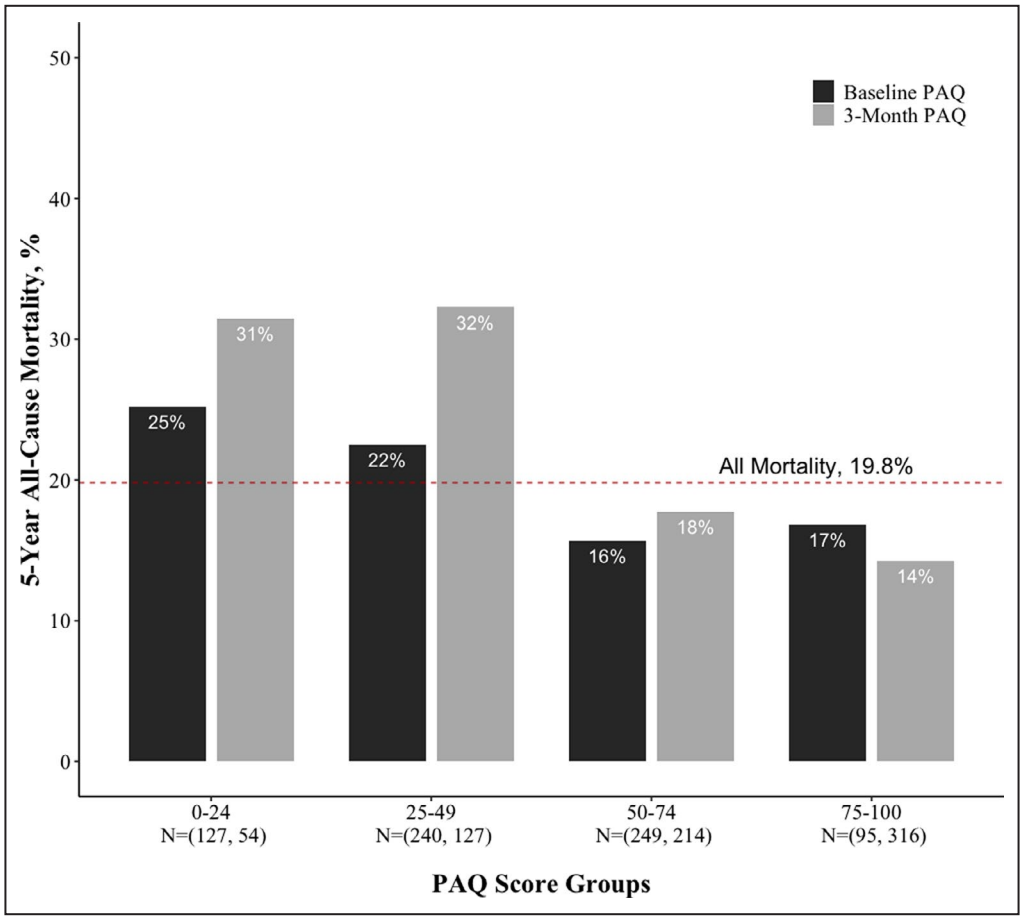

Figure 2. Mortality rates by ranges of Peripheral Artery Questionnaire (PAQ) summary score.
Red dash line indicates total 5-year all-cause mortality.

such as heart failure.[26] These findings advocate for the routine and repeated monitoring of PAD-specific health status in the clinical setting, which may become more feasible with the expanding use of patient portals in electronic health records and other evolving strategies for routine PRO collection. This direct integration of serial collected health status data in the PAD treatment pathway can potentially facilitate better patient-physician relationship, shared-decision making and subsequently improve outcomes.[27] These potential clinical benefits warrant future study to better understand the longitudinal and routine health status assessment in patients with PAD.[28]

Limitations

These analyses should be considered in the context of the following potential limitations. First, PORTRAIT study included 10 PAD specialty clinics in the US and may not be representative of all PAD patients in other clinics that were not included in the present study. Second, our analyses were inclusive to only US patients, and these findings will need to be replicated for other countries. However, we do not expect our associations would be dissimilar across other geographical regions. Third, we excluded patients with missing baseline and 3-month health assessments in the analytic cohort. Table S1 shows the standardized differences of the baseline characteristics by missing health status. While there were imbalances for some variables, these variables were included in the fully adjusted mortality model, mitigating the risk of bias associated with these observed factors. Fourth, there may be the potential for unmeasured confounding, including the impact of interventions that may result in better health status and lower risk of mortality (eg, exercise therapy, stress management, other lifestyle changes) that were not accounted for. Future research will have to further examine mechanisms and potential interventions that may both impact health status and improve survival. Future research also needs to examine whether more complex analyses of sequential health status trajectories may continue to improve upon their prognostic value. However, the simplicity of focusing on the initial assessment with subsequent follow-up is likely more clinically useful and actionable than the incremental value of more complex longitudinal analyses.

