Knowledge and attitude of physicians in a major teaching hospital towards atherosclerotic risk reduction therapy in patients with peripheral arterial disease

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Background: Peripheral arterial disease (PAD) is a marker of advanced atherosclerosis with an elevated risk of cardiovascular mortality and morbidity. Although intensive risk reduction therapy is critical in reducing the adverse cardiovascular outcomes in patients with PAD, the awareness of this information among all physicians is felt to be low. Given the role of family physicians (FP), general internists (GI), cardiologists (C), and vascular surgeons (VS) in treating patients with PAD, we sought to determine their perceptions and knowledge of risk reduction therapy in these patients.

Methods and results: We conducted a cross-sectional self-administered survey of 84 physicians who work at a major teaching hospital. FP, GI, C, and VS represent 39%, 33%, 16%, and 12% of the surveyed physicians, respectively. The recommended targets of LDL-cholesterol, blood glucose and blood pressure in PAD patients were known to 37.3%, 94.1% and 35.3% of physicians, respectively. The majority of physicians reported to screen for risk factors in PAD. Although 86.3% of physicians would recommend antiplatelets therapy in PAD, only 17.6% would recommend angiotensin converting enzyme (ACE) inhibitors; 25.5% would recommend nicotine replacement therapy for smokers and 62.7% would recommend statins. Compared to other specialties, cardiologists had the lowest threshold, whereas GI had the highest threshold for initiating antiplatelets and statins for patients with PAD.

Conclusion: The perceptions towards risk reduction in PAD identify glaring knowledge and action gaps. Effective strategies to encourage health professionals to use risk reduction therapy are needed.

Keywords: peripheral arterial disease, risk reduction, atherosclerosis

Introduction

Peripheral arterial disease (PAD) is an atherosclerotic disease that affects lower extremities. The risk factors for PAD are the same as those for atherosclerosis in general and include male sex, advanced age, cigarette smoking, hypertension, diabetes, and hyperlipidaemia (Fowkes et al 1992).

PAD is a marker of advanced atherosclerosis with an elevated risk of cardiovascular mortality and morbidity. Patients with PAD have a 4 fold increased risk of myocardial infarction (Criqui et al 1992) and a 2–3-fold increased risk of stroke (Wilterdink and Easton 1992) compared to persons without PAD. Furthermore, the risk of cardiovascular mortality and morbidity in patients with PAD is comparable to that in patients with coronary artery disease (CAD) (CAPRIE Steering Committee 1996).

Reducing the adverse cardiovascular outcomes of atherosclerosis through risk factor identification and modification has been an active area of research over the past few

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decades. Since PAD is a marker of advanced atherosclerosis with an elevated risk of cardiovascular mortality and morbidity, intensive risk reduction therapy is critical in these patients. Risk reduction therapy such as smoking cessation, blood sugar control, blood pressure control, antiplatelets, statin, and angiotensin converting enzyme (ACE) inhibitors are proven therapy in reducing the risk of cardiovascular mortality and morbidity in PAD patients (Stratton et al 2000; Yusuf et al 2000; Antithrombotic Trialists' Collaboration 2002; Heart Protection Collaborative Group 2002; Lu and Creager 2004; Willigendael et al 2004). These results have led several expert committees in recommending their use patients with PAD (Abramson et al 2005; Hirsch et al 2006; Smith et al 2006).

Although the adverse outcomes in patients with PAD are well documented, the awareness of this information among all physicians is felt to be low (Hirsch et al 2004). The knowledge and implementation of atherosclerotic risk factors reduction in PAD patients have been shown to be suboptimal among general practitioners, internal medicine specialists, cardiologists, and vascular surgeons in the United States, Canada and the United Kingdom (Hirsch et al 2001; McDermott et al 2002; Cassar, Belch et al 2003; Cassar, Coull et al 2003; Al Omran et al 2006).

The knowledge and implementation of risk factors reduction in patients with PAD among physicians in Saudi Arabia are not known and given the central role of physicians practicing in academic institutes in disseminating the standard of care in treating various diseases, this study was performed to assess the knowledge of the recommended target levels for blood pressure, blood glucose and LDL-cholesterol and knowledge and attitude towards risk reduction therapy in patients with PAD among physicians practicing in a major teaching hospital in Saudi Arabia.

