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Limited Adherence to Peripheral Arterial Disease Guidelines and Suboptimal Ankle Brachial Index Reliability in Dutch Primary Care

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WHAT THIS PAPER ADDS

The Dutch College of General Practitioners' guideline on peripheral arterial disease (PAD) provides univocal recommendations regarding the management of PAD. General practitioners (GPs) are advised to measure the ankle brachial index (ABI), prescribe antiplatelet drugs and statins, and initiate supervised exercise therapy in patients with intermittent claudication. This study shows that Dutch GPs still have difficulty in adhering to their own society's PAD guideline, resulting in suboptimal care for this fragile patient population. Assuming that ABI values obtained in the hospital's vascular laboratory are gold standard, values in primary care varied substantially. Collaboration between primary and secondary care regarding PAD requires optimisation.

Objective/Background: The Dutch College of General Practitioners' guideline on peripheral arterial disease (PAD) provides clear recommendations on the management of PAD. An ankle brachial index (ABI) measurement, prescription of antiplatelet drugs and statins, and supervised exercise therapy (SET) for intermittent claudication (IC) are advised. The aims of this study were to determine the adherence of general practitioners (GPs) to their own guideline on PAD and to evaluate the reliability of primary care ABI measurements.

Methods: This was a cross-sectional study. All patients suspected of having symptomatic PAD who were referred by GPs to a large hospital in 2015 were evaluated regarding three of the guideline criteria: (i) ABI measurement; (ii) prescription of secondary prevention; (iii) initiation of SET. ABI values obtained in primary care and the hospital's vascular laboratory were compared using correlation coefficients and regression analysis. An abnormal ABI was defined as a value $<.9$ (normal ABI $\geq .9$).

Results: Of 308 potential patients with new onset PAD, 58% ($n = 178$) had undergone ABI measurement prior to referral. A modest correlation between ABI values obtained in primary care and the vascular laboratory was found ($r = .63$, $p < .001$). Furthermore, a moderate reliability was calculated (intraclass correlation coefficient 0.60, 95% confidence interval 0.49–0.69, $p < .001$). Of the new patients with an abnormal ABI, 59% used antiplatelet drugs and 55% used statins. A referral for SET was initiated by a GP in 10% of new PAD patients with IC symptoms.

Conclusions: Adherence by Dutch GPs to their own society's PAD guideline has room for improvement. The reliability of ABI measurements is suboptimal, whereas rates of prescription of secondary prevention and initiation of SET as primary treatment for IC need upgrading.

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INTRODUCTION

General practitioners (GPs) play a key role in the management of peripheral arterial disease (PAD). The Dutch College of General Practitioners' guideline on PAD is in line with the recently published guidelines on the diagnosis and treatment of PAD by the European Society of Cardiology and

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European Society for Vascular Surgery.[1,2] Recommendations are provided for an adequate diagnostic approach with an ankle brachial index (ABI) measurement.[1] If abnormal, supervised exercise therapy (SET) is the primary treatment for intermittent claudication (IC). Smoking is discouraged and other cardiovascular risk factors are identified and treated, when necessary. Antiplatelet drugs and statins are also prescribed as part of cardiovascular risk management (CVRM).[3] Furthermore, the guideline provides recommendations on when to refer a patient to a vascular surgeon.[1] Consultation with a vascular surgeon is indicated for critical limb ischaemia or insufficient symptomatic relief after maximal non-invasive treatment.

An ABI is pivotal in the diagnosis of PAD in primary, as well as secondary care. An ABI $<$ .9 indicates the presence of PAD in symptomatic, as well as asymptomatic patients. In addition, lowered ABIs reflect the presence of generalised atherosclerotic disease and its associated increased cardiovascular risk.[4] This non-invasive and inexpensive ABI measurement has optimal positive and negative predictive characteristics if performed by well trained professionals.[5,6] However, reproducibility depends on training and the experience of the operator, which may be difficult in a primary care practice. Given the importance of ABI as a diagnostic tool, as well as a predictor of cardiovascular morbidity and mortality, accurate baseline determination of the ABI is crucial.

The aims of this study were to determine the adherence of GPs to their own guideline on PAD regarding ABI measurement, prescription of antiplatelet drugs and statins, and initiation of SET in patients with IC, as well as to evaluate the reliability of ABI measurements performed in primary care.

METHODS

Setting and participants

All patients who were referred by GPs to the vascular surgery outpatient clinic of the Catharina Hospital in Eindhoven, the Netherlands, between 1 January and 31 December 2015, were identified from the hospital's electronic health record. To be eligible for inclusion in this cross-sectional study, patients had to be referred because of suspected symptomatic PAD, as documented in the referral letter. The study was approved by the medical ethical committee of the Catharina Hospital and reported according to the STROBE guidelines.[7] GPs were not informed of the study as it was thought that doing so would have biased the results.

Adherence to the national PAD guideline

After patients presented at the vascular surgery outpatient clinic, two authors (D.H. and N.P.) independently screened the referral letter, accompanying medication list, entries in the electronic health record, and possible previous ABI reports of the hospital's vascular laboratory. When necessary, additional information was obtained from these patients by a telephone call. A standardised data collection form was used for data extraction and disagreements were resolved by discussion.

Patients were evaluated regarding the three criteria as recommended in the Dutch College of General Practitioners' guideline on PAD.[1] First, it was determined whether the patient had undergone an ABI measurement prior to referral. Second, it was checked whether the patient received CVRM medication prescriptions. Third, it was determined whether SET had been initiated if patients were having IC symptoms. Each of the three guideline criteria was registered as being present or absent. Only patients suspected of new onset PAD were included in these analyses to reduce potential bias.

ABI measurements

In each patient, ABI measurements were repeated in the vascular laboratory. Following a 15 min rest period, systolic blood pressures (SBPs) of the brachial and ankle arteries (dorsal pedal and posterior tibial) were determined in a supine position with vascular laboratory equipment (ELCAT vasolab 320; ELCAT Medical Systems, Wolfratshausen, Germany) by a trained vascular technician. Brachial and ankle pressures were measured with sphygmomanometer cuffs, which were automatically inflated and deflated by pushing a button. SBP cutoff points of all arteries were defined as the systolic upstroke of the first arterial waveform. At the first characteristic arterial sound and at the simultaneous appearance of the first arterial waveform, the monitor screen was frozen and the SBP cutoff point was defined by precise retrospective positioning of an adjustable marker line. Brachial pressures were measured bilaterally. Ankle pressures were determined with cuffs placed proximal to the malleoli. The ABI was calculated in each leg by dividing the highest systolic ankle pressure (either posterior tibial or dorsal pedal) by the highest systolic brachial pressure of both arms.[2,8–10] An abnormal ABI was defined as a value $<$ .9 (normal ABI $\geq$ .9).[10,11] The leg with the lowest ABI measurement as determined in primary care was used for comparison.

Statistical analysis

Rates of ABI measurement, prescription of CVRM medication, and referral for SET were assessed using descriptive statistics. Potential differences between ABI measurements in primary care and the vascular laboratory were assessed using a paired samples *t* test. A Pearson's correlation coefficient (*r*) compared both ABI values. Overall reliability was assessed by means of an intraclass correlation coefficient (ICC) with 95% confidence intervals (CIs). A correlation coefficient was considered strong if $\geq$ .7, moderate if between .3 and .7, and weak if $\leq$ .3. Variability between the two ABI measurements was demonstrated by means of the coefficient of variation (CV). To this end, the average of, and the difference between, the two ABI measurements were calculated for each patient. Because of a nonparametric distribution of the differences between the two

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