



MITRAL VALVE REGURGITATION CAUSES IN A SAMPLE OF IRAQI PATIENTS

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ABSTRACT

Background: Mitral regurgitation (MR) is a common valvular heart condition seen in clinical practice and on echocardiography. Proper morphologic evaluation is crucial for successful valve reconstruction surgery. Transthoracic echocardiography can identify the cause and location of mitral valve issues by assessing the affected leaflets and segments. **Objectives:** To assess the causes of mitral valve regurgitation among a sample of Iraqi patients at Mosul general Hospital in Mosul/ Iraq. **Methods:** This is a descriptive cross-sectional study conducted at Mosul General Hospital from January 2023 to March 2025. The study includes 500 patients selected in systematically randomized manner from those who were seen in inpatient or outpatient departments of the hospital. Exclusion criteria included patients over 85 years old or under 15 years old, as well as those who had received prior valve interventions or replacement. All patients did a standard transthoracic echocardiogram. The questionnaire consisted from 2 parts. Part one for sociodemographic information and part two for echocardiography findings. **Results:** The study includes 500 patients distributed equally between males and females. Mitral valve regurgitation was prevalent in 169 (33.8%) patients of them. Among these 169 patients; 99 (58.5%) were females and 70 (41.5%) were males with male to female ratio of 1:1.41. Moreover; mitral valve regurgitation was prevalent among 99 out of 250 (39.6%) patients of females versus in male it was prevalent among 70 out of 250 (28%) patients. Primary causes of mitral valve regurgitation were prevalent among 122 (72.9%) of the study patients, while secondary causes of it were prevalent among 47 (27.1%) patients. Among those with primary causes of mitral valve regurgitation. Degenerative cause was the most prevalent cause, while among those with secondary causes, ischemic cause was the most prevalent cause. The majority of patients had mild severity, followed by trace severity. While the least common was severe mitral valve severity. **Conclusion:** Mitral regurgitation is prevalent in the Iraqi population. The common cause is the primary cardiac defect. The majority of patients had mild mitral regurgitation, whereas only eight percent had severe mitral regurgitation.

KEYWORDS: Iraq, Mitral, Mosul, regurgitation.

1. INTRODUCTION

Mitral regurgitation (MR) is a common valvular heart condition seen in clinical practice and on echocardiography.^[1] Mitral insufficiency is a leading cause of heart failure and associated problems such as endocarditis, arrhythmia, and sudden cardiac death.^[2] As people age, the prevalence and severity of this condition increase.^[3] The actual prevalence of this condition may be underestimated, and the underlying causes and processes have not been well investigated. MR is often classified as primary or secondary, according on its underlying mechanism. According to European Society

of Cardiology recommendations, MR can be classified as primary (organic) or secondary (functional and ischemic).^[4]

Primary MR is caused by a structural or degenerative abnormality of the mitral valve in leaflets, chordate tendineae, mitral annulus, or papillary muscles. Secondary MR occurs when the left ventricle (LV) is damaged by dilated cardiomyopathy or coronary artery disease, resulting in annular dilatation and lateral displacement of the papillary muscles, resulting in mitral valve insufficiency.^[5-6] Ischemia of the left ventricle

causes the sub-valvular apparatus to become tethered, which restricts the mobility of the mitral leaflets and leads to ischemic MR.^[7]

On the other hand, functional MR is caused by changes in LV geometry due to LV dysfunction, such as in ischemic or idiopathic cardiomyopathy with significant dysfunction. Severity of secondary MR is a crucial prognostic factor, with increasing severity related with increased mortality.^[8]

Surgical results for secondary MR are dismal compared to primary MR.^[9] Since these characteristics determine and direct the proper care, echocardiography is the gold standard for diagnosing patients with mitral valve disease and determining the etiology and underlying processes that lead to valve failure.^[10] Proper morphologic evaluation is crucial for successful valve reconstruction surgery.^[11] Transthoracic echocardiography can identify the cause and location of mitral valve issues by assessing the affected leaflets and segments.^[12]

The aim of this study was to assess the causes of mitral valve regurgitation among a sample of Iraqi patients at Mosul general Hospital in Mosul/ Iraq.

2. PATIENT AND METHOD

This is a descriptive cross-sectional study conducted at Mosul General Hospital from January 2023 to March 2025. The study includes 500 patients selected in systematically randomized manner from those who were seen in inpatient or outpatient departments of the hospital. Verbal approval was obtained from each patient after taken the approval from the local ethics committee in Mosul directorate of health. Exclusion criteria included patients over 85 years old or under 15 years old, as well as those who had received prior valve interventions or replacement.

