

Evaluation of prescribing pattern of drugs use in patients of coronary artery disease at a tertiary care hospital

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Received: 06 July 2018

Accepted: 11 August 2018

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ABSTRACT

Background: Coronary artery disease (CAD) is a major cause responsible for mortality more in younger age group than in elderly. Studies have reported underuse of four evidence based medicines namely aspirin, β -blockers, angiotensin-converting enzyme inhibitors (ACE-I) or angiotensin receptor blockers (ARB), and statins in patients with CAD, particularly in developing countries. Therefore, this study was planned to analyse the prescriptions of patients with CAD to determine the appropriateness of the prescriptions.

Methods: After obtaining the Institutional ethics committee permission, a cross sectional observational study was conducted at a tertiary care hospital. Total 150 patients were enrolled from the outpatient department, wards and intensive care unit of medicine department. Total 150 patients' prescriptions presenting with varied category of CAD were screened and analysed.

Results: The most common categories of CAD encountered was ST segment elevated myocardial infarction (N=50, 33%) followed by chronic stable angina (N=29, 20%). Among the drugs prescribed, antiplatelet drugs were prescribed to 135 (90%), hypolipidemics to 134 (89%), nitrates to 114 (76%), beta blockers to 97 (65%), ACE inhibitors to 94 (64%), anticoagulants to 60 (40%) and miscellaneous drugs to 52 (35%), patients. Of 68 (45%) patients with type 2 diabetes mellitus, 15 (22%) were prescribed only metoprolol and others were given ACE-I or ARBs.

Conclusions: Among four evidence based drugs, use of 3 drugs, antiplatelets, beta blockers and hypolipidemics was apparent in 90% of prescriptions. Use of ACE inhibitors and ARBs was observed in type 2 diabetic patients with CAD, reflecting rational prescribing behavior of clinicians.

Keywords: Myocardial infarction, Observational study, Prescription auditing, Secondary prevention

INTRODUCTION

Cardiovascular diseases (CVDs) are the number one cause of death globally, more people die annually from CVDs than from any other cause. Over three quarters of CVD deaths take place in low- and middle-income countries.¹ In Western populations only 23% of CVD deaths occur before the age of 70 years whereas in India, this number is 52%.² In addition, case fatality attributable to deaths due to cardiovascular diseases in low-income countries,

including India, appears to be much higher than in middle and high-income countries.^{3,4} As speculated by WHO, as a result of burden of CVDs, India would lose \$237 billion due to the loss of productivity and spending on health care over next 10-year period, 2005–2015.⁵ Coronary artery disease (CAD) and stroke constitute the majority of CVD mortality in India (83%), with CAD being predominant, causing mortality more in younger age group than in older age.⁶

In a study conducted by Sharma et al, the authors concluded that the use of evidence-based secondary prevention cardiovascular therapies was low in patients with established CAD. At a tertiary care hospitals, the combination of 4 evidence-based medicines, namely aspirin, β -blockers, angiotensin-converting enzyme inhibitors (ACE -inhibitors) or angiotensin receptor blockers (ARBs), and statins were prescribed only to 54% of eligible patients with CAD, whereas the rates were despairingly low in secondary (28%) and primary care (7%) clinics.⁷

Another findings from an epidemiological survey carried out by Yusuf et al, in 'PURE' study, in 5650 self-reported CAD and 2292 stroke participants, observed remarkable underuse of therapies for CAD in low-income countries.³ Almost 80% of the participants with CAD were not on any of the 4 evidence-based secondary prevention drugs (aspirin, β -blocker, ACE -inhibitors, and statins) in the low-income countries, in comparison with 11% of participants in high-income countries which suggested an urgent need of providing basic, inexpensive and affordable drugs to the patients at large in developing countries.³ Vamadevan et al, in their review article on coronary artery disease in Indians have recommended the need for developing treatment algorithms and treatment guidelines for patients with CAD at various levels of health care.⁸

The patient of CAD may present with variety of clinical presentations, as different CAD subtype (acute ST segment elevated myocardial infarction (ST segment elevated myocardial infarction; STEMI), acute non-Q infarction (Non-ST segment elevated myocardial infarction; NSTEMI), unstable angina, chronic stable angina or congestive heart failure, and may show evidence of associated cardiovascular risk factors such as smoking, hypertension, hypercholesterolemia and diabetes, which might have influenced the prescribing practices.

