Original Article

St-Segment Elevation Myocardial Infarction

Implementation of Guidelines in Patients with St-Segment Elevation Myocardial Infarction Admitted at National Institute of Cardiovascular Diseases Karachi

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ABSTRACT

Objective: To determine implementation of guidelines recommended pharmacological (disease modifying) and reperfusion therapy in patients with ST- Segment Elevation Myocardial Infarction (STEMI).

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted at the at National Institute of Cardiovascular Diseases Karachi from January 2019 to September 2020.

Materials and Methods: All 200 patients with diagnosis of acute STEMI were evaluated. Information collected included baseline ECG and cardiac markers, reperfusion therapy i.e. fibrinolytic or primary percutaneous coronary intervention, medications prescribed in the first 24 hours of admission and at the time of discharge.

Results: Among 200 patients' aspirin was administered to 200 (100%) at admission and discharge. 176 (88.6%), 198(99.0%) received oral beta-blockers at admission and discharge. (ACEI) or ARBS were administered in 172(86.0%), 196(98.0%) at admission and discharge. Lipid-lowering therapy was prescribed in 199(99.5%) patients. No patients received fibrinolytic (streptokinase). 200 (100%) patient underwent primary percutaneous intervention.

Conclusion: We concluded that almost 99% of Patients with STEMI received recommended disease modifying pharmacological therapy i.e. Aspirin, Beta blocker statins, ACE inhibitors and 100% trend towards primary percutaneous coronary intervention. However, as majority of our patients are unprivileged & unaware of their disease.

Key Words: Acute coronary syndrome, ST-segment Elevation Myocardial Infarction

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INTRODUCTION

In industrial countries and developing countries, acute myocardial infarction is a major public health hazard.[1] Diagnosis and management of the ST-segment of acute cardiac upliftments (STEMI) over the past 20 years has made significant progress.[1] Despite these developments, the application in clinical practice of the recommended treatment modalities was varied.[1] Early and suitable reperfusion therapy has significant repercussions on early and late morbidity and death in patients with acute myocardial infarction (MI).[1]

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Early uses have demonstrated to minimize mortality and recurrent MI and death in patients surviving initial STEMs in ST-Segment Elevation Myocardial Infarction (ST EMIT).[1] Despite convincing proof of the acknowledged advantages the awareness of general practitioners and Community hospitals about the usage of Aspirin is quite inadequate.[2] It is suggested that aspirin begin early and forever in all STEMI patients (without known contraindications).[1] STEMI beta-blocker benefits are clearly established for secondary prevention.[3] Reduces recurrent ventricular arythmia, ischemia, infarction size and refarctus. Reduces short-term and long-term mortality if given early enough.[1] Oral treatment without contraindication is suggested in all STEMI patients.[4] The advantages of lipid lowering treatment have been demonstrated by multiple clinical trials for individuals with an immediate coronary effect; patient adherence should be enhanced in hospital beginning for lipid lowering therapy.[1] Two inhibitors of the enzyme conversion of angiotensin (ACEI) have been demonstrated to lower death and morbidity in STEMI patients. The benefits of earlier MI and more linked ventricular impairment (LVEF <.40) were higher.[1] In patients with STEMI who may tolerate this

medicine, early oral treatment is advisable, and should be continued over the long term.[4]

Majority of the above mentioned drugs in addition to their primary pharmacological effect have additional important, yet overlooked effect on the endothelium "plaque stabilization.[5] The American Heart Association in their guidelines have recommended long term use of Aspirin, Beta-blockers, ACEI and Statins in all patients with STEMI for secondary prevention.[1I] Prompt and complete restoration of blood flow in the infarctiartery can be achieved by pharmacological means (fibrinolysis) and percutaneous coronary intervention (PCI) in the patients with STEMI. There is evidence that the quick recovery of blocked infarct artery flow when symptoms occur in patients with STEMI is a critical driver of long-term and short-term outcomes whether fibrinolysis or percutaneous intervention leads to reperfusion (PCI).[5]

Thus it is recommended that the health care personnel should facilitate rapid recognition and treatment of patients with STEMI for reperfusion therapy which reduces morbidity and mortality[1] The objective is to achieve the door-to-needle (or medical contact-to-needle) time for initiation of fibrinolytic therapy within 30 minutes or door-to-balloon (or medical contact-to-balloon) time for percutaneous coronary intervention (PCI) under 90 minutes.[1]

To improve care and outcome, recently updated American College of cardiology/American Heart Association (ACC/AHA) guidelines on STEMI recommend hospital-specific protocols to rapidly assess and treat patients with STEMI.[1] These guidelines, based on evidence-based medicines, promise to improve outcome and reduce variability in the delivery of clinical care.

The aim of this study is to determine implementation of use of pharmacological and reperfusion therapy which modifies disease process in patients with STEMI admitted at tertiary care hospital.

