An observational study of prescription patterns of drugs used in acute myocardial infarction in Western Rajasthan

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Abstract

Aims: Aim of this study was to evaluate prescription patterns of drugs used in acute myocardial infarction patients in Western Rajasthan.
Materials and Methods: This study was cross-sectional and observational study, conducted at Department of Pharmacology, in association with Department of Cardiology, M. D. M. Hospital, a tertiary care teaching hospital attached with Dr. S.N. Medical College, Jodhpur, Rajasthan.
Results: Out of 101 STEMI diagnosed patients, 66 were males and 35 were females. Maximum patients belong to age group (60-69yrs) and least in age group (20-29yrs). Anticoagulant and hypolipidemic drugs were prescribed to every patient. Atorvastatin and enoxaparin (LMWH) were maximum prescribed drug that were used in all 100% patients; while Aspirin and Clopidogrel used in 99% patients. Among antianginal drugs, Isosorbide dinitrate (ISDN) was most common prescribed drug in 66 patients (65.34%), followed by Nitroglycerin (NTG) in 62 patients (61.38%). While among antihypertensive drugs beta blockers were maximum prescribed drugs that were used in 64 patients (63.36%), followed by ACE inhibitors in 32 patients (31.68%).
Conclusion: Findings of our study are in accordance with ESC Guidelines 2018. Myocardial infarction and risk of its complications can be control by diet control, regular exercise, medicines and by time to time follow up. Most common prescribed drugs were anticoagulant and hypolipidemic drugs. While most common prescribed antihypertensive drug in MI patients was Beta blockers and most prescribed antianginal drug was Isosorbide dinitrate (ISDN).

Keywords: STEMI, Prescription Pattern, LMWH, ESC Guidelines, FDC.

Introduction

Acute myocardial infarction (MI) remains a leading cause of morbidity and mortality worldwide. Critical myocardial ischemia can occur as a result of increased myocardial metabolic demand, decreased delivery of oxygen and nutrients to the myocardium via the coronary circulation, or both. An interruption in the supply of myocardial oxygen and nutrients occurs when a thrombus is superimposed on an ulcerated or unstable atherosclerotic plaque and results in coronary occlusion.[1]

Myocardial infarction can be subcategorized on the basis of anatomic, morphologic, and diagnostic clinical information. From an anatomic or morphologic standpoint, the two types of MI are transmural and nontransmural. Based on clinical diagnostic criteria, is determined by the presence or absence of Q waves on an electrocardiogram (ECG). However, the presence or absence of Q waves does not distinguish a transmural from a nontransmural MI as determined by pathology.[2]

Further Myocardial infarction was classified by the clinical scenario into various subtypes. Type 1 is a spontaneous MI related to ischemia from a primary coronary event (e.g., plaque rupture, thrombotic occlusion). Type 2 is secondary to ischemia from a supply-and-demand mismatch. Type 3 is an MI resulting in sudden cardiac death. Type 4a is an MI associated with the percutaneous coronary intervention, and 4b is associated with in-stent thrombosis. Type 5 is an MI associated with coronary artery bypass surgery.[3]

A more common clinical diagnostic classification scheme is also based on electrocardiographic findings as a means of distinguishing between two types of MI, one that is marked by ST elevation (STEMI) and one that is not (NSTEMI). Management practice guidelines often distinguish between STEMI and non-STEMI, as do many of the studies on which recommendations are based. The distinction between STEMI and NSTEMI also does not distinguish a transmural from a nontransmural MI. The presence of Q waves or ST-segment elevation is associated with higher early mortality and morbidity; however, the absence of these two findings does not confer better long-term mortality and morbidity.[4]

MI can be symptomatic or asymptomatic. Symptoms of MI ranges from none at all to sudden cardiac death. Despite the diversity of manifesting symptoms of MI, there are some characteristic symptoms like chest pain described as a pressure sensation, fullness, or squeezing in the midportion of the thorax, radiation of chest pain into the jaw or teeth, shoulder, arm, and/or back, it can associated with dyspnea or shortness of breath, epigastric discomfort with or without nausea and vomiting, diaphoresis or sweating, syncope or near syncope without other cause impairment of cognitive function without other cause.

