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Frequency Of Mitral Regurgitation In Different Myocardial Infarction Patient Reported To Rmi Peshawar

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Abstract

Background: Acute myocardial infarction (MI) has a significant impact on health-related quality of life and remains a leading cause of morbidity and mortality worldwide. It is a major contributor to the global burden of cardiovascular disease. Mitral regurgitation (MR) is a common mechanical complication of MI that adversely affects left ventricular function and contributes to the development of heart failure.

Objective: To determine the frequency of mitral regurgitation among patients with different types of myocardial infarction and to assess the severity of mitral regurgitation in these patients.

Methodology: Ethical approval was obtained from the Ethical Research Committee of Rehman College of Allied Health Sciences. An observational cross-sectional study was conducted involving 349 patients with myocardial infarction. Data were collected using a structured questionnaire, and the presence and severity of mitral regurgitation were assessed by echocardiography.

Results: A total of 349 patients were included in the study, comprising 240 (68.8%) males and 109 (31.2%) females. The frequency of mitral regurgitation was highest in patients with inferior myocardial infarction (58.16%), followed by anterior myocardial infarction (33.52%), posterior myocardial infarction (4.58%), and lateral myocardial infarction (3.72%). Mild mitral regurgitation was the most common grade observed across all types of myocardial infarction.

Conclusion: Mitral regurgitation was most frequently observed in patients with inferior myocardial infarction. Mild mitral regurgitation was the predominant grade among patients with all types of myocardial infarction, highlighting the importance of routine echocardiographic evaluation following acute myocardial infarction.

Introduction

Myocardial infarction (MI) remains one of the leading causes of morbidity and mortality worldwide and is a major contributor to the global burden of cardiovascular disease (1). It occurs when myocardial blood flow is abruptly reduced or interrupted, resulting in ischemia and irreversible necrosis of cardiac muscle (2). The most common underlying cause is atherosclerotic plaque rupture followed by thrombus formation within a coronary artery, although an imbalance between myocardial oxygen supply and demand may also lead to myocardial injury (3). Based on electrocardiographic findings, acute MI is classified into ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI), both of which differ in clinical presentation, management, and prognosis. Despite remarkable advances in reperfusion therapy, pharmacological treatment, and percutaneous coronary intervention (PCI), myocardial infarction continues to be associated with substantial short- and long-term complications (4).

Mitral regurgitation (MR) is one of the most important mechanical complications following myocardial infarction (5). It results primarily from ischemic injury causing left ventricular remodeling, papillary muscle displacement or dysfunction, annular dilatation, and impaired coaptation of the mitral valve leaflets rather than from primary structural abnormalities of the valve itself. In severe cases, papillary muscle rupture may cause acute, life-threatening MR requiring urgent intervention (6). Even mild ischemic MR has been associated with increased risks of heart failure, recurrent hospitalization, and mortality, making its early identification clinically important.

Mitral regurgitation is among the most common valvular heart diseases worldwide and may develop secondary to ischemic heart disease, non-ischemic cardiomyopathy, or degenerative valvular disorders. Functional MR following MI occurs because of alterations in left ventricular geometry and papillary muscle function, leading to incomplete leaflet closure during systole. The severity of MR depends on the extent and location of myocardial damage, ventricular remodeling, and left atrial compliance (7). Progressive MR contributes to left atrial enlargement, left ventricular volume overload, pulmonary hypertension, and worsening ventricular dysfunction, thereby adversely affecting patient outcomes. Echocardiography with color Doppler imaging is the diagnostic modality of choice for evaluating mitral regurgitation (8). It accurately identifies the presence, mechanism, and severity of regurgitation while simultaneously assessing left ventricular size, systolic function, and associated structural abnormalities. Doppler echocardiography is considered the gold standard for grading MR severity and plays a crucial role in clinical decision-making, prognostic assessment, and planning appropriate medical or surgical management (9).

Although ischemic mitral regurgitation has been extensively investigated in developed countries, limited data are available regarding its frequency among different types of myocardial infarction in Pakistan (10). Understanding the burden of MR in patients with STEMI and NSTEMI is essential for identifying high-risk individuals, facilitating timely intervention, and improving clinical outcomes. Therefore, the present study was conducted to determine the frequency of mitral regurgitation among patients with different types of myocardial infarction presenting to Rehman Medical Institute (RMI), Peshawar.

