

PRESCRIPTION PATTERN ON MYOCARDIAL INFARCTION

Abstract

Background: Myocardial infarction is a major cause of death and disability worldwide. Myocardial infarction is majorly divided into two types based on the ECG findings Non-ST segment elevated myocardial infarction (NSTEMI) and ST segment elevated myocardial infarction (STEMI). Here, the prescription pattern is evaluated by using the WHO's five core indicators.

Objectives: To observe the best treatment option that is used in the treatment of NSTEMI and STEMI. To identify the risk factors that are encountered in the occurrence of myocardial infarction.

Methods: A prospective observational study.

Results: In this study, Rational prescribing of drugs in a prescription was analyzed by the index of rational use of medicines. For analyzing the rational prescription five dimensions or five core indicators are used according to WHO they are polypharmacy, injection, generic names, essential drugs, and antibiotics. In this present study, the polypharmacy was found to be 8.3, and the optimal value is less than three; the index of generic prescribing was 72%, and the value according to WHO is 100%. The optimal value of antibiotic prescribing was set to less than 30% and in this study, it is found to be 6.6%. The injection prescribing index was found to be 23.9% and its optimal value is less than 10%. All the drugs that are present in the prescription were prescribed by the EDL/Formulary of the hospital. The primary goal for maintaining the rational prescription is to maintain the cost, efficacy, and safety.

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Conclusion: The present study shows the drug pattern used in myocardial infarction. In this study, we observe polypharmacy, high prescription of injectables, and high prescription of drugs with brand names.

Keywords: WHO core indicators, myocardial infarction, rational prescribing, polypharmacy.

I. INTRODUCTION

Cardiovascular diseases are the main reason for approximately 1/3 of deaths globally.^[1] Considering the mortalities related to cardiovascular diseases in 2015 20 million people are reported and it is expected to more than 24 million people by the end of 2030.^[2] It is found that the incidence of cardiovascular diseases occupies 1/3 of deaths and it is more than non-communicable diseases and it occupies 86% of the global burden. (3)

Myocardial infarction is one of the common types of ischemic heart disease. Myocardial infarction is defined as heart muscle death resulting from the sudden blockage of the coronary artery due to a blood clot or fat deposition in it. Fat deposition or blood clot results in insufficient blood supply and insufficient oxygen supply which leads to the damage of the heart muscle. (4)

Myocardial infarction is of two types non-ST segment elevated myocardial infarction (NSTEMI) and ST segment elevated myocardial infarction (STEMI) based on pathophysiological differences and ECG changes (5). The ST-segment elevation is not seen in NSTEMI and blockage may be temporary or partial and the degree of damage will be small where as ST-segment elevation is seen in STEMI and prolonged blockage of blood supply is seen and damages large areas of the heart muscle. (6) The incidence of myocardial infarction in a population is used as a proxy for the prevalence of coronary artery diseases in that population. (7)

II. MATERIALS AND METHODS

- **Study design:** This study was a prospective observational study with 150 patients at Santhiram Medical College and General Hospital, Nandyal.
- **Study site:** This study was conducted at the Department of Cardiology in Santhiram Medical College and General Hospital, Nandyal, Kurnool (Dist.), Andhra Pradesh.
- **Study duration:** The present study was carried out for a period of 6 months from December 2020- May 2021.
- **Institutional Ethics Committee (IEC):** After the approval of the institutional ethics committee at Santhiram medical college and general hospital, Nandyal this study was initiated.
- **Sample size:** 150 patients with myocardial infarction

III. STUDY CRITERIA

1. Inclusion Criteria:

- Patients with informed consent form.
- All Patients with the age group of >30 years.
- Patients who are admitted clinically with myocardial infarction in hospital.
- Patients with suspected symptoms of myocardial infarction and chest pain.

2. Exclusion Criteria:

- Patients are unwilling to join the study.

- Patients with age groups below 30 and pregnant women.