The most prominent risk factors for myocardial infarction are older age, actively smoking, high blood pressure, diabetes mellitus, and total cholesterol and high-density lipoprotein levels.[5] Many risk factors of myocardial infarction are shared with coronary artery disease, the primary cause of myocardial infarction.[6]

A myocardial infarction requires immediate medical attention. Treatment aims to preserve as much heart muscle as possible, and to prevent further complications.[7] Treatment depends on whether the myocardial infarction is a STEMI or NSTEMI.[8] Treatment in general aims to unblock blood

vessels, reduce blood clot enlargement, reduce ischemia, and modify risk factors with the aim of preventing future MIs.[7] In addition, the main treatment for myocardial infarctions with ECG evidence of ST elevation (STEMI) include thrombolysis or percutaneous coronary intervention, although PCI is also ideally conducted within 1–3 days for NSTEMI.[8]

In this study, we have studied the prescription patterns of drugs used in acute myocardial infarction. The principal aim of drug utilization research is to facilitate the rational use of drugs in population. For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price.[9]

Materials and Methods

This cross-sectional observational study was conducted at Department of Pharmacology, in association with Department of Cardiology, M. D. M. Hospital, a tertiary care teaching hospital attached with Dr. S.N. Medical College, Jodhpur, Rajasthan. Patients of both sex and all adults age groups (more than 40 years) who were admitted inpatient department (IPD) with a diagnosis of STEMI included in the study. While patients with a hypertensive emergency, cerebral stroke, Patients with concomitant acute medical conditions eg. CHF with edema, Renal Failure, Hepatic Failure and pregnant female were excluded from the study.

After recording the obtained information in the case record form the data were analyzed further according to demographic profile, social habits, coexisting illness and the drug utilization pattern including routes of administration, category of the drug used in the treatment and fixed-dose combination prescribed.

Results

Demographic Profile of the Patient

a. A number of patients: A total of 101 patients of either sex and all adult age group who fulfilled inclusion criteria were taken for study at tertiary care hospital of Dr. S.N. Medical College, Jodhpur.
b. Gender (sex) distribution of study patients: Out of 101 patients 66 (65.34%) were male and 35 (34.65%) were female. (Table 1)

Table 1: Sex distribution of study patients

Sex	No. of Patients(n= 101)	Percentage
Male	66	65.34%
Female	35	34.65%

Age Wise Distribution of Study Patients

Out of 101 patients, 66 (65.34%) were male and 35(34.65%) were female. Maximum patients belonged to the age group of 60-69 years in this age group 20 (19.8%) were male and 13 (12.8%) were female. followed by age group 50-59 years male were 16(15.84%) and female were 8(7.9%), age group 70-79 years male were 14(13.8%) and female were 8(7.9%), age group 40-49 years male were 10(9.9%) and female were 1(0.99%), age group 80-89 years all patients were female 5(4.9%), age group 30-39 years all patients were male 5(4.9%). Minimum patients belonged to age group 20-29 years 1 male (0.99%). (Table 2)

Table 2: Age wise distribution of study patients

Age in Years	Total Patients (n= 101)	Number of Male (n=66)	Number of Female (n= 35)	Percentage	
				Male	Female
20-29	1	1	0	0.99%	0.0%
30-39	5	5	0	4.9%	0.0%
40-49	11	10	1	9.9%	0.99%
50-59	24	16	8	15.84%	7.9%
60-69	33	20	13	19.8%	12.8%
70-79	22	14	8	13.8%	7.9%
80-89	5	0	5	0.0%	4.9%

Drug Prescription Pattern

Distribution According to a Class of Drugs Prescribed

In this study among the different classes of drugs used in the management of acute myocardial infarction, anticoagulant and hypolipidemic were maximum prescribed drugs they were used in all study patients (100%) followed by antiplatelets which were used in 100 patients (99%), antianginal 93 patients (92.02%), antihypertensive 81 patients (80.19%) diuretics 52 patients (52.47%), anti-anxiety 35 patients (34.65%), Fibrinolytics 34 patients (33.66%), antidiabetic (Human insulin regular) 31 patients (30.69%), analgesics 30 patients (29.70%), Inotropic agents 8 patients (7.92%), Antiarrhythmic were least prescribed 2 patients (1.99%). (Table 3)

Distribution among Cardiac Drugs Prescribed to Study Patients

Among the cardiac individual drugs atorvastatin and enoxaparin (LMWH) was maximum prescribed drug that used in all 101 patients (100%), followed by Aspirin and Clopidogrel used in 100 patients (99%), Streptokinase in 29 patients (28.7%), Reteplase in 5 patients (4.96%), Rosuvastatin in (PCI) 4 patients (3.96%), Eptifibatide in 3 patients (2.97%), Ticagrelor and Prasugrel in 2 patients (1.98%) and Tirofiban in 1 patients (0.99%) was least prescribed drug. (Table 4)