Methods

A self-administered questionnaire was mailed to all family physicians, general internists, cardiologists and vascular surgeons working at King Khalid University Hospital (KKUH) in Riyadh, Saudi Arabia in March 2006. KKUH is the major teaching hospital for the college of medicine, King Saud University; which is the oldest and largest medical school in Saudi Arabia. The questionnaire was based on a previously published questionnaire with some modifications (Al Omran et al 2006). The questionnaire was anonymous and physicians were consented before participation. This study was approved by KKUH Ethics Review Board.

The survey contained multiple-choice questions (Appendix). The questions requested information from participants regarding their demographics (age, gender, specialty, board certification status, years of experience), their knowledge about target levels of blood pressure, LDL-cholesterol, and blood glucose in patients with PAD, in addition to their attitudes toward patient counseling about cardiovascular risk reduction; comfort with recommending and instituting risk reduction therapy (smoking cessation, antiplatelets; statin; ACE inhibitors; and antihypertensive medications), factors that influence adequate risk reduction therapy delivery in PAD patients, proportion of patients with PAD who have their vascular risk factors evaluated systematically by the participants, and their self-assessment of PAD risk reduction knowledge.

All survey results are expressed as percentages. The number of respondents who completed each question provided the denominator for proportions of responses. The prespecified subgroups for analysis were specialty type (family physicians versus general internists versus cardiologists versus vascular surgeons). Chi-square tests were used to compare proportions between different subgroups. All p-values reported were two tailed, and were considered significant at the 0.05 level.

Results

Fifty one of the 84 surveyed physicians at KKUH completed the survey, representing a response rate of 60.7%. Family physicians, general internists, cardiologists and vascular surgeons represent 39%, 33%, 16%, and 12% of the surveyed physicians, respectively. The results are depicted in Tables 1–4.

Physicians' characteristics

Two third of participated physicians are board certified in their specialties. Almost half of the respondents were practicing for more than 10 years (Table 1).

Physicians' knowledge and attitude

The knowledge of the surveyed participants for the recommended targets of LDL-cholesterol and blood pressure was low, on the other hand their knowledge for the recommended target level of blood glucose was high (Table 2). Only 21.6% knew that ACE inhibitor can be initiated in PAD patients irrespective of the blood pressure status, as an anti-atherosclerotic therapy (Table 2). Eighty five percent of the surveyed physicians indicated that their self assessment of risk reduction in PAD was average to below average.

Attitude towards routine patients counseling with regard to the importance of risk factor control was suboptimal

Table 1 Characteristics of physicians who completed the survey by specialty (N = 51)

	Family physicians (N = 20)	General internists (N = 17)	Cardiologists (N = 8)	Vascular surgeons (N = 6)	All (N = 51)
Response rate,%	66.7	53.1	53.3	85.0	60.7
Mean age, y, +/– SD	43.2 +/– 5.2	39.7 +/– 7.2	38.8+/– 6.5	39.5+/–4.2	40.8+/–5.3
Male gender,%	55.0	64.7	100	100	70.6
Board-certified,%	60.0	58.8	87.5	50.0	66.7
Years in Practice					
<5 years,%	10.0	29.4	62.5	66.8	31.4
5–10 years,%	25.0	29.4	12.5	16.6	23.5
>10 years,%	65.0	41.2	25.0	16.6	45.0

(Table 3). Apart from routine initiation of antiplatelets therapy (86.3%), the attitude towards routine initiation and/or modification of other risk reduction therapy was very poor especially for initiating ACE inhibitors (17.7%). The highest threshold for initiating different risk reduction therapies was observed among general internist compared to other specialists, however, it was only statistically significant for initiating statin therapy ($p = 0.025$). On the other hand, cardiologists appeared to have the lowest threshold in initiating these therapies; however, it was not statistically significant for any therapy (Table 3). Two third of participants evaluate less than half of their PAD patients for vascular risk factors (Table 3).

Barriers for delivering risk reduction therapy

The barriers for not receiving adequate risk reduction therapy with the participants' responses are shown in Table 4.