All patients did a standard transthoracic echocardiogram (using vivid E9 GE Health care) in compliance with the European Association of Cardiovascular Imaging's (EACVI/ASE) guidelines.^[13] A thorough 2-dimensional, M-mode, and Doppler echocardiography study was also conducted on each patient. Patients were evaluated for signs of MR, valve morphology, and other cardiac abnormalities. The etiology of MR was defined as primary (valve structural abnormalities) or secondary (left ventricular abnormalities). MR severity was classified into four groups, from trace to severe.^[14] Color Doppler was used to evaluate the severity of regurgitant jet in several viewpoints, including assessing vena contract width, proximal velocity surface area, and pressure half-time. Associated heart valve disease was also confirmed. Valve stenosis severity was determined by peak gradient and velocity, mean gradient and velocity, and valve area. It was classified as mild, moderate, or severe based on EACVI/ASE recommendations for valvular disease.^[15] Transthoracic echocardiography was used to quantify the left atrial and left ventricular chambers, following EACVI/ASE criteria.^[16]

The collected data were coded, entered, and analyzed using the available data base software program statistical package of IBM SPSS-29 (IBM Statistical Packages for Social Sciences- version 29, Chicago, IL, USA). Continuous data has been reported as mean and SD, whereas categorical variables were expressed as frequencies and percentages.

3. RESULTS

The study includes 500 patients distributed equally between males and females. Mitral valve regurgitation was prevalent in 169 (33.8%) patients of them. Among these 169 patients; 99 (58.5%) were females and 70 (41.5%) were males with male to female ratio of 1:1.41. As shown in figure 3.1.

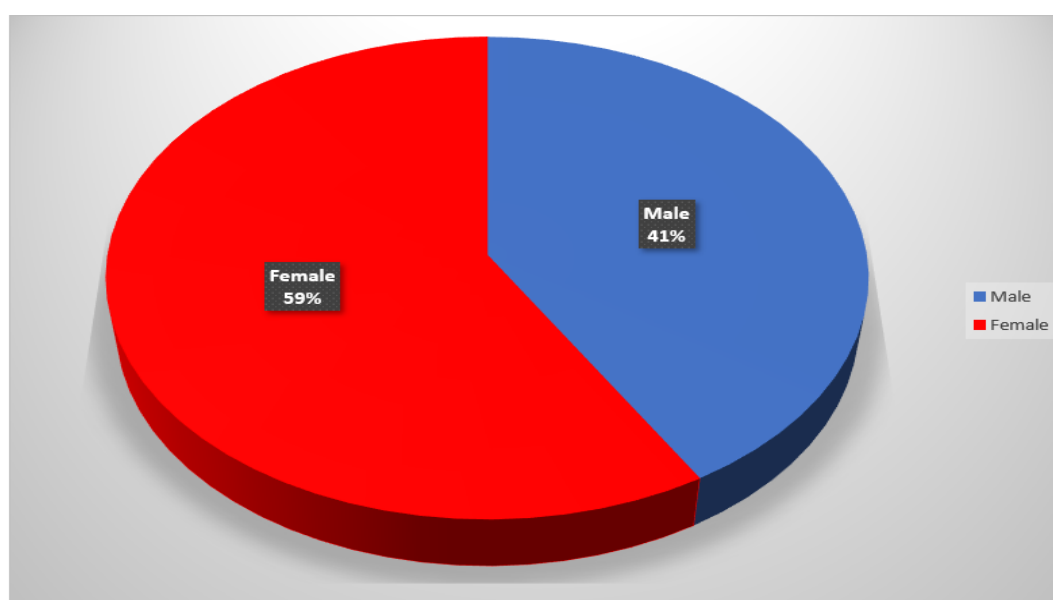


Figure 3.1: Pie graph showing distribution of the study participants according to their gender.

Moreover; mitral valve regurgitation was prevalent among 99 out of 250 (39.6%) patients of females versus in male it was prevalent among 70 out of 250 (28%) patients.

Figure 3.2 shows distribution of the study patients according to their causes. Primary causes of mitral valve regurgitation were prevalent among 122 (72.9%) of the study patients, while secondary causes of it were prevalent among 47 (27.1%) patients.

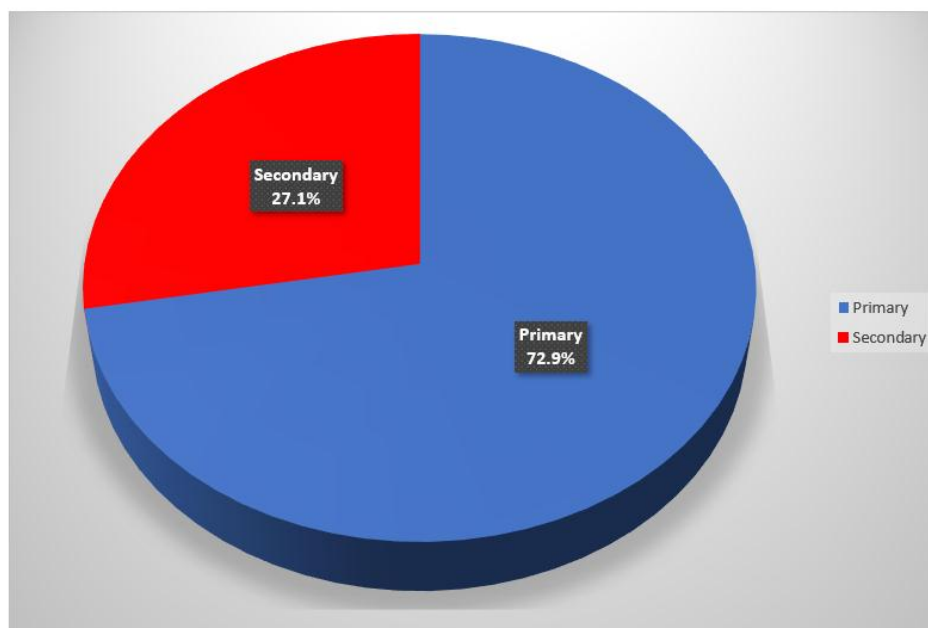


Figure 3.2: Pie graph showing distribution of patients with mitral valve regurgitation according to their causes.

