

FREQUENCY AND COMPLICATIONS OF ISCHEMIC MITRAL REGURGITATION IN PATIENTS WITH ACUTE CORONARY SYNDROME

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ABSTRACT

Objective: To determine the frequency of ischemic mitral regurgitation, determine severity and defining its complications among patients with acute myocardial infarction (MI).

Methodology: This study was conducted at Hayatabad Medical complex. Our study was descriptive cross sectional study in which 262 patients with acute MI were studied using non-probability consecutive sampling technique. Complications were followed for 6 Months & recorded on a pre-designed proforma.

Results: In this study mean age was 60 ± 1.26 years. One hundred and ten (42%) patients were male while 152(58%) patients were female. One hundred thirty six patients (52%) patients were ST elevation MI (STEMI) and 126(48%) patients were non-ST elevation MI (NSTEMI). Mitral regurgitation was found in 141(54%) patients in whom 104(74%) patients were found to have mild mitral regurgitation, 29(20%) patients were found to have moderate mitral regurgitation and 8(6%) patients were having severe mitral regurgitation. Moreover 25(18%) patients had new onset atrial fibrillation, 24(17%) patients had in-hospital mortality and 15(11%) patients were re-admission with heart failure.

Conclusion: Following myocardial infarction, baseline mitral regurgitant severity is associated with deterioration of LV function & increased mortality. The presence of mitral regurgitation confers poor prognosis in patients with acute coronary syndrome.

Key Words: Acute coronary syndrome, Echocardiography, Mitral regurgitation

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INTRODUCTION

Cardiovascular disease is a major health problem affecting people across the globe. According to a report in 2004, cardiovascular diseases led to 17.1 millions deaths worldwide, which was 29% of all deaths in that year; & 23.6 million people are at risk of death from cardiovascular problems in 2030¹. Among the cardiovascular diseases acute MI is the main cause of mortality and morbidity in the western world². one of the mechanical complications during first few days of myocardial infarction is mitral regurgitation³ and mitral regurgitation early after acute myocardial infarction shows a poor prognosis with increased deaths due to non-cardiac causes, cardiovascular deaths & hospitalization for heart failure^{4,8}.

Multiple factors play a role in causing mitral regurgitation after myocardial infarction but the most commonly accepted mechanism is that ischemia causes the regional myocardium underlying the papillary muscles

to bulge outwards leading to malcoaptation of the mitral leaflets⁵. In contrast patients with non ST elevation acute coronary syndrome (ACS) have myocardial ischemia or hibernation leading to mitral regurgitation⁶. An uncommon but fatal complication is papillary muscle rupture⁷. Patients with mitral regurgitation may be asymptomatic or may develop shortness of breath, fatigue, a new murmur, pulmonary edema and shock⁸. The severity of these symptoms is related to ventricular function and subsequent development of congestive heart failure⁹. Echocardiography with color doppler is used as a diagnostic tool for mitral regurgitation and to quantify its severity⁴.

In the western world the prevalence of echo detected mitral regurgitation after the acute myocardial infarction during hospital stay was found as 53.48%, of which mild mitral regurgitation (MR) in 75.85%, moderate MR in 18.5% and severe MR in 5.65%¹⁰, while the prevalence of doppler detected mitral regurgitation following myocardial infarction in Pakistan is 65.2%^{9,10}. The preva-

lence of mitral regurgitation after acute MI was found to be higher in patients with advanced age, female gender, diabetic and hypertensive patients¹¹.

The presence of mitral regurgitation early after acute MI is a predictor of adverse outcomes like atrial fibrillation, heart failure hospitalization and death^{9,12}. Prevalence of atrial fibrillation in patients with MR resulting from Ischemia or infarction is 18%¹². Early ischemic mitral regurgitation is associated with increased mortality (22%) against no mitral regurgitation in which case the mortality is 10%⁹. 16% patients with ischemic mitral regurgitation need hospitalization for heart failure against 9% patients with no mitral regurgitation¹⁰.

The current study was aimed at determining the frequency of MR and the resultant morbidity & mortality among patients presenting with acute coronary syndrome (STEMI/NSTEMI). Our study was designed to generate local data regarding mitral regurgitation in the setting of acute myocardial infarction, to spread alertness to the problem that is often a marker of high risk & high mortality in our population & to help design local facilities for such patients, who often need invasive treatment in the form of well equipped cardiac cath & cardiac surgical facility.

METHODOLOGY

Our study was conducted in Hayatabad Medical Complex. Patients were followed for 6 months. Our study was descriptive cross sectional study & sampling technique used was non-probability consecutive sampling. After approval of ethical committee, informed consent was taken from all patients before enrolment in our study. 262 patients were included according to sample size calculator by WHO. All patients both male and

female of age more than 18 years presenting with first ever episode of acute coronary syndrome (ST elevation & non ST elevation ACS) defined according to universal definition of myocardial infarction. Mitral regurgitation was quantified according to the AHA guidelines for valvular heart disease, using standard echocardiography techniques by a qualified cardiologist. All patients were scheduled for routine echocardiography as standard of care on 3rd day of myocardial infarction & were followed up at 6 months in the cardiology OPD.