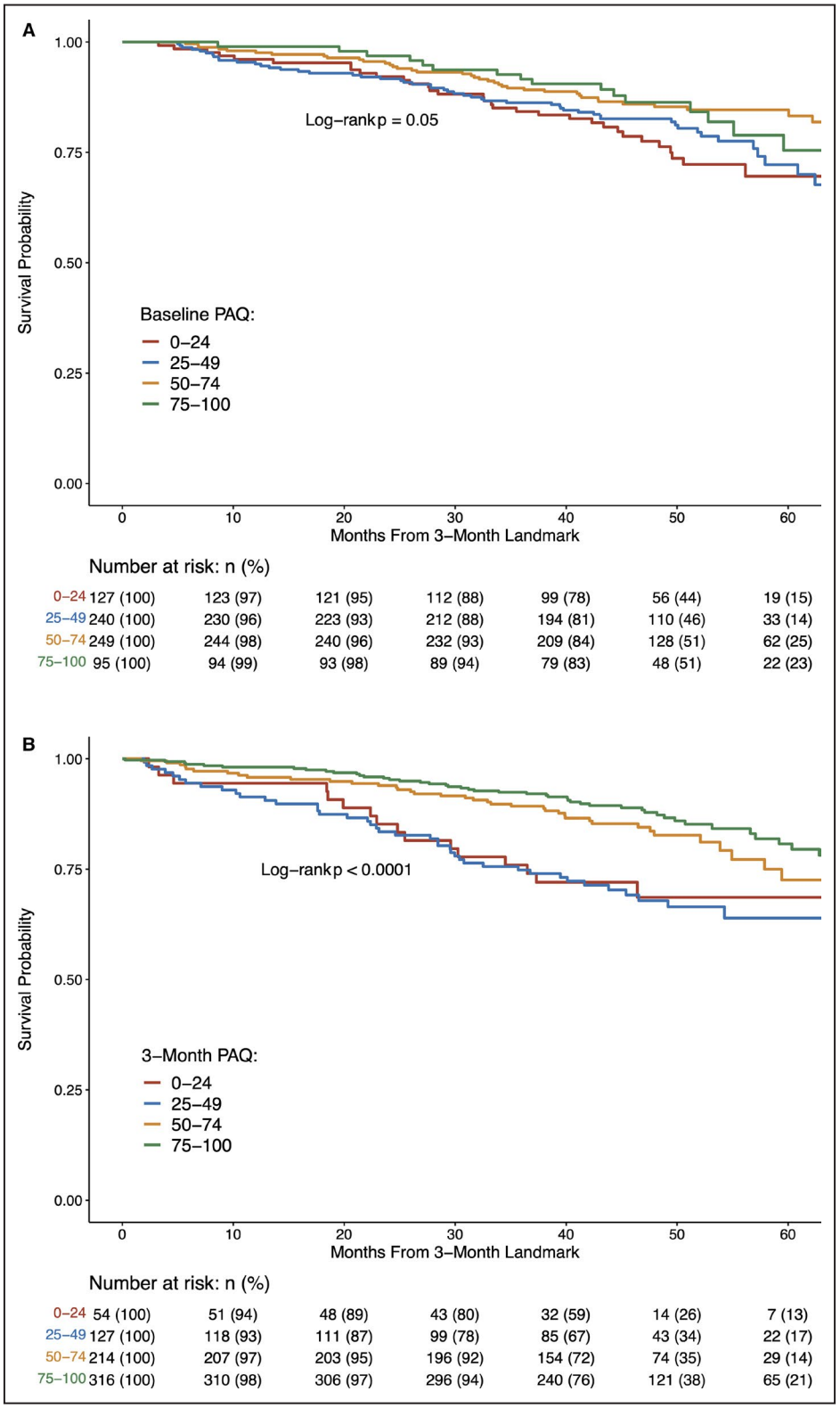

Figure 3. Kaplan-Meier survival curves by ranges of Peripheral Artery Questionnaire (PAQ) summary score at baseline and 3-month.
The 5-year Kaplan-Meier probability estimate (95% confidence interval) of survival stratified by PAQ groups (0–24, 25–49, 50–74 and 75–100) at (**A**) baseline is 69.6% (60.5–80.1), 72.2% (64.5–80.8), 84.6% (80.1–89.5), and 75.5% (64.3–88.5) and (**B**) 3-month is 68.6% (56.6–83.2), 63.9% (54.9–74.4), 72.6% (63.4–83.0), and 80.7% (74.9–87.0), respectively.

