

Comparative Analysis In The Treatment Of Myocardial Infarcted Patients In The Tertiary Care Hospital Of Peshawar Against American Heart Association (AHA) Treatment Guidelines

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Abstract

Objective: To analyze pharmacotherapy provided in the hospital for MI indications and outcomes and to assess the protocols that are practiced for MI patients against the AHA and NICE guidelines.

Methods: This study was conducted from 23rd July 2022 to 13th December 2022 in Cardiology ward of Lady Reading Hospital (LRH), Peshawar, Khyber Pakhtunkhwa, Pakistan. Patients of Myocardial Infarction (n = 240) admitted to hospital during the said period were included in this work.

Results: The results showed that around 77% (185) of male patients suffered from MI as compared to 23% (55) of female patients. In our study only 68% of the patients were kept on aspirin and clopidogrel simultaneously, rest were either only administered aspirin or clopidogrel. The p-value for anti-coagulant and beta-blocker usage was found to be significant as it came out to be less than 0.001 whereas the use of ACE inhibitors was around 0.67, which stated that it was the least important.

Conclusion: MI is as emergency that needs the patients follow up and monitoring and their treatment is administered to the latest and most advanced guidelines whether they are AHA or NICE guidelines. For this a thorough study was conducted on admitted patients in cardiac ward with MI and the drugs data was tabulated. Then studied the different internationally accepted guidelines that are followed by the most advanced hospital in the world ranging from Europe to America.

The data collected showed that the tertiary care hospital of Peshawar do not follow the latest new guidelines. The practicing doctors administered the drugs that were correct almost half decade ago but now new guidelines have overtaken them which leads to improved patients morbidity and decreased mortality.

Keywords: Myocardial Infarction, Acute Coronary Syndrome, Cardiology, Pharmacotherapy, Practice Guidelines.

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1. Introduction

Myocardial infarction the permanent death of heart muscle secondary to prolonged lack of oxygen supply (ischemia). Myocardial infarction (MI) usually results from an unevenness in oxygen supply and ultimatum, which is most often initiated by plaque rupture with thrombus formation in an epicardial coronary artery, resulting in an acute decrease of blood supply to a portion of the myocardium.^{1, 2}

Myocardial infarction (MI), commonly known as a heart attack, is defined pathologically as the permanent death of myocardial cells caused by less supply of blood.³ Clinically, MI is a syndrome that can be known by a set of symptoms, chest pain being the important of these symptoms in most cases, supported by biochemical laboratory changes, ECG changes, or findings on imaging modalities able to detect myocardial injury and necrosis.^{4,5}

According to the third universal MI definition, implemented by a joint task force from the European Society of Cardiology, American College of Cardiology Foundation, American Heart Association, and the World Heart Federation, MI is diagnosed when either of the following two criteria are met.⁶

Detection of an upturn or fall in cardiac biomarker values with at least one value above the 99th percentile of the high reference limit (URL) and with at least one of the following findings:

Ischemia Symptoms New or presumed new significant ST-T changes or new left bundle branch block.⁷

Development of pathologic Q waves on the ECG Imaging evidence of new loss of viable myocardium or a new regional wall motion abnormality Identification of an intracoronary thrombus by angiography or autopsy Cardiac death with symptoms suggestive of myocardial ischemia and presumed new

ischemic changes or injury or new BBB on ECG, but death occurred before cardiac biomarker stages were obtained, or earlier cardiac biomarker values would be increased.⁸ MI is a common presentation of coronary artery disease. In 2004 WHO estimated that 12.2% of deaths worldwide was due to ischemic heart disease; with it being the major cause of death in high- or middle-income countries and second only to lower respiratory tract infections in lower-income countries or developing countries.⁹ More than 3 million people have STEMIs and 4 million have NSTEMIs a year internationally or worldwide. STEMIs occur about twice as often in men as women.¹⁰

In developed countries death rate or ratio of death from ischemic heart disease (IHD) have decline or slowed. Although till 2008 in US cardiovascular disease still accounted for one in three of all deaths. In US for example from 2001 to 2011,¹¹ rates of death from cardiovascular disease have decreased almost a third. In contrast, in developing countries IHD is becoming a more common cause of death.¹² In India for example up to 2004 IHD had become the major cause of death accounting for 1.46 million deaths (14% of total deaths) were expected to double during 1985–2015 due to Ischemic heart disease. World widely, disability adjusted life years (DALYs) lost to IHD are predicted to responsible for about 5.5% of total DALYs in 2030, making it the second leading cause of disability (after unipolar depressive disorder, as well as the leading cause of death by this date.^{13, 14,}

¹⁵ The prevalence of acute MI as the first manifestation of ischemic heart diseases is high in approximately 50% to 70% of patient and is a common cause for hospital admission. Several factor related to severity of disease have been identified such as diabetes mellitus, smoking hypertension dyslipidemia the numbered of arteries impaired and degree of functional impairment of the left ventricle. Furthermore age, sex, and obesity heavily alcohol consumptions and physical inactivity were also considered as contributed risk factors.^{16, 17}

2. Materials & Methods

This was a cross-sectional research that was conducted from 23rd July 2022 to 13th December 2022 in Cardiology ward of Lady Reading Hospital (LRH), Peshawar, Khyber Pakhtunkhwa, Pakistan.

