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Original Research Article

FREQUENCY OF ACUTE ISCHEMIC MITRAL REGURGITATION IN PATIENTS OF ACUTE ST-SEGMENT ELEVATED MYOCARDIAL INFARCTION IN PATIENTS PRESENTING AT TERTIARY CARE HOSPITAL OF PESHAWAR

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Abstract: *This study aimed to determine the frequency of acute ischemic mitral regurgitation in patients with acute ST-segment elevated myocardial infarction. This descriptive cross-sectional study was conducted at the Cardiology Department of Lady Reading Hospital in Peshawar from March 18, 2019, to September 18, 2019. The study was conducted at Peshawar's Cardiology Department of Lady Reading Hospital. A total of 126 patients were observed, and all of them were subjected to a detailed history, including their past medical history, age, sex, and smoking status. They also underwent a routine physical examination baseline investigation, including ECG (cardiofax) and transthoracic echocardiography (Siemens' Accuson CV-70). The data was recorded in a pre-designed proforma. The mean age of the patients in this study was 53 years, with a standard deviation of ±11.23. 68% of the patients were male, while 32% were female. Additionally, 5% of the patients had ischemic mitral regurgitation, while 95% of the patients did not have ischemic mitral regurgitation. This study concludes that the frequency of acute ischemic mitral regurgitation in patients with acute ST-segment elevated myocardial infarction was 5%.*

Keywords: Acute Ischemic Mitral Regurgitation, Acute ST-Segment Elevated Myocardial Infarction

Introduction

The prognosis is worse for ischemic mitral regurgitation following an increased ST-segment myocardial infarction. Even in cases when ischemic mitral regurgitation is minimal, the prognosis is poor and gets worse as the condition worsens. An independent predictor of a worse prognosis is the early onset of ischemic mitral regurgitation following an elevated ST segment myocardial infarction. Patients who have experienced an ST segment raised myocardial infarction nevertheless frequently have it (Mentias et al., 2017). With an estimated prevalence of 20–50%, ischemic mitral regurgitation is a common mechanical consequence of myocardial infarction. Following myocardial infarction, ischemic mitral regurgitation is frequently moderate and may disappear entirely. Rather than an anterior wall myocardial infarction, 38 percent of cases of irreversible mitral regurgitation occur after an inferior myocardial infarction (10 percent) (Fattouch et al., 2010). Ischemic mitral regurgitation is commonly linked to myocardial infarction and ischemia in the left ventricle, which supports the mitral valve structurally and contractilely. The amount of myocardial necrosis, the preservation of left ventricular function, and the prevention of left ventricular remodeling are all significantly impacted by the time to reperfusion (Poh et al., 2012). The degree of ischemic mitral regurgitation has been demonstrated to correlate with the heart's viability. The existence of viable myocardium within the myocardial infarction zone inhibits the development or exacerbation of mitral regurgitation and decreases left ventricular remodelling (Golia et al., 2001; Valuckiene et al., 2016). Thrombolysis after the first ST-segment raised myocardial infarction dramatically decreased the incidence of severe (at least moderate) Ischemic mitral regurgitation and localized left ventricular remodeling, as demonstrated by studies by Leor et al. and Tenenbaum et al.(Leor et al., 2005; Tenenbaum et al., 2011). Furthermore, no patient undergoing thrombolysis experienced significant ischemic mitral regurgitation, according to the Leor et al. study (Leor et al., 2005). The most popular technique for assessing the degree of mitral regurgitation is still quantitative echocardiography. [12] Research has indicated a correlation between acute ischemic mitral regurgitation following an acute ST-segment elevation myocardial infarction and several mechanical problems, such as rupture of the ventricular septum and papillary muscle. Research findings indicate that ischemic mitral regurgitation is relatively common in various groups, with rates as high as 79.9% in a Cleveland Clinic research and 70% in an Amsterdam study (Abate et al., 2016; Engström et al., 2010). Due to logistical issues and a lack of some recent advancements, compared to other developed countries, the majority of patients in our population present late, or SDT (symptoms to door time) and DNT (door to needle time), or the time to begin therapy and reperfusion. Additionally, effective reperfusion techniques are less likely, which could increase the incidence of acute ischemic mitral regurgitation. The incident rate is significantly affected by accounting for these problems (Goyal et al., 2015).

