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Original Research Article

Assessment of proportion and prescribing trends of coronary artery diseases in a tertiary care hospital, Kerala: a prospective observational study

Sreelekshmi V. S.*, Philip John Sebastian, Shamna C., Neenu Babu, Nithin Manohar R.

Department of Pharmacy Practice, Sree Krishna College of Pharmacy and Research Centre, Parassala, Trivandrum, Kerala, India

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***Correspondence:**
Dr. Sreelekshmi V. S.,
E-mail: venisurendran96@gmail.com

ABSTRACT

Background: The aim of the study is to assess the proportion of types of coronary artery diseases and to analyze the trends of drug prescribing in coronary artery disease (CAD) by checking the compliance with the standard guidelines provided by the American College of Cardiology Foundation / American Heart Association (ACCF/AHA).
Methods: A prospective observational study was conducted in the department of Cardiology for a period of 6 months. A total of 94 patients with varied categories of CAD were screened and analyzed. Study related data was collected from case records and by a structured interview. Data analysis was done by analyzing the prescribing trends of drug and assessing the proportion of CAD.
Results: The current study found that most of the patients were of the age group of 61-70 years. The proportion of Non-ST segment elevation myocardial infarction (NSTEMI) was remarkably higher in patients with CAD (55.3%) followed by ST-elevated myocardial infarction (STEMI) (39.4%) and Unstable angina (5.3%). Chi square test shows that prescription of Antiplatelets were apparent in all the prescriptions (100%), followed by Statins (Atorvastatin 98.9%), Antihypertensives (94.7%), Anticoagulants (90.4%), Nitrates (76.6%), Antidiabetics (75.5%) and Potassium channel opener (Nicorandil 36.2%). By analyzing the prescription, it was observed that most of the drugs were prescribed rationally according to the standard treatment guidelines (ACCF/AHA).
Conclusions: This study provides an overall insight of proportion of CAD and prescribing pattern in patients with CAD which reveals the rational prescribing of drugs in accordance with the standard guidelines.

Keywords: Coronary artery disease, ACCF/AHA Guidelines, Rational drug use

INTRODUCTION

Coronary artery disease (CAD) is a condition in which the vascular supply to the heart is hindered by atheroma, thrombosis or spasm of coronary arteries. It results from an imbalance between myocardial oxygen demand and oxygen supply that is most often due to coronary atherosclerosis. This causes impaired supply of oxygenated blood to the cardiac tissue sufficiently and myocardial ischemia develops as a result, which if severe or prolonged, may cause the death of cardiac muscle cells.[1]

CAD can be classified as chronic stable angina and acute coronary syndrome (ACS). Chronic stable angina is described as retrosternal discomfort lasting less than 10 min, brought about or increased with exertion and reduced with rest or Nitrates. ACS is a blanket term used to describe the consequences of coronary artery occlusion, whether transient or permanent, partial or complete. These different patterns of coronary occlusion give rise to the different types of ACS, namely Unstable angina (where no detectable myocardial necrosis is present), non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction ((STEMI),

usually larger in extent and fuller in thickness of myocardial wall affected than NSTEMI). Unstable angina and NSTEMI are a continuum of disease, and usually only distinguishable by the presence of a positive serum troponin test in NSTEMI.[2]

The various treatment strategies for coronary artery disease include Percutaneous coronary interventions, Coronary artery bypass graft and medical management using drug therapy depending upon the severity of occlusion of coronary arteries. Antiplatelets, Statins, Anticoagulants, Nitrates, Potassium Channel Openers, ACE inhibitors, Angiotensin II receptor blockers, Beta-blockers, Calcium channel blockers, Diuretics and Antidiabetics were the most commonly prescribed drugs. The American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) have jointly engaged in the production of guidelines in the area of cardiovascular disease since 1980. ACCF/AHA practice guidelines are designed for improving the care of individual patients. Performance measures are generally used for improving the care of populations of patients. In general, most performance measures should be chosen from Class I and Class III practice guideline recommendations and Class IIa recommendations may be suitable in selected situations.[3]

Prescription pattern analysis is a powerful exploratory tool to evaluate present trends of drug use and appropriateness of prescription. It is a descriptive and analytical method of collection, quantification, understanding and evaluation of the prescribing pattern, as well as dispensing and consumption for the advancement of existing therapy and enhancement of patient safety.[4] Identification and prescription pattern assessment are the very first step for improving both medication quality and patient safety in order to avoid irrational prescribing pattern. In the present study, we examined the proportion of cardiovascular diseases and prescribing trends.

METHODS

A prospective observational study was conducted in patients from the Department of Cardiology in Cosmopolitan Hospital, Trivandrum who were diagnosed with Coronary Artery Disease during the study period after obtaining permission for collection of data from the Institutional human ethical committee. The study was for a period of 6 months from December 2018 to May 2019. Written informed consents were obtained as per Indian council of medical research (ICMR) Biomedical research guideline format from the patients of with CAD satisfying the inclusion and exclusion criteria.

