A survey of control of major risk factors following coronary artery bypass graft surgery

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Abstract

The aim of this survey was to review the awareness and efficacy amongst patients and general practitioners (GPs) in controlling coronary risk factors following coronary artery bypass graft surgery (CABG). It was a prospective cohort study based on an inclusive registry at our department.

230 patients who underwent CABG between April 1999–July 2000 and who had a history of hypertension and hypercholesterolaemia were selected. Frequency of blood pressure (BP) and cholesterol monitoring, blood glucose control, current smoking status, weight and medications were established via telephone interview of patients. BP and cholesterol levels were confirmed by written questionnaires to GPs. BP and cholesterol were considered to be controlled if they were ≤ 140/85 mmHg and ≤ 5.0 mmol/L respectively

Of the 230 patients, 213 were successfully contacted. After surgery, 181 (85%) patients had BP checks at least six-monthly by their GPs, 13 (6.1%) less frequently and 19 (8.9%) not at all. Cholesterol levels were checked at least six-monthly in 128 (60.1%), less frequently in 47 (22.1%) and not at all in 38 (17.8%). Thirteen of the 20 patients who were smoking at the time of surgery continued to smoke. BP and cholesterol readings were obtained for 169 of the 213 patients. Of these, BP was well controlled in 92 (54.4%), uncontrolled in 61 (36.1%) and not checked in 16 (9.5%). Cholesterol was well controlled in 106 (62.7%), uncontrolled in 35 (20.7%) and not checked in 28 (16.6%) patients.

Although patients and GPs are generally aware of the importance of controlling coronary disease risk factors, more effort is required if we are to meet the Joint British recommendations on prevention of coronary heart disease.

Key words: coronary artery bypass graft, risk factors, secondary prevention.

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Introduction

Coronary artery bypass graft (CABG) surgery is indicated for both the relief of symptoms and the improvement of life expectancy in patients suffering from coronary heart disease (CHD). There is good evidence that modification of the risk factors for CHD is important for the ultimate benefit of this surgical intervention.[1-3] Patients undergoing CABG already have established coronary artery disease as well as potential graft disease. It is therefore vital, both before and after surgery, that lifestyle and therapeutic interventions are put into practice as a means of secondary prevention.[4,5]

Hypertension, hypercholesterolaemia, cigarette smoking, diabetes mellitus and obesity are all modifiable risk factors which have importance in isolation but also act synergistically in the recurrence of native coronary or graft disease.[6-11] Secondary prevention in clinical practice requires that efficient and effective measures should be taken to control these risk factors in order to avoid, or at least reduce, the rate of progression of the disease.

In 1998, the British Cardiac Society, British Hyperlipidaemia Association and British Hypertension Society[2] made joint recommendations on the prevention of CHD in clinical practice. These recommendations, which were endorsed by the British Diabetic Association, advise a target blood pressure (BP) of ≤ 140 mmHg systolic and ≤ 85 mmHg diastolic and a total plasma cholesterol level of ≤ 5.0 mmol/L for patients with established CHD. These recommendations also refer to the importance of smoking cessation and control of diabetes and weight.

The aim of this survey was to review the awareness and efficacy amongst patients and their general practitioners (GPs) in the control of major coronary risk factors, especially hypertension, hypercholesterolaemia and cigarette smoking, after CABG.

Methods

The survey was conducted in October 2000. All patients who underwent primary CABG in our department between April 1999 and July 2000 and who had a history of hypertension and hyper-

cholesterolaemia were included. The presence of other risk factors such as cigarette smoking, diabetes mellitus and obesity was also recorded for each patient. Demographic and pre-operative information was obtained from the computerised cardiac surgical registry (PATS Dendrite Clinical Systems Ltd, Berkshire, UK).

On the day of admission for the CABG, the risk factors for coronary artery disease were assessed for each patient. Patients were considered hypertensive if their blood pressure was > 160/90 mmHg or if they were taking treatment for hypertension. Patients with a fasting plasma cholesterol level > 6.5 mmol/L or who were on lipid-lowering medication were classed as hypercholesterolaemic. Smoking status was recorded according to whether the patient had ever smoked, was an ex-smoker or a current smoker at the time of surgery.[2] A previous diagnosis of diabetes mellitus, and any current diabetic therapy (diet, tablet or insulin), was also noted. Those patients with a body mass index (BMI) > 32 kg/m^2 were classified as obese.

At the time of the survey, the frequency of BP and plasma cholesterol monitoring by GPs, their current medications, smoking and weight status were recorded via telephone calls to patients. GPs were asked in writing for the two most recent BP and fasting plasma cholesterol readings of these patients. A maximum of four weeks was given to compile the responses. BP and cholesterol were considered to be controlled if they were ≤ 140/85 mmHg and ≤ 5.0 mmol/L respectively, in keeping with the Joint British recommendations.

