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A study of the management of post myocardial infarction patients after discharge from hospital

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ABSTRACT

Aim: To describe secondary prevention practice following first myocardial infarction (MI).
Method: A cohort design was used. Consecutive patients discharged from Auckland Hospital with a diagnosis of first MI were recruited. Patient recruitment took place between June 1995 and June 1996. Six months after discharge each patient had their hospital and GP charts reviewed and had a telephone interview.
Results: Seventy-two patients took part in the study. At six-month follow-up 94 per cent of patients without contraindications were taking aspirin, 72 per cent of patients without contraindications were taking beta-blockers, ACE inhibitors were used by 29 per cent of all patients, and lipid modifying medication by 44 per cent of all patients. Most patients (91.7 per cent) had attended their GP at least once and 83 per cent had obtained cardiac follow-up. Lifestyle changes were adopted.
Conclusion: In this cohort secondary prevention practice compared favourably with overseas studies. Ease of prescribing and continued collaboration by health professionals will enhance management.

KEY POINTS
- A cohort of patients from the Coronary Care Unit at Auckland Hospital with first myocardial infarction was reviewed six months after discharge to determine secondary prevention practice
- At the time of data collection the 1993 National Heart Foundation guidelines for management of dyslipidaemia were still current and Pharmac policy prevented GPs from prescribing government-funded lipid modifying medication without specialist endorsement
- Use of aspirin and beta-blockers in the cohort studied compared favourably with overseas studies
- Some patients had not received appropriate lipid modifying agents which may be attributable to the

INTRODUCTION

Cardiovascular disease continues to remain the leading cause of death in the Western world. While myocardial damage is the predominant factor affecting prognosis in the early stages following MI, over the longer term risk factors are more important.[1-4] Judicious management of hypertension,[1] hypercholesterolaemia,[1,2,4-6] smoking[1,3,4,7,8] and the use of

aspirin,[3,4,9-11] beta-blockers,[3,4,8,10-12] and ACE inhibitors where appropriate,[3,4, 11,13,14] will have a significant effect on coronary mortality and morbidity. There have been surveys from a number of countries describing suboptimal use of secondary prevention practices.[15-17]

prescribing regulations
• 91.7 per cent of patients had consulted their GP after discharge from hospital

The situation in New Zealand has not previously been studied. Moreover, at the time of data collection regulatory requirements prevented New Zealand GPs prescribing government-funded lipid modifying medication without the approval of a specialist. As this medication was usually considered six months after a trial of dietary management,[18] there may have been barriers to ensuring that such a therapy was offered to patients when appropriate following MI. Such difficulties include patients' accessing their GPs, GPs remembering to test blood lipids, and the GP having to obtain specialist endorsement for the use of a lipid modifying agent.
The primary aim of this study was to examine secondary prevention practice six months following first MI with particular regard to the use of aspirin, beta-blockers, ACE inhibitors and lipid modifying medication. The adoption of appropriate lifestyle changes including smoking cessation was also examined.

METHODS

Consecutive patients identified from Auckland Hospital Coronary Care Unit records as having been admitted with a provisional diagnosis of first MI were sent a letter from the Coronary Care Unit rehabilitation nurse to determine their interest in participating in the study. Those patients who expressed an interest were sent a patient information sheet and a consent form; each patient was also telephoned by the investigator (AP). This method of recruitment was employed in order to meet the requirements of the Privacy Act which did not allow the investigator in the first instance to directly contact the patients identified from hospital records. Patients were approached to participate in the study no less than six months after their discharge from hospital. This was done as current recommendations at the time advised that three to six months should elapse before lipid lowering medication is considered.[18]
The hospital records of each patient who consented to take part were examined by one of the investigators (AP). Baseline data obtained included admission and discharge dates, blood pressure recordings at admission and discharge, blood glucose, lipid measurements (recorded only if obtained within 24 hours of MI), smoking and dietary habits, and medications at discharge. Information was also obtained regarding subsequent admissions and outpatient clinic visits.
Each patient was then contacted for a telephone interview by one of the investigators (AP). Information obtained at this interview included the patient's current medications, smoking and alcohol history, exercise and dietary habits at the time of the interview. Data was obtained relating to subsequent admissions, attendance at cardiac rehabilitation programmes, and GP, specialist and outpatient visits since discharge.
The patient's GP or practice nurse was interviewed after the hospital chart review and patient interview. Information was obtained regarding current medication, known drug allergies, consultations since discharge, blood pressure recordings, recent blood tests, referrals to specialists since discharge, past medical history, and family history of coronary heart disease.
The study received ethical approval from the local Regional Health Authority. Patient recruitment took place between June 1995 and June 1996 and involved those patients who had been discharged from Auckland Hospital between 25 August 1994 and 5 December 1995.
The collected data was coded and entered into a database. Analysis was performed using the software package JMP.