IV. RESULTS

The study was conducted for six months in the cardiology department at Santhiram Medical College and General Hospital, Nandyal-518501, Kurnool district, Andhra Pradesh, India, which is a tertiary care teaching hospital. The present study was designed to study the prescribing pattern in myocardial infarction patients. The study was conducted with a sample size of 150 patients.

In age-wise distribution, almost 78 % of patients with myocardial infarction were found between 51-80 years of age and it is evident that elderly people were more prone to MI. It is shown that males (56%) were more prone to MI compared to females seen in Table No.2. The number of patients with NSTEMI (63.3%) is more than STEMI (36.7%) shown in Table No.3. The chief complaints of patients with MI are chest pain(41.3%), SOB(6%), chest pain and SOB(52.7%) as shown in Table No.4. Patients with comorbidities like DM(18%), HTN(19.3%), both HTN and DM(30.7%) were more prone to MI compared to patients with no comorbidities (32%) as shown in Table No.5. From the table no.6 it is shown patients who are smokers (31.3%) were more effective to MI when compared to alcoholic (2%). Table No. 7. 125 (83.3%) patients were discharged ,8(5.3%) referred and 17(11.3) absconded without any information. Route of information includes 23.9%, 74.6%, 1.04%, and 0.32% of drugs prescribed in injectables, oral form, inhaler, and topical form respectively as shown in Table No.8. Prescribing trends of the physician include the antihypertensive drugs like beta blockers (38), calcium channel blockers (13), angiotensin II receptor blockers(23), diuretics (56) were prescribed as shown in TableNo.10. Antiplatelets were given in 150(100%) patients as shown in Table No.11.From Table No. 12. Antihyperlipidemic drugs like atorvastatin 147 (98.6%) and rosuvastatin 2 (1.7%) were prescribed. Another class of drugs prescribed among 150 patients were 149(99.3%) with heparin (anticoagulant), 115(76%) with nitroglycerin (antianginal), 2(1.3%) with streptokinase (thrombolytic agent), 145 (96.6%) with pantoprazole (proton pump inhibitor), 7(4.6%) with etizolam(benzodiazepines), 12(8%) with tramadol (analgesic), 9(6%) with paracetamol(antipyretic), 13(8.6%) with lactulose (laxative) and these are shown in Table NO. 13, Table NO.14, Table NO.15, Table NO.16, Table NO.17.

The average number of drugs per prescription was found to be 8.3 and which is more than the WHO standard(less than 3), the drugs prescribed by generic names were found to be 72%, antibiotics prescribed percentage was found approximately 6.6%, Drugs prescribed in the form of injection percentage was found to be23.9% and 100% of drugs prescribed from formulary is shown in Table No.18.

From Table No.19. Poly pharmacy was found to be 8.3 and the optimal value is less than three, the index of generic prescribing was 72%, and the value according to WHO is 100%. The optimal value of antibiotic prescribing was set to less than 30% and in this study, it is found to be 6.6%. The injection prescribing index was found to be 23.9% and its optimal value is less than 10%. All the drugs that are present in the prescription were prescribed by the EDL/Formulary of the hospital.

V. DISCUSSION

It is an observational study of the prescription pattern in myocardial infarction patients. From this study, it is evident that age, gender, comorbidities (Diabetes mellitus, Hypertension), and social habits (smoking, alcohol) are some of the risk factors for the development of Myocardial Infarction. From the prescription pattern, it is evident that dual antiplatelet therapy is adopted for almost all patients along with anticoagulant and anti-hyperlipidemic to treat Myocardial Infarction. In the present study, the average number of drugs per prescription was found to be 8.3 and it is more than WHO standard. According to this standard, it is not justifiable but in this condition, they are prescribed for cardiovascular emergencies. It is not considered polypharmacy because there is a need for empirical therapy. For the management of life-threatening conditions. According to WHO standards, physicians highly recommend prescribing drugs with generic names. In the present study, the drugs prescribed by generic names were found to be 72% and it is 100% according to WHO standards. This trend of prescribing generic names decreases the cost burden, increases patient compliance, and avoids the chances of duplication. The present study indicates that the antibiotics prescribed percentage was found approximately 6.6% and according to WHO standards, it is less than 30%. Various health hazards were caused by the irrational use of antibiotics. So, precautions must be taken when a prescription contains antibiotics. Drugs prescribed in the form of injection percentage was found to be 23.9% and it is less than 10% according to WHO standards. It is justifiable in the case of conditions when they need immediate action. Drugs like low molecular heparin, streptokinase, insulin, and sometimes nitroglycerin, etc. must be given by injectable route in emergencies. In this study, these drugs were used to prevent the patient from suffering from a life-threatening condition that needs immediate action of drugs. Rational prescribing of drugs in a prescription was analyzed by the index of rational use of medicines. For analyzing the rational prescription five dimensions or five core indicators are used according to WHO they are polypharmacy, injection, generic names, essential drugs, and antibiotics. The primary goal for maintaining the rational prescription is to maintain the cost, efficacy, and safety. As per previous study reports the Anti-Hypertensive drugs, Beta Blockers were observed to be the drugs with maximum benefits and had shown better efficacy by optimal therapy (8).