Inclusion criteria

Patients with CAD who are willing to participate in the study. Patients between the ages of 30 to 80 years with CAD.

Exclusion criteria

Patients who are not willing to participate in the study. Patients with age <30 years. Pregnant women. Psychiatric patients. Bleeding disorders/ thrombocytopenia.

All the relevant information regarding the study were collected from case records and direct interview with the patients. A total of 94 patients who met the criteria were included in the study and followed on a regular basis. Data from the patients were collected by using a suitably designed proforma. The demographic data, personal habits, clinical manifestations, clinical parameters, diagnosis, presence of other co-morbid conditions and prescriptions were recorded from the output prescription sheet or inpatient admission papers. Data related to the drugs prescribed such as name of the drug (Brand name or Generic name), dosage form, strength, frequency of dosing and duration of treatment were recorded. The drugs prescribed were analyzed to evaluate whether the treatment given is in accordance with the ACCF/AHA guidelines. Every modification made on the therapy for inpatients during the treatment period was updated and reviewed regularly and the proportion of CAD among different age groups and gender were determined.

Statistical analysis

It was performed by using Chi-square test for goodness of fit for testing significant proportional difference between classes and Chi-square test for association was used for finding significant association between level of diagnosis. Frequencies and percentage were calculated as summary measures and a calculated $p<0.05$ is considered to be statistically significant. All analysis were done with the help of Statistical package for social sciences (SPSS), version 22.

RESULTS

Demographic data

Around 94 patient's data related to demographic details were collected and analyzed. The calculated frequencies and percentage are shown in the Table 1. From the demographic profile, it was observed that among the 94 patients 67 (71.3%) were males and 27 (28.7%) were females. Thus, the majority of patients are males. From the Figure 1, it is observed that the highest number of patients were between the age group of 61-70 years (35 patients, 37.2%) followed by the age group of 51-60 years (25 patients, 26.6%), 71- 80 years (23 patients, 24.5%), 41-50 years (9 patients, 9.6%) and 30-40 years (2 patients, 2.1%). Thus, majority of patients were between the age group 61 to 70.

Types of CAD

The most common categories of CAD encountered in the study were NSTEMI (52 patients, 55.3%) and STEMI (37

patients, 39.4 %) and Unstable angina (5 patients, 5.3%). Majority of the patients presented with NSTEMI.

Table 1: Frequency and percentage distribution of patients based on gender.

Gender	Frequency	Percentage
Male	67	71.3%
Female	27	28.7%

Table 2: Percentage distribution of patients based on type of CAD.

Type of CAD	Frequency	Percentage
Unstable Angina	5	5.3%
NSTEMI	52	55.3%
STEMI	37	39.4%

Table 3: Percentage distribution of different categories of drug.

Category	Frequency	Percentage
Antiplatelet	94	100
Statins	93	98.9
Anticoagulants	85	90.4
Nitrates	72	76.6
Potassium channel opener	34	36.2
Antihypertensives	89	94.7
Antidiabetics	71	75.5

Assessment of prescription pattern

Categories of drugs prescribed

In Table 3, Chi square test showed that prescription of Antiplatelets were apparent in all the prescription i.e., 100%. It is then followed by Statins (Atorvastatin), Antihypertensives, Anticoagulants, Nitrates, Antidiabetics and Potassium channel opener (Nicorandil).

Prescribing pattern of antiplatelets

In Table 4, Chi square test showed that a significant majority of physicians prescribe Aspirin (100%), followed by Clopidogrel (87.2%). But a significant majority of prescribers do not choose combination therapy (5.3%). The use of newer Antiplatelet agent like Ticagrelor is prescribed for only 27 patients (28.7%). Thus, majority of Antiplatelet prescribed were Aspirin.

Prescribing pattern of anticoagulants

From Figure 2, it is observed that the most commonly prescribed Anticoagulants are Low molecular weight heparin (36 patients, 38.3%) and Fondaparinux (35 patients, 37.2%). There exists no significant difference in prescribing these two drugs that is both drugs are equally prescribed. The use of newer Anticoagulants is least that is Abciximab (5 patients, 5.3%).