The analysis of prescription pattern in patients with CAD would help in recognizing the current trend of treating patients with CAD having diverse presentation and associated co morbidities in the patients attending the government hospital. This study was therefore planned to scrutinize the prescriptions to determine the appropriateness of the prescriptions so as to provide the basis for modification in the future drug usage if any, and to find out availability of these medications from the hospital pharmacy.

Aims and objectives

1. To categorize patients with CAD into different subtypes (acute ST elevation infarction, acute non Q infarction, unstable angina, chronic stable angina or congestive cardiac failure).
2. To find out total number of drugs prescribed from various classes (ACE-inhibitors, ARBs, calcium channel blockers, beta blockers, alpha blockers, nitrates, diuretics, hypolipidemic drugs, antiplatelets,

fibrinolytics, and anticoagulants) with their doses, dosage forms, and frequency of administration.

3. To evaluate availability of these drugs in the hospital pharmacy.

METHODS

This was a cross-sectional observational study conducted by the Department of Pharmacology in collaboration with Department of Medicine at a tertiary care teaching hospital in Mumbai. Institutional Ethics Committee permission was obtained before initiating the study. Total 150 patients were enrolled from the medicine outpatient department, intensive care unit and medicine wards.⁹ The study was conducted over a period of 6 months from April 2017 to September 2017.

Inclusion criteria

- Patients with the established diagnosis of CAD, attending outpatient department or admitted in the ward or intensive care unit of Medicine department
- ≥ 18 years of age, of either gender
- Patients with or without co morbidities, such as diabetes mellitus, bronchial asthma, rheumatoid arthritis, or any other disease
- Patient willing to give written informed consent.

Exclusion criteria

Patients who refuse to participate in the study.

Written informed consent was obtained from each patient before screening their prescription. The procedures followed in the study were in accordance with the ethical standards of Institutional Ethics committee on human experimentation and with the Declaration of Helsinki, adopted by the 18th World Medical Assembly, revised in 64th General Assembly, Fortaleza, Brazil, October 2013. The privacy and the confidentiality of the data was maintained throughout the study.

Data collection

Total 150 patients' prescriptions were studied and included in final analysis. Physicians were not asked to change their routine-prescribing practice behaviors. The demographic data (included age, sex, occupation, education and income per annum), diagnosis, personal habits, and presence of any other co morbid conditions were recorded from the outpatient prescription sheet or inpatient admission papers. Data related to drugs prescribed was recorded as the name of the drug (Brand name or generic name), dosage form, strength, frequency of dosing, duration of treatment and cost of the drug. Similarly, details about the concomitant medications, information regarding availability of these medications from the hospital pharmacy and physical examination findings such as blood pressure recordings, heart rate, ECG reporting was noted. Other laboratory investigations

carried out within past 6 months such as blood sugar level (fasting and post-prandial), lipid profile, serum electrolyte, serum creatinine, and prothrombin time were also noted.

Statistical analysis

Data was entered in MS Excel 2010 and analyzed. Descriptive statistics expressed in terms of actual numbers, and percentage was used for data analysis. The statistical analysis was done using statistics software GraphPad Prism version 5.0 for Windows, GraphPad Software, San Diego California USA, www.graphpad.com and SPSS version 20.0.

RESULTS

Total 150 patients’ prescriptions were screened from May 2017 to September 2017 and analysed.

From the demographic profile, it was observed that among the 150 prescriptions of patients analysed, 87 (58%) were males and 63 (42%) were females. The age distribution of patients with CAD is represented in Figure 1.

