

## **TITLE PAGE**

### **A cross sectional survey of secondary prevention measures in patients with peripheral arterial disease in primary care.**

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#### **Keywords**

Peripheral arterial disease, cardiovascular disease, primary care, secondary prevention.

**Word count** 2174 (excluding title page, refs, figs, tables)

## **ABSTRACT**

### **Background:**

The National Service Framework for Coronary Heart Disease defines standards for the secondary prevention of cardiovascular disease in at risk individuals, including those with peripheral arterial disease. This cross-sectional survey aimed to assess current standards of secondary prevention and health monitoring in patients with peripheral arterial disease following a vascular procedure, and additionally compare care in patients with and without diagnosed coronary heart disease.

### **Methods:**

Indicators for this survey were identified from national recommendations and evidence. A retrospective review was conducted of GP records, for patients who were treated in hospital for peripheral arterial disease.

### **Results:**

Data were collected for 103 patients from 42 practices. Overall, prescribing was well achieved for antiplatelets but poor for statins. Standards of assessment of blood pressure, smoking status, and smoking cessation advice were high. However, approximately only half of patients received advice about exercise or had their body mass index checked. Furthermore, for all indicators, standards of care for patients who additionally had a diagnosis of coronary heart disease, were better than for patients without coronary heart disease.

### **Conclusion:**

The cross-sectional survey suggested the treatment received by some patients with established peripheral arterial disease is substandard. There is considerable potential to increase secondary prevention of coronary heart disease in patients with peripheral arterial disease in primary care.

## INTRODUCTION

The National Service Framework (NSF) for Coronary Heart Disease (CHD)<sup>1</sup> published in 2000 defines national standards for the application of appropriate secondary prevention measures to those at risk of cardiovascular disease, including those with peripheral arterial disease (PAD). Symptoms of coronary artery disease or electrocardiographic abnormality are found in half of patients presenting with PAD, and coronary angiography abnormalities and duplex evidence of carotid artery disease have been found in 90% and 40% respectively.<sup>2</sup> Furthermore, PAD has been found to be an independent predictor of increased risk of cardiovascular death. In patients with symptomatic PAD there is a 30% risk of death within 5 years and nearly 50% within 10 years, primarily due to myocardial infarction (MI) (60%) or stroke (12%).<sup>2</sup> An aggressive approach is therefore required to modify risk factors to reduce the risk of fatal and non-fatal MI and stroke in patients with PAD.<sup>2</sup>

Currently the management of patients with established CHD is substandard,<sup>3,4</sup> and even when recommendations are implemented there is much variation in the care that patients receive.<sup>5</sup> Secondary prevention strategies in patients with PAD are likely to be worse than for patients with CHD. For example, a recent study focusing on cholesterol management in general practice showed that patients with stroke or PAD achieved poorer cholesterol control than those with CHD. In this study approximately 50% of patients with PAD and 43% with a stroke had cholesterol levels <5mmol/l compared to 60% of patients with CHD.<sup>6</sup>

The objectives of this survey were:

- To assess current standards of secondary prevention measures and health monitoring in patients with PAD following a vascular procedure.
- To compare standards of secondary prevention in patients with PAD with and without diagnosed CHD.

## **METHODS**

### **Design**

The survey was designed as a retrospective record review of GP held medical records (paper and electronic). Evidence based indicators for the study were identified from national recommendations and evidence,<sup>1,2,7-12</sup> (Table 1). A structured data collection form was designed to collect data for each indicator and relevant supplementary information.

The six primary care trusts (PCTs) in Leicestershire were approached and asked if they were willing to participate in the multi-practice survey. Three PCTs agreed to participate and a letter of invitation was then sent to all 87 general practices identified in the 3 PCTs at that time. Practices who failed to respond were sent a second letter. If no reply was received after the second letter a follow up telephone call was made to the practices.

Patients whose records were eligible for the survey were identified from Strategic Health Authority records as having undergone a vascular procedure in 2003 for PAD (amputation, arterial grafting, endarectomy, or balloon angioplasty) in the year 1<sup>st</sup> January 2003 to 31<sup>st</sup> December 2003 inclusive. The study population included all patients admitted/discharged from two of the University Hospitals of Leicester (Leicester Royal Infirmary, Leicester General Hospital) with a diagnosis of PAD, and registered with a GP in the six PCTs in Leicestershire. Exceptions were: patients who had more than one procedure for PAD in the year reviewed (data were collected for the last admission only); patients who died at any time between date of procedure and date of survey; patients who had left their registered GP since the procedure.