RATIONALE

Mitral regurgitation is the most common consequence of myocardial infarction. Accurate assessment of Mitral Regurgitation in Myocardial infarction patients is

important as it effect left ventricular function and development of heart failure.This study will help us to identify high riskpatients who may benefit from early intervention.We can advise treatment plans like medical therapy, catheter-based treatment and surgical repair.We can also enhance patients outcomes by addressing complications from mitral regurgitation.

OBJECTIVES

Assessing Mitral Regurgitation frequency in patients having different Myocardial Infarction

Comparing the degree of Mitral Regurgitation in patients having Myocardial Infarction

MATERIALS AND METHODS

This observational cross-sectional study was conducted in the Cardiology Department of Rehman Medical Institute (RMI), Hayatabad, Peshawar, over a period of four months. A total of 349 patients diagnosed with myocardial infarction were included in the study. The sample size was calculated using the single population proportion formula, assuming a prevalence of 35%, a 95% confidence level, and a 5% margin of error. Participants were recruited using a convenient sampling technique. All patients with a confirmed diagnosis of myocardial infarction were eligible for inclusion, while patients with mitral regurgitation due to causes other than myocardial infarction were excluded. Ethical approval was obtained from the Ethical Research Committee of Rehman College of Allied Health Sciences, and permission to conduct the study was obtained from the Graduate Students Committee and the Head of the Cardiology Department at Rehman Medical Institute. After obtaining informed consent, demographic and clinical data were collected using a structured questionnaire, and the presence of mitral regurgitation was assessed through echocardiographic evaluation. Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize the study variables, and appropriate statistical tests were applied where required. Statistical significance was considered at a *p*-value of <0.05.

RESULTS

A total of 349 patients were included in this study. Out of which 240(68.8%) were males and 109(31.2%) were females. As shown in Fig 4.1

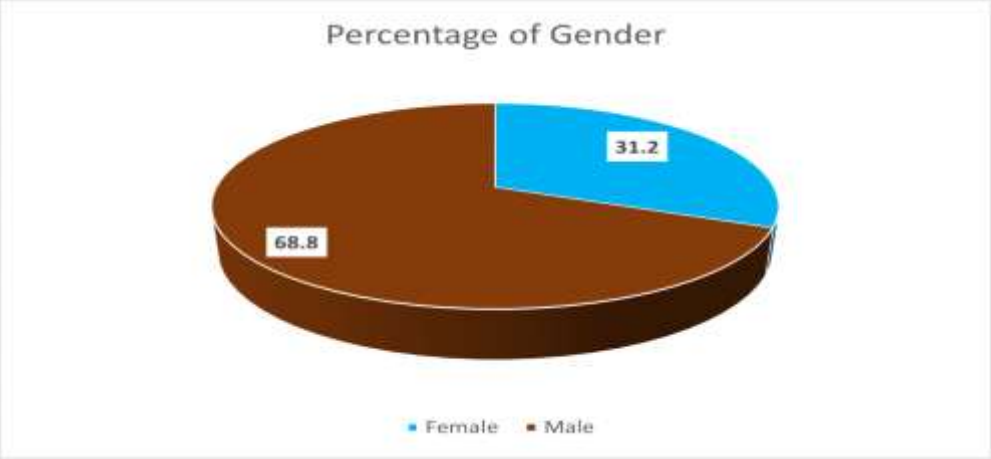

Figure 4.1 Gender of Patients

In total 349 patients, the frequency and percentage according to age categories are given below. The most prevalent age group was 62 and above and the least frequent age group was 30-45. As shown in Fig 4.2.

