A Contemporary Role of Beta Blockers in Myocardial Infarction

ABSTRACT

Myocardial infarction (MI) is characterized by plaque formation in the inner layer of arteries which occurs due to insufficient or complete cessation of oxygen supply in the myocardium. The common symptoms of MI are crushing or squeezing chest pain which radiates to the arms, shoulders, neck, or jaw, nausea, anxiety, restlessness, fear, heartburn, shortness of breath, cold sweat, fatigue, and dizziness. The treatment of this medical condition includes antiplatelet and thrombolytic therapy, painkillers (morphine or meperidine), diuretics and digitalis glycosides drugs. Moreover, nitroglycerin and antihypertensive drugs such as Beta-blockers, ACE inhibitors, or Calcium channel blockers may also be administered to reduce the blood pressure and improve the oxygen supply in the heart. Among them, beta blocker therapy has several beneficial properties such as it reduces myocardial oxygen demand, preventing arrhythmias, and improves ventricular remodeling, etc. However, there is no study on the role of only beta blocker therapy in the survival of MI patent is found to date. Thus, the present study focused on the evidence-based validation of Beta blocker therapy in the treatment and survival of MI patients. The retrospective study was conducted on 51 MI patients under the observation of medical practitioners. 100% of patients with MI showed a good recovery as well as survival percentage with Beta blocker therapy. This study finally concluded that beta blocker therapy is a safe and effective treatment for MI patients with negligible life-threatening medical conditions. Furthermore, a large group study is suggested with a number of health-related parameters for a better understanding of beta blocker as a first line of treatment for MI patients.

Keywords: Acute coronary syndrome, Myocardial infarction, symptoms, Beta Blockers, retrospective study

1. INTRODUCTION

The acute coronary syndrome is considered one of the common causes of morbidity and mortality all across the globe and is described as the clinical signs and symptoms of myocardial ischemia including unstable angina, and myocardial infarction (MI) [1; 2]. Among them, MI is popularly known as the "Heart attack" and occurs due to the formation of plaque in the inner sides of the arteries. Plaque formation occurs due to the decreased or discontinuation of oxygen supply in the myocardium. It is a catastrophic event that leads to hemodynamic deterioration and the sudden death of a person [3-5]. The major symptoms of MI include chest pain that expands from left arm to neck, shortness of breath, perspiration, nausea, vomiting, irregular heartbeat, anxiety, fatigue, weakness, stress and depression. The incidence of MI increases in old age people commonly after 65 years, and males are more prone as compared to females [10-12]. Moreover, smokers, patients with hypertension & higher content of low density lipoprotein (LDL), hypercholesterolemia, diabetes, obesity, chronic renal disorders, higher consumption of alcohol, drugs such as cocaine and amphetamines are other risk factors for MI [5]. The electrocardiogram (ECG) is used for the detection of MI and on the basis of shape of the tracing MI can be classified into two groups such as non-ST-segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI) [1; 4]. Additionally, Cardiac Troponin I or T are the very sensitive and specific blood test for the diagnosis of MI [9].

Patients with MI are commonly treated in Coronary Care Unit in the emergency division of hospitals and the instant treatment of MI includes the use of antiplatelet drugs that dissolve blood clots, arterial blockage [6; 13] and then clot-dissolving drugs like tissue plasminogen activator (tPA), Streptokinase or Urokinase are injected in the blood within 3 h of the onset of a heart attack while painkillers (morphine or meperidine) can also be given to reduce pain. Along with this, diuretics may also recommend for the promotion of the effect of the above-mentioned drugs. Moreover, digitalis

glycosides namely digoxin may be prescribed in several cases to support heart muscle contraction while dopamine or dobutamine is given to improve blood flow and strengthen the heartbeat. Nitroglycerin and antihypertensive drugs such as Beta-blockers, ACE inhibitors or Calcium channel blockers may be administered to reduce the blood pressure and oxygen demand in the heart [5].

The beta blocker therapy due to its several beneficial properties such as it reduces myocardial oxygen demand, prevents arrhythmias, and improves ventricular remodeling against MI [7]. However, at present these drugs are not used as the first line of the treatment while it has the ability to play role in the recovery as well as the survival of the MI patients. There is no studies were found on the role of only beta blocker therapy in the survival of MI patent. Thus, the present study focused on the validation of beta blocker therapy in the recovery as well as the survival of MI patients.

