



Original Article

The Trends of Pharmacological Therapy in one Month Post Myocardial Infarction Patients

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ARTICLE INFO

Key Words:

Appropriate Drug, Appropriate Dosage, Myocardial Infarction

How to Cite:

 Liaquat Memon, H. ., Ahmed Shaikh, N. ., Naz, M. ., Ahmed, K. ., Rahman Khalid, M. ., & ., S. (2023). The Trends of Pharmacological Therapy in one Month Post Myocardial Infarction Patients: Pharmacological Therapy in Myocardial Infarction Patients. *Pakistan Journal of Health Sciences*, 4(01). <https://doi.org/10.54393/pjhs.v4i01.260>

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 Received Date: 12th October, 2022

 Acceptance Date: 29th January, 2023

 Published Date: 31st January, 2023

ABSTRACT

Guideline recommended treatment has an important impact on the mortality and morbidity of post myocardial infarction patients. **Objective:** To assess the frequency of appropriate drug with its appropriate dosage of guideline recommended pharmacological therapy, prescribed by physician, in patients with Myocardial Infarction (MI). The cross sectional study conducted at National Institute of Cardiovascular Disease, Karachi from 1st January 2020 to 30th June 2020. **Methods:** Total 160 patients who came to hospital for follow-up after one month of Myocardial infarction were included in the study. Prescription was considered appropriate if the patient has taken at-least 5 out of 6 medications. At least 5 out of 6 along with its goal dose was considered as appropriate dosage. Descriptive statistics were calculated. Stratification was done. Chi-square test was applied post stratification and p-value ≤ 0.05 was considered as significant. **Results:** There were 103 male and 57 female patients. The mean age was 53.36 ± 8.10 years. Number of drugs used was found appropriate in 96.3% patients but the doses of drugs used was found appropriate in only 5.6% patients. **Conclusions:** The present study revealed that the majority of the physicians prescribed the recommended number of the drugs used; however, the doses of drugs used were not always according to the guidelines. It is important for cardiology physicians to understand the importance of guideline recommended pharmacological intervention among patients with a one-month history of MI.

INTRODUCTION

The greatest cause of death and a significant contributor to disability worldwide is coronary heart disease (CHD). In South Asia, where it is anticipated to more than double over the next 20 years, the estimated growth in CHD is anticipated to be significantly bigger than in any other region worldwide [1, 2]. It has been suggested, in particular, that communities in South Asia are prone to cardiometabolic diseases because of a confluence of genetic and lifestyle variables that encourage metabolic dysfunction, but there is a dearth of concrete evidence to support this [3]. Patients with MI carry an increased risk of

recurrence of ischemic events. Therefore, active secondary prevention is necessary for long term management [4]. American Heart Association (AHA) has recommended pharmacological management to prevent recurrent ischemia or infarction [5]. Guidelines support the use of drugs in appropriate doses e.g., Beta-Blockers, statin & Influenza vaccine for long term treatment [6]. Four classes of medications that deliver the best results in reducing the burden of the recurrent cardiac events include antiplatelets (such as clopidogrel, aspirin, dual antiplatelet therapy), B-blockers, among others [7].

According to a recent study that used data from 2012, 4–5 of the recommended medications for ACS were provided to majority of patients from Australia and New Zealand who were discharged from the hospital after developing ACS [8]. Using populations from clinical trial studies, reduced deaths and morbidity have been linked globally with cardiovascular medicine compliance [9]. Implementation of evidence-based medical treatment guideline recommendations are associated with better outcomes [10]. It has been reported that these drugs are not prescribed in appropriate doses by physicians. After 1 year in a study in the US, 77% of doctors were not prescribing optimal medical treatment. The most common reason for not prescribing guideline directed medical therapy was subjective underestimation of a patient's risk. Other reasons were allergy/intolerance of drugs, use of concurrent oral anticoagulants, bleeding complications, asthma/COPD, renal insufficiency, and hypotension [11]. Guideline recommended treatment was reported to have an important impact on the mortality and morbidity of post MI patients. Therefore, the objective of this study was "to assess the trends of guideline recommended pharmacological therapy, prescribed by physician, for one month post MI patients, admitted at tertiary cardiac center. This helped us to assess the implementation of these guideline recommended treatments in post MI patients.

