

Original Research Article**Use of secondary prevention drug therapy in patients with coronary artery disease in a tertiary care centre in Mangalore, South India**

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Abstract

Coronary artery disease (CAD) has grown into a global epidemic. Secondary prevention therapies have proven to be of benefit in the long term management of CAD patients. Still secondary prevention therapy is under utilized in these patients. This retrospective study was undertaken in a tertiary healthcare centre in Mangalore, South India during 2009-2010 to study the rates of aspirin, β -blocker, angiotensin converting enzyme inhibitor (ACEI), statin and their combinations prescribed during discharge from the hospital. Among 137 patients 75.9% were men, 95.6% received an antiplatelet, 85.4% received statins, 74.5% received β -blocker, and 54.7% received angiotensin converting enzyme inhibitor. Receipt of prescription for β -blocker, ACEI combination was observed in 43.1% patients, three drug combination excluding antiplatelet was seen in 41.6% and all four drug combination use was observed in 40.9% patients. Even though the secondary prevention therapy in this study was comparable with other studies, secondary prevention therapy is under utilized in India. The findings of this study highlight the opportunity to improve care for CAD patients.

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1. Introduction

Cardiovascular diseases (CVDs) remain a leading cause of morbidity and mortality worldwide, and have become a burgeoning global epidemic and more than 30% of all the deaths every year are attributed to CVDs.^{1,2} The principal CVD responsible for the global rise in mortality is atherosclerotic vascular disease.² Studies have indicated that, India is witnessing CVD as the leading cause of death,^{3,2} and more over Indians have a high prevalence of risk factors, with coronary heart disease affecting them at least 5-6 years earlier than their western

counterparts,^{3,4} and also as the Indian economy grows, there is a possibility for further increase in CVD.² β -blockers, angiotensin-converting enzyme inhibitors (ACEI)/Angiotensin-II Receptor Blockers (ARBs), statins, and antiplatelet agents have been codified into the 2006 American Heart Association/American College of Cardiology (AHA/ACC) Guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease. These secondary prevention therapy guidelines reflect the current standard of care for patients with coronary artery disease (CAD),^{5,6,7} also, numerous clinical trials have demonstrated

the value of long term management with secondary prevention medications in reducing the risk of cardiovascular events and mortality in patients after acute coronary syndromes (ACS),⁸ but there is evidence that secondary prevention therapies are neither consistently prescribed when appropriate, nor adhered to by patients,^{2,5,9,10} few studies on this field in India have reconfirmed this finding.^{3,11}

Most of the recent decline in coronary mortality in the USA is believed to be secondary to improving risk-factor profiles, and effective primary and secondary treatments of ACS with aspirin, β -blockers, statins, and, when appropriate, ACEI or ARB. Expensive interventions, such as revascularisation, account for only 5% of this benefit.^{2,12} Studies have indicated that proper implementation of this evidence based secondary prevention treatment is an important step to reduce the morbidity and mortality associated with CAD among Indians.^{2,13}

Although secondary prevention has the potential to substantially reduce the risk of coronary events, its impact depends on the extent to which it is applied in the community, hence, the objective of this study was to evaluate rates of use of four key evidence based drug therapies (β -blockers, ACEI/ARB, statins, antiplatelets) for patients with CAD during their hospital discharge in a tertiary care hospital in Mangalore, South India, and evaluate its use in relation to the patient's age.

2. Materials and methods

A retrospective analysis of discharge records of all patients admitted to A.J. Hospital and Research Centre between August 2009 and July 2010 with a diagnosis of ACS were eligible for study inclusion. All aspects of this study were approved by the Institutional Ethics Committee and written permission was obtained from the Head of the Institute. Patients who did not

receive coronary angiography during the hospitalization were excluded. The diagnosis of ACS was documented by presence of symptoms consistent with acute coronary insufficiency, ECG findings and coronary angiography findings.

