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Seventeen-month follow-up of drug utilization for secondary prevention in coronary artery disease

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Research Article

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Abstract

Background: Despite the availability of various prevention guidelines on coronary artery disease, secondary prevention practice utilizing aspirin, beta-blockers, angiotensin converting enzyme inhibitors and statins still can be sub-optimal.

Objective In this study, we aimed to assess the guideline adherence of secondary prevention prescribing and the continuity of adherence for a 17-month period in a small cohort of patients angiographically diagnosed to have acute coronary syndrome (ACS).

Method In this prospective study, 190 patients who were angiographically diagnosed to have ACS were followed up for 17 months. The baseline demographic, clinical and drug data were collected at the day of discharge. All patients were followed up for three scheduled follow-up cardiac clinic visits (17 months period). After each clinic visit, Outpatient Medical Progress Notes (OMPN) were reviewed and prescribed treatments were recorded.

Results the 'initial prescribing rate' at discharge was found to be 98% for statins, 95.3% for aspirin, 87.2% for beta blockers, 73.8% for ACE inhibitors and 60% for all these medications in combination. 'Continuity of prescribing' for 2 years was 92.7% for aspirin, 89.3% for statins, 69.3% for beta-blockers, 58.7% for ACE inhibitors and 32.7% for all these medications in combination.

Conclusions Besides the sub-optimal prescribing of secondary prevention drugs, absence of continuity of prescribing seems to be a challenging issue in pharmaceutical care of coronary artery disease patients.

Keywords: *Drug Utilization, Follow up, Guideline, Secondary prevention, Coronary disease*

Introduction

Coronary artery disease (CAD) continues to be the leading cause of admission and non-accidental death In Malaysia for the last 10 years[1]. It accounts for 15-16% of all Ministry of Health (MOH) Hospitals' deaths annually for the 1995 – 2003 period. In 2006, there were a total of 31186 admissions to the 73 coronary care units (CCU) in Malaysia, of which 12534 admissions were due to ACS. The incidence of ACS admission was therefore 47.1 per 100,000 population in 2006[2].

Patients surviving an ACS are particularly susceptible to develop a wide range of complications , they have a risk of over 20% of heart failure, re-infarction, stroke, and mortality within 5 years[3], highlighting the importance of secondary prevention.

In fact, nearly 60% of the mortality from ACS occurs in patients with a previous cardiac event. [4]

Randomized trials have provided a clear and large volume of evidence that certain medications – namely Antiplatelet therapy, angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, and lipid-lowering therapy- can reduce recurrent ischemic events and improve survival in patients with ACS partly by modifying the disease process.[5-7] These classes form the basis for evidence-based medicine.

In Malaysia, there are two CPGs for ACS i.e. CPG on Management of Acute ST-Segment Elevation Myocardial Infarction (STEMI) 2007 and CPG on UA/NSTEMI 2002.

Malaysian guidelines as well as major international guidelines such as The American College of Cardiology/American Heart Association (ACC/AHA) guidelines currently recommend that all patients recovering from ACS should be initiated on (1) angiotensin converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs) for ACE inhibitor intolerance, (2) beta-blockers, (3) statins, and (4) Antiplatelet therapy for long-term treatment after an acute coronary event[8, 9].

Despite the guideline recommendations, many studies have reported an underutilization of evidence-based medicines (EBM) in ACS patients discharged from clinical practice [10-12].

Aim of the study

In this study, we aimed to assess the guideline adherence of secondary prevention prescribing and the continuity of adherence for a 17-month period in a small cohort of patients angiographically diagnosed to have acute coronary syndrome.

Methodology

This prospective cohort study was performed in the cardiac clinic of Penang general hospital (PGH), Penang, Malaysia. PGH is the largest public and tertiary hospital in Penang state. it provides primary and advanced medical health care for all illnesses and accidents. The baseline demographic, clinical and drug data were extracted from patients' medical records and chart reviews using a purpose- designed data collection form at the day of discharge. All patients enrolled in this study were followed up for three scheduled follow-up cardiac clinic visits (17 months period). After each clinic visit, Outpatient Medical Progress Notes (OMPN) were reviewed and prescribed treatments were recorded.

All aspects of the study protocol were approved by the Ministry of Health Ethical Committee (MREC) and from Penang General Hospital. All patients were fully informed and gave their informed consent before participating in the study.

Patient population

Patients with a diagnosis of acute coronary syndrome admitted to the hospital in one-month period were assessed; a random sample of 190 patients who met the inclusion criteria was selected and was followed-up for three scheduled follow-up cardiac clinic visits (17 months period).