METHODS

A cross-sectional, descriptive study was undertaken at National Institute of Cardiovascular Diseases (NICVD), Karachi between January 2020 and June 2020. Ethical approval was obtained prior to the study. By taking prevalence $p = 94\%$, confidence interval 95%, margin of error 5%, sample size of my study was 160 [11]. A non-randomized consecutive sampling was used for the project. All male and female patients between 18 years to 75 years of age who came to hospital for follow-up after one month of Myocardial infarction in whom revascularization has done or not Who were not discharged against medical advice were included in the study. Cases where myocardial infarction was succeeded by another significant comorbidities such as traumatic injury, low hemoglobin, severe anemia, trauma, recent surgery within 1 week of discharge or if the patient had a bleeding disorder (Idiopathic Thrombocytopenic purpura, Thrombotic thrombocytopenic purpura, myelodysplastic syndrome), CKD (chronic kidney disease), Heart block (sinus block, AV block), Asthma, Drug allergy were excluded from the study. All patients presenting with clinical features of myocardial infarction meeting the inclusion criteria were included in the study. A written informed consent was taken. The patients were enrolled in OPD after 1 month of discharge.

Names of all guideline recommended drugs with doses were recorded which were prescribed to the patient by a physician after 1 month of discharge. Data were collected as shown in the proforma. All of the collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0. Age is one of the quantitative variables for which mean and standard deviation were determined. According to the advice of the AHA, frequency and percentage were estimated for qualitative variables including gender, diabetes, hypertension, smoking, and medication. Age, gender, comorbidities were effect modifiers that were managed through stratification. The post-stratification chi-square test was used, with $p < 0.05$ being considered significant.

RESULTS

The research involved 160 patients in total. The demographics and clinical parameters are presented (Table 1).

| Parameter | Mean \pm SD/ N (%) |
|--------------------------|----------------------|
| Age (years) | 53.36 \pm 8.1 |
| Gender | |
| Male | 103 (64.4%) |
| Female | 57 (35.6%) |
| Diabetes mellitus | |
| Yes | 44 (27.5%) |
| No | 116 (72.5%) |
| Hypertension | |
| Yes | 76 (47.5%) |
| No | 84 (52.5%) |
| Smoking | |
| Yes | 77 (48.13%) |
| No | 83 (51.88%) |

Table 1: Clinical characteristics of patients

The results about drugs used showed that aspirin and clopidogrel were each used by 96.9% of patients. Among β -blockers, Metoprolol was used by 63.1% and Carvedilol was used by 36.9% of patients. Among ACE-I, Captopril was used by 33.8%, Ramipril was used by 36.9%, and Lisinopril was used by 29.4% patients. Among use of statins, Atorvastatin was used by 55.0% and Rosuvastatin was used by 45.0% patients. The final outcome, i.e., the number of drugs used was found appropriate in 96.3% of patients, but the doses of drugs were found appropriate in only 55.6% of patients. The frequency distributions are presented (Table 2).

| Drugs | N (%) |
|--------------------|--------------|
| Aspirin use | |
| Yes | 155 (96.88%) |
| No | 5 (3.13%) |

| Clopidogrel use | |
|---|--------------|
| Yes | 155 (96.88%) |
| No | 5 (3.13%) |
| Beta-blocker used | |
| Metoprolol | 101 (63.13%) |
| Carvedilol | 59 (36.88%) |
| Ace-I used | |
| Captopril | 54 (33.75%) |
| Ramipril | 59 (36.88%) |
| Lisinopril | 47 (29.38%) |
| Statin used | |
| Atorvastatin | 88 (55%) |
| Rosuvastatin | 72 (45%) |
| Influenza vaccine use | |
| Yes | 13 (8.13%) |
| No | 147 (91.88%) |
| Appropriateness by number of drugs used | |
| Appropriate | 154 (96.3%) |
| Inappropriate | 6 (3.8%) |
| Appropriateness by dose of drugs used | |
| Appropriate | 9 (5.6%) |
| Inappropriate | 151 (94.4%) |