Discharge medications that were assessed included β -blockers, ACEIs /Angiotensin Receptor Blockers, statins and antiplatelet agents (aspirin, clopidogrel or ticlopidine). Extent of use of secondary prevention treatment in CAD was assessed in all ACS patients, and compared the prescription rates of each secondary prevention medication between patients. Use of secondary prevention treatment was also assessed in relation with the age of the patients. Patients were divided into four age groups those aged <35 years, patients aged from 36 to 45, those from 46 to 65 and those aged >65.

Descriptive statistics were used to report on the data for cardiovascular drug utilization. The utilization of cardiovascular drug classes described includes β -blockers, ACEI/ARBs, statins and antiplatelets. Statistical analysis included calculations of percentages for discrete variables and means and standard deviations (SD) for continuous variables.

3. Results

During the study period, 137 patients were hospitalized due to ACS. Of these, 75.9% (n=104) were men (Table 1). The combined mean age (\pm SD) for men and women was 59 years (\pm 11.60). The mean age of the men was significantly lower than for the women. The majority of the patients were aged between 51-65 years (n=62, 44.9%) followed by those aged above 65 years (n=42, 30.4%). More men, 46.2% (n=48), were between 51-65 years whereas women who were affected in this age group formed 42.4% (n=14), more women

(n=14, 42.4%) than men (n=28, 26.9%) were aged more than 65 years.

Of the 137 patients, 135 (98.5%) were treated by at least one of antiplatelets, β -blockers (BBs), ACEI/ARBs and/or statins (Table 2). 102 patients received a β -blocker, 75 received an ACEI/ARB, 131 patients received an antiplatelet agent, and 117 patients received a statin. 43.1% (n=59) received β -blocker and ACEI, two drug combination, 41.6% (n=57) received β -blocker, ACEI, and a statin, three drug combination and 40.9% (n=56) received all the four drug combination. Among ACE-I and β -blocker, ACE-I was used more commonly in younger (age-a) (80%) and older (age-d) (76.2%) patients, especially so when compared with its

use in age-b (42.8%) and age-c (43.5%). Use of β -blocker was comparable within all the age groups. In the younger than 35 years and older than 65 year age group, the drug class with the highest prevalence of use was ACEI/receptor blocker (rates of 80% and 76.2% respectively), whereas the age group of 36-50, 51-65 were prescribed more commonly with a β -blocker (rates of 71.4% and 77.4% respectively). Antiplatelets were the most commonly used class in all the age groups (overall rate of 95.6%) followed by statins (overall rate of 85.4%). Patients older than 65 years were more likely to receive all the drug classes either alone or in combinations compared with those aged less than 65 years.

Table1: Demographic characters of CAD patients

	Male	Female	Total
Total no. of patients	104 (75.9%)	33 (24.1%)	137
Age (years; mean \pm SD)	57.85 \pm 11.92	62.58 \pm 9.81	59 \pm 11.60
Age-a (<35yrs); No. (%)	5 (4.8)	0	5 (3.6)
Age-b (36-50); No. (%)	23 (22.1)	5 (15.6)	28 (20.4)
Age-c (51-65); No. (%)	48 (46.1)	14 (42.4)	62 (45.3)
Age-d (>65); No. (%)	28 (27)	14 (42.4)	42 (30.7)

Table 2: Secondary prevention drug therapy utilization in CAD patients

	Age-a (%)	Age-b (%)	Age-c (%)	Age-d (%)	Total No. (%)
β blocker	3 (60)	20 (71.4)	48 (77.4)	31 (73.8)	102 (74.5)
ACEI/ARB	4 (80)	12 (42.8)	27 (43.5)	32 (76.2)	75 (54.7)
Statin	4 (80)	23 (82.1)	53 (85.5)	37 (88.1)	117 (85.4)
Antiplatelet	4 (80)	27 (96.4)	59 (95.2)	41 (97.6)	131 (95.6)
BB+ACEI/ARB	3 (60)	10 (35.7)	21 (33.9)	25 (59.5)	59 (43.1)
BB+ACEI/ARB +Statin	3 (60)	10 (35.7)	20 (32.3)	24 (57.1)	57 (41.6)
All 4 drugs	3 (60)	10 (35.7)	20 (32.3)	23 (54.8)	56 (40.9)