RESULTS

One hundred and sixty-five patients with a provisional diagnosis of MI were identified from Coronary Care Cardiac Rehabilitation records. Eighty-six patients expressed an interest in participating in the study and were sent appropriate material and consent forms. Eighty-five patients consented to take part in the study. Of these, 73 were eligible and were recruited to the study. Of those who were ineligible 11 were excluded because complete chart review showed that this was not their first infarction, or there was another diagnosis; one patient was involved in another study. One patient became unavailable after recruitment leaving a total of 72 patients in the study.
Seventy-two patients had their hospital and GP charts reviewed, and completed a telephone

interview. This represented 43.6 per cent of patients discharged from Auckland Hospital Coronary Care Unit with a provisional diagnosis of MI between August 1994 and December 1995, or at least 47.4 per cent if adjustments are made for the ineligibility as described previously.
There were 47 males and 25 females with an age range of 35 to 74 years. Ethnic groups are shown in Table 1. Chart reviews and telephone interviews took place six months after discharge. Baseline characteristics are shown in Table 1.

TABLE 1. DEMOGRAPHICS AND BASELINE CHARACTERISTICS	
Mean age	
Overall Men Women	57.9 years (sd = 9.9 years) 55.3 years (se = 1.40); n = 47 62.7 years (se = 1.9); n = 25
Ethnicity	
European Maori Pacific Island Asian Other	65 (90%) 3 (4%) 2 (3%) 1 (1%) 1 (1%)
Time between discharge and first visit to GPs	
Mean Median	22.5 days (sd = 38.4 days)
Time from discharge to interview	
Mean Median	245.6 days (sd = 46.6 days, 232 days (range 169 to 396 days)

Medications

Aspirin: At discharge 65 patients (90 per cent or 98.5 per cent of patients without contraindications) were taking aspirin (Table 2). Contraindications were recorded in six patients (8 per cent). One patient began aspirin therapy after discharge (Table 3). At the six-month interview 62 patients (86 per cent or 94 per cent of patients without contraindications) were still taking aspirin (Table 2).

Beta-blockers: At discharge 50 patients (69 per cent or 77 per cent of patients without contraindications) were taking beta-blockers (Table 2). Contraindications (diabetes, asthma) were recorded in seven patients (9.7 per cent), and seven patients were noted to have low blood pressure readings at discharge (range 92/70 to 100/75). Seven patients (9.7 per cent) commenced beta-blockers after discharge from hospital (Table 3). At the six-month review 47 patients (65 per cent or 72.3 per cent of those without contraindications) were still taking beta-blockers (Table 2).

Lipid-modifying drugs: At discharge 12 patients (17 per cent) were taking lipid-modifying drugs (Table 2). No patients had contraindications to this class of drugs. Twenty patients (27.8 per cent) began taking lipid modifying drugs after discharge (Table 3). Sixteen of these patients were started on this medication by specialists and four patients by their GP (Table 3). At the six-month review 32 patients (44 per cent) were taking lipid modifying drugs. Bezafibrate (17 patients, 53 per cent) and simvastatin (12 patients, 38 per cent) were most commonly prescribed.

ACE inhibitors: At discharge 22 patients (31 per cent) were taking an ACE inhibitor (Table 2). No patients had contra-indications to this class of drugs. At the six-month review 21 patients (29 per cent) were taking an ACE inhibitor (Table 2). Captopril was most commonly prescribed.
Nitrates: At discharge 48 patients (67 per cent) were taking nitrates (Table 2). No patients had contraindications recorded to this group of drugs. At the six-month review 29 patients (40 per cent) were using nitrates, predominantly in the form of nitrolingual spray (69 per cent) [Table 2].