A research associate collected data for patients in the recruited practices between September 2005 and March 2006. Data collected were entered into a database and basic statistical analysis undertaken using Excel and SPSS to measure standards of care.

This cross sectional survey was carried out as part of a local quality assurance programme between primary and secondary care. As such it constituted the first stage of a planned audit conducted to identify and compare levels of care, therefore, statistical significance was not sought in our analysis of the data collected. Additionally, the survey did not require ethics committee approval.

**Table 1: Standards achieved for evidence based indicators**

<b>Evidence based indicator</b>	<b>All patients, n = 103* ( %; PCT % range)</b>	<b>Patients with diagnosed CHD, n = 39* (%)</b>	<b>Patients with NO diagnosed CHD, n = 64* (%)</b>
The patient record shows that:			
1: Aspirin or clopidogrel is currently prescribed unless contraindicated	81/92 ( 88.0; 84 to 94 )	35/35 (100)	46/57 (80.7)
2a: Cholesterol level has been checked in the past 12 months	73 <sup>†</sup> ( 70.9; 67 to 83 )	33 <sup>†</sup> /39 (84.6)	40/64 (62.5)
2b: Cholesterol level is ≤5mmol/l	54/72 <sup>‡</sup> ( 75.0; 72 to 80 )	28/32 <sup>‡</sup> (87.5)	26/40 (65.0)
2c: A statin is currently prescribed if cholesterol level was >5mmol/l, unless contraindicated	8/15 <sup>§</sup> ( 53.3; 25 to 100 )	4/4 (100)	4/11 (36.4)
3a: Blood pressure has been checked in the past 12 months	90 ( 87.4; 83 to 89 )	39/39 (100)	51/64 (79.7)
3b: Blood pressure is <140/85mmHg	43/90 ( 47.8; 41 to 53 )	19/39 (48.7)	24/51 (47.1)
4a: Smoking status has been checked in the past 12 months	85 ( 82.5; 78 to 88 )	38/39 (97.4)	47/64 (73.4)
4b: Cessation advice/ health education was given if patient was a smoker	21/22 ( 95.5; 90 to 100 )	8/8 (100)	13/14 (92.9)
5: Exercise advice re: walking given in the past 12 months, unless contraindicated	47/84 <sup>  </sup> ( 56.0; 46 to 75 )	27/35 (77.1)	20/49 (40.8)
6: BMI has been checked in the past 12 months, unless contraindicated	46/92 <sup>¶</sup> ( 50.0; 43 to 56 )	26/37 (70.3)	20/55 (36.4)

\* n is less when criterion is not applicable to all patients

<sup>†</sup> includes 1 patient who had cholesterol check carried out within 4 weeks of the survey but result (level) missing

<sup>‡</sup> cholesterol level not available for 1 patient who was checked

<sup>§</sup> statin contraindicated (3 patients)

<sup>||</sup> exercise advice (walking) contraindicated due to severe mobility problems (19 patients)

<sup>¶</sup> BMI contraindicated due to leg amputation(s) (11 patients)

## RESULTS

### Number of practices taking part and patient records reviewed

Three of the 6 PCTs agreed to participate and of the 87 practices in these 3 PCTs, 53 had eligible patients (see Figure 1). Of these, 42 (79%) agreed to take part in the survey. In total, 137 eligible patients were identified and data were collected for 103 (75%). The median number of patient records reviewed per practice was 2 (range 1 to 7).

### Practice characteristics

A higher proportion of practices who participated were teaching practices and group practices compared to those who declined to take part, (see Table 2). Teaching practices represented 18% of eligible practices who did not agree, compared to 43% of practices where data were collected. Group practices represented 64% of eligible practices who did not agree, compared to 83% of practices where data were collected.