Table 2. Association of PAQ Summary Score With 5-Year All-Cause Mortality

PAQ models	Unadjusted analysis			Adjusted analysis		
	HR (95% CI)	AIC	*P* value	HR (95% CI)	AIC	*P* value
Baseline	0.90 (0.84–0.97)	1754.91	0.008	0.84 (0.77–0.92)	1684.07	<0.001
3-mo	0.87 (0.82–0.93)	1743.32	<0.001	0.82 (0.77–0.88)	1670.95	<0.001
Change	0.92 (0.85–099)	1756.62	0.0210	0.91 (0.84–0.99)	1694.24	0.030
Baseline and 3-mo						
Baseline	0.99 (0.90–1.08)	1745.23	0.770	0.93 (0.84–1.03)	1670.98	0.161
3-mo	0.88 (0.81–0.95)	…	<0.001	0.85 (0.78–0.92)	…	<0.001
Change and 3-mo						
Change	1.01 (0.92–1.11)	1745.23	0.770	1.08 (0.97–1.19)	1670.98	0.161
3-mo	0.86 (0.80–0.93)	…	<0.001	0.79 (0.94–1.00)	…	<0.001

Hierarchical Cox proportional hazards regression models in unadjusted (without covariates) and adjusted (with covariates) analysis. Hazard ratios (HRs) for baseline and 3-month PAQ are scaled per 10 points. Hazard ratio for change in PAQ is per 10-point change from baseline to 3-month visit. Hazard ratios <1 suggested lower all-cause death and HR >1 suggested higher all-cause death. AIC indicates akaike information criterion; and PAQ, Peripheral Artery Questionnaire.

CONCLUSIONS

In a large, multicenter, contemporary cohort study of patients presenting with new or worsening claudication, PAD-specific health status was found to be independently associated with 5-year survival, with the most recent assessment being most prognostic. These results support routine, longitudinal monitoring of health status for updated risk estimation. Future work is needed to better implement such strategies to improve outcomes in patient care.

ARTICLE INFORMATION

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Affiliations

Department of Medicine, University of California Irvine School of Medicine, Orange, CA (A.T.T.); Cardiovascular Research, Saint Luke's Mid America Heart Institute, Kansas City, MO (J.A.S., P.G.J., D.M.S., A.O.M., P.A.P.); Department of Biomedical and Health Informatics of Medicine, University of Missouri–Kansas City, Kansas City, MO (J.A.S., P.G.J., D.M.S., A.O.M., P.A.P.); Vascular Medicine Outcomes Program, Section of Cardiovascular Medicine, Department of Internal Medicine (C.I.M., K.G.S.) and Department of Psychiatry, School of Medicine, Yale University, New Haven, CT; Department of Medicine, Alpert Medical School of Brown University, Providence, RI (H.D.A.); Interventional Cardiovascular Center, Case Western Reserve University School of Medicine, Cleveland, OH (M.H.S.); The Queen Elizabeth Hospital, Adelaide Medical School, University of Adelaide, SA, Australia (C.L.); and Department of Psychiatry, School of Medicine, Yale University, New Haven, CT (K.G.S.).