Statistical analysis

All analyses were performed using the18th version of SPSS statistical software. Descriptive statistics were used to describe demographic and disease characteristics of the patients. Percentages and frequencies were used for the categorical variables, while means and standard deviations were calculated for the continuous variables.

Main outcome measures

The guideline adherence rate of the initial prescribing; the continuity of prescribing; and the rate of 'ever prescribed' patients were calculated for aspirin, statins, beta-blockers and ACE inhibitors.

The *'initial prescribing rate'* for each medication reflects the percentage of patients who were initially (at discharge) prescribed the relevant medication.

'Continuity of prescribing rate' for each medication reflects the percentage of patients who were initially and continuously prescribed the relevant medications for 17 months period.

The rate of *'ever prescribed'* patients reflects the percentage of patients who were prescribed the relevant medications initially or at any time during the 17 months period.

Results

Of the 190 patients in the initial study, only 150 (78.9%) manage to complete the follow-up study. Reasons for non-response to follow up are shown in Table 1.

Table 1. Reasons for withdrawal from the study

Reason	No. of patients
Died	3
Transferred to another center	18
Not adherent to follow-up	13
No more Follow-up needed	6
Total	40

Patient characteristics

The mean age of our study population was 59.01 years (range 32–84 years), with 27.9% of patients aged over 65 years (Table 1). Most (70%) patients were males. 58.9% (112) of the subjects were diagnosed as UA, 21.05% (40) as NSTEMI and 20% (38) as STEMI. A large proportion of patients had pre-existing hypertension (74.2%) or diabetes mellitus (50.5%) hypercholesterolemia (59.5%) on hospitalization. Regarding prior cardiovascular events and interventions, 116 patients (61.1%) reported a prior angina / MI, 29 (15.3%) had a prior PCI and 20 (10.5%) patients had a CABG, table I shows the baseline characteristics of the patients.

Table 2. Patient characteristics

Characteristic	UA (N=112) *n* (%)	NSTEMI (N=40) *n* (%)	STEMI (N=38) *n* (%)
Age group			
≤ 44 years	10 (8.9)	4 (10.0)	4 (10.5)
45 – 54 years	29 (25.9)	8 (20.0)	16 (42.1)
55 – 64 years	43 (38.4)	11 (27.5)	12 (31.6)
65 – 74 years	14 (12.5)	11 (27.5)	4 (10.5.0)
75 – 84 years	16 (14.3)	6 (15.0)	2 (5.3)
Gender			
Male	77 (68.8)	24 (60.0)	32 (84.2)
Female	35 (31.3)	16 (40.0)	6 (15.8)
Race			
Malay	36 (32.1)	13 (32.5)	17 (44.7)
Chinese	44 (39.4)	16 (40.0)	14 (36.8)
Indian	32 (28.6)	11 (27.5)	7 (18.4)
IHD Risk Factors			
Family history of IHD	50 (44.6)	24 (60.0)	23 (60.5)
Hypertension	92 (82.1)	29 (72.5)	20 (52.6)
Diabetes mellitus	65 (58.0)	23 (57.5)	8 (21.1)
Dyslipidemia	74 (66.1)	23 (57.5)	16 (42.1)
Cigarette smoking			
Current	31 (27.7)	12 (30.0)	23 (60.5)
Past	31 (27.7)	11 (27.5)	5 (13.2)
Medical History			
Prior angina / MI	84 (75.0)	21 (52.5)	11 (28.9)
Prior bypass surgery	14 (12.5)	6 (15.0)	0 (0.0)
Prior PCI	21 (18.8)	5 (12.5)	3 (7.9)
AF	3 (2.7)	1 (2.5)	2 (5.3)
CHF	3 (2.7)	0 (0.0)	0 (0.0)
Renal insuffiency	8 (7.1)	5 (12.5)	0 (0.0)
History of stroke/TIA	10 (8.9)	2 (5.0)	3 (7.9)
Peptic Ulcer	5 (4.5)	1 (2.5)	1 (2.6)
Gastritis	23 (20.5)	8 (20.0)	2 (5.3)
COPD	6 (5.4)	2 (5.0)	1 (2.6)
BMI (kg/m^2)			
<18.5	6 (5.4)	0 (0.0)	2 (5.3)
18.5 – 24.9	64 (57.1)	24 (60.0)	22 (57.9)
25 – 29.9	36 (32.1)	13 (32.5)	11 (28.9)
≥30	6 (5.4)	3 (7.5)	3 (7.9)
Ejection fraction			
Not Measured	37 (33.0)	14 (35.0)	3 (7.9)
≤ 40%	18 (16.1)	8 (20.0)	9 (23.7)
> 40 %	57 (50.9)	18 (45.0)	26 (68.4)
TIMI risk score			
0 – 2	27 (24.1)	13 (32.5)	10 (26.3)
3 – 4	73 (65.2)	19 (47.5)	20 (52.6)
5 – 7	12 (10.7)	8 (20.0)	8 (21.1)
NYHA Classification			
Class I	32 (28.8)	13 (32.5)	22 (57.9)
ClassII	61 (55.0)	17 (42.5)	13 (34.2)
ClassIII	17 (15.3)	10 (25.0)	3 (7.9)
Class IV	1 (0.9)	0 (0.0)	0 (0.0)
GFR (ml/min)			
≥ 90	27 (24.1)	8 (20.0)	12 (31.6)
89-60	39 (34.8)	11 (27.5)	16 (42.1)
59-30	38 (33.9)	17 (42.5)	8 (21.1)
29-15	7 (6.3)	2 (5.0)	2 (5.3)
< 15	1 (0.9)	2 (5.0)	0 (0.0)