Discussion

Patients with PAD generally have widespread arterial disease and therefore are at a significantly increased risk of stroke, myocardial infarction, and cardiovascular death (The TASC Working Group 2001). Coronary artery disease (CAD) is the most common cause of death in patients with PAD and accounts for 40%–60% of deaths. Stroke accounts for 10%–20% of deaths. Only 20% to 30% of patients with PAD die of non-cardiovascular causes (The TASC Working Group 2001). Patients with PAD have a 6 fold increased risk of cardiovascular disease mortality compared to patients without PAD (Criqui et al 1992). Therefore, intensive risk reduction therapy is critical in these patients to reduce the adverse cardiovascular outcomes. Risk reduction pharmacotherapy (antiplatelets, statins, and ACE inhibitors) are proven therapy in reducing the risk of cardiovascular mortality and morbidity in PAD patients in large scale randomized clinical trials (Yusuf et al 2000; Antithrombotic Trialists' Collaboration 2002; Heart Protection Collaborative Group 2002). On the other hand, although there are no randomized clinical trials to prove the role of smoking cessation and blood sugar control in reducing the adverse cardiovascular outcomes in patients with atherosclerosis; large observational studies showed their effect to do so (Lu and Creager 2004; Stratton et al 2004).

The compelling evidence from the literature has led several expert panels to recommend atherosclerotic risk reduction therapy use in all patients with PAD (Expert Panel on Detection 2001; Smith et al 2001, 2006; American Diabetes Association 2003; Chobanian et al 2003). Furthermore, with the increasing recognition of the disease burden in patients with PAD, separate guidelines have been published to encourage the use of risk reduction therapies (Abramson et al 2005; Hirsch et al 2006).

Although there is strong evidence supporting the importance of using risk reduction therapy in patients with PAD, in this study we have shown that despite the majority of surveyed physicians evaluate and counsel patients with PAD for their risk factors, knowledge and action remain suboptimal, and clear gaps have been identified. Majority of surveyed physicians rated their knowledge about risk reduction as average or above average; however, there is deficiency in the knowledge of the recommended target levels of blood pressure and LDL-cholesterol levels. In addition, minority of the participants knew that ACE inhibitor can be used in PAD patients irrespective to the blood pressure status for reducing atherosclerotic complications and cardiovascular death. Furthermore, there was also deficiency in initiating risk reduction therapy especially for ACE inhibitors and anti-smoking therapies. The action gap was most prominent among general internists compared to other specialties.

Our findings could be explained by the absence of national or locally adapted guidelines in managing patients with PAD

Table 2 Knowledge of physicians participated in the survey of risk reduction in patients with peripheral arterial disease expressed in percentage

	Family physicians (N = 20)	General internists (N = 17)	Cardiologists (N = 8)	Vascular surgeons (N = 6)	All (N = 51)
Perception for the main cause of morbidity and mortality in patients with PAD:					
Limb loss	30.0	11.8	37.5	0	21.6
Perioperative complications	10.0	0	0	0	3.9
Cardiovascular events	60.0	88.2	62.5	100	74.5
Knowledge of the current recommended target of:					
LDL-Cholesterol (<2.5 mmol/l)	35.0	35.3	62.5	16.7	37.3
Blood Pressure (<130/80 mmHg)	30.0	35.3	75.0	0	35.3
Blood Glucose (HbIAc < 7%)	100	100	100	66.7	94.1
Knowledge of the relationship between BP and ACE inhibitors in PAD patients:					
Not indicated in normal BP	15.0	17.6	0	0	11.7
Initiate irrespective to BP status	20.0	11.8	50.0	16.7	21.6
Unclear about recommendations	65.0	70.6	50.0	83.3	66.7
Self-assessment of PAD risk reduction knowledge:					
Average	50.0	35.3	75.0	33.3	47.0
Above-average	30.0	35.3	25.0	66.7	35.3
Below-average	15.0	29.4	0	0	15.6

and the reluctance of physicians to apply CAD guidelines to the PAD patient population even though the risks are similar, if not higher (Criqui et al 1992). Furthermore, the suboptimal use of ACE inhibitors could be explained by the fact that the evidence supporting the use of ACE inhibitors in patients with PAD to reduce the risk of adverse cardiovascular events is not a level A evidence and also dependent on the presence of symptoms (class IIa recommendation for symptomatic patients with PAD and Class IIb recommendation for asymptomatic patients) (Hirsch et al 2006).