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Supplementary Material

Table S1
Figure S1

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SUPPLEMENTAL MATERIAL

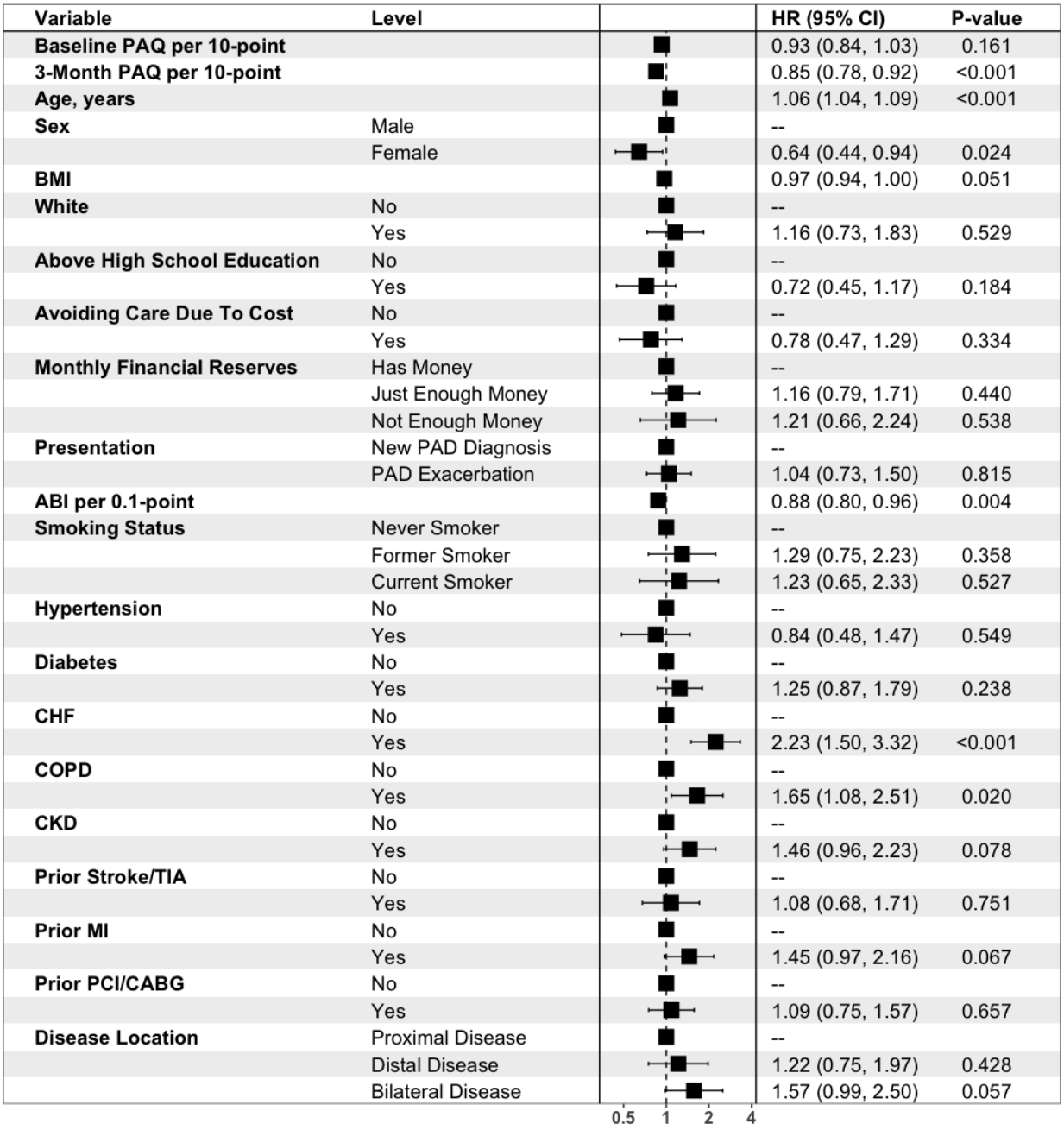
Table S1. Baseline Characteristics by Missing Health Status.