MATERIALS AND METHODS

This cross sectional study was carried out at National Institute of Cardiovascular Diseases Karachi on 200 patients with Diagnosed cases of ST-Segment Elevation Myocardial Infarction on the basis of history, clinical examination, electrocardiogram from January 2019 to September, 2020. Patients less than 18 years of age were not included in this study.

Patients who met and received coronary care and intervention step-down admission in emergency rooms of the National Institute of Cardiovascular Diseases were identified and informed consent to treatments for STEMI was given.

Information of pharmacological and reperfusion therapy which modifies the disease process like Aspirin, Beta-blockers, lipid-lowering drugs, ACEI or ARBs, fibrinolysis and percutaneous coronary intervention (primary) was collected through a proforma made by principal investigator at the time of admission and discharge, treated as case of STEMI on the basis of history, clinical examination, ECG and cardiac biochemical markers.

Data Analysis: The data was analyses on statistical package for social sciences (SPSS). Relevant descriptive statistics, frequency and percentage was computed for qualitative and quantitative variables including pharmacological and reperfusion therapy like Aspirin, Beta-blockers, lipid-lowering drugs, ACEI or ARBs, fibrinolysis and percutaneous coronary intervention (primary). Mean standard deviation was computed for quantitative variables like age. Logistic analyses were performed to assess the effect of these variables and chi-square test was applied to check the proportion of prescribed variables at p .05 level of significance.

RESULTS

Among 200 patients 153 (76.5%) were male and 47 (23.5%) were female. The mean age of the patients was 53.25+-10.29 (range from 28 to 71 years.

Among all patients 112 (56.0%) patients had acute anterior wall myocardial infarction, 84(42%) patients had acute inferior wall myocardial infarction and 4 (2.0%) patient myocardial infarction was aborted.

At the time of admission aspirin was administered to 200 (100%) of patients.

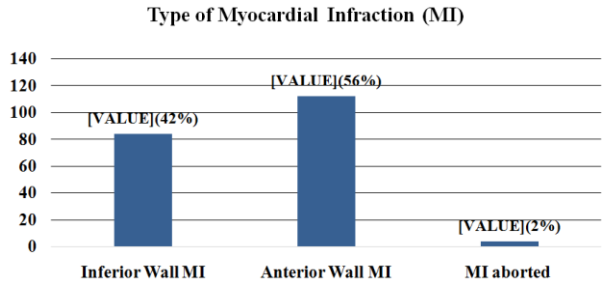
Total of 176(88.6%) patients received oral beta-blockers in the first 24 hours. Of the 24(12.0%) patients who did not receive beta-blockers, all had had contraindications. Angiotensin-converting enzyme inhibitors or ARBS were started 172(86.0%), while 28(14.0%) patients were not prescribed due to low blood pressure. Lipid-lowering therapy were prescribed in 200(100%).

Table No.1: Distribution of patients according to age and gender (n = 200)

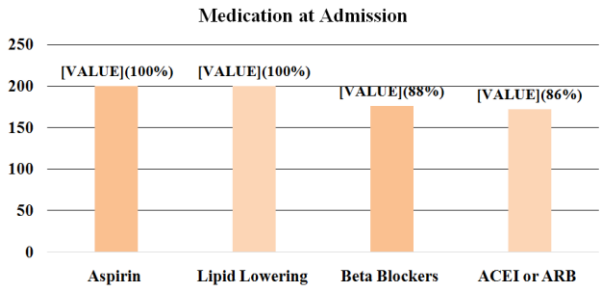
Gender	Number	Percentage
Male	153	76.5%
Female	47	23.5%
Mean age ± SD(Range)	53.25±10.29(28 to 71 years)	

At discharge, majority of the patients was prescribed aspirin 200 (100%) (P-value0.47, not significant) of patients. There is significant increase in use of betablockers 198(99.5%) (chi-square 19.91,P-value 0.000008) who were prescribed oral beta-blockers at discharge. Of the two patients who did not receive beta-blockers, all had had contraindications. ACEI or ARBS were prescribed in 196(98.) (chi-square 19.5, P-value 0.000010), which is significant increase. Lipid-lowering therapy were prescribed in 200(100%) (P-value not significant).

Of the total group of acute STEMI, 200(100%) patients underwent primary PCI (chi-square 217.91, P-value 0.000000). No patient received thrombolytic therapy (0%) (P-value not significant).



