Improving the Prescribing Gap For Guideline Recommended Medications Post Myocardial Infarction

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Introduction

Numerous large, randomised, controlled clinical trials have clearly demonstrated the substantial benefits of secondary preventive medications following myocardial infarction. Based on this large evidence base, international guidelines for treatment of acute coronary syndromes (ACS) recommend prescription of dual antiplatelet therapy, statins, beta

Background

We assessed the effect of a pre-discharge medication checklist on discharge prescription rates of guideline recommended medications following myocardial infarction. In addition, we assessed what proportion of the residual prescribing gap following implementation of the checklist was due to the presence of contraindications.

Methods

We examined baseline prescription rates of guideline recommended medications in 100 patients discharged from our institution following acute myocardial infarction. We then introduced a pre-discharge checklist and reassessed discharge medications and reasons for non-prescription of guideline recommended medications in 447 patients with acute myocardial infarction.

Results

We demonstrated a significant gap in the prescription of guideline recommended secondary prevention medications at the time of discharge in our pre-intervention cohort. Introduction of a pre-discharge checklist resulted in a significant improvement in the prescription rates of all guideline recommended secondary prevention medications, with aspirin increasing from 90% to 97% (p = 0.004), Adenosine diphosphate (ADP) receptor antagonist from 84% to 96% (p = 0.0001), B-blocker from 79% to 87% (p = 0.03), statin from 88% to 96% (p = 0.002) and angiotensin converting enzyme (ACE) inhibitor from 58% to 70% (p = 0.03). The residual gap in prescribing was largely explained by the presence of contraindications or absence of an indication in the case of ACE-inhibitors. Once these were taken into account there was a residual gap of 0–4% which represents genuine non-adherence to the guidelines.

Conclusions

Introduction of a pre-discharge checklist significant improvement in prescription rates of all five guideline recommended secondary prevention medications. The residual gap in medication prescription following introduction of the checklist was largely due to the presence of contraindications rather than non-adherence.

Keywords

Acute myocardial infarction • Secondary prevention • Evidence-based medicine • Guideline adherence

blocks and angiotensin converting enzyme (ACE) inhibitors following myocardial infarction [1–4]. There is compelling evidence that improved adherence to these guidelines translates to a reduction in mortality [5,6].

Despite this robust evidence base, studies continue to show a significant gap in the use of guideline recommended medications following myocardial infarction [7–12]. Reducing errors of omission, that is failure to provide evidence-based therapies, is clearly important and recently there has been a focus on implementing strategies to achieve this [13–15]. Checklists are increasingly recognised as effective and safe means of increasing adherence to best practice in health care settings [16]. In this regard, they form a useful tool aiding clinician prescription choices at the time of discharge post myocardial infarction [5].

It is also important to recognise that the gap in prescribing secondary prevention medications is likely to be due to a combination of errors of omission and the presence of contraindications to prescribing [17]. Because large registries usually do not collect data on the reasons for non-prescription currently, there is limited data on what proportion of the prescribing gap for secondary prevention medications is due to non-adherence and what proportion is due to the presence of contraindications to prescribing.

The aim of this study was, firstly, to quantify the existing gap in prescription of guideline recommended secondary prevention medication post myocardial infarction at our institution. Secondly, we aimed to assess whether introduction of a pre-discharge medication checklist would improve prescription rates of guideline recommended medication. Finally, we assessed what proportion of the residual prescribing gap following implementation of the checklist was due to non-adherence and what proportion was due to the presence of contraindications to prescribing.

The demographic data, clinical characteristics and admission medications for both the pre and post-intervention groups are shown in Table 1. There were no significant differences between the two groups.

There was significant variation in the prescription rates of guideline recommended secondary prevention medications at the time of discharge in the pre-intervention group (Table 2). Consistent with previous studies the prescription rates were highest for aspirin and lowest for ACE-inhibitors or angiotensin receptor blockers. Introduction of a discharge medication checklist resulted in a significant improvement in prescription rates for all of the guideline recommended medications following myocardial infarction [7–12]. Reducing evidence that improved adherence to these guidelines translates to a reduction in mortality [5,6].

**Methods**

**Patient Enrolment**

We identified a pre-intervention cohort of 100 consecutive patients discharged from our institution following acute myocardial infarction between May and September 2014 from the Wellington ACS registry. The Wellington ACS registry prospectively enrolled patients with acute myocardial infarction undergoing invasive management who are adequately pretreated with dual antiplatelet therapy, but the analysis of discharge prescription was retrospective. Patients were excluded if they had a platelet count less than 100 x 10^9/L, known platelet function disorder, administration of a fibrinolytic agent within 24 hours of enrolment or administration of a glycoprotein IIb/IIIa receptor antagonist within a week prior to enrolment. The Wellington ACS registry was reviewed and approved by the Central Regional Ethics Committee. All patients provided written informed consent.

From September 2014 until July 2015 an intervention cohort of 447 consecutive patients discharged from the Cardiology Service of Wellington Hospital following acute myocardial infarction was prospectively enrolled in to the study. Patients could either be admitted directly to Wellington Regional Hospital or referred for coronary angiography or percutaneous coronary intervention from secondary hospitals. Patients who died during admission and those who proceeded to in-patient coronary artery bypass surgery were excluded. Myocardial infarction was diagnosed in accordance with the third universal definition of myocardial infarction [18]. This project was introduced as a quality improvement initiative and conforms to the New Zealand standard for observational research.

**Data Collection**

Patient demographics, clinical characteristics, admission and discharge medications were recorded prospectively. Clinical management, including discharge medication prescription was at the discretion of the attending physician.

**Intervention**

A pre-discharge medication checklist was used as a prompt to prescription of guideline recommended medication for this group of patients (supplementary data Figure 1). This was placed in each patient’s notes at the time of admission and was completed at the time of discharge. The form documented whether or not aspirin, an ADP receptor antagonist (clopidogrel or ticagrelor), a statin, a beta blocker or an ACE-inhibitor or angiotensin receptor blocker had been prescribed and, if not, whether a contraindication was present. Absence of a contraindication to these medications was meant to prompt prescription if this had not already occurred. Two physicians were delegated responsibility for ensuring completion of the pre-discharge checklist.

**Statistical Analysis**

Categorical variables are expressed as frequencies and percentages. Continuous variables are expressed as mean and standard deviation. Statistical analyses were performed with Chi squared tests for dichotomous data and independent t-tests for continuous data. For all statistical analyses a p-value <0.05 was considered significant. All statistical tests were performed using SPSS version 22 (IBM, Armonk, NY).

**Results**

The demographic data, clinical characteristics and admission medications for both the pre and post-intervention groups are shown in Table 1. There were no significant differences between the two groups.

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<tr>
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**Table 2:** Significant variation in the prescription rates of guideline recommended secondary prevention medications at the time of discharge in the pre-intervention group (Table 2). Consistent with previous studies the prescription rates were highest for aspirin and lowest for ACE-inhibitors or angiotensin receptor blockers. Introduction of a discharge medication checklist resulted in a significant improvement in prescription rates for all of the guideline recommended medications following myocardial infarction [7–12]. Reducing evidence that improved adherence to these guidelines translates to a reduction in mortality [5,6].

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