Table 3: Distribution according to a class of drugs prescribed

Class of Drug	Number of Patients (n= 101)	Percentage %
Fibrinolytics	34	33.66%
Anticoagulant	101	100%
Anti Platelets	100	99%
Hypolipidemic	101	100%
Anti Anginal	93	92.07%
Anti Hypertensive	81	80.19%
Anti Diabetic	31	30.69%
Diuretics	53	52.47%
Analgesics	30	29.70%
Anti Anxiety	35	34.65%
Inotropics	08	7.92%
Anti Arrhythmic	02	1.98%

Table 4: Distribution among cardiac drugs prescribed to study patients

Cardiac Drugs	Number of Patients (n = 101)	Percentage %
Atorvastatin	101	100%
Enoxaparin (LMWH)	101	100%
Aspirin	100	99%
Clopidogrel	100	99%
Streptokinase	29	28.71%
Reteplase	05	4.96%
Rosuvastatin	04	3.96%
Eptifibitide	03	2.97%
Ticagrelor	02	1.98%
Prasugrel	02	1.98%
Tirofiban	01	0.99%

Distribution of Antianginal Drugs to Study Patients

Among individual drugs Isosorbide dinitrate (ISDN) most common prescribed drug in 66 patients(65.34%),followed by Nitroglycerin (NTG) in 62 patients (61.38%), Trimetazidine in 57 patients (56.43%), Ivabradine in 22 patients (21.78%), Nicorandil in 14 patients (13.86%), and Ranolazine in 2 patients(1.98%) was least prescribed antianginal drug. (Table 5).

Table 5: Distribution of antianginal drugs to study patients

Antianginal Drugs	No. of Patients (n= 101)	Percentage %
Nitroglycerine (NTG)	62	61.38%
Isosorbide dinitrate (ISDN)	66	65.34%
Isosorbide mononitrare (ISMN)	03	2.97%
Ivadradine	22	21.78%
Trimetazidine	57	56.43%
Nicorandil	14	13.86%
Ranolazine	02	1.98%

Mostly prescribed antianginal drug Isosorbide dinitrate (ISDN) and least prescribed drug was Ranolazine.

Distribution of Antihypertensive Drugs to Study Patients

Among the individual class of drugs, beta blockers were a maximum prescribed drug that used in 64 patients (63.36%), followed by ACE inhibitors in 32 patients (31.68%), Calcium Channel Blocker in 8 patients (7.92%), and ARBs in 1 patient (0.99%) was least prescribed drugs. (Table 6).

Distribution of Diuretics to Study Patients

Among individual drugs furosemide was a maximum prescribed drug that used in 20.79% patients followed by Eplerenone in 18.81% patients, Torsemide in 14.85% patients, Spironolactone in 11.88% patients and Furosemide+ Spironolactone in patients10.89% patients was least prescribed diuretic. (Fig. 1).

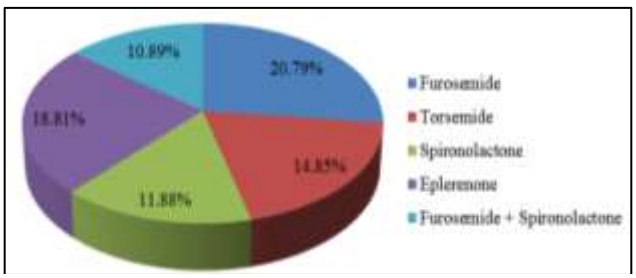

Fig. 1: Distribution of diuretics to study patients. Mostly prescribed diuretics was Furosemide, followed by Eplerenone

Table 6: Distribution of antihypertensive drugs to study patients

Class of Antihypertensive	Number of Patients (n= 101)	Percentage %
ACE Inhibitors	32	31.68%
Angitension Receptor Blockers	01	0.99%
β Blockers	64	63.36%
Calcium Channel Blockers	08	7.92%

Fixed Dose Combination (FDC) of Drugs Prescribed to Study Patients

Total 4 FDCs have been prescribed, in 30 patients out of 101 patients, most commonly prescribed FDC was Aspirin+ Clopidogrel and Furosemide+ Spironolactone in 14 patients followed by Torsemide+ Spironolactone and Telmisertan+Hydrochlorthiazide in 1 patient. (Fig. 2)