**Table 2: Characteristics of practices in 3 participating PCTs**

Characteristics of practices:	All practices (n=87)	Practices with eligible pt records (n =53)	Practices with eligible pt records who did not agree ( n = 11)	Practices where audit data were collected (n = 42)
<u>Training status: n (%)</u>				
<b>Teaching practice</b>	21 (24.1)	20 (37.7)	2 (18.2)	18 (42.9)
<b>Non-teaching practice</b>	66 (75.9)	33 (62.3)	9 (81.8)	24 (57.1)
<u>Number of GPs: n (%)</u>				
<b>Group practice</b>	62 (71.3)	42 (79.2)	7 (63.6)	35 (83.3)
<b>Single-handed</b>	25 (28.7)	11 (20.8)	4 (36.4)	7 (16.7)

### Patient characteristics

Characteristics of patients in our sample are shown in Table 3. A higher proportion of patients whose records were reviewed was male (62%) than female (38%). The mean age for all patients was 73 years (standard deviation (SD) 11.0), however, females were on average older than males (mean age 77 years (SD 11.0) for females, and 70 years (SD 10.0) for males). The mean number of months since the procedure was carried out for PAD was 29 (SD 3.6).

**Table 3: Characteristics of patients whose records were reviewed**

<b>Variables</b>	<b>All patients <i>n</i> = 103*</b>
<u>Age in years:</u>	
<b>All patients, mean (s.d.)</b>	73 (11.0)
<b>Female, mean (s.d.)</b>	77 (11.0)
<b>Male, mean (s.d.)</b>	70 (10.0)
<u>Gender:</u>	
<b>Female, <i>n</i> (%)</b>	39 (37.9)
<b>Male, <i>n</i> (%)</b>	64 (62.1)
<u>Co-morbidity, past medical history of, <i>n</i> (%):</u>	
<b>Hypertension</b>	71 (68.9)
<b>Atrial Fibrillation</b>	12 (11.7)
<b>Angina</b>	32 (31.1)
<b>MI</b>	19 (18.4)
<b>Stroke / CVA / TIA</b>	23 (22.3)
<b>Cardiovascular disease (stroke, angina or MI)</b>	51 (49.5)
<b>Diabetes, Type 1</b>	3 (2.9)
<b>Diabetes, Type 2</b>	27 (26.2)
<b>History of smoking, ever*</b>	70/89* (78.7)
<u>Vascular symptoms prior to procedure, <i>n</i> (%):</u>	
<b>Intermittent claudication</b>	75 (72.8)
<b>Ischaemic rest pain</b>	38 (36.9)
<b>Arterial ulceration</b>	34 (33.0)
<b>Arterial gangrene</b>	9 (8.7)
<b>Ischaemic rest pain, or arterial ulceration or gangrene</b>	54 (52.4)
<b>Months since vascular procedure, mean (s.d.)</b>	29 ( 3.6 )
<b>Previous vascular procedure<sup>†</sup>, <i>n</i> (%)</b>	48/101 <sup>†</sup> (47.5)
* data available for 89 patients only	
† data available for 101 patients only	

Overall 69% of patients had a history of hypertension, and 50% of patients had cardiovascular disease (diagnosed with one or more of stroke, angina, or MI). In addition, although only 26% of patients were current smokers, 79% of patients had a history of smoking ever (current smoker or ex-smoker).

### **Current standards of practice**

Table 1 shows current standards of practice for our survey sample.

#### **Secondary prevention - prescribing:**

Prescription rates of medication for secondary prevention measures were well achieved for aspirin or clopidogrel (88%) but much lower for statins (68% for all patients, and 53% currently for patients with cholesterol >5mmol/l).

#### **Health monitoring and prevention in the preceding 12 months:**

Annual blood pressure monitoring (87%), smoking status check (83%), and cessation advice to current smokers (96%) were all well achieved. The proportion of patients who had a cholesterol check was less well achieved (71%) and the percentages of patients who had their BMI checked (50%) or whose records indicated that they had received exercise (walking) advice (56%) were even lower.

#### **Intermediate outcomes of care:**

Cholesterol level  $\leq 5$ mmol/l was achieved for 75% of patients but blood pressure <140/85mmHg was achieved for only 48%. However, 85% of patients with a blood pressure  $\geq 140/85$  mmHg were currently prescribed antihypertensive medication.