RESULTS

Frequency of mitral regurgitation among 262 patients was 141(54%). Mitral regurgitation was seen in both STEMI (76 patients) & NSTEMI (65 patients). Common clinical outcome of mitral regurgitation among 141 patients was analyzed and 25(18%) patients had presence of atrial fibrillation, 24(17%) patients had in-hospital mortality and 15(11%) patients were re-admitted with heart failure. Among 141 patients with mitral regurgitation, 104(74%) had mild mitral regurgitation. Relative frequencies of mitral regurgitation severity are shown in table 1.

25 patients had new onset atria fibrillation. Relative frequencies of clinical outcome of mitral regurgitation are shown in table 2. 32 patients were more than 60 years of age, 12 with new onset atria fibrillation, 12 had in-hospital mortality and 08 were re-admitted with heart failure. Clinical outcome of mitral regurgitation and age distribution is shown in table 3.

regarding gender distribution 37 were females. In 25 patients with new onset atria fibrillation, 9 were male s and 16 were females. Clinical outcome of mitral regurgitation and gender distribution is shown in table 4.

Table 1: Severity of mitral regurgitation (n=141)

| Severity Of Mitral Regurgitation | Frequency | Percentage |
|----------------------------------|-----------|------------|
| Mild | 104 | 74% |
| Moderate | 29 | 20% |
| Severe | 8 | 6% |
| Total | 141 | 100% |

Table 2: Common clinical outcome (n=64)

| Common Clinical Outcome | Frequency | Percentage |
|---------------------------------|-----------|------------|
| New onset Atrial Fibrillation | 25 | 39.1% |
| In-hospital Mortality | 24 | 37.5% |
| Re-admission with Heart Failure | 15 | 23.4% |
| Total | 64 | 100% |

Table 3: Common clinical outcome in age distribution (n=64)

| Common Clinical Outcome | 41-50 Years | 51-60 Years | > 60 years | Total |
|---------------------------------|-------------|-------------|------------|-------|
| New onset Atrial Fibrillation | 4 | 9 | 12 | 25 |
| In-hospital Mortality | 4 | 8 | 12 | 24 |
| Re-admission with Heart Failure | 2 | 5 | 8 | 15 |
| Total | 10 | 22 | 32 | 64 |

Table 4: Common clinical outcome in gender distribution (n=64)

| Common clinical outcome | Male | Female | Total |
|---------------------------------|------|--------|-------|
| New onset atrial fibrillation | 9 | 16 | 25 |
| In hospital Mortality | 11 | 13 | 24 |
| Re-admission with Heart Failure | 7 | 8 | 15 |
| Total | 27 | 37 | 64 |

DISCUSSION

In our study mitral regurgitation was found in 54% patients. Among these 74% patients had mild mitral regurgitation, 20% patients had moderate mitral regurgitation and 6% patients had severe mitral regurgitation. Similar results were found in study done by Amigoni et al¹⁰. In his study mitral regurgitation was found as mild in 76.22%, moderate in 18.5% and severe in 5.4% patients. Similar findings were also observed in another study done by Randhawa et al¹¹.

Our study shows that mitral regurgitation was found at nearly similar rates in STEMI & NSTEMI, in contrast to observation that were found in study done by Grigioni et al⁹ in which mitral regurgitation was found more in STEMI as compare to NSTEMI.

In our study worse outcomes were seen in patients with Ischemic mitral regurgitation. MR after MI indicates changes in ventricular geometry that causes the morbidity & mortality in these patients. Worsening of mitral regurgitation will obviously lead to recurrent admission for heart failure, but as such patients die earlier so excluding the possibility of longterm follow-up. Nevertheless, our data shows the importance of detecting, quantifying and following the presence of MR after MI in patients with signs or symptoms of heart failure. The proper strategy that will reduce the progression of MR is not known^{12,13}.

LIMITATIONS

Some limitations of this study should be noted. We analyzed mitral regurgitation by colour flow doppler, mapping regurgitant jet expansion within the LA, a method that may result in misclassification of MR in

some patients. Better evaluation of mitral regurgitation is by proximal isovelocity surface area (PISA) method, but the necessary images for this are technically more challenging. Finally, assessment of left ventricular sphericity is made dubious by potential ventricular foreshortening during echocardiographic image acquisition.

CONCLUSION

Mitral Regurgitation was associated with complications of systolic dysfunction, HF, or both. Accurate assessment of MR and its presence following MI may help identify a particularly high-risk group to be followed up & treated aggressively with all available modalities.

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CONTRIBUTORS

A conceived the idea, planned the study, and drafted the manuscript. JUR helped acquisition of data and did statistical analysis. AK critically revised the manuscript. All authors contributed significantly to the submitted manuscript.