A total of 891 patients underwent primary CABG at our department during the stated period. Hypertension and hypercholesterolaemia were present in 230 patients, of whom 213 (92.6%) were successfully contacted. Those who were not contacted had either changed address or died.

Of the 213 patients contacted, 159 (74.6%) were men and 54 (25.4%) women. Their mean age was 65.3 years (range 33–80 years). Thirty-eight (17.8%) of them suffered from diabetes mellitus and 27 (12.7%) had a pre-operative BMI > 32 kg/m.^{2} Twenty (9.4%) patients were recorded as current smokers, 116 (54.5%) as ex-smokers and 77 (36.1%) as non-smokers at the time of surgery.

Results

The specific details for frequency of monitoring of BP and cholesterol levels for the patients contacted are illustrated in table 1.

Hypertension

Whilst 181 (85%) patients had BP checks at least six-monthly, 13 (6.1%) had less regular checks and 19 (8.9%) patients had not had their blood pressure checked since CABG.

Cholesterol

Cholesterol checks were carried out at least six-monthly in 128 (60.1%) patients, less frequently in 47 (22.1%) and 38 (17.8%) had not had their cholesterol checked at all since CABG.

Smoking

Thirteen of the 20 patients who were smoking at the time of surgery continued to smoke and one of the ex-smokers resumed smoking after surgery.

Table 1. Numbers of patients with frequency of their blood pressure and cholesterol monitoring

Frequency	1	2	3	4	6	8	12	Never	Total
Blood pressure	43	28	65	0	45	1	12	19	**213**
Cholesterol	2	10	45	3	68	2	45	38	**213**

Frequency of monitoring is described on a monthly basis eg. 1 = monthly, 2 = two-monthly

Diabetes mellitus

All diabetics claimed to have their blood glucose checked regularly with a finger prick test. The level of control was good in all patients, the highest blood glucose reading being 11 mmol/L.

Obesity

Amongst the 27 obese patients, only one managed to lose weight whilst six others gained on their pre-operative weights.

BP and cholesterol readings were requested from the GPs of the 213 patients contacted. Replies were received for 169 (79.3%) patients. Of these, 16 (9.5%) patients had never had their BP checked. BP was well controlled in 92 (54.4%) patients and uncontrolled in 61 (36.1%), only 50 of whom were still on some form of antihypertensive treatment. Cholesterol had never been checked in 28 (16.6%) patients, was under control in 106 (62.7%) and was uncontrolled in 35 (20.7%), of whom 10 were no longer on treatment.

Discussion

The major and independent risk factors for CHD are elevated blood pressure, elevated total plasma cholesterol and low-density lipoprotein cholesterol (LDL-C), low serum high-density lipoprotein cholesterol (HDL-C), cigarette smoking, diabetes mellitus and advancing age.[12] Obesity has also been considered to be an independent risk factor for CHD.[5]

The Joint British recommendations on prevention of CHD[2] were formed using the best scientific evidence available at the time and were the basis on which we produced our results. These guidelines on primary and secondary prevention, which apply not only to patients with established CHD but also to those who have had CABG, should be diligently followed. In this study, we used the stated levels for BP and cholesterol set out by the Joint British recommendations as a marker by which to assess level of control of these coronary risk factors.

Hypertension

There is not a great deal of information available about the effect of BP control on the outcome of CABG. In our study, there appeared to be a reasonable level of awareness of the importance of BP control in secondary prevention of CHD as most

patients were having their BP recorded at least every six months. There are no recommended guidelines on the frequency of BP measurement but it could be assumed that it should be monitored as often as required until an adequate level of control is achieved. Worryingly, a considerable percentage of patients in our study failed to reach a level of BP control as set out by the Joint British recommendations.

Irving *et al.*,[1] however, in their 10-year audit of secondary prevention in coronary bypass patients, reported that the standard of BP control was good. They used 160 mmHg and 90 mmHg as the limits for systolic and diastolic pressures respectively. If the current, stricter recommendations had been applied, their results might have been less favourable. Our findings reinforce the importance of GPs' awareness of the recommendations for BP monitoring and their commitment to maintaining patients' BP at an adequate level.

Cholesterol

The significance of cholesterol control following coronary surgery has been addressed in various reports. The investigators in the Post Coronary Artery Bypass Graft Trial[13] studied the effect of aggressive lowering of LDL-C levels on obstructive changes in saphenous vein grafts. In this study, the mean percentage per patient of grafts with occlusion or new lesions was significantly lower for patients in the aggressive cholesterol-lowering treatment group (target LDL-C < 85 mg/dl) than for patients undergoing moderate treatment (target < 140 mg/dl). Similar observations have been reported by Blankenhorn *et al.*[14] in a randomised, placebo-controlled angiographic trial which tested combined colestipol hydrochloride and niacin therapy in patients who had had previous bypass surgery (Cholesterol-lowering Atherosclerosis Study). This study showed that treatment resulted in a significant reduction in the number of new lesions or adverse changes, not only in bypass grafts but also in the native coronary arteries.