### **Standards of secondary prevention in patients with PAD and diagnosed CHD compared to PAD patients with no diagnosed CHD**

Standards of care for patients who had undergone a recent procedure for PAD and additionally had a diagnosis of CHD, were better than for patients who had PAD without diagnosed CHD, for all indicators (see Table 1). Blood pressure control showed only a very marginal difference (49% in patients with CHD and 47% in patients with no CHD). However, statin prescribing, exercise advice and assessment of BMI showed very noticeable differences between patients with PAD with and without diagnosed CHD (statin if total cholesterol >5mmol/l 100% vs. 36%, exercise advice 77% vs. 41%, BMI check 73% vs. 40%).

## **DISCUSSION**

### **Summary of main findings**

This cross sectional survey suggests that standards of secondary prevention measures in patients with symptomatic PAD recently discharged from secondary care following a vascular procedure are suboptimal. Additionally, in our sample, standards of secondary prevention in patients with PAD without a diagnosis of CHD were much poorer than for patients with both diagnoses. This is in spite of PAD being an independent risk factor for fatal and non fatal MI.

### **Strengths and limitations**

It is acknowledged that our results may not be a true reflection of secondary prevention in all practices as only 53 (61%) of the 87 practices in the 3 participating PCTs were eligible to take part in the survey. However, the other 34 practices did not have any patients who were discharged following a vascular procedure for PAD in 2003, and overall we collected data for 75% of eligible patients. There were some differences in the characteristics of eligible practices who did not agree to the survey compared to those that participated, in terms of teaching status and the proportion of practices that were single handed (Table 2). However, these differences are unlikely to have had a substantial impact as the differences were not statistically significant.

The small number of patient records reviewed at some practices may limit the representativeness of the findings. As patient records were reviewed approximately 2 years following admission there was some loss of cases due to deaths or patients having left the practice where they were registered at the time of their vascular procedure.

### **Comparison with other studies**

Our sample was small compared to a recent audit of cholesterol management in cardiovascular disease in English general practices,<sup>6</sup> which included a subset of 3,617 patients with PAD. In the latter study 50% of patients with PAD had a cholesterol level  $\leq 5\text{mmol/l}$  compared to 75% of patients in our survey. However, our survey considered only PAD patients who had undergone a recent vascular procedure and were therefore of higher risk, whereas the cholesterol management audit collected data on all patients with a diagnosis of PAD. A study conducted in secondary care in the USA<sup>13</sup> which looked at a similar group of patients to our survey, also found that patients received sub-optimal treatment following discharge after undergoing a vascular procedure.

Compared to aggregated 2005/2006 CHD Quality and Outcomes Framework (QoF) data for smoking, BP and cholesterol indicators in patients with established CHD,<sup>14</sup> care for patients with PAD whose records we reviewed was substandard. The proportion of patients who had BP, cholesterol, and smoking status checks when records were reviewed were 87% for BP, 71% for cholesterol, and 83% for smoking status compared to 98%, 93%, and 96% respectively for the QoF CHD data. However, our survey considered care in the previous 12 months whereas QoF data looks at a 15 month period. Although the proportions achieving total cholesterol levels  $\leq 5$  mmol/l were very similar (75% in this study vs. 79% for QoF data), BP targets were very poorly achieved (48% for patients with PAD vs. 87% QoF). However, BP targets in our study were lower than the QoF targets ( $<140/85$  and  $\leq 150/90$  respectively). Standards of care for patients with PAD who additionally had a diagnosis of CHD were similar to the QoF CHD data, with the exception of blood pressure control.

The recently published Scottish Intercollegiate Guidelines Network (SIGN) guidelines on the Diagnosis and management of peripheral arterial disease<sup>15</sup> include guidance on secondary prevention of cardiovascular events. Indicators that were utilized in this survey are similar to the SIGN recommendations (smoking cessation, cholesterol lowering, BP control, antiplatelet therapy). However, tighter control of cholesterol is recommended by SIGN,  $\leq 3.5$  mmol/l compared to  $\leq 5.0$  mmol/l in this survey.