Table 2: Distribution of Drugs Used by Patients

The frequencies of doses according to the drugs used are presented in table 3 and table 4.

| | Goal dose | Not Used |
|-----------------|------------|----------|
| Aspirin use | | |
| Yes | 155 (100%) | 0 (0%) |
| No | 0 (0%) | 5 (100%) |
| Clopidogrel use | | |
| Yes | 155 (100%) | 0 (0%) |
| No | 0 (0%) | 5 (100%) |

Table 3: Drug dose goal of Aspirin and Clopidogrel

| Medicine | Goal dose | Moderate intensity | Low intensity |
|-------------------|------------|--------------------|---------------|
| Beta-blocker used | | | |
| Metoprolol | 10 (55.6%) | 5 (55.6%) | 86 (64.7%) |
| Carvedilol | 8 (44.4%) | 4 (44.4%) | 47 (35.3%) |
| Ace-I used | | | |
| Captopril | 0 (0%) | 32 (59.3%) | 22 (40.7%) |
| Ramipril | 52 (100%) | 4 (7.4%) | 3 (5.6%) |
| Lisinopril | 0 (0%) | 18 (33.3%) | 29 (53.7%) |
| Statin used | | | |
| Atorvastatin | 0 (0%) | 18 (21.7%) | 70 (90.9%) |
| Rosuvastatin | 0 (0%) | 65 (78.3%) | 7 (9.1%) |

Table 4: Drug dose goal of Beta-blockers, ace-I and statin

It was also observed that no significant association of appropriateness of doses and number of drugs used was found with gender, age, diabetes mellitus, hypertension, and smoking.

DISCUSSION

The detrimental impacts of non-compliance on outcomes associated with MI patients, including as all-cause and CVD-specific mortality, have been emphasized by several sizable longitudinal registry studies [12–14]. Simons et al., study conducted in B-blockers, statins, ACE inhibitors, antiplatelet therapy, and calcium-channel blockers are all associated with poor long-term compliance and endurance in the Australian population. In a representative selection of 48,690 Australians receiving ACEI, ARB, and/or calcium-channel blockers, 81% of individuals had a second prescription filled for ACEI or ARB drugs; after median intervals of about 2 years, the numbers declined to around 45% and 47%, respectively, for ACEIs and ARBs [15]. However, in Roughead et al., study of 9635 military personnel following a hospitalisation for ischemic heart disease, adherence levels of 75% to ACEI/ARBs, 83.9% for lipid-lowering treatments, and 84% for non-aspirin antiplatelets were seen [16]. These results imply that secondary preventive cardiac protective drug non-adherence exists and differs by drug class. Further research is needed to determine the scope of nonadherence's consequences on community costs and health outcomes [15, 16]. Individual secondary preventive drugs have been shown to reduce mortality and morbidity after MI in clinical trials. Mukherjee et al., found that data from registries demonstrate that their concurrent use in individuals in reality is connected to a comparable benefit in outcome [17]. In fact, higher adherence to advice in guidelines is linked to small increases in survival, but stopping medicine is linked to a worse outcome [18]. However, the doses of these medicines that were provided were lower than those that were investigated in clinical trials, with approximately 85% of patients being discharged on beta-blocker doses and 75% of patients being discharged on statin and ACE/ARB doses, respectively [19]. Cumulative adherence to medical therapy advised by guidelines, risk factor management, and lifestyle modifications after myocardial infarction were linked to increased long-term survival in a large community-based population. The largest boost to survival was related with complete adherence [20]. The single-center experience, low female representation, and nonrandomized study design are the primary drawbacks of the present study. Because of the small sample size and urban setting of the study, it is possible that the findings cannot be extrapolated to bigger populations.

CONCLUSIONS

The present study revealed that the majority of the physicians prescribed the recommended number of the drugs used; however, the doses of drugs used were not

always according to the guidelines. It is important for cardiology physicians to understand the importance of guideline recommended pharmacological intervention among patients with a one-month history of MI.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article

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