Research paper

An audit of secondary prevention of coronary heart disease in post acute myocardial infarction patients in primary care

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ABSTRACT

Introduction The National Service Framework for Coronary Heart Disease (CHD) defines national standards for delivering care after acute myocardial infarction (AMI).

Objectives To improve appropriate use of secondary prevention measures and investigations after an AMI at the interface of primary and secondary care.

Method Criteria for this audit were selected from those devised by the National Institute for Clinical Excellence: *Audit of the Management of Post-MI Patients in Primary Care.* A retrospective review was conducted of general practitioner (GP) records, for patients who were identified as being treated in hospital for AMI. Baseline audit data were collected in 2003 for patients treated for an AMI in 2001. Following a multifaceted intervention a re-audit was conducted in 2004 of patients treated for an AMI in 2002.

Results Data were collected for 340 patients from 78 practices for the baseline audit, and for 203 patients from 51 practices for the re-audit. Comparison of primary care trusts (PCTs) showed a variation in meeting the audit criteria at baseline and re-audit, but overall 9 out of 10 audit criteria were better achieved in the re-audit than at baseline.

Conclusion Baseline audit suggested standards of secondary prevention of CHD in post-MI patients were good overall, but there were variations in care between PCTs. Re-audit results suggest standards of care have improved overall after a multifaceted intervention.

Keywords: audit, myocardial infarction, primary care, secondary prevention

Introduction

The National Service Framework (NSF) for Coronary Heart Disease (CHD) published in 2000 defines national standards for delivering care after acute myocardial infarction (AMI).[1] Specific standards for the application of appropriate secondary prevention measures are identified as priorities in the NSF. The latter stipulates that drugs such as aspirin, beta-blockers and statins should be prescribed to 80–90% of patients following AMI, but previous audits and studies have suggested that many patients in primary care are receiving suboptimal doses of secondary prevention measures and that there is substantial potential to improve.[2–4] The NSF also states that: (1) a systematic approach should be used to identify people at risk of heart failure, including those who have suffered AMI; and (2) after AMI, hospitals should document assessment of left ventricular dysfunction in the discharge documents sent to general practitioners (GPs).

The objectives of the audit were to:

- improve appropriate use of secondary prevention measures (aspirin, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, statins)
- improve appropriate investigation (assessment of left ventricular function by echocardiogram) after an AMI

at the interface of primary and secondary care.

Methods

Design of audit

The audit was designed as a retrospective record review of GP-held medical records (paper and electronic). Criteria were selected from those devised by the National Institute for Clinical Excellence (NICE): *Audit of the Management of Post-MI Patients in Primary Care* (see Table 1).[5] A structured data collection form was designed to collect data for each criterion and relevant supplementary information. Formic automated data capture software was used, as this builds a database automatically as the data collection form is designed, and enables the data collected to be scanned directly into the database, with no manual data entry required.[6]

The audit was planned as a three-stage multipractice audit, as this approach has been shown to improve the management of patients in primary care following MI if appropriate feedback is given:[4]

1 *baseline audit*: phase I data collection
2 *implementation of change*: intervention
3 *re-audit*: phase II data collection.

Baseline audit

The six primary care trusts (PCTs) in Leicestershire were approached and asked if they were willing to participate in the multipractice audit. A letter of invitation was then sent to all 153 general practices identified at the time of audit. Practices that failed to respond were sent a second letter. If no reply was received after the second letter it was assumed that they did not wish to participate.

Patients eligible for the audit were identified from coronary care unit (CCU) records as being treated for an AMI in the year 1 January 2001 to 31 December 2001 inclusive. The study population included all patients admitted and discharged from the CCUs at the three main University Hospitals of Leicester (Leicester Royal Infirmary, Leicester General Hospital, and Glenfield General Hospital) with a diagnosis of AMI, and registered with a GP in the six PCTs in Leicestershire.

Exceptions were:

- patients who had more than one AMI in the year audited (data were collected for the last admission only) or who attended more than one of the three hospitals during their admission (data were collected for discharge hospital only)
- patients who died at anytime between date of AMI and date of audit
- patients who had left their registered GP since their AMI.