TABLE 2. MEDICATION USE IN STUDY PARTICIPANTS

	Beta-blocker*	Aspirin†	Lipid modifying‡	ACE inhibitor§	Nitrate¶
% used (n) at discharge	69 (50/72)	90 (65/72)	17 (12/72)	31 (22/72)	67 (48/72)
Still using at six-month interview	65 (47/72)	86 (62/72)	44 (32/72)	29 (21/72)	40 (29/72)
Reason for use % (n)	80 (45) prophylaxis 16 (9) hypertension 3 (3) unknown	98 (65) prophylaxis 2 (1) unknown	6 (2) prophylaxis 94 (30) dyslipidaemia	16 (4) prophylaxis 16 (4) hypertension 48 (12) heart failure 0 (5) unknown	21 (11) prophylaxis 77 (40) angina 2 (1) CHF
Names of medication @ 6 months	Atenolol 79% (37) Celiprolol 13% (6) Sotalol 8% (4)	Not recorded	Bezafibrate 53% (17) Simvastatin 38% (12) Gemfibrozil 6% (2) Pravastatin 3% (1)	Captopril 72% (15) Enalapril 12% (3) Enalapril/HCTZ 4% (1) Lisinopril/HCTZ 4% (1) Trandalopril 4% (1)	GTN spray 69% (36) Isosorbide mononit. GTN tablets 2% (1)

* Seven patients started beta-blockers after discharge.
† One patient started after discharge.
‡ Twenty patients started after discharge.
§ Three patients started after discharge.
¶ Four patients started after discharge.

Lifestyle changes

Smoking: At the time of hospital admission 34 patients (47.2 per cent) were smoking. Nineteen patients had never smoked. Nineteen patients had previously been smokers – 15 had stopped smoking more than five years before admission, and four had stopped in the preceding five years. At the six-month interview 20 of those patients who had been smokers at the time of their admission had stopped smoking. The remaining 14 patients (20 per cent) who still smoked had reduced the number of cigarettes smoked per day.

Medical follow-up

Visits to the GP: 66 patients (91.7 per cent) consulted their GP. Forty-eight (66.7 per cent) of these patients had made their first visit within two weeks of discharge (range one to 209 days) [Table 1].

Visits to cardiac outpatient clinic: 12 patients had never attended a cardiac outpatient clinic following hospital discharge. However, five of these patients had seen a cardiologist in private practice after hospital discharge.

Measurement of blood lipids: 69 patients (95.8 per cent) had a total cholesterol measured at the hospital within 24 hours of the acute coronary event. Twenty-seven of these patients had a cholesterol greater than 6.5mmol/L. Twenty-three patients (31.9 per cent) had not had blood lipid measurements done by their GPs at the time of the review. Four of these patients had available blood lipid measurements done at outpatient clinics.
Of those 49 patients who had blood lipid measurements ordered by their GP there were eight patients with total cholesterol greater than 5.5mmol/L, including three greater than 6.5mmol/L who were not taking lipid modifying drugs. Seven of these lipid measurements were obtained more than three months after the date of MI.
Nineteen patients had HDL cholesterol <1.0mmol/L. Thirteen of these occurred in patients with a total cholesterol <5.5mmol/L.

TABLE 3. MEDICATION PRESCRIBING; TEMPORAL AND PROVIDER ASPECTS					
	Beta-blocker (n = 57) % (n)	Aspirin (n = 66) % (n)	Lipid modifying (n = 32) % (n)	ACE inhibitor (n = 25) % (n)	Nitrate (n = 52) % (n)
Before MI by GP	17.5 (10)	9.1 (6)	6.2 (2)	24.0 (6)	7.7 (4)
Before MI by specialist	0 (0)	1.5 (1)	9.4 (3)	0 (0)	0 (0)
In hospital	70.2 (40)	87.9 (58)	21.9 (7)	64.0 (16)	84.6 (44)
After MI by GP	3.5 (2)	1.5 (1)	12.5 (4)	12.0 (3)	1.9 (1)
After MI by specialist	8.8 (5)	0 (0)	50.0 (16)	0 (0)	5.8 (3)
Proportions add to 100 per cent in columns.					

