

## Completing the Audit Cycle: Comparison of Cardiac Risk Factor Management in Patients with Intermittent Claudication in Two Time Periods

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**Aim.** The first line treatment of patients with intermittent claudication (IC) is to prolong life via cardiac risk factor management. We aimed to compare current standards of secondary prevention with those in a previously published audit.

**Methods.** Risk factor data was prospectively collated on 304 consecutive new referrals attending the claudication clinic over a 1-year period (2004/2005) and compared to the 104 patients assessed in 2000.

**Results.** In 2004/5 30% (n = 91) of patients did not have a diagnosis of IC confirmed (p < 0.01). The use of antiplatelet therapy remained static at 73%. Statin therapy increased in 2004/5 (62% versus 38%, p < 0.01) but blood pressure control remained poor with 65% failing to achieve the target levels. Smoking cessation therapy continues to be offered to a minority of patients and 17% of patients have previously undiagnosed diabetes in 2004/2005 (p-value 0.353). The number of patients who have been advised to increase physical activity significantly has fallen from 15% to 2% in the 2004/5 (p < 0.01).

**Conclusions.** Difficulties exist in diagnosing intermittent claudication in primary care and cardiac risk factor management continues to be sub-optimally managed.

**Keywords:** Intermittent claudication; Secondary prevention.

### Introduction

Intermittent claudication (IC) is a common and potentially disabling disorder, which impairs quality of life and is a marker of significant underlying cardiovascular disease. In Western countries the incidence of intermittent claudication has been shown to range between 2% and 7% in middle aged populations. In the United Kingdom, the Edinburgh Artery Survey examined over 1500 subjects aged 55 to 74, of whom 4.5% had symptomatic claudication, and 8% had asymptomatic disease, defined as an ankle brachial pressure of less than 0.9.<sup>1</sup> Patients with intermittent claudication have been shown to have as high a risk of developing, or dying from, coronary heart disease as many patients surviving their first myocardial infarction (MI).<sup>2</sup> The Joint British recommendations on prevention of coronary heart disease in clinical practice, published in 1998, stated that patients with

peripheral vascular disease (PVD) should therefore be managed in the same way as those with established coronary heart disease.<sup>2</sup> More recent reviews and detailed guidelines from the American College of Cardiology/American Heart Association 2006<sup>3</sup> have also reinforced this important message.<sup>4,5</sup> Current guidelines state that all PVD patients should: be prescribed aspirin; be commenced on statin therapy providing their cholesterol level is above 3.5 mmol/l, be screened for the presence of diabetes, and undergo rigorous control of their blood pressure, with the aim of achieving a systolic less than 140 mmHg and diastolic less than 90 mmHg. For patients with diabetes the recommended target blood pressure is a systolic less than 130 mmHg and diastolic less than 80 mmHg. Patients should also receive lifestyle intervention measures aimed at discontinuing smoking and increasing aerobic exercise.

A previously published local audit, performed in 2000,<sup>6</sup> identified suboptimal management of all of these risk factors in new patients referred to the claudication clinic. Efforts were made to increase the awareness of this condition on a local level by

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providing feedback to general practitioners, along with invitations to talks held at primary care practices on the diagnosis, prognosis and need for risk factor management in patients with IC. This was aided by the publication of national guidelines by Burns *et al.* in the British Medical Journal.<sup>4</sup> In order to complete the audit loop and assess the effectiveness of this approach we aimed to perform a further prospective audit and to compare this data with the 2000 audit to see if any improvement had occurred.

**Methods**

Data was prospectively collated on 304 consecutive new referrals attending the claudication clinic over a one-year period (October 2004–September 2005) using a pre-defined datasheet. A full history was recorded, and the following risk factors were then assessed: dyslipidaemia, hypertension, diabetes, smoking and cessation therapy, level of exercise and use of antiplatelet therapy (Table 1). All patients underwent a clinical examination, which included measurement of blood pressure and ankle brachial pressure indices (ABPIs) performed by a fully accredited vascular technologist. Those patients with symptoms of claudication and an ABPI less than 0.9 were deemed to have peripheral vascular disease.<sup>7</sup> Patients with a history highly suggestive of intermittent claudication but with normal ABPIs underwent testing to measure ABPI after exercise. Those patients with an ABPI greater than 1.3 had toe pressures measured. Blood samples were taken from non-fasted patients for random glucose, total cholesterol, urea and electrolytes, liver function tests and full blood count. Patients with a random glucose of greater than 5.6 mmol/l had fasting blood glucose tests and an oral glucose tolerance test if necessary.

**Statistical Analysis**

Statistical analysis was performed using SPSS (Statistical Package for the Social sciences) version 14.0 for all tests. Continuously distributed variables are expressed as mean (standard deviations, SD) and comparisons were made with non-paired *t* tests. Categorical data were analysed with.<sup>2</sup> A probability value of *p* < 0.05 was considered significant.