4. Discussion

Our study evaluated the rates of exposure to four evidence-based drug therapies during hospital discharge for patients with CAD in a tertiary care hospital. We found that 102 (74.5%) of CAD patients received a β -blocker during discharge from the hospital, 75 (54.7%) received ACEI, 117 (85.4%) received statin, and 131 (95.6%) received an antiplatelet. Several other studies have examined the proportion of hospitalized cardiac patients discharged on secondary prevention medications.^{5,9,10,14} Lee et al. examined the use of β -blockers, ACEIs and statins using medical claims from commercial health plans within a managed care organization located in the Mid-Atlantic states, this research found rates of use of 63.9% for β -blockers, 51.8% for ACEI, and 62.6% for statin and 29.9% had all three drug utilization among 1,135 patients.⁹ Ramnath et al evaluated treatment for 2264 patients CAD patients admitted to the University of Michigan Health System's ACS (Acute Coronary Syndrome) registry. Use rates for aspirin, β -blockers, ACEIs, and statins were 95%, 89.2%, 65.6% and 81.2% respectively for obstructive CAD and 87.8%, 74%, 62.6% and 69.1% for non-obstructive CAD. Combination of three or more medication was reported among 85.9% and 69% respectively for obstructive and non-obstructive CAD.¹⁴ Maddox et al. conducted a retrospective cohort study of 14,89,745 CAD patients to evaluate the use of aspirin, β -blocker, ACEI and statin among non-obstructive and obstructive CAD patients and reported 72.7% versus 90.9% for aspirin, 57.9% versus 79.4% for β -blocker, 45.9% versus 58.6% for ACEI and 60% versus 80.3% for statin.⁵ Toomas et al. reported use of 3 drug combination (β -blocker, ACEI, statin) in 42.2% out of 2365 men patients and 38.98% out of 1660 women patients, and 2 drug (BB & ACE-I) combination in 25.45% men and 31.63% in women.¹⁰ Another multicentre study in India among 20468 patients identified that 97.9% received antiplatelet therapy, 59.3% received β -blocker, 52% received statins and

56.8% received ACEIs.³ The percentage of use in these studies ranged from 57.9% to 89.2% for β -blockers, 45.9% to 65.6% for ACEIs, 52% to 81.2% for statins and 72.7% to 97.9% for antiplatelets. Our reported use rates fall within this range for β -blockers, antiplatelet and ACEIs, and all above the mid range, but the use of statin in our study was higher than the reported range.^{5,9,10,14} Lee et al. reported use of β -blocker, ACEI and statin combination therapy in 29.9% patients,⁹ and 42.2% was reported by Toomas et al.¹⁰ Our study reported use of this three drug combination in 41.6% of patients. Toomas et al. also reported use of β -blocker and ACEI two drug combination in 31.63% in females and 25.45% in males, which was 43.1% in our study report, including both male and female patients. All the four drugs combination was used in 40.9% of patients in our study. Our study noted that patients in the higher age category (>65 years) were more likely to receive ACEI, statin, and antiplatelet compared to younger patients, even the three drug and four drug combination treatment was found to be highest in older age group. Lee et al. reported less use of statins in older age and patients \geq 80years were less likely to receive ACEIs.⁹

5. Conclusion

Majority of patients admitted with CAD received at least one of the classes of secondary prevention medications. Use of combination of secondary prevention medications was comparable with other study reports. More than 65 year age group patients were more likely to receive the secondary prevention drugs both individually and in combination when compared to patients aged from 36-45years and 46-65 years except β -blocker which was used higher in 46-65 age group. Further research is needed in assessing the secondary prevention usage in large patient groups and the differences in use of these therapies by demographic factors, adherence and persistence to improve use of the secondary prevention therapies.

6. Limitations

Foremost among the study limitations is that it is a retrospective study and use of the prescribed drugs by the patient was not confirmed. Associated co-morbidities were not taken into consideration and treatment difference among male and female patients were not considered.

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