An audit assistant, employed by the Leicestershire Primary Care Audit Group (PCAG), collected data for patients in the recruited practices between March and September 2003. Data collected were scanned into a database and statistical analysis undertaken using Excel and SPSS to identify compliance with the audit criteria.

Implementation of change

A multifaceted intervention strategy was designed, as this has been shown to be the most appropriate approach to use when implementing change in performance in a clinical setting.[7] It consisted of four different parts:

1 practices were sent feedback of baseline audit results specific to their individual practice, and results comparing their PCT with the whole of Leicestershire
2 practices were sent reminders of recommendations for the management of post-AMI patients based on NICE audit criteria[5]
3 laminated guidelines on managing patients with heart failure due to left ventricular systolic dysfunction were sent to all GPs and contained information on:
   - assessment and treatment of heart failure
   - the use of beta-blockers and ACE inhibitors

Table 1 Proportion of patient records achieving individual audit criteria at baseline and re-audit

Audit criterion – the patient record shows that:	Baseline ($n = 340$)[a] (%; PCT % range)	Re-audit ($n = 203$)[a] (%; PCT % range)
1a Aspirin or clopidogrel was prescribed on discharge unless contraindicated	294/335 (87.8; 64–98)	188/190 (98.9; 96–100)
1b Aspirin or clopidogrel is currently prescribed unless contraindicated	302/332 (91.0; 88–98)	182/185 (98.4; 92–100)
2a A beta-blocker was prescribed on discharge unless contraindicated	267/318 (84.0; 58–100)	173/180 (96.1; 92–100)
2b A beta blocker is currently prescribed unless contraindicated	258/297 (86.9; 79–92)	159/167 (95.2; 91–100)
3a An ACE inhibitor was prescribed on discharge unless contraindicated	206/329 (62.6; 52–70)	163/195 (83.6; 69–89)
3b An ACE inhibitor is currently prescribed unless contraindicated	223/288 (77.4; 65–88)	147/166 (88.6; 84–100)
4a An angiotensin II receptor antagonist unless otherwise contraindicated was prescribed on discharge (where an ACE inhibitor was contraindicated)	3/10[b] (30.0; 0–67)	4/6[b] (66.7; 0–100)
4b An angiotensin II receptor antagonist unless otherwise contraindicated is currently prescribed (where an ACE inhibitor is contraindicated)	29/51[c] (56.9; 0–67)	28/31[c] (90.3; 50–100)
5 Cholesterol level has been checked in the past 12 months	262 (77.1; 65–84)	173 (85.2; 80–100)
6 Blood pressure has been checked in the past 12 months	306 (90.0; 79–95)	187 (92.1; 89–96)
7 Smoking status has been checked in the past 12 months	226 (66.5; 55–73)	159 (78.3; 60–94)
8 An echocardiogram has been performed if the patient is diagnosed with heart failure	110/184 (59.8; 40–71)	97/115 (84.3; 79–100)
9 Spironolactone is currently prescribed if the patient is diagnosed with moderate to severe heart failure, unless contraindicated	14/73 (19.2; 0–27)	7/40 (17.5; 0–33)
10 A flu vaccination has been administered in the preceding September to March	222 (65.3; 61–69)	136 (67.0; 47–83)

[a] n is less when criterion is not applicable to all patients.
[b] Angiotensin II receptor antagonist contraindicated on discharge (1 patient at baseline, 2 at re-audit).
[c] Angiotensin II receptor antagonist contraindicated currently (1 patient at baseline, 6 at re-audit).

(Guidelines included recommendations and an algorithm adapted from the NICE guideline.[8] These were supplemented by information from the Scottish Intercollegiate Guidelines Network (SIGN) in the form of two algorithms that were considered to be particularly appropriate[9])

4 A full detailed report was sent to PCTs to discuss at PCT-based multiprofessional learning sessions.

Educational events were also arranged to provide feedback but were later cancelled due to lack of interest.