**Results**

The number of new patients who did not have a confirmed diagnosis of IC increased from 17% in the first audit (21/125) to 30% (91/304) in the second (*p*-value = 0.007). In the later audit period, 213 patients with a confirmed diagnosis of IC attended the clinic (Table 2). The mean index-limb ankle-brachial pressure index was 0.59 (SD 0.17), which was significantly lower than in 2000 (0.73, SD 0.19) (*p*-value < 0.01). The number of patients with a history of coronary heart disease fell from 32% in 2000 to 19% in the later audit (*p*-value = 0.020).

*Risk factor management in patients with a diagnosis of PAD*

*Dyslipidaemia*

The proportion of patients with intermittent claudication on statin therapy increased significantly from 38% to 62% (*p*-value < 0.01). The number of patients with controlled cholesterol levels (<5 mmol/L) also significantly improved from 35% to 58% (*p*-value < 0.01). In the 2000 cohort, of the 39 patients on statin therapy, 47% (18) had a cholesterol level greater than 5 mmol/L (Fig. 1). In the later cohort, of the 62% (132) patients on a statin, 25% (33) had a cholesterol level greater than 5 mmol/L (Fig. 1).

**Table 1. Claudication clinic protocol**

Risk factor	Screening	Management
Antiplatelet	All patients should be on antiplatelet therapy (unless on warfarin)	Prescribe aspirin 75 mg daily Clopidogrel 75 mg as second line therapy
Dyslipidaemia	Random cholesterol	Start statin if cholesterol level is greater than 3.5 mmol/l Inform general practitioner to monitor reduction in serum cholesterol
Hypertension	Resting blood pressure Targets: <140/90 mmHg Diabetics <130/80 mmHg	If high: Inform general practitioner Ask patient to make appointment with practice nurse
Diabetes	Random glucose	>5.6 mmol/l – inform general practitioner Patient required fasting glucose oral glucose tolerance test
Smoking	Advise patient to stop	Refer to nurse smoking cessation councillor Prescribe nicotine replacement therapy
Exercise	Advise patient to increase	Supervised exercise programme currently not available

**Table 2. Claudicant demographics**

	2000 N = 104	2004/05 N = 213	p-value
Age in years (range)	70 (41–85)	68 (36–87)	0.30
Sex (M:F)	57:47 (1.21:1)	138:75 (1.84:1)	0.11
ABPI (std)	0.73 (0.19)	0.59 (0.17)	<0.01
History of cardiac disease (angina, MI, revascularisation)	32% (n = 33)	19% (n = 41)	0.02
Hypertensive therapy	43% (n = 45)	62% (n = 131)	<0.01
Known diabetic	16% (n = 18)	23% (n = 48)	0.35

Data is mean (SD) or % (number) of patients. P value- non paired t-test or chi-squared of 2000 versus 2004/5 audit data. Abbreviations: ABPI – ankle brachial pressure index.

### Diabetes

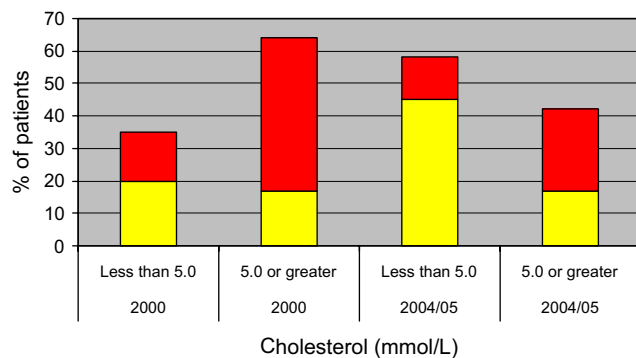
The prevalence of previously diagnosed diabetes in new referrals was 23% (n = 48) in 2004/2005 compared to 16% (18) in the earlier cohort (p-value 0.353). In the later cohort, 74% (158) of patients with IC were not known to be diabetic and had no recollection, or documentation, of a blood test. Of these 17% (n = 27) were found to have previously undiagnosed diabetes. Similarly, in 2000, previously undiagnosed diabetes was identified in 14%.

### Hypertension

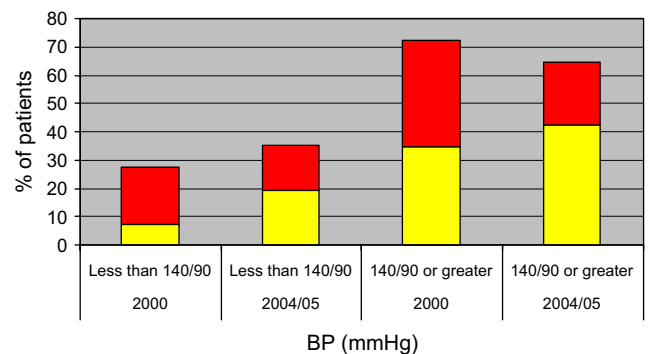
The use of antihypertensive therapy increased from 43% to 62% in the later audit (p-value < 0.01). This also corresponded with a decrease in uncontrolled hypertension (BP > 140/90 mmHg) from 73% to 65% (p-value = 0.176). The blood pressures of the two cohorts are shown in Fig. 2. The target BP of 130/80 mmHg for diabetic patients was achieved only in 35% of the later cohort.