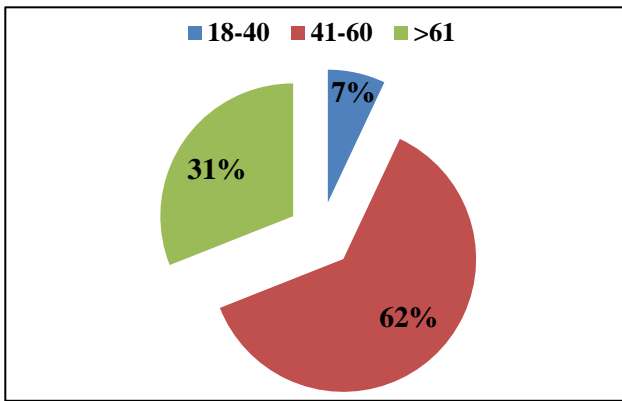
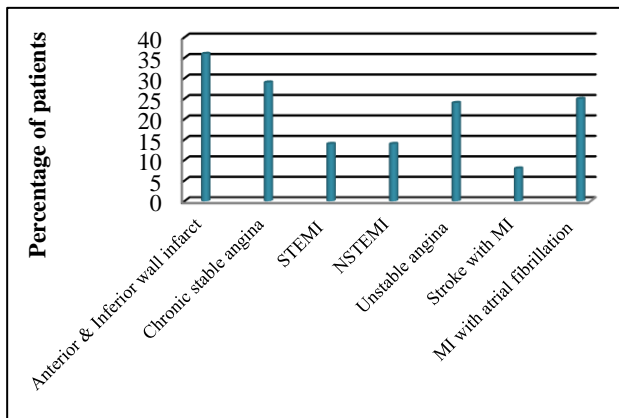


Figure 1: Age (in years) distribution of patients with CAD.



NSTEMI - Non ST segment elevation myocardial infarction, STEMI - ST segment elevation myocardial infarction, MI - myocardial infarction

Figure 2: Percentage distribution of category of CAD diagnosed.

Among the males, 23(16%) were smokers, 28(19%) gave past history of alcohol consumption and 21(14%) were tobacco chewers.

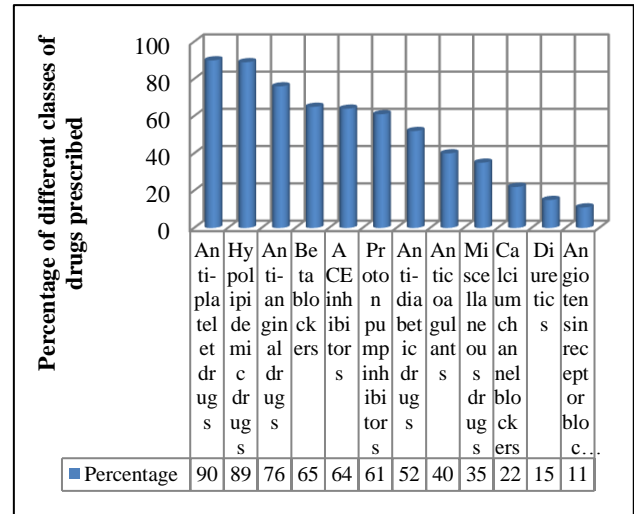


Figure 3: Percentage distribution of different classes of the drugs prescribed.

The common categories of CAD encountered in the study were anterior and inferior wall infarction (N=36,24%), Non-ST segment elevation myocardial infarction (NSTEMI)(N=14, 9%), ST segment elevation myocardial infarction (STEMI) (N=14, 9%), unstable angina (N=24, 16%), stroke with myocardial infarction (N=8, 6%), chronic stable angina (N=29, 20%), myocardial infarction (MI) with atrial fibrillation (N=25, 16%). This distribution of different categories of CAD encountered is depicted in Figure 2. The categorization of patients of CAD based on presence of concomitant diseases is depicted in Table 1. Of 150 patients, 20 (13%) patients had only CAD. Figure 3 represents the percentage distribution of various classes of drugs prescribed to these patients.

Table 1: Categorization of patients of CAD based on presence of concomitant diseases.

Concomitant diseases	Number (%) of patients (N=150)
Hypertension	51 (34%)
Type 2 diabetes mellitus	23 (15%)
Hypertension and Type 2 diabetes mellitus	45 (30%)
Bronchial asthma	06 (4%)
Others (COPD, epilepsy)	09 (6%)

Out of 150 patients 68 (45%) patients had type 2 diabetes mellitus, of which 29 (43%) patients were prescribed cardioselective beta blocker (metoprolol) and ACE inhibitor (ramipril), 24 (35%) received only ACE a cardioselective inhibitor, ramipril and 15 (22%) patients were prescribed only beta blocker (metoprolol). Also, of 6 patients who had CAD also had asthma with chronic obstructive pulmonary disease (COPD), 4 patients were

prescribed cardio-selective beta blocker, one patient was given an ACE inhibitor and the other patient who also had type 2 diabetes mellitus was prescribed an ARB. All the prescribed drugs were provided from the hospital pharmacy.