Re-audit: design and data collection

The re-audit was undertaken in 2004 and conducted using the same audit criteria, and inclusion and exclusion criteria as those used in the baseline audit. Patients were identified with a diagnosis of hospital-treated AMI in the year 1 January 2002 to 31 December 2002 inclusive.

At the time of the re-audit, 150 general practices were identified in the six Leicestershire PCTs, and all practices were invited to take part in phase II of the data collection. A research assistant collected data for patients in the recruited practices between September 2004 and early January 2005.

Results

Number of practices taking part and patient records audited

- For the original baseline audit 911 patients were identified; 98 general practices agreed to take part in the audit and, after exclusions, data were collected for 340 patients from 78 practices (51% of all practices).

- For re-audit 718 patients were identified; 74 general practices agreed to take part and, after exclusions, data were collected from 61 practices. The phase II re-audit data presented were for 203 patients from 51 practices who took part in both phases of the audit (65% of the original practices who took part in the baseline audit). For 10 practices we collected baseline data only (15 patients), and these data were therefore excluded.

- The median number of patient records audited per practice was four at baseline (range 2 to 7) and three at re-audit (range 1 to 5).

Patient characteristics

The proportion of males and females, and age of patients were similar at baseline and re-audit (see Table 2). The number of months since admission to hospital with AMI, at time of audit, was slightly more at re-audit than baseline. Overall the comorbidity for patients at both baseline and re-audit was similar.

There was a slightly higher proportion of angina and strokes in the re-audit group compared to the baseline group, but a history of fewer MIs.

Practice characteristics

For both phases of the audit a higher proportion of practices that participated were teaching practices or group practices compared to those who declined to take part, (see Table 3). Teaching practices represented

Table 2 Characteristics of patients at baseline audit and re-audit

Variables	Baseline audit (*n* = 340)	Re-audit (*n* = 203)
Age in years		
all patients, median (IQR)	66 (57–74)	67 (57–76)
female, median (IQR)	72 (63–79)	69 (60–78)
male, median (IQR)	65 (56–71)	66 (56–75)
Sex		
female, *n* (%)	97 (28.5)	53 (26.1)
male, *n* (%)	243 (71.5)	150 (73.9)
Co-morbidity, *n* (%), past medical history of		
angina	193 (56.8)	138 (68.0)
previous MI	55 (16.2)	25 (12.3)
diabetes	91 (26.8)	58 (28.6)
stroke/CVA/TIA	25 (7.4)	22 (10.8)
atrial fibrillation	34 (10.0)	16 (7.9)
Number of months since AMI, median (IQR)	23 (21–27)	28 (25–31)

IQR: interquartile range; TIA: transient ischaemic attack.

Table 3 Characteristics of practices at baseline audit and re-audit

Characteristics of practices	Baseline audit			Re-audit
	Practice did not agree to the audit ($n = 55$)	Practice agreed to the audit ($n = 98$)	Audit data collected ($n = 78$)	Took part in both phases of the audit ($n = 51$)
Training status n (%)				
teaching practice	15 (27.3)	33 (33.7)	30 (38.5)	22 (43.1)
non-teaching practice	40 (72.7)	65 (66.3)	48 (61.5)	29 (56.9)
Number of GPs n (%)				
group practice	33 (60.0)	74 (75.5)	64 (82.1)	44 (86.3)
single-handed	22 (40.0)	24 (24.5)	14 (17.9)	7 (13.7)

27% of practices that did not agree at baseline, compared to 39% and 43% respectively of practices where baseline and re-audit data were collected. There was an even greater variation in the proportion of practices that were group practices; 60% of practices that did not agree at baseline, compared to 82% and 86% respectively of practices that participated in phase I and phase II data collection.