Knowledge and action gaps in managing risk factors in patients with PAD also have been shown among physicians in the United Kingdom, the United States and Canada (McDermott et al 2002; Mukherjee et al 2002; Cassar et al 2003; Al Omran et al 2006). Cassar et al (2003) showed that over a quarter of the UK vascular surgeons would not screen for diabetes or measure blood pressure in patients with PAD and only 34% of them would treat claudicants if the cholesterol was greater than 5.5 mmol/l. McDeermott et al (2002) showed that only 45.5% of the internal medicine physicians (IMP) prescribe antiplatelets to patients with PAD compared to 52.5% of the vascular surgeons, and only 16.8% of the vascular surgeons knew the large effect of cholesterol lowering on the risk of future cardiovascular events in patients with PAD compared to 43.6% of the IMP. Furthermore, even in cardiologists who were surveyed there was knowledge and action gaps in dealing with atherosclerotic risk. Al-Omran et al (2006) showed that the utilization of risk reduction pharmacotherapy and the knowledge of the recommended target levels of blood glucose, blood pressure and LDL-cholesterol levels in patients with PAD among Canadian vascular surgeons were suboptimal. Furthermore, Mukherjee et al showed a suboptimal use of lifestyle modifications such as smoking cessation, exercise, weight reduction and diet for lipid control, and the use of evidence-based therapy such as antiplatelets therapy, ACE-inhibitors, beta-blockers, and statins in patients undergoing peripheral vascular interventions for PAD at hospital discharge and at 6 months follow-up (Mukherjee et al 2002).

The knowledge and action gaps in managing risk factors in patients with PAD from the previously published studies (McDermott et al 2002; Cassar et al 2003; Al Omran et al 2006) along with our data add support to the available literature documenting inequities in use of risk reduction therapies for patients with PAD in comparison to patients with CAD (Hirsch et al 2004). Furthermore, this data can be useful in supporting a call to action for PAD management and public awareness (Hirsch et al 2004).

Table 3 Attitude of physicians participated in the survey towards risk reduction in patients with peripheral arterial disease expressed in percentage

	Family physicians (N = 20)	General internists (N = 17)	Cardiologists (N = 8)	Vascular surgeons (N = 6)	All (N = 51)
Proportion of patients with PAD assessed for risk factors by the participant:					
None	10.0	11.8	0	0	7.8
<50%	60.0	47.0	37.5	16.7	47.1
>50%	25.0	41.2	62.5	83.3	43.1
Attitude towards routine evaluation of risk factors:					
Lipid profile measurement	95.0	88.2	100	83.3	92.1
Blood pressure measurement	100	100	100	83.3	98.0
Blood glucose measurement	95.0	100	87.5	66.7	92.1
Asking about smoking	85.0	100	87.5	100	92.1
Attitude towards routine patients counselling with regards to the importance of:					
LDL-cholesterol reduction	90.0	70.6	75.0	83.3	80.4
Blood pressure control	100	94.1	87.5	83.3	94.1
Blood glucose control	95.0	100	87.5	83.3	92.1
Smoking cessation (advise to stop)	85.0	100	87.5	100	92.1
Attitude towards routine initiating/modifying risk reduction pharmacotherapy:					
Statin	65.0	41.1	87.5	83.3	62.7
ACE inhibitor	25.0	5.88	37.5	0	17.7
Anti-hypertensive	75.0	58.8	87.5	33.3	66.7
Anti-platelets	85.0	76.4	100	100	86.3
Nicotine replacement therapy	20.0	17.6	50.0	33.3	25.5
Referral to smoking cessation program	10.0	29.4	12.5	0	15.6

Table 4 Barriers for delivering risk reduction therapy in patients with peripheral arterial disease as viewed by physicians participated in the survey expressed in percentage

Barriers	Family physicians (N = 20)	General internists (N = 17)	Cardiologists (N = 8)	Vascular surgeons (N = 6)	All (N = 51)
Lack of knowledge of treating physicians about PAD	10.0	5.9	12.5	0	7.8
Lack of PAD management guidelines	35.0	29.4	0	16.7	25.5
Absence of continuing education about risk reduction therapy for PAD	10.0	23.5	25.0	16.7	17.6
Absence of vascular medicine specialist	5.0	0	0	0	2.0
Combination of all above factors	40.0	41.2	62.5	66.6	47.1

In the evaluation of these results, certain limitations merit emphasis. The small number of the participants included in this survey. It is also important to stress that this survey reflects the practice of physicians in a single teaching institute, and may not be generalizable to other hospitals. Also, since the data represent self-reported perceptions of knowledge they may underestimate the true gap. In addition, the survey form did not differentiate between symptomatic and asymptomatic PAD with regard to the use of ACE inhibitors as a risk reduction therapy.