Patients who presented in the emergency department and were diagnosed and confirmed as MI patients on history and lab work were included in the study of either gender fitting to any age group.

Whereas the patients who were not diagnosed as MI patients or who landed in emergency with some other disease but later developed MI were excluded from the study. The sample size was calculated using G*Power software (latest ver. 3.1.9.7; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany) and it came to be n = 240 Myocardial Infarcted patients admitted to hospital during the said period.

3. Results

The results showed that around 77 percent (185) male patients suffered from MI as compared to 23 percent (55) female patients. This data has been explained in figure 1 for easy understanding according to the brands used in the cardiology ward. Prescription of the antiplatelet drugs and lipid lowering drug shared the most prescribed drugs at 68 percent (165) patients. After the prescription of antiplatelets and lipid lowering drugs the most prescribed drug was Low Molecular Weight Heparin that constituted around 62 percent (150) patients. ACE Inhibitors and beta blockers almost stood at 50 percent each. In our study only 68 percent of the patients were kept on aspirin and clopidogrel simultaneously, rest were either only administered aspirin or clopidogrel. It is also showed that the number of patients on the other three drugs was also markedly low 52 percent, 50 percent and 58 percent for ACE inhibitors, Beta blockers and Nitroglycerine respectively as shown in table 1.

Table 1: Different drugs usage and their p value

Drugs	Drug Usage		P value
	Yes	No	
Anticoagulant + beta blocker	165(68%)	75 (32%)	0.001
ACE inhibitor	125 (52%)	115 (48%)	0.67
Beta blocker	120 (50%)	120 (50%)	0.53
Nitroglycerine	130 (58%)	110 (42%)	0.08

In this table the p value for anti-coagulant and beta blockers usage was found to be significant as it came out to be less than 0.001 whereas the use of ACE inhibitors usage was around 0.67 which stated that it was least significant in the above table.

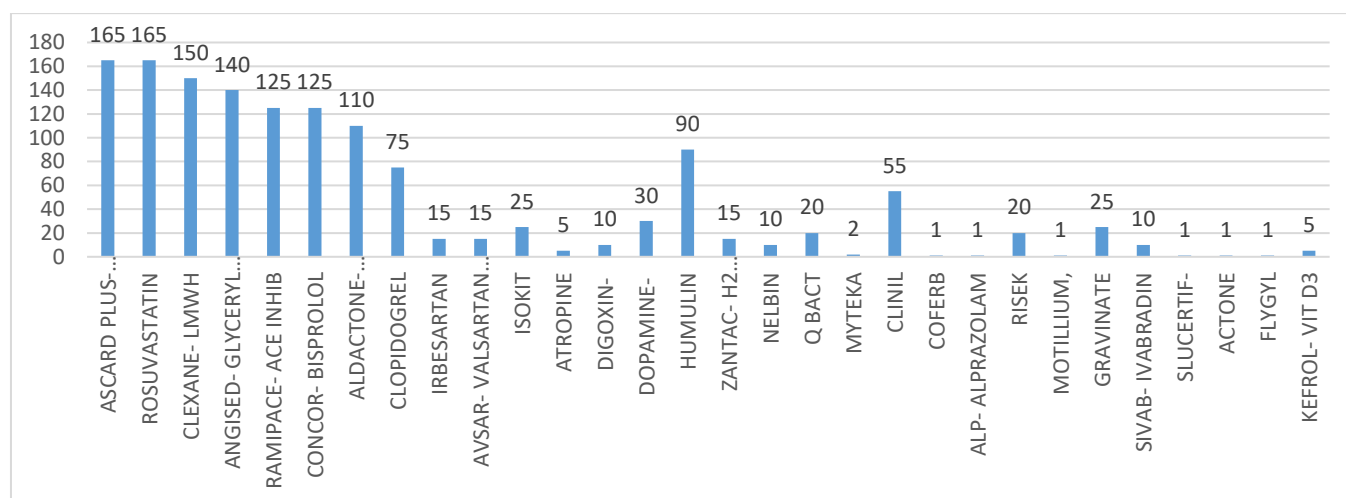


Figure 1: Statistic of Brands Used In Cardiology Ward for MI Patients

4. Discussion

These comparative studies underscore the complex interplay of clinical, organizational, and systemic factors shaping the implementation of updated treatment guidelines in NSTEMI management. Addressing these challenges requires a multifaceted approach, involving ongoing education, multidisciplinary collaboration, and innovative use of technology to bridge the gap between research evidence and clinical practice. With the new advancements and the lack of time it is difficult for the doctors to keep up with the ever new changing treatment strategies in medicine and elsewhere. This is also depicted in the study ¹⁷ and another study conducted eight years later by RH Lim published in Wiley's online library 2018. All these studies showed that even the simplest field of Radiology have so much new innovations like for example if a doctor reads 40 pages a day for 5 days a week it would require over 11 years to bring his knowledge up to date but by that time over 82,000 new research pages will be in practice. Same case is with the other medical fields where one needs to regularly keep his knowledge updated.^{18, 19}