Prescription issues

Restricting the analysis to only those patients who complete the follow-up study (n=150), the prescribing patterns of evidence-based medicines changed over the study period. table 3.

The rate of ever-prescribed patients was 99.3% for statins, 98.7% for aspirin, 94% for beta-blockers, 87.3% for ACE inhibitors and 80.7% for all these medications in combination.

The 'initial prescribing rate' was 98% for statins, 95.3% for aspirin, 87.2% for beta-blockers, 73.8% for ACE inhibitors and 60% for combined EBM.

'Continuity of prescribing' was 92.7% for aspirin, 89.3% for statins, 69.3% for beta-blockers, 58.7% for ACE inhibitors and 32.7 for combined EBM.

Table 3. Trends in EBM use from hospital discharge to third follow up

Medication	discharge (n=150)	1st Follow-up (n=150)	2nd Follow-up (n=150)	3rd Follow-up (n=150)	*p* value *
Aapirin/Ticlopidine	143 (95.3)	146 (97.3)	143 (95.3)	144 (96.0)	0.791
ACE-I/ ARB	111 (74.0)	113 (75.3)	115 (76.7)	113 (75.3)	0.962
Beta-blocker	131 (87.3)	128 (85.3)	124 (82.7)	119 (79.3)	0.267
Statin	147 (98.0)	144 (96.0)	145 (96.7)	144 (96.0)	0.743
All classes togather	90 (60.0)	93 (62.0)	88 (58.7)	84 (56.0)	0.758

It was found out that 2.6% of those who were initially prescribed aspirin at discharge were no longer using the medication at the end of the follow-up study. This rate was 8.7% for statins, 15.3% for ACE inhibitors, 18% for beta-blockers and 27.3% for combined EBM. The continuity of adherence rates was very low for combined EBM. Figure 1.

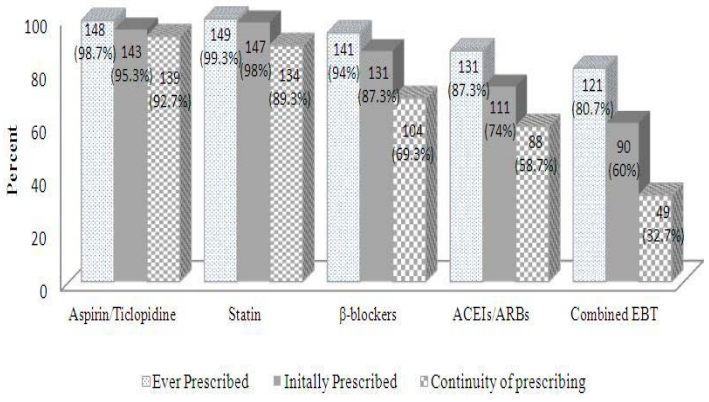

Figure 1. Prescribing adherence to guidelines

Conclusion

Besides the sub-optimal prescribing of secondary prevention drugs, absence of continuity of prescribing seems to be a challenging issue in pharmaceutical care of coronary artery disease patients.

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AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

PEER REVIEW

Not commissioned; externally peer reviewed

CONFLICTS OF INTEREST

The authors declare that they have no competing interests