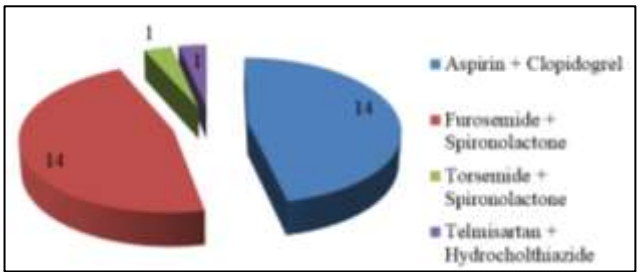

Fig. 2: Fixed dose combination (FDC) of drugs prescribed to study patients. Asprin+ Clopidogrel and Furosemide + Spironolactone were most commonly prescribed FDC

Discussion

Myocardial infarction is a major cause of death and disability worldwide. Currently, India leads the world with the largest number of myocardial infarction subjects and this is expected to further rise in the coming years. The study of prescribing pattern is a component of a medical audit that does monitoring and evaluation of the prescribing practice of the prescribers as well as recommends necessary modifications to achieve rational and cost-effective medical care.

Myocardial infarction is associated with complications may lead to premature death, but people with myocardial infarction can take steps to control the disease and lower the risk of complications by compliance to diet, regular exercise, and medicines. In this study, total of 101 patients analyzed. Regarding sex wise distribution, the majority of the patients were male sex (65.34%) and females accounted for (34.65%).which is not accordance to Chandana et al study(2013), in which males were 73.8% and females were 26.2%.[10] but the present study is similar to Vakade KP et al study(2016) in which males were(64.63%) and females were(35.37%).[11] In the present study, the greatest number of patients were in the age group of 60-69 years (32.6%). The mean age of the total MI patients is 60.36 years.

In present study among the different class of drugs used in the management of acute myocardial infarction (AMI) maximum prescribed drugs was anticoagulant and hypolipidemic in 100% patients, followed by Antiplatelets (99%), Antianginal (92.07%) and Antihypertensives in 80.19% patients. In Chandana N et al study (2013), anticoagulant was also prescribed in (100%) patients,[10] which is similar to present study but other classes of drug-like (Antianginal, Antihypertensive, Hypolipidemic, and Thrombolytics) were not according to present study. While Jesso George et al in their study in 2013 found that the five commonly prescribed drug classes were platelet inhibitors (88.7%), statins (76.3%), ACE Inhibitors/Angiotensin receptor blockers (72%), beta-blockers (58%), and heparin (57%). Polypharmacy (>5 drugs) was noticed in (71%) patients. In their study, they concluded that antithrombotics, statins, ACE inhibitors/ARBs and beta blockers were the most frequently prescribed drugs.[12] In the present study among the cardiovascular individual drugs, Atorvastatin and LMWH were maximum prescribed in 100% patients, followed by Aspirin and Clopidogrel in 99% of patients and Streptokinase in 28.7% in patients. It is not in accordance with Joseph et al study in (2018) in which LMWH in 52.32%, Aspirin in 25.38%, Streptokinase in 13.95% patients were prescribed.[13]

In present study Among antianginal drugs Isosorbide dinitrate (ISDN) most common prescribed drug in 66 patients (65.34%), followed by Nitroglycerine NTG) in 62 patients (61.38%), It is not in accordance with Aswani et al study (2016) in their study they demonstrate that Nitroglycerine in 41.08% patients, Isosorbide Dinitrate in 29.70% patients, and Nicorandil in 12.87% patients were prescribed.[14]

In the present study among the individual class of antihypertensive drugs, beta blockers were maximum prescribed in 63.36% patients, followed by ACE inhibitors in 31.68% patients. It is not in accordance with Chandana N et al study (2013) in which ACE inhibitors in 48% patients followed by beta-blockers in 39.80% patients.[10]

In the present study in 30% of patients FDC drugs were prescribed which is not accordance to the Bandla et al and Barot et al in their study they found that FDC drugs were prescribed in 7.65% and 8% patients.[14,15]

In our study Furosemide was most commonly prescribed diuretics which is similar to the study of Kerkar et al.[16]

Conclusion

Findings of our study are in accordance with ESC Guidelines 2018. Myocardial infarction (STEMI) and risk of its complications can be controlled by diet, regular exercise, medicines and by time to time follow up. Most commonly prescribed drugs were anticoagulant and hypolipidemic

drugs. While most common prescribed antihypertensive drug in MI patients was Beta blockers and most prescribed antianginal drug was Isosorbide dinitrate (ISDN) .

Limitations of the Study

The study populations size was small so it was not representative of the entire IHD population, and the duration of the study was short.

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Conflict of Interest: None.

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