	Not Missing N=711	**Missing** N=86	**Standardized Difference***
Age, years	68.754 ± 9.59	67.21 ± 10.45	0.154
Female	291 (40.9)	43 (50)	0.183
Body Mass Index, kg/m^2	29.42 ± 6.31	29.57 ± 5.76	0.025
Race/Ethnicity			0.112
White	517 (72.7)	60 (69.8)	
Black	160 (22.5)	23 (26.7)	
Other	34 (4.8)	3 (3.5)	
Above High School Education	610 (85.8)	67 (77.9)	0.183
Avoiding Care Due to Cost	114 (16)	16 (18.6)	0.070
Monthly Financial Reserves			0.091
Has Money	364 (51.2)	42 (48.8)	
Just Enough Money	262 (36.8)	29 (33.7)	
Not Enough Money	81 (11.4)	12 (14.0)	
Presentation: PAD Exacerbation	424 (59.6)	53 (61.6)	0.041
Ankle Brachial Index	0.67 ± 0.19	0.67 ± 0.19	0.014
Smoking Status			0.243
Never Smoker	90 (12.7)	14 (16.3)	
Former Smoker	412 (57.9)	39 (45.3)	
Current Smoker	209 (29.4)	32 (37.2)	
Hypertension	635 (89.3)	71 (82.6)	0.195
Diabetes Mellitus	269 (37.8)	36 (41.9)	0.082
Congestive Heart Failure	101 (14.2)	14 (16.3)	0.058
COPD	111 (15.6)	16 (18.6)	0.080
Chronic Kidney Disease	106 (14.9)	15 (17.4)	0.069
Prior Stroke/TIA	87 (12.2)	6 (7.0)	0.179
Prior MI	156 (21.9)	20 (23.3)	0.031
Prior PCI/CABG	324 (45.6)	34 (39.5)	0.122
Disease Location			0.180
Proximal Disease	169 (23.8)	21 (24.4)	
Distal Disease	278 (39.1)	39 (45.3)	

Bilateral Disease	259 (36.4)	24 (27.9)	

Values are mean ± SD or n (%). *The standardized difference compares the difference in means or proportions in units of the pooled standard deviation; a standardized difference greater than 0.1 is suggestive of imbalance between groups. Abbreviation: CABG, coronary artery bypass grafting; COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; PAD, peripheral artery disease; PAQ, Peripheral Artery Questionnaire, PCI, percutaneous coronary intervention; TIA, transient ischemic attack.

Figure S1. Hierarchical Cox Proportional Hazards Regression Model of Baseline and 3-Month PAQ with Long-Term Mortality, Adjusted.



Variable	Level	HR (95% CI)	P-value
Baseline PAQ per 10-point		0.93 (0.84, 1.03)	0.161
3-Month PAQ per 10-point		0.85 (0.78, 0.92)	<0.001
Age, years		1.06 (1.04, 1.09)	<0.001
Sex	Male	--	
	Female	0.64 (0.44, 0.94)	0.024
BMI		0.97 (0.94, 1.00)	0.051
White	No	--	
	Yes	1.16 (0.73, 1.83)	0.529
Above High School Education	No	--	
	Yes	0.72 (0.45, 1.17)	0.184
Avoiding Care Due To Cost	No	--	
	Yes	0.78 (0.47, 1.29)	0.334
Monthly Financial Reserves	Has Money	--	
	Just Enough Money	1.16 (0.79, 1.71)	0.440
	Not Enough Money	1.21 (0.66, 2.24)	0.538
Presentation	New PAD Diagnosis	--	
	PAD Exacerbation	1.04 (0.73, 1.50)	0.815
ABI per 0.1-point		0.88 (0.80, 0.96)	0.004
Smoking Status	Never Smoker	--	
	Former Smoker	1.29 (0.75, 2.23)	0.358
	Current Smoker	1.23 (0.65, 2.33)	0.527
Hypertension	No	--	
	Yes	0.84 (0.48, 1.47)	0.549
Diabetes	No	--	
	Yes	1.25 (0.87, 1.79)	0.238
CHF	No	--	
	Yes	2.23 (1.50, 3.32)	<0.001
COPD	No	--	
	Yes	1.65 (1.08, 2.51)	0.020
CKD	No	--	
	Yes	1.46 (0.96, 2.23)	0.078
Prior Stroke/TIA	No	--	
	Yes	1.08 (0.68, 1.71)	0.751
Prior MI	No	--	
	Yes	1.45 (0.97, 2.16)	0.067
Prior PCI/CABG	No	--	
	Yes	1.09 (0.75, 1.57)	0.657
Disease Location	Proximal Disease	--	
	Distal Disease	1.22 (0.75, 1.97)	0.428
	Bilateral Disease	1.57 (0.99, 2.50)	0.057

Hazard ratios (HRs) for baseline and three-month PAQ are scaled per 10 points. Hazard ratio for change in PAQ is per 10-point change from baseline to 3-month visit. Hazard ratios less than 1 suggested lower all-cause death and HR greater than 1 suggested higher all-cause death. Number of sites=10. CABG indicates coronary artery bypass grafting; COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; PAD, peripheral artery disease; PAQ, Peripheral Artery Questionnaire; PCI, percutaneous coronary intervention; TIA, transient ischemic attack.