Graph No.1: Frequency of patients according to type of Myocardial Infraction (MI)



Graph No.2: Frequency of patients according to Medication at admission

DISCUSSION

Our study shows a significant improvement in care as shown by increase in thrombolysis rates. Among 200 patients of STEMI, 151 (75.50%)patients received repurfusion therapy in the form of streptokinase (SK). A local study in 2002 showed that 29% of the patients of STEMI were given SK.[6] while in a European study conducted in 2005 63% of the patients with STEMI were given thrombolytic therapy.[7]Significant increase in prescribing beta-blockers, ACE inhibitors, and statins. Previous recommendations for the use of ACE inhibitors in patients with left ventricular failure and the use of cholesterol lowering medicines in patients with low-density lipoprotein concentrations were limited. However, several recent clinical trails[8], regardless of the amount to which left ventricular failure or serum cholesterol is involved, have established the benefit of the use of ACE inhibitors and lipid lowering medicines in MI patients. The US Cardiology College and the American Heart Association[9]advocate the use of all four medicines for AMI hospital survivors in patients with STEMI. In the light of the increasingly complicated treatment guidelines for AMI patients, monitoring compliance with these criteria in more common samples of AMI patients is more relevant.

In recent years, there is insufficient data on the use of discharged medicine in the entire range of MI,[10] patients and their association with features and patterns of care of patients. There is limited data available for patients hospitalized with AMI from a more general perspective about the current prescription of effective cardiac medicines. In this population sample of AMI hospitalized patients in central Massachusetts, the Worcester Heart Attack Study[8], saw the increase in usage of ACE inhibitors, aspirin, beta-blockers and fat-reducing medication. Increased usage of combination therapy in hospital survivors of AMI over time was also described in this study.[8] In Olmsted, Minnesota,[11]studies were performed on the usage of ACE inhibitors, aspirin and beta blocker drugs in hospital survivors of AMI from 1989 to 1998. A Myocardial Infarction,[12]national registry data shows a considerable increase in the usage of aspirin (about 10%), beta-blockers (aroundi37%) and ACE (about 40%) inhibitors from 1994 to 1997. Airecent overview,[13] has showed that medicinal products with established efficacy are used in poor nations in the treatment of AMI patients. Six(3.0%) improvement observed in implementing primary percutaneous intervention, probably due to logistic problems and financial constrains which shows that evidence based medicine is underutilized, however much improvement has been seen in year 2012 towards primary PCI procedures, around twenty-five to thirty patients per month undergoing Primary PCI. Utilization of aspirin in AMI in our study was 99.5% which is better than a local study[6] which showed 78% utilization of aspirin at the time of discharge to AMI patients. Utilization of beta-blockers in current study was 99.0% which has considerable improvement as compared to previous local study[6] in 2002, which showed 61% use of beta-blockers in patients of AMI. Use of beta-blockers in our study is comparable to international study[7] which showed 83% & 61% utilization of beta-blockers in patients with STEMI. Another study[14] showed increase in utilization of beta-blockers from 83% to 91% during the study period (2000 – 2005). ACE inhibitors or ARBs were given to 98.0% of patients in current study while in a previous local study[6] these drugs were prescribed to 48% while in a Western study[7] these drugs were given to 67% of patients with AMI. A study[14]showed an increase in use of ACE from 63% to 77% during the study period (2000 – 2005).The utilization of statins in our study was 99.0% which is superior to local[6] and international studies[7] which showed only 28s% and 62% utilization of these agents. Another Western study[14]showed a marked increase in the use of statin therapy (from 45% to 85%) during the study period from 2002 –2005.A local study conducted in the last decade[14]showed that only 17.34% patients received thrombolytic therapy. Aspirin was used in 99.48% patients, beta blockers to 31.12% and ACE inhibitors to 13.28% of patients with acute myocardial infarction. Another local study conducted in this

decade[6] showed that 78% patients were given aspirin, 62% oral nitrates, 61% oral beta blockers and 48% ACE inhibitors. In the light of above data there is marked improvement in the utilization of cardiac medication of proven benefit, particularly in the use of streptokinase, beta blockers and ACE inhibitors, where the improvement is two to three times in comparison to the previous decade.

Pre-medication initiation has shown improve secondary prevention therapy, showing significantly higher utilization rates of aspirin, beta-blockers, ACE inhibitors, and lipid lowering drugs. Implementation of ACC/AHA/ESC guidelines is another potential source of change in practice in order to improve care of the patients. Our statistical analysis shows that there is improvement in implementing pharmacological guidelines and much improvement in implementing early re-vascularization with primary coronary interventions. Trend analysis shows that publication of new trials may have been the driving force for implementing above treatment modalities.

CONCLUSION

Implementation of STEMI guidelines has positive impact on patient's outcome. We have shown is still for short from the guideline recommendation, however increase trends towards primary PCI has been seen in recent years.

Our findings suggest that National Institute of Cardiovascular Diseases is an ideal place for implementation of evidence-based medicine. A predominant facilitating feature is awareness of attending intervention cardiac physicians, intervention cardiology fellows, about the guideline recommended management. Thus at discharge almost 100% of Patients with STEMI received recommended disease modifying pharmacological therapy i.e. Aspirin, B. blocker statin & ACE inhibitor and primary PCI. This is an unbeatable achievement.

Author's Contribution:

Concept & Design of Study:	Mahboob Ali
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Final Approval of version:	Mahboob Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

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