VI. CONCLUSION

Myocardial infarction (MI) and its sequelae are the leading causes of morbidity and mortality worldwide. This study shows that prescribing pattern was not optimal when compared to the optimal values of core indicators of WHO. Irrationality is seen in prescribing the injectables but in this case, it is justifiable because to treat emergencies some drugs must be given in injectable routes. But it is necessary to encourage physicians to prescribe the drugs administered in the oral route if the patient can take in oral route. Brand names were used but according to WHO the drugs should be prescribed in generic names. Antibiotics usage was rational in this study. Average number of drugs per prescription was very high compared to standards of WHO and all the drugs were used to treat emergencies like myocardial infarction, and all the drugs prescribed by the physician were from the EDL/hospital formulary.

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Table 1: Age-wise distribution of study subjects		
Age	No of Patients	Percentage
30-40	9	6%
41-50	24	16%
51-60	48	32%
61-70	41	27.3%
71-80	28	18.7%
<i>The sample size "n"=150</i>		

Table 2: Gender-Wise Distribution of Study Subjects		
Gender	No of Patients	Percentage
MALE	84	56%
FEMALE	66	44%
<i>The sample size "n"=150</i>		

Table 3: Types of Myocardial Infarction of Study Subjects		
Types of MI	No of Patients	Percentage
NSTEMI	95	63.3%
STEMI	55	36.7%
<i>The sample size "n"=150</i>		

Table 4: Chief Complaints of Study Subjects		
Chief Complaint	No Of Patients	Percentage
CHEST PAIN	62	41.3%
SOB	9	6%
CHEST PAIN & SOB	79	52.7%
<i>The sample size "n"=150</i>		

Table 5: Comorbidities of Study Subjects				
Comorbidities	No of Patients		Total	Percentage
	Male	Female		
DIABETIESMELLITUS	3	0	3	2%
HYPERTENSION	47	0	47	31.3%
DM & HTN	21	0	21	14%
NO COMORBIDITIES	21	58	79	52.7%
<i>The sample size "n"=150</i>				

Table 6: Social History of Study Subjects				
Social Habit	No of Patients		Total	Percentage
	Male	Female		
ALCOHOLIC	16	11	27	18%
SMOKER	19	10	29	19.3%
ALCOHOLIC & SMOKER	28	18	46	30.7%
TEETOTLLERS	17	31	48	32%
<i>The sample size "n"=150</i>				

Table 7: Patient Outcomes		
Parameter	No of Patients	Percentage
DISCHARGED	125	83.3%
REFERRED	8	5.3%
ABSCONDED	17	11.3%

Table 8: Route of Administration of Drugs				
Route of Administration	Sub Class	No of Drugs	Percentage	
INJECTABLES	IV	239	19.16%	23.9%
	IV INFUSION	40	3.2%	
	IM	6	0.48%	
	SC	13	1.04%	
ORALS		930	74.6%	
INHALATIONS			1.04%	
TOPICAL			0.32%	