Achievement of audit criteria at baseline and re-audit: (see Table 1)

Secondary prevention: prescribing

The criterion for prescribing of aspirin or clopidogrel was well achieved in the baseline audit and improved further in the re-audit. Prescribing of beta-blockers was also overall well achieved at baseline audit, but there were variations between PCTs. This improved at re-audit and the variation between PCTs was reduced. Prescribing of ACE inhibitors was poorly achieved by some PCTs in the baseline audit, and prescribing rates for angiotensin II receptor antagonists were even lower. Combining results for criteria 3 and 4, the total number of patients prescribed either an ACE or an angiotensin II receptor antagonist if an ACE was contraindicated improved considerably in the re-audit. The increase in prescribing at discharge was from 62% to 83% (combining results for criteria 3a and 4a), and at the time of audit from 74% to 89% (combining results for criteria 3b and 4b).

Health monitoring and prevention in the preceding 12 months

Cholesterol checks, blood pressure checks, smoking status checks and influenza vaccination showed some improvement on re-audit overall, although the degree of improvement varied.

Heart failure

Assessment of left ventricular dysfunction by echocardiogram for patients diagnosed with heart failure was very poorly achieved by some PCTs in the baseline audit. One PCT achieved only 40%, and overall the percentage was only 60%. On re-audit this had increased considerably to 84% (ranging from 79% to 100%). The criterion for prescribing spironolactone to patients diagnosed with moderate to severe heart failure was very poorly achieved at baseline. Overall the result was only 19%, with the range being from 0% to 27%. On re-audit, achievement of this criterion fell slightly to 18% overall, and the range had increased only marginally from 0 to 33%.

Overall 9 out of 10 audit criteria were better achieved in the re-audit than at baseline. Variation between the PCTs increased at re-audit for influenza vaccinations, smoking checks and spironolactone, but for all other criteria variation decreased or remained similar.

Discussion

The baseline audit suggested that standards of secondary prevention of CHD in post-MI patients were good overall but there were variations in care between PCTs. Re-audit results suggest that in the short term standards of care had improved overall after a multifaceted intervention. Determination of longer-term effects was not within the scope of this audit.

It is acknowledged that our results may not be a true reflection of secondary prevention in all practices due to the low participation rate. Phase II re-audit data were available for only 51 out of 150 practices (34%). Unfortunately 24 of the 78 practices that took part in

the baseline audit did not agree to re-audit and three practices that took part in the original audit had no patients admitted with AMI in 2002. The audit did not require any additional work for the practices, but a few practices declined as they felt that they were already involved in other research or quality assurance programmes.

In addition, there were some differences in the characteristics of practices that did not agree to the audit compared to those that participated, in terms of teaching status and the proportion of practices that were single-handed (see Table 3). It is possible that these differences could affect the representativeness of the audit.

The small number of patient records audited at some practices may also limit the representativeness of the findings. As patient records were audited approximately two 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 AMI. Furthermore, practices in outlying parts of Leicestershire may have sent some patients with AMI to secondary care providers outside the locality, and these patients would not have been included in the audit.

Compared to previous audits conducted in Leicestershire this audit was more comprehensive. It considered all major evidence-based aspects of secondary prevention in primary care following AMI. This audit also included a multifaceted intervention designed to facilitate change in clinical practice and improve care. Other audits conducted in primary care have been limited to particular aspects of secondary prevention, or involved only baseline data collection with no intervention.[2–4]

The new general practice Quality and Outcomes Framework (QOF) may have had an influence in raising standards. The prescribing of spironolactone for patients diagnosed with moderate to severe heart failure is not included in the QOF, and this was the only criterion that did not improve in the re-audit. This suggests that the QOF may have had an impact on some of the improvements in the other criteria. However, improvements found were not restricted to primary care as re-audit results at discharge from secondary care also showed an increase. Furthermore, the prescribing of ACE inhibitors for patients who have suffered an MI is not part of the QOF, yet this criterion showed a marked improvement on re-audit. This suggests that the audit and multifaceted intervention may also have contributed to improvements in care. With the continuation of the QOF, further work needs to be conducted to find out which components of the quality improvement programme were associated with changes in care.

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CONFLICTS OF INTEREST

None.

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