2. PATIENTS AND METHODS

This retrospective study was conducted on 51 patients admitted with MI to the cardiology department in SSB Heart and Multispeciality Hospital at Faridabad, Haryana, India from January to June 2021. Before participation in the present study, all patients signed an informed written consent form. In addition, this study was conducted with permission from the local ethical committee of SSB Heart and Multispeciality Hospital. Patients with obvious contraindications unstable and angina were excluded in this investigation. Further, the study is done only with Beta-blockers not combined with other cardio-protective classes of drugs such as ACE inhibitors. Another exclusion criterion were patients with MI with complete heart block/brady-arrythmias/acute left ventricular failure/COPD/RVMI in shock.

Beta-blocker drug is given only to 36 (70.5%) out of which 26 (72%) received immediate particular drug after administered in hospital followed by patent received drug with in 12 h, between

12 to 24 h and after 24 h i.e. 20 (55%), 3 (8.3%) and 3 (8.3%), respectively (Fig. 1) and only 15 (29.4%) not received beta-blocker drug which is due to the delay in starting of particular drug therapy, MI with bradycardia/complete heart block or any other brady arrhythmias, patient with acute left ventricular failure, right ventricular myocardial infarction (RVMI) & shock, Chronic obstructive pulmonary disease (COPD) and active Bronchial asthma.