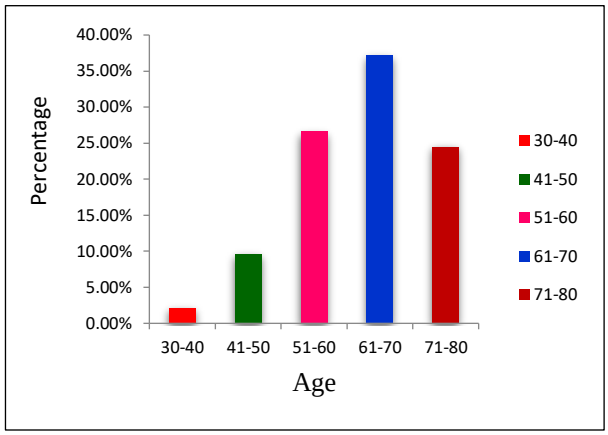

Figure 1: Percentage distribution of patients based on age.

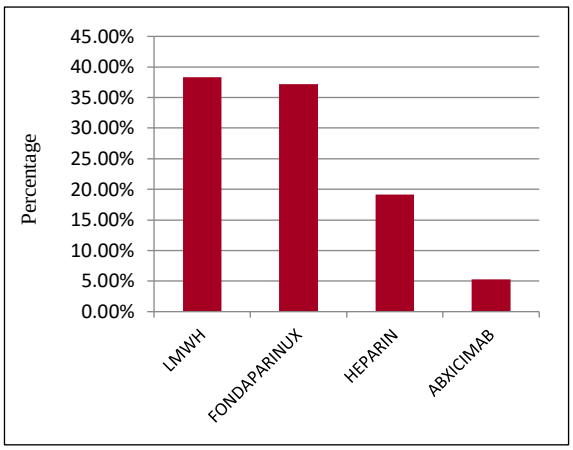

Figure 2: Percentage distribution of anticoagulants.

Table 4: Percentage distribution of antiplatelets prescribed.

Drug	Frequency	Percentage
Aspirin	94	100
Clopidogrel	82	87.2
Ticagrelor	27	28.7
Fixed dose Combination (A+C)	5	5.3

Prescribing pattern of antihypertensives

From the table 5, it is observed that the most common class of Antihypertensive used were Beta blockers (64 patients, 68.9%), followed by ACE Inhibitors (30 patients,31.9%), Diuretics (27 patients, 28.7%), ARBs (23 patients, 24.5%), Calcium channel blockers (10 patients, 10.6%) and Centrally acting agents (4 patients,4.3%). The majority of Antihypertensives prescribed is Beta blockers.

Among Antihypertensive drugs the most commonly prescribed drug was Metoprolol (39.40 %) followed by Ramipril (37%) and Bisoprolol (34.0%) and the least prescribed is Amlodipine (2.10%) which are shown in Figure 3.

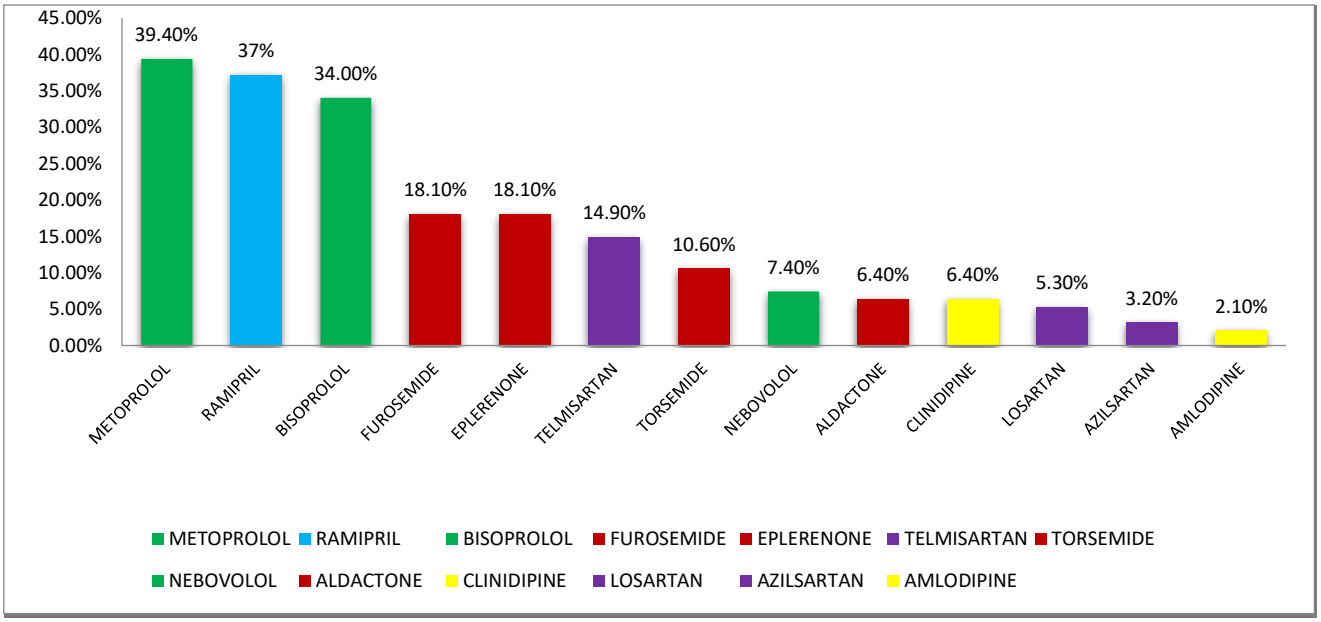

Figure 3: Antihypertensive drugs.