In addition to the studies referenced, there are several recent research findings and comparative studies that shed light on the challenges of implementing updated treatment guidelines, particularly in the context of Non ST Elevated Myocardial Infarction (NSTEMI) management. A study ²⁰ compared the adherence to ESC, ACC, and AHA guidelines for NSTEMI treatment across different hospital settings, including tertiary care

hospitals and community hospitals. The research revealed significant variations in the implementation of guideline-recommended therapies, with tertiary care centers generally exhibiting higher rates of compliance but still falling short of optimal adherence levels.

Building upon the findings of previous studies, a qualitative analysis conducted by ²¹ explored the barriers and facilitators to guideline implementation in cardiology practice, focusing on factors such as physician knowledge, institutional support, and patient preferences. The study identified gaps in knowledge translation and highlighted the need for tailored strategies to overcome barriers to guideline adherence.

An observational study by ²² assessed the impact of multidisciplinary care models, involving collaboration between cardiologists, nurses, pharmacists, and other healthcare professionals, on treatment outcomes in NSTEMI patients. The research demonstrated that integrated care approaches led to improved adherence to evidence-based guidelines and reduced rates of adverse events, underscoring the importance of team-based care in optimizing patient outcomes.

In this research we saw that the patients with Non-ST Elevated Myocardial Infarction (NSTEMI) when they were admitted in hospital besides the medical or surgical intervention what was their treatment plans that were followed. Most of the new guidelines in JACC ²³ showed that the newer treatment modalities have evolved but in tertiary care hospital of KPK the patients are not treated according to the latest guidelines whether that are laid by European Society of Cardiology (ESC), American College of Cardiology Foundation (ACC), American

Heart Association (AHA), National Institute for Health and Care Excellence (NICE) or the World Heart Federation (WHF).²⁴

Most of the patients should have been on beta blockers as stated in multiple studies but only 122 (50 percent) patients were found to be treated with this individual drug. It cannot be emphasized more that in all these and many more studies that were carried out in the last decade showed, that use of beta blockers had more useful effects in short- and long-term therapy irrespective the patient was discharged or planned for the surgical intervention.^{1, 25}

Another aspect that was concluded in the study was that the total number of 240 patients only 68 percent (165 patients) were found to be taking the combined Aspirin along with Clopidogrel and the remaining 32 percent patients were administered either Aspirin or Clopidogrel. The multiple studies^{18,19} have emphasized the important of using the combination of Aspirin and Clopidogrel. This is because that studies have shown better results in the patients who were treated with the combined drugs as compared to the use of aspirin or Clopidogrel alone.^{2, 26}

5. Conclusion

The data collected showed that the tertiary care hospital of Peshawar does not follow the latest new guidelines. The practicing doctors administered the drugs that were correct almost half decade ago but now new guidelines have overtaken them which leads to improved patient's morbidity and decreased mortality.

The NICE guide lines states that at least two anticoagulants should be administered followed by ACE inhibitors, Beta blockers and Nitroglycerine but in our study only 68 percent of the patients were kept on aspirin and clopidogrel simultaneously, rest were either only administered aspirin or clopidogrel.^{27, 28}

Our finding also showed that the number of patients on the other three drugs was also markedly low 52 percent, 50 percent and 58 percent for ACE inhibitors, Beta blockers and Nitroglycerine respectively. Our recommendation is that consultant and attending physicians should on annual basis be strongly recommended to attend training sessions and compelled to go through the updated guidelines that are issued by JCC, AHA, NICE and other organization so that the patient's morbidity and mortality can be decreased and

the burden on the government organizations can be lowered by decreased load of medical prescriptions.

It is also recommended the concerned higher ups that a set of rules and regulations should be inculcated that can strictly take action against the mafia or the concerned who prescribe loaded useless medication to the poor's and the doctors who are malpractising by prescribing placebo drugs and making easy money.

These practices cannot be halted until strong punishments are given to the culprits who practice these unethical norms.

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Contributions:

S.A.K, Q.N, A.M - Conception of study

S.A.K, Q.N, - Experimentation/Study Conduction

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S.A.K, Q.N, S.A, S.K - Manuscript Writing

S.A.K, S.K - Critical Review

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All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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