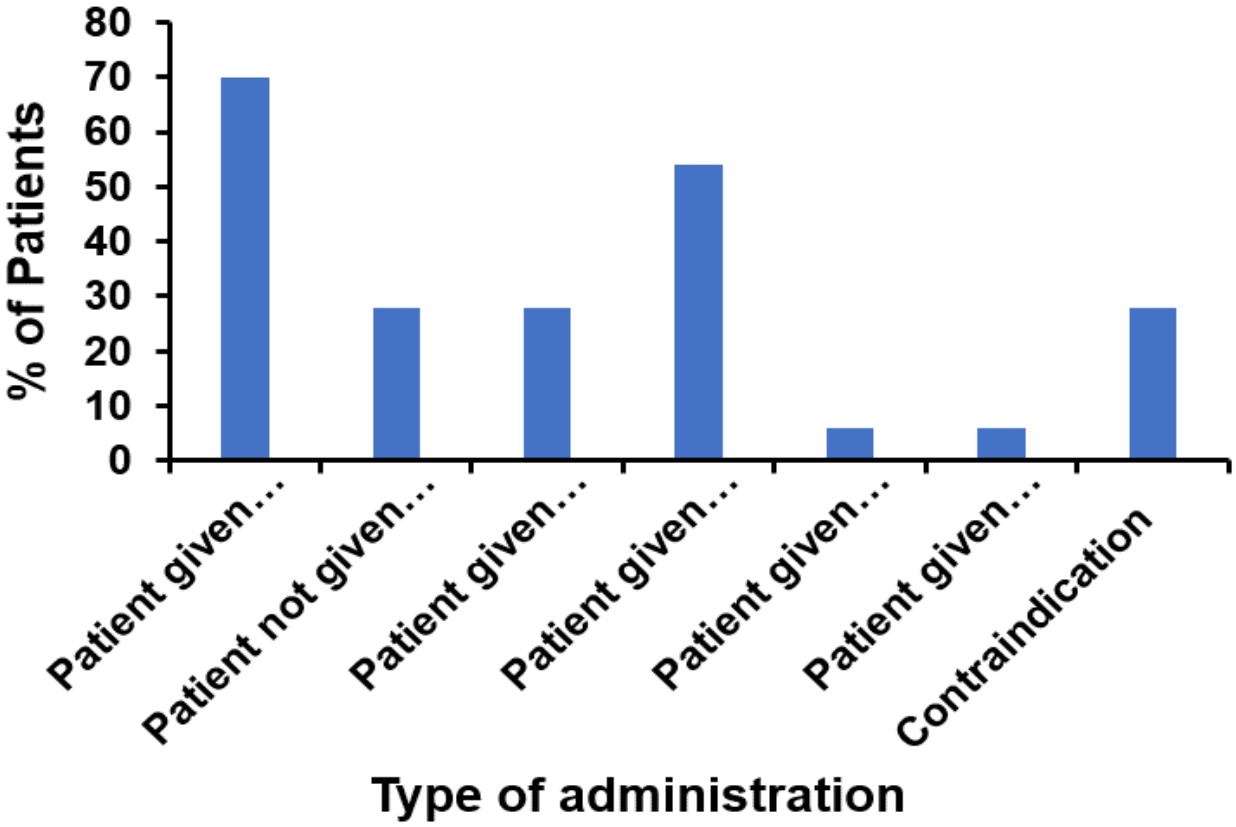

Fig. 1. Percentage of patients involves in the study

3. RESULTS AND DISCUSSION

The present study revealed that all patients with beta blocker therapy showed remarkable recovery. Out of them, a total of 89% of patients received immediately after being admitted in an emergency followed by within 12 and between 12- 24 h administration i.e. 75 and 56% (Fig. 2)This drug exhibited a similar impact in all age groups. There was no significant relation recorded between cardiac death and beta blocker therapy within the duration of the study. (P=0.06)

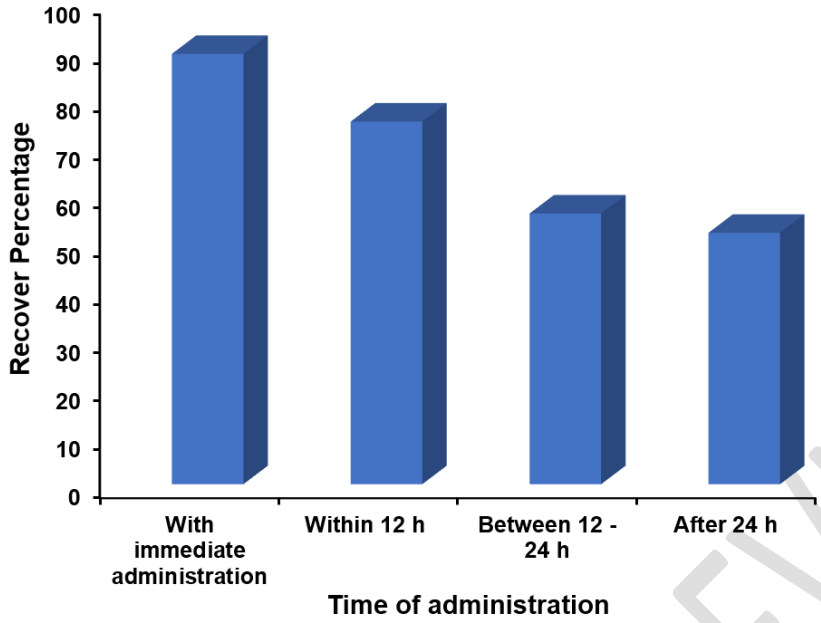

Fig. 2. Percent recovery of patients

Various controlled trials also showed that early Beta blockers in prescription have shown improved outcomes in patient with Acute MI by reducing myocardial O_2 demand & thus gradually infarct size and by preventing life-threatening arrhythmias which are a very common cause of sudden death in MI setting. Moreover, it helps to decrease the extent of Negative remodelling & thus long-term survival benefits and improves left ventricular diastolic functions.

This study showed that the use of beta blockers was associated with better cardiac recovery in patients with AMI than the use of other drugs. Furthermore, the beneficial effects of beta blockers were consistently observed across the patient. This study revealed that beta blocker therapy supports the reduction of mortality rate in MI patients and a similar result was also reported by the Norwegian Multicenter Study Group [8]. To the best of our knowledge, this is the first study in North India that address the efficacy of β-blockers in patients with AMI and vasodilating β-blocker therapy significantly reduced the rate of cardiac death, and incidence of MI and hospitalization for heart failure.

5. CONCLUSION

Several controlled trials have shown that early Beta blockers in prescription have shown improved outcomes in the patient of acute MI. This study finally concluded that clinical trials on large groups for a long duration with other parameters will be conducted to improve the treatment process in MI Patients.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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