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Consequently, when the incidence is accessible, recommendations or suggestions would be provided to avoid the terrible consequences of acute ischemic mitral regurgitation for the timely diagnosis, transfer, and thrombolysis of patients with STEMI (acute ST-elevation myocardial infarction). We received the most recent and updated information regarding the frequency of acute ischemic mitral regurgitation in patients with acute ST-segment-raised myocardial infarction from this study, as no similar study had been carried out in our community in the previous five years. Furthermore, other health professionals were informed of the study's findings, and they were utilized in future research projects

Methodology

The investigation was conducted with approval from the hospital's ethics and research committee. Individuals are scheduled to see the outpatient cardiology department at Lady Reading Hospital in Peshawar between March 18 and September 18, 2019.

This study included patients, both male and female, aged 18 to 60, who had an acute myocardial infarction and presented within 24 hours. Patients with NSTEMI, patients with RHD, patients with connective tissue illnesses, and patients who had previously undergone mitral valve surgery were excluded from this study. Patients were admitted to the cardiology ward after receiving their informed permission. Before undergoing a standard physical examination, every patient had a thorough medical history that included information on their age, sex, and smoking status. A baseline investigation was conducted, which involved transthoracic echocardiography using Siemens' Accuson CV-70 and an ECG using Cardiofax. A pre-made proforma was used to record the data above, including demographic characteristics. Strict exclusion criteria were adhered to to adjust for confounders and bias in the study's findings. SPSS version 22 was used to analyze the data that was gathered. The mean and standard deviation were computed for continuous variables like age. The following categorical variables were shown as frequencies and percentages: gender, hypertension, diabetes, smoking, type of STEMI, gendered mitral regurgitation, and its grades. Ischemic mitral regurgitation was stratified according to age, gender, hypertension, diabetes, smoking history, and type of STEMI to determine the effect modifiers. A chi-square test was used after stratification, with a P value of ≤ 0.05 deemed significant. Tables and graphs were used to show every result.

Results

The age distribution of the 126 patients in this study was analyzed. Of them, 31 (or 25%) were between the ages of 31 and 40, 38 (30%) were between the ages of 41 and 50, and 57 (or 45%) were between the ages of 51 and 60. With an SD of 11.23, the mean age was 53 years. Analysis of the gender distribution of the 126 patients revealed that 40 (32 percent) and 86 (68 percent) were female. (Table Number 1).

Among the 126 patients, the kind of STEMI was analyzed: 85 (68 percent) had anterior, 28 (22 percent) had inferior, and 13 (10 percent) had lateral. (Table Number 2).

Upon analyzing the hypertension status of 126 individuals, it was found that 113 (90 percent) had hypertension and 13 (10%) did not. (Table No. 3). Analysis of the 126 individuals' diabetes mellitus status revealed that 88 (or 70%) had the disease, whereas 38 (30%) did not. After 126 patients' status of their prior CAD history was examined, it was found that 83 (66%) had a positive history and 43 (34%) had an adverse history. (Table No. 3). Analysis of the smoking status of 126 patients revealed that 82 (65%) of them were smokers and 44 (35%) were not.

The frequency of ischemic mitral regurgitation in 126 individuals was examined; 6 patients, or 5% of the total, had the condition, whereas 120 patients, or 95%, did not. (Table No. 3).

Table No. 4 shows the stratification of ischemic mitral regurgitation according to age, gender, hypertension, diabetes, smoking history, prior history of CAD, and type of STEMI.

Table 1: Distribution of age and gender of the patients

Parameter	Age (years)	Frequency	Percentage
Age	31- 40	31	25%
	41-50	38	30%
	51-60	57	45%
Gender	Male	66	68%
	Female	40	32%

Table 2: Distribution of STEMI in patients

Type of STEMI	Frequency	Percentage
Anterior	85	68%
Inferior	28	22%
Lateral	13	10%

Table 3: Frequency of different variables in the study sample

Parameter	Yes/No	Frequency	Percentage
Hypertension	Yes	113	90%
	No	13	10%
Diabetes Mellitus	Yes	88	70%
	No	38	30%
Smoking	Yes	82	65%
	No	44	35%
Previous CAD	Yes	83	66%
	No	43	34%
Ischemic mitral regurgitation	Yes No	06 120	5% 95%

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Table 4: Stratification of acute ischemic mitral regurgitation with age, gender, hypertension, diabetes mellitus, smoking, previous CAD and type of STEMI