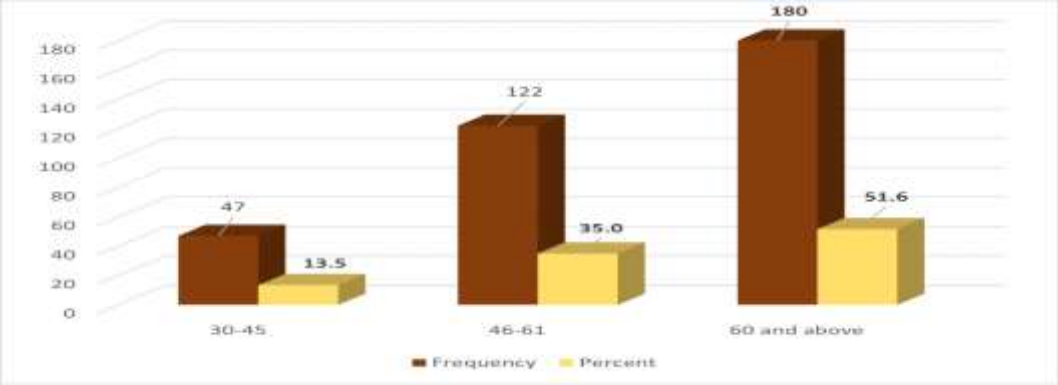

Figure 4.2: Age wise distribution of the participants.

In total of 349 patients, the frequency of MR was most frequent in inferior wall MI and least frequent in lateral wall MI. As shown in Fig 4.3.

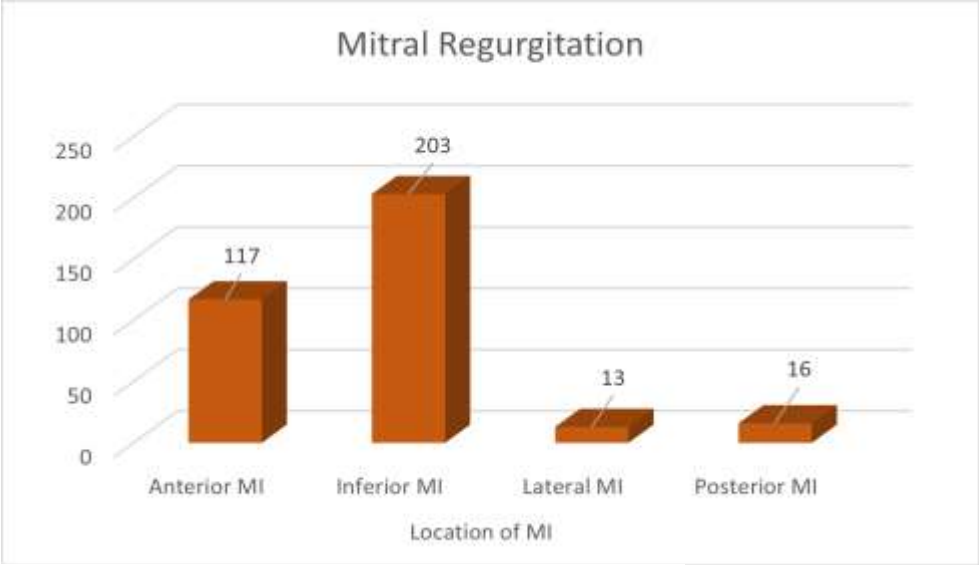

Figure 3: Frequency of MR in various types of MI

In total of 349 patients, MR in inferior wall MI was most prevalent as compared to all types of MI, and then MR in Anterior MI was more common than Lateral MI and Posterior MI, and MR of mild degree was common in all MI. As shown in Table 4.1.

		Mild	Moderate	Severe
Location of MI	Anterior MI	56	48	13
	Inferior MI	94	91	18
	Lateral MI	8	4	1
	Posterior MI	10	5	1

Table 4.1: Degree of MR in various types of MI on basis of location of MI

DISCUSSION

Quality of life related to health have been significantly impacted by acute myocardial infarction. It is a major cause of mortality and morbidity in worldwide and contributes mainly to the burden of cardiovascular disease. According to general practice estimates, the annual incidence of MI in the UK is predicted to be 2.6 per 1000 people. Men experience MI three to four times more frequently than women of similar age. One hour after the beginning of symptoms is when one-third of men and one-quarter of women between the ages of 25 and 64 pass away from MI. The meta-analysis of nine studies shows that white people had a less incidence of cardiovascular disease compared to South Asians.Ethnicity South Asian is linked to a higher incidence of coronary heart disease but a reduced death rate after the disease manifests due to primary prevention.