Table 5: Percentage distribution of antihypertensives.

Category	Frequency	Percentage
Beta blockers	64	68.9
ACE Inhibitors	30	31.9
Diuretics	27	28.7
ARBs	23	24.5
Calcium channel blockers	10	10.6
Centrally acting agents	4	4.3

DISCUSSION

The CAD has become a leading cause of mortality across the world. The gender wise distribution of patients with CAD shows that among the 94 patients 67 (71.3%) were males and 27 (28.7%) were females. In the present study the results indicated that most of the patients belong to the age group of 61-70 (37.2%) and 71-80 (24.5%) due to the occurrence of comorbidities and the least occurrence was found in the age group of 30-40 (2.1%) where the comorbidities are very less which is comparable with the study by Whyelian et al and George et al which shows that majority of patients were more than 60 years (38.6%) and 51-60 year age group (39.07%) respectively.[5,6] In the present study, majority of patients presented with NSTEMI (55.3 %). Other categories of CAD encountered in the study were STEMI (39.4 %) and Unstable angina (5.3%) which is similar to the study conducted by Mukhopadhyay et al where 20 patients (50%) presented with Chronic stable angina, rest 20 (50%) presented with Acute coronary syndrome 15 (37.5%) with Unstable angina and 5 (12.5%) with NSTEMI.[7]

The use of Aspirin, Beta-blockers and Statins is recommended by World Health Organization (WHO) in all patients diagnosed with CAD and in addition, patients with Left ventricular dysfunction can be treated with ACE inhibitors. In the present study the most commonly used category of drugs were Antiplatelets (100%) and Statins (98.9%) followed by Anticoagulants (90.4%), Nitrates (76.6%), Potassium channel openers (36.2%), Antihypertensives (94.7%), Antidiabetics (75.5%). Ashwani et al conducted a study on prescribing pattern of cardiovascular drugs.[8] The prescription rate of Antiplatelets, Anticoagulants and Fibrinolytics were 22.46% followed by 20.07% of Anti-anginal drugs. Biradar et al assessed the prescribing pattern in cardiovascular disease.[9] Diuretics (40%) like Furosemide, Torsemide, and Spirinolactone were used frequently followed by Anti-coagulants (30%) like Aspirin and Clopidogrel and Ramipril was the frequently prescribed ACE inhibitor (20%).

In the present study, among the Antiplatelets 87.2% of the patients received dual antiplatelets therapy (Aspirin and Clopidogrel) and 27 patients received newer antiplatelet drugs like Ticagrelor (28.7%) which is in accordance with Kamath et al study in which 90% of the patients were given dual antiplatelets therapy.[10]

The most commonly prescribed Anticoagulants in this study are low molecular weight heparin (38.3%) and Fondaparinux (37.2%). The use of newer anticoagulants like Abciximab (5 patients, 5.3%) is least. The most common class of Antihypertensive used were Beta blockers (68.9%), followed by ACE Inhibitors (31.9%), Diuretics (28.7%), ARBs (24.5%), Calcium channel blockers (10.6%) and Centrally acting agents (4.3%).

In a study conducted by Adhikari et al to assess drug utilization evaluation in Cardiology intensive care unit of a tertiary care hospital, it was found that 75.6% of patients were prescribed Nitroglycerin followed by Aspirin in 69.4% patients.[11] These results show similarity with our study where 76.6% of patients were prescribed with Nitrates and 100% of patients were prescribed with Aspirin.

The clinical pharmacist has a major role in educating the patient about the various aspects of disease and improving the medication taking behavior of patients. Clinical pharmacists are in an ideal position to provide patient education and optimize patient care. The limitations of our study include short duration and small sample size. Understanding about the various aspects of disease like signs and symptoms, complications and the need for drug therapy and improved medication compliance yields better therapeutic outcomes. For future researches, the study should be done in a large sample and for long duration of period to enhance a better understanding about the prescribing trends of patients with CAD.

CONCLUSION

In the present study, the proportion of NSTEMI was remarkably high. The male patient with an age group of 61-70 were mostly affected. Antiplatelets, Statins and Anticoagulants were most frequently prescribed drugs. Among Antiplatelets, majority of physicians preferred Aspirin followed by Clopidogrel. Therefore, the study concluded that most of the drugs were prescribed rationally in accordance with ACCF/AHA guidelines.

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