In conclusion, the perceptions towards risk reduction in PAD identify glaring knowledge and action gaps, despite a considerable effort to evaluate and counsel patients for their risk factors. Given the heightened risk of cardiovascular adverse outcomes in patients with PAD, these data have important and immediate implications. If the current practice continues, the observed knowledge and action gaps are expected to persist. These findings may be useful for guiding targeted interventions such as locally adapted clinical practice guidelines in managing patients with PAD, self audit of practice, focused continuing medical education programs, the inclusion of risk reduction pharmacotherapy as a plenary topic at scientific meetings, and other educational outreach programs that aim to bring physicians' practice into agreement with current guidelines for cardiovascular risk reduction.

Note

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Appendix

The survey questionnaire

Please encircle the chosen answer

What is your age?	------- years
What is your gender ?	Male Female
What's your speciality? General practitioner	Internist Cardiologist Vascular surgeon
Are you board certified?	Yes No
Hospital name and city?	……./…….
Nationality?	……...
How many are you in practice in your speciality?	<5 years 5–10 years >10 years
What do you perceive as being the main cause of morbidity and mortality in patients with PAD?	a) Limb loss b) Perioperative complications c) Cardiovascular events, including, MI,Stroke and Cardiovascular outcomes
What proportion of your patients with PAD have their vascular risk factors evaluated systematically by your self?	a) None b) <50% c) >50%
Please rate your knowledge of risk reduction therapies in PAD	a) Average b) Below average c) Above average
i) Diabetes mellitus	
If PAD patient is not diabetic, do you measure Random and/or fasting blood sugar as a screening tool?	Yes No
What are the current recommendations with respect to glucose control in patients with diabetes?	a) Unsure b) HbA1c < 7% in all patients, with an effort to achieve HbA1c < 6% ideally, if possible c) Fasting blood glucose of < 10mmol/L
Do you routinely counsel diabetic patients regarding the importance of diabetes control?	Yes No
ii) Cigarette smoking	
Do you routinely ask these patients about smoking history?	Yes No
Do you routinely advise these patients to stop smoking?	Yes No
Do you routinely recommend nicotine replacement therapy and/or other proven cessation intervention in these patients?	Yes No
Do you refer these patients to smoking cessation program?	Yes No
iii) Lipid control	
Do you routinely measure lipid values?	Yes No
What are the current LDL-cholesterol target level in patients with PAD?	a) Unsure b) less than 3.5 mmol/L c) less than 4.5 mmol/L d) less than 2.5 mmol/L e) less than 1.7 mmol/L

Do you routinely counsel these patients regarding the importance of LDL-cholesterol reduction in PAD to achieve LDL-target level?	Yes No
Do you routinely prescribe or modify statin therapy in patients with PAD?	a) No b) In few patients c) In majority of patients

iv) Hypertension control

Do you routinely measure patient's blood pressure?	Yes No
What is the current blood pressure target for patients with PAD?	a) Unsure b) Less than 140/80 mmHg c) Less than 125/75 mmHg d) Less than 130/85 mmHg e) Lowest achievable
Do you routinely counsel patients regarding the importance of blood pressure control?	Yes No
Do you routinely initiate or modify antihypertensive therapy in patients with PAD?	a) No b) In few patients c) In majority of patients

v) Antiplatelets therapy

Do you routinely initiate aspirin in patients with PAD?	Yes No
If aspirin is contraindicated or intolerable, do you prescribe other antiplatelets agents? If yes indicate the antiplatelets therapy you prescribe	Yes No (…….)

vi) Angiotensin converting enzyme inhibitor (ACE-I) therapy

Should all patients with PAD receive an ACE inhibitor irrespective of their blood pressure?	a) If patients with PAD have normal BP, ACE-I therapy is not indicated b) ACE-I therapy should be initiated in every patient with PAD, irrespective of their BP c) I am unclear what the exact recommendations regarding ACE-I in PAD are at the present time
Do you routinely initiate ACE inhibitor therapy in patients with PAD?	a) No b) In few patients c) In majority of patients

vii) Management barriers in patients with PAD

What is the most important barrier to your patients with PAD not receiving risk reduction therapies, and reaching targets for vascular protection? (Chose one answer)	a) Lack of knowledge of treating physician about PAD b) Lack of PAD management guidelines c) Lack of continuing education in the importance of risk reduction approaches in global cardiovascular protection d) Absence of vascular medicine speciality in Saudi e) All of the above