DISCUSSION

The use of beta-blockers and aspirin in secondary prevention after MI is well accepted. Beta-blockade for at least a year following MI is of proven value,[12] and is associated with a significant reduction (22 per cent) in cardiac death.[10]

Similarly the benefits of aspirin use have also been well documented.[9,10] In reality most studies have shown under-utilisation of these drugs in clinical practice.[15-17,19] The recently published ASPIRE study in Britain (a retrospective study which looked at prevalence and control of risk factors six months after coronary artery bypass graft, angioplasty, acute MI and acute myocardial ischaemia) showed that six months following MI 85 per cent of females and 86 per cent of males were receiving aspirin and 35 per cent of females and 41 per cent of males were receiving beta-blockers.[15]

Most recently Dovey et al. in their Oxfordshire study of secondary prevention practice three months following MI found that 92 per cent of all patients or 97 per cent of patients without contraindications were taking aspirin. Beta-blockers were used by 57 per cent of all patients and 66 per cent of patients without contra-indications.[20]

The figures from our study, namely that at six months after discharge from hospital 72 per cent were taking beta-blockers and 94 per cent of patients without contraindications were still taking aspirin, therefore compare favourably.

Valid cholesterol measurements taken at the hospital were found for 96 per cent of study patients. This compares favourably with two recent UK studies where the rates were 46 per cent[15] and 50 per cent.[20]

At the time of data collection the 1993 National Heart Foundation Guidelines[18] for detection and management of dys-lipidaemia were still current. The recommendations for very high and high risk groups (that is 10-year coronary event risk 20 per cent or greater) to which all study patients belonged were that there should be six months of dietary management initially.

Drug treatment would then be considered if total cholesterol levels were greater that 6.5mmol/L. The fact that only 12 patients were discharged on lipid modifying drugs when 27 patients had a total cholesterol greater than 6.5mmol/L is probably a reflection of those guidelines.

Approximately 26 per cent of patients had no blood cholesterol levels measured in the following six months either by their GP or at outpatient appointments. This may have potentially resulted in patients not receiving medication.

Furthermore, the finding that three patients with a total cholesterol of > 6.5mmol/L at six months had not yet received lipid modifying agents may in part be attributable to the prescribing regulations in existence at the time. In their study of the implementation of the 1993 guidelines Patel et al. also were of the opinion that restrictions placed on GPs were likely to be a major factor in the failure of blood lipid control in those patients in very high and high risk groups.[21]

Since data collection, the revised 1996 National Heart Failure clinical guidelines for the

assessment and management of dyslipidaemia[22] have become available and Pharmac has relaxed its prescribing regulations for statins by GPs. While concern continues to be voiced about the latter regulations,[23] the potential now exists for high and very high risk groups to have easier access to lipid modifying medications.

Approximately 20 per cent of the patients studied were taking ACE inhibitors at six-month follow-up. As objective evidence for left ventricular failure or impairment was not collected in this study no assessment can be made as to whether this represents appropriate prescribing. However the figure obtained is comparable to the figure of 25 per cent for MI in the ASPIRE study.[15]

Lifestyle changes following MI are an important part of secondary prevention. The benefits of smoking cessation are well proven. Mortality rates may be reduced up to 50 per cent when patients stop smoking after MI.[3,7,8] In our study 80 per cent of patients were not smoking at six-month follow-up. This is a similar figure to the ASPIRE study in which 77 per cent of patients were not smoking six months following MI.[15]

The level of follow-up as reflected in attendance at the GP (91.7 per cent) and private cardiologist or cardiac outpatient clinic (83 per cent) is encouraging.

The group of patients studied may be biased as a result of the response rate (47.4 per cent) and may not be representative of patients or practice throughout New Zealand. Maori and Pacific Island ethnic groups are under-represented. The fact that the investigator was not permitted to contact patients before patient consent had been obtained by hospital staff may have contributed to the response rate. However, the results obtained for the variables examined compare well with overseas studies.

Current opinion from overseas studies[15,20] is that most effective secondary prevention following MI will occur through the coordinated efforts and collaboration of primary and secondary care health professionals. The situation in New Zealand is no different. It is hoped that continued dissemination and education regarding secondary prevention practice, easier prescribing and improved communication will further enhance secondary prevention practice for patients following MI.

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