Mitral regurgitation is a common complication of myocardial infarction which affect the left ventricular function and development of heart failure.Mitral regurgitation (MR) is commonly observed after acute myocardial infarction (AMI). Ischemic heart diseases, non ischemic heart diseases and valve degeneration are the most frequent causes of mitral regurgitation. Functional MR is caused by both ischemic (coronary artery disease) and non ischemic heart diseases through various different mechanism which include impaired LV wall motion, papillary muscle rupture or dysfunction and LV dilatation. Structural defects of the mitral valve leaflets and subvalvular apparatus, along with rupture of the chordae tendineae are caused by degenerative valve disease Its transient nature, varying severity, and the different methods used for detection have led to significant uncertainty about its incidence, progression, and prognostic significance during the post-infarction period. Multiple studies have established that MR following AMI is linked to higher mortality rates. Despite numerous studies addressing various aspects of MR after AMI, there is limited data on the early predictors of MR.

Doppler and two-dimensional echocardiography is now the main methods used to evaluate mitral regurgitation. When both methods are used in tandem, data about the degree of regurgitation and the morphology of the valvular apparatus are obtained. Echocardiographic measurement of ventricular size and function is crucial in individuals with severe mitral regurgitation.

More than 4 million people in Europe and America were affected by mitral regurgitation. Every year, over 250000 new people are diagnosed with the illness.Mitral regurgitation(MR) is the third most frequent form of valvular heart disease affecting around 24.2 million people around the world. Secondary, or functional MR affects, 24% patients with systolic congestive heart failure (CHF) and accounts for 65% of cases of moderate-to-severe MR. It comes from the left ventricle or atrium's morphological enlargement without any alteration to mitral valve leaflets. Developed countries with high rates of atherosclerosis, coronary artery disease (CAD), and congestive heart failure (CHF) have secondary MR. These conditions all contribute to and are linked to secondary MR.

The aim of our study is to determine the frequency of mitral regurgitation in different MI on the basis of location and also to find out degree of MR in different MI. The aim of this study is to find the type of MI related to MR. Review article was focused on presence of Mitral regurgitation in MI patients. Our aim is to find out the frequency of different MR in MI patients**.**

Data is collected through questionnaire from the patients. A total 349 patients were the part of our study in which 240 were male and 109 were females. Frequency of MR in inferior MI was 203, anterior MI was 117, posterior was 16 and lateral was 13. The frequency of MR in inferior MI was higher among all the MI patients. We also found that the mild degree of MR in inferior MI was 94, moderate MR was 91 and severe MR was 18. The degree of mitral regurgitation in anterior MI was mild(56), moderate(48), severe(13).In lateral MI the degree of MR was observed as mild(8),

moderate(4), severe(1) and in posterior MI mild(10), moderate(5), severe(1).It was observed that the mild degree of MR is most common in all MI.

CONCLUSION

This study evaluated the frequency and severity of mitral regurgitation among patients with different types of myocardial infarction presenting to Rehman Medical Institute (RMI), Peshawar. The findings demonstrated that mitral regurgitation was more frequent among patients with inferior myocardial infarction than in other types of myocardial infarction. Furthermore, mild mitral regurgitation was the most commonly observed grade across all myocardial infarction patients. These findings highlight the importance of routine echocardiographic assessment in patients with acute myocardial infarction for the early detection and appropriate management of ischemic mitral regurgitation.

RECOMMENDATIONS

Routine echocardiographic evaluation should be considered for all patients presenting with acute myocardial infarction to facilitate the early diagnosis of mitral regurgitation and guide timely management. Patients with inferior myocardial infarction should receive particular attention because of their higher frequency of mitral regurgitation. In addition, strategies aimed at reducing cardiovascular risk factors, including smoking cessation, regular physical activity, healthy dietary habits, and effective control of hypertension, diabetes mellitus, and dyslipidemia, should be encouraged to reduce the incidence of myocardial infarction and its associated complications.

LIMITATIONS

This study was conducted at a single tertiary care center using a cross-sectional study design and a convenient sampling technique, which may limit the generalizability of the findings. The study included only patients with ischemic (secondary) mitral regurgitation following myocardial infarction, while primary, congenital, and age-related mitral regurgitation were excluded. In addition, the relatively short study duration and limited sample from a single institution may have influenced the study outcomes. Future multicenter studies with larger sample sizes and longitudinal follow-up are recommended to validate these findings.

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