DISCUSSION

Studies have reported that, apart from non-availability of secondary prevention programs, low availability of drugs and lack of suitable long term care in patients of coronary artery disease has been considered as one of the important contributing factors responsible for increased mortality in the south Asian region globally and in India.^{8,10} The present study was planned with the purpose of identifying the appropriateness in the prescription of the patients diagnosed with CAD at a tertiary care hospital.

Of 150 prescriptions analysed, it was noted that 62% of patients diagnosed with CAD were in the age range of 41-60 years, similar to the findings presented by Rajanandh et al.¹⁰ WHO recommends the use of aspirin, beta-blockers and statins in all patients diagnosed with CAD and in addition, ACE inhibitors should be used in those with left ventricular dysfunction for secondary prophylaxis.¹¹ Our study revealed that out of 4 evidence based drugs to be used in the management of CAD, the use of antiplatelet drugs, and hypolipidemic was observed in almost 90% of prescriptions. This finding was comparable with the findings described by Sharma et al, Alam et al, Dawalji et al, Patel et al, Sandozi et al, and Mendis et al.^{7,12-16} Also, 65% patients received beta blockers, 64% were prescribed ACE inhibitors whereas 11% were prescribed ARBs, this was a promising finding similar to the findings reported by Sharma et al, Alam et al, and Dawalji et al, wherein more than 50% patients receiving at least 3 of the 4 evidence based medicines for the treatment of CAD.^{7,12,13} Although, this particular finding was contradictory to the findings cited by Yusuf et al, Rajanandha et al, Choudhary et al, Vamadevan et al, mentioning underuse of these 4 evidenced based drugs used for secondary prophylaxis in low income countries.^{3,8,10,17} Anti-anginal drugs were prescribed to 70% of patients which was comparable to the reports presented by Dawalji et al, Sandozi et al, Thaker et al, in the similar studies.^{13,15,18} The use of lipid lowering agent was found in 89% of patients which was again similar to the findings stated by Dawalji et al, Choudhary et al, Thaker et al, reflecting the rational use of these drugs for the purpose of secondary prophylaxis in CAD.^{13,17,18} In present study, authors also found 51% of patients were prescribed aspirin and clopidogrel along with a proton pump inhibitor. This finding perhaps is contradictory to the textual evidence stating the reduction in the therapeutic benefit of clopidogrel when administered with a proton pump inhibitor. However, it has now been accepted widely that no such clinically significant interactions exist between clopidogrel and either statins or calcium channel blockers. In fact, addition of a proton pump inhibitor to aspirin or aspirin and clopidogrel have shown fewer

gastrointestinal adverse effects and smaller number of patients stopping their antiplatelet therapy.¹⁹

Limitation of the study is small sample size.

CONCLUSION

Among the four evidence based drugs, use of 3 drugs, namely antiplatelets, beta blockers and hypolipidemics was apparent in almost 90% of prescriptions which was an encouraging finding. Use of ACE inhibitors and ARBs particularly in diabetic patients reflected rational prescribing habit of the treating physicians. The use of other cardiovascular drugs in our study was found to be optimal. As apparent from the findings reported by number of similar studies conducted across the country, it is perceived that there is a considerable difference in the drug therapy being given to patients of CAD across the country. With the aim of providing uniform healthcare to CAD patients in India, it is imperative to formulate the national guidelines with collaborative efforts from the healthcare authority and the physicians. Apart from spreading awareness among people about the disease and its prevention, additional efforts in the direction to provide cheaper drugs, affordable diagnostic and interventional strategies will perhaps reduce the overall morbidity and mortality associated with CAD.

The findings of the present study can be further strengthened by increasing the sample size and collecting data from secondary and tertiary healthcare centers of the country for gathering the robust data on drugs used in CAD.

ACKNOWLEDGEMENTS

Authors are thankful to ICMR for providing financial support for this project.

Funding: Funding sources from ICMR - STS

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Belhekar MN, Patel TC, Singh MK, Pandit PR, Bhave KA, Redkar NN. Evaluation of prescribing pattern of drugs use in patients of coronary artery disease at a tertiary care hospital. *Int J Basic Clin Pharmacol* 2018;7:1792-6.