Interestingly, pre-operative lipid control with HMG-CoA reductase inhibitors has been shown to reduce the risk of post-operative thrombocytosis in patients undergoing CABG.[15] This finding could explain why hypercholesterolaemic patients on cholesterol-lowering therapy have a better outcome. In our study, only 62.7% of patients had total cholesterol levels ≤ 5.0 mmol/L, a result similar to that reported by Irving *et al.*[1] who found that only 50% of patients had cholesterol levels < 5.2 mmol/L following CABG.

Smoking

The effect of cigarette smoking on survival following CABG is well documented. Cavender *et al.*[16] in their analysis of the Coronary Artery Surgery Study (CASS) found that those patients who continued to smoke after surgery had a higher incidence of angina and hospital admissions than the non-smokers. A greater limitation of physical activity and a higher rate of unemployment were also reported in this group. Similarly, Voors *et al.*[10] in their 15-year follow-up study, found a detrimental effect on the health of patients who continued to smoke after CABG compared to those who managed to stop. They showed that in persistent smokers there was an increased risk of death, myocardial infarction, re-operation and recurrence of angina five to 15 years following CABG.

In our study, only seven out of the 20 patients who admitted that they were smokers at the time of surgery had managed to 'kick the habit' at the time of the survey. This could be seen as a failure in patient education or a reflection of the lack of commitment by the patients in following the advice of healthcare professionals. However, it may represent a group of smokers whose dependence on tobacco overrides repeated advice and evidence on the danger of smoking.

Diabetes mellitus

Diabetes mellitus has been identified as a marker of poor prognosis in patients with CHD. It has been associated with a worse five-year survival in patients undergoing both CABG and percutaneous transluminal coronary angioplasty.[17] In our series, all patients known to be diabetic seemed to have good control of their condition.

Obesity

The significance of patients' BMI on vein and internal mammary artery (IMA) graft patency has been assessed in the past. In their study, Eritsland *et al.*[18] found that the incidence of one-year occlusion in IMA and vein grafts was inversely associated with the body surface area. Three possible mediators, namely hypertension, diabetes and serum cholesterol, have been identified between obesity and CHD.[5] It therefore follows that weight control *per se* would have a positive effect on those three independent risk factors. Despite this evidence, only one of 27 obese patients in our study managed to lose weight following surgery.

General comments

When it is considered that the patients included in our survey represent a particularly high-risk group (established CHD with both hypertension and hypercholesterolaemia risk factors present), the results are far from ideal. Of all the risk factors identified in the study, only diabetes seemed to be well controlled. More than half of the patients smoking at the time of surgery continued to do so at the time of questioning and only a small proportion of obese patients managed to lose weight following surgery. BP and plasma cholesterol levels were adequately controlled in only just over half of the patients.

These findings suggest that a great deal more effort is required at all levels in the healthcare system to ensure adequate awareness of the importance of risk factor control in this group of patients.

We appreciate that our survey was subject to certain limitations caused by the way in which we obtained our information. Figures were gathered using telephone calls to patients so therefore were dependent on patients' recall of facts. This in itself is a source of inaccuracy. In addition, BP, cholesterol and blood sugar levels are labile and subject to diurnal and day-to-day variation. Without a standardised procedure for management, to ensure that blood taken for cholesterol is done when the patient is fast-

Key messages

- Hypertension, hypercholesterolaemia, smoking, diabetes mellitus and obesity are significant risk factors for coronary artery disease
- There is evidence that good control of risk factors reduces the recurrence of coronary artery disease
- Both patients and medical staff need to be aware of the importance of monitoring the risk factors involved in order to achieve a good long-term result from expensive and risky coronary revascularisation procedures

ing or that BP is recorded at approximately the same time of the day, there is room for discrepancies to occur. Operator inaccuracies must also be taken into account. Patients who had been discharged recently from the hospital might have not yet visited their GPs for follow-up and indeed some patients were only checked by their GPs when they attended the surgery for some other reason.

In conclusion, although patients and GPs appear to be generally aware of the importance of monitoring coronary disease risk factors, more effort is required in control of these factors if we are to meet the Joint British recommendations on prevention of coronary heart disease. Before patients are admitted for CABG, assessment of risk factors should be carried out and carefully documented. The patients should be educated on the importance of risk factor control and should be advised to visit their GPs for regular monitoring after being discharged from specialist care. A comprehensive discharge summary, with a request to monitor any risk factors present, should be sent to the GPs without delay.

It is promising that a few GP practices run a special cardiac monitoring clinic where regular checks are performed and problems can be addressed promptly and effectively. The formation of more clinics of this nature should be encouraged so that a similar service can be offered to all CHD patients in the community.

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