Parameter	Sub-division of parameter	Ischemic mitral regurgitation		P value
		Yes	No	
Age group	31-40 years	2	29	0.8132
	41-50 years	2	36	
	51-60 years	2	55	
Gender	Male	4	82	0.9317
	Female	2	38	
Hypertension	Hypertensive	5	108	0.6003
	Non-hypertensive	1	12	
Diabetes mellitus	Diabetic	4	84	0.8621
	Non-diabetic	2	38	
Smoking	Smoker	4	78	0.9333
	Nonsmoker	2	42	
Previous CAD	Yes	4	79	0.9664
	No	2	41	
Type of STEMI	Anterior	4	81	0.8461
	Inferior	1	27	
	Lateral	1	12	

Discussion

The prognosis is worse for ischemic mitral regurgitation following an increased ST-segment myocardial infarction (Persson et al., 2010; Poh et al., 2012). The prognosis is poor even in cases of moderate ischemic mitral regurgitation, and it gets worse as the condition worsens. An independent predictor of a worse prognosis is the early onset of ischemic mitral regurgitation following an elevated ST segment myocardial infarction. · Patients who have experienced an ST segment raised myocardial infarction nevertheless frequently have it. With an estimated prevalence of 20–50%, ischemic mitral regurgitation is a common mechanical consequence of myocardial infarction. Following myocardial infarction, ischemic mitral regurgitation is frequently moderate and may disappear entirely. Rather than an anterior wall myocardial infarction, 38 percent of cases of irreversible mitral regurgitation occur after an inferior myocardial infarction (10 percent) (Fattouch et al., 2010). 53 years was the mean age, with a standard deviation of (Engström et al., 2010). Thirty-two percent of patients were female, and twenty-three percent were male. Ninety-five percent of patients did not have ischemic mitral regurgitation, compared to over five percent who did. Studies have demonstrated a correlation between additional mechanical problems, such as ventricular septal rupture and papillary muscle rupture, and acute ischemic mitral regurgitation following acute ST-segment raised myocardial infarction. Research has shown that ischemic mitral regurgitation occurs relatively frequently in various groups, with rates as high as 79.9% in a Cleveland Clinic research and 70% in an Amsterdam study (Khan, 2017; Zoghbi et al., 2003).

Similar outcomes were noted in a different study by Asifullah et al. with a mean age of 60 ±1.26 years, 110 male patients (42 percent), 152 female patients (58 percent), 136 ST-elevation MI (STEMI) patients (52 percent), and 126 non-ST elevation MI patients (48 percent) (NSTEMI). Eight patients (6%) had severe mitral regurgitation, 104 patients (74%) had moderate mitral regurgitation, and 29 patients (20%) had mild mitral regurgitation. Of the patients, 18 percent had mitral regurgitation. Furthermore, of the patients, 25 (18%) had atrial fibrillation with a new beginning, 24 (17%) experienced in-hospital mortality, and 15 (11%) were re-admitted with heart failure (Mengal et al., 2016).

A different study by Mengal MN et al. revealed that 262 patients with a mean age of 53.9±7.1 years were included in the investigation. Male patients made up 68% of the total. Ten percent of patients had mild, moderate, or severe mitral regurgitation, each with its features. The likelihood of MR was higher in elderly individuals receiving SK and experiencing acute inferior wall MI (IWMI). Additionally, patients receiving SK and those with IWMI had a higher risk of developing a severe grade of MR (p 0.05). A common side effect of STEMI is MR, which was more common in individuals who had IWMI or who had emergency thrombolysis with SK (Amigoni et al., 2007; Bouma et al., 2016).

The incidence of mild, moderate, and severe MR following STEMI was reported to be 40.7%, 9.9%, and 2.8% in another study by Amigoni M et al. found nearly similar results in our investigation, with the frequency of mild, moderate, and severe MR being 10%, 15%, and 1%, respectively. Their study's low incidence of severe MR could be primarily attributed to higher primary PCI rates.

This study's primary weakness was its tiny sample size. A larger sample, age, sex-standardized research populations, and long-term follow-up would highlight the tight connection between acute ischemic mitral regurgitation and patients with stemming.

Conclusion

Our study concludes that the frequency of acute ischemic mitral regurgitation was 5% in patients with acute ST-segment elevated myocardial infarction.

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Declarations

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All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared absence of conflict of interest.

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