Table 9: Prescribing Trends of Physician		
Class of Drug	No of Patients	Percentage
ANTIPLATELET	149	100%
ANTIHYPERLIPIDEMIC	149	99.3%
ANTICOAGULANTS	149	99.3%
ANTIANGINAL	115	76.6%
ANTIHYPERTENSIVES	63	42%
H+PUMP INHIBITORS	145	96.6%
ANTIBIOTICS	10	6.6%
ANTIHISTAMINES	17	11.3%
K+SUPPLIMENTS	1	0.6%
ANTIEMETICS	4	2.6%

ANTIPYRETICS	9	6%
ANALGESIC	12	8%
BRONCHOILATOR	17	11.3%
ANTIDIABETIC	52	34.6%
LAXATIVE	13	8.6%
BENZODIAZEPINES	7	4.6%

Drugs Used For Mi Condition

Table 10: Antihypertensive Drugs			
Class of Drugs	Name of Drugs	No of Drugs	Percentage
BETA-BLOCKERS(38)	METOPROLOL	37	24.6%
	TAZOLOL	1	0.6%
CALCIUM CHANNEL	CLINIDIPINE	12	8%
	NIFIDIPINE	1	0.6%
ARBS (23)	TELMISARTAN	23	15.3%
DIURETICS (56)	FORSEMIDE	43	28.6%
	SPIRANOLACTONE	37	24.6%
	FUROSEMIDE+SPIRANOLACTONE	52	34.6%

Table 11: Antiplatelet Drugs		
Name of the Drug	No of Patient	Percentage%
ASPRIN	150	100%
CLOPIDOGREL	150	100%
TICAGRELOR	1	-

Table 12: Antihyperlipidemic drugs		
Name of the Rug	No of Patient	Percentage
ATORVASTATIN	147	98.6%
ROSUVASTATIN	2	1.3%

Table 13 : Anticoagulant Drugs		
Name of the Drug	No of Patient	Percentage
HEPARIN	149	99.3%

Table 14: Antianginal Drugs		
Name of the Drug	No of Patient	Percentage
NITROGLYCERIN	115	76%

Table 15: Thrombolytic Agents		
Name of the Drug	No of Patient	Percentage%
STREPTOKINASE	2	1.3%

Table 16: Proton Pump Inhibitors		
Name of the Drug	No of Patient	Percentage%
PANTOPRAZOLE	145	96.6%

Table 17: Benzodiazepines		
Name of the Drug	No of Patient	Percentage%
ETIZOLAM	7	4.6%

Table 18: Analgesics, Antipyretics and Laxatives			
Class of Drugs	Name of Drug	No of Patients	Percentage%
ANALGESIC	TRAMADOL	12	8%
ANTIPYRETIC	PARACETAMOL	9	6%
LAXATIVE	LACTULOSE	13	8.6%

Average Number of Drugs per Prescription

The average number of drugs per prescription:

$$\frac{\text{Total number of drugs present in the prescriptions}}{\text{Total number of prescriptions encounters}} = \frac{1245}{150}$$

The average number of drugs per prescription is 8.3 and it indicates polypharmacy.

Table 19: Prescribing Indicators of Myocardial Infarction Patients	
Indicator	Percentage
AVERAGE NO OF DRUGS PER PERSCRIPTION	8.3%
%OF DRUGS PRESCRIBED WITH ANINJECTION	23.9%
%OF PRESCRIPTIONS WITH ANANTIBIOTICS	66%
% OF DRUGS PRESCRIBED FROMFORMULARY	100%
%OF DRUGS PRESCRIBED BY GENERICNAME	72%

Table 20: Index of Rational use of Medicines

Prescription Indicators	Optimal Value (Who Standard)	Observed Value	Individual Index
AVERAGE OF DRUGS PER ENCOUNTER	≤3%	83	0.36
GENERIC NAME PRESCRIBING	100%	72%	0.72
ANTIBIOTIC PRESCRIBING	≤30%	6.6%	4.5
INJECTION PRESCRIBING	≤10%	23.9%	0.4
EDL/FORMULARY PRESCRIBING	100%	100%	1