## **CONCLUSION**

In spite of national and international recommendations and strong evidence of an increased risk of death due to cardiovascular disease, currently the treatment received by some patients with established PAD is substandard. There is considerable potential to increase secondary prevention of CHD in patients with PAD, using appropriate evidence based management. More attention needs to be given to this group of patients in primary care in order to improve secondary prevention.

## **ACKNOWLEDGEMENTS**

We would like to thank all the General Practices who participated in this survey, and the Clinical Governance Leads. We wish to thank all staff at the Leicestershire PCAG for their assistance and acknowledge the contribution made by Champa Patel at the planning stage and in assisting with recruitment of PCTs. We would also like to acknowledge the contribution made by Hanna Blackledge in helping identify patient records to be reviewed.

## **FUNDING**

The Leicestershire Interface Audit Group provided the funding for this cross-sectional survey.

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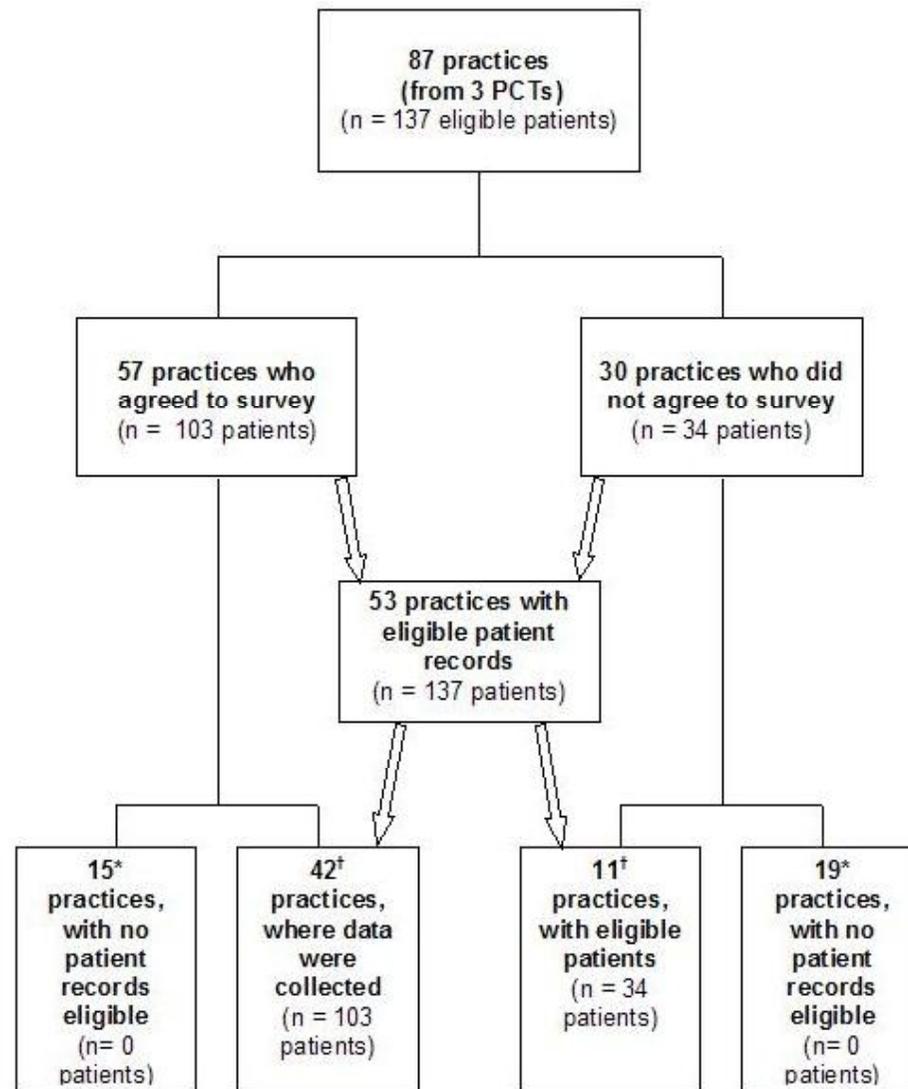
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Figure 1: Practices and patients included in the cross-sectional survey



\* No patients registered at practice at time of audit who had a procedure in 2003 for PAD.

† Total number of eligible practices = 42 + 11 = 53.