### Antiplatelet therapy

In 2000, 73% of patients with intermittent claudication were on anti-platelet therapy and this was unchanged in 2004/2005. The prescribing of an alternative anti-platelet to aspirin (e.g. Clopidogrel) had increased from 7% to 10%.



**Fig. 1.** Cholesterol level and statin therapy. Legend key; Red = No statin, Yellow = On statin.



**Fig. 2.** Blood pressure. Yellow = On antihypertensive, Red = No antihypertensive.

Of the patients surveyed in 2000, 66% were prescribed aspirin and 7% clopidogrel or warfarin. In total 73% of the 104 IC patients were on antiplatelet or anticoagulant medication and of the remaining 27% of patients, 7% were aspirin intolerant and 20% had no contraindications to the drug. Similarly in 2004/05, 63% of the 213 claudicants were prescribed aspirin and 10% were on clopidogrel or warfarin. In 1% antiplatelet agents were contraindicated and consequently 26% had no antiplatelet therapy.

### Cigarette smoking

The number of patients with IC who admitted to smoking was similar in the two time periods (38% versus 36%), as was the number of ex and non-smokers. The proportion advised to stop smoking (85% versus 80%) also remained static. In the original audit only 7 (18%) of the 39 smokers had been given any further help to stop smoking. Unfortunately smoking cessation help was not recorded in the later audit.

### Exercise

The number of patients who recalled receiving advice to increase physical activity significantly fell from 14% to 2% (p-value < 0.01).

## Conclusions

Overall, patients diagnosed as having PAD have a two to three fold increased risk of cardiovascular and cerebrovascular mortality when compared to an age and sex matched group without PAD.<sup>8,9</sup> This audit has shown that well recognised cardiac risk factors in patients with intermittent claudication continue to be sub-optimally managed. This is disappointing given local and national efforts to increase the awareness and profile of this condition. Almost a third of our new referrals to our speciality claudication clinic

do not have PAD. Yet those who do, have more severe disease, as shown by the significant decrease in the ABPI.<sup>10–12</sup> The mean index-limb ankle-brachial pressure index was 0.59 in the later cohort (SD 0.17). A recent community based longitudinal study of adults aged 65 and older has shown that the all cause cardiovascular mortality and events were consistently higher amongst patients with an ABPI of 0.6 or less.<sup>13</sup> Significant linear trends have been shown across ABPI categories and cardiovascular outcome in a number of studies<sup>14–16</sup> and this relationship appears to be independent of the metabolic syndrome and other major CVD risk factors.<sup>17</sup>

In our latest audit, over a quarter of patients with IC are still not prescribed antiplatelet therapy, despite no apparent contra-indications, and the presence of national guidelines since 1998 (which recommend their routine use). Diabetes continues to remain undiagnosed in 17% of new patients with IC, and consequently is under treated, in the community. In addition to random blood glucose we now routinely measure HbA1C on all patients and recommend further screening if the value is above 5.8%.<sup>18</sup>

Cigarette smoking is acknowledged to be “the single most powerful risk factor associated with the aetiology and clinical progression of peripheral arterial disease”.<sup>8</sup> Nicotine replacement therapy (NRT) has been available for several years and shown to be effective and capable of increasing quit rates by approximately 1.5 to 2 fold.<sup>19</sup> Newer treatments may be even more effective.<sup>20</sup> Yet only a minority of smokers in this study in the two time periods were offered cessation advice or therapy. Despite the recognised importance of exercise on cardiac risk factors and the ability of exercise programmes to substantially increase walking distance in patients with intermittent claudication only 2% of patients in the later cohort were correctly advised to increase their levels of physical activity.<sup>21</sup>

There have been some marginal improvements such as a significant increase in use of statin therapy despite a reduction in the number of patients with documented ischaemic heart disease in the later cohort. However, the Heart protection study,<sup>22</sup> which was published after our initial audit, clearly showed that the benefits of statins occur irrespective of the cholesterol level. Thus all patients with IC should be prescribed a statin providing their cholesterol level is above 3.5 mmol. Despite this, over a third of new patients with IC have not been started on a statin and in those on therapy this appeared ineffective in a quarter of patients. It is now apparent that the benefit achieved with statin therapy is directly proportional to the reduction in cholesterol.<sup>23</sup> There has

also been an increase use of hypertensive therapy, yet two thirds of patients with IC in the later cohort still had resting blood pressure recordings above the recommended target level set by the British Society of hypertension. In diabetic patients only 35% had appropriate BP control (<130/80).

This study has shown that currently patients with intermittent claudication are receiving suboptimal secondary prevention. One of the underlying reasons for this is likely to be the inadequate recognition and diagnosis of intermittent claudication in the community. This is discussed further in the article by Schouten et al.<sup>24</sup>

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