Among those with primary causes of mitral valve regurgitation. Degenerative cause was the most prevalent cause followed by mitral valve prolapse, while

congenital cause was the least prevalent cause. As shown in table 3.1.

Table 3.1: Distribution of patients with primary causes of mitral valve regurgitation according to their ages. (number = 122).

Primary cause of mitral valve regurgitation	Number	Percent
Degenerative cause	64	52.5%
Mitral valve prolapse	19	15.6%
Barlow 's disease	26	21.3%
Annular calcification	4	3.2%
Infective endocarditis	3	2.5%
SLE endocarditis	3	2.5%
Rheumatic fever	2	1.6%
Congenital	1	0.8%

On the other hand, among those with secondary causes. Ischemic causes were more prevalent than functional causes. As shown in table 3.2.

Table 3.2: Distribution of patients with secondary causes of mitral valve regurgitation according to their ages. (number = 47)

Secondary cause of mitral valve regurgitation	Number	Percent
Ischemic causes	31	65.9%
Functional causes	16	34.1%

Figure 3.3 shows distribution of the study participants according to their severity. The majority of patients had mild severity, followed by trace severity. While the least common was severe mitral valve severity.

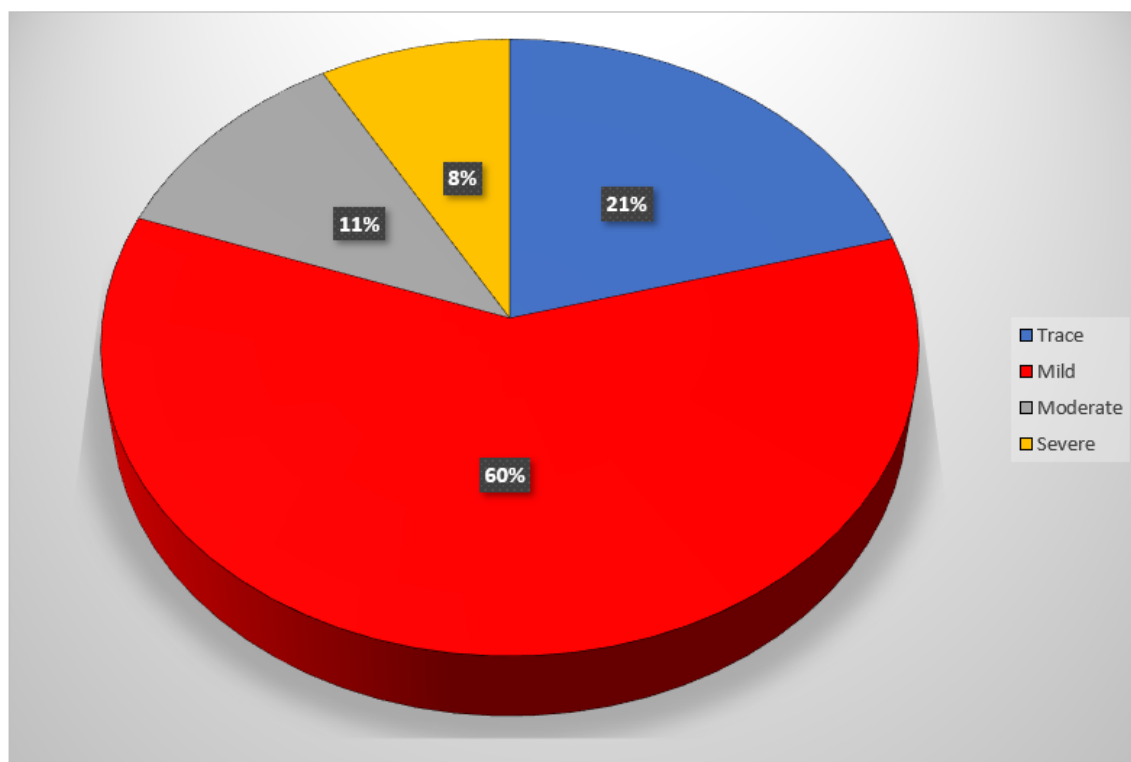


Figure 3.3: Pie graph showing distribution of patients with mitral valve regurgitation according to their severity.

Figure 3.4 shows distribution of the study participants according to their concomitant valvular lesion. Its evidence that 93 (55%) patients had concomitant valvular lesion. Tricuspid valve regurgitation was the

most frequent lesion followed by pulmonary regurgitation and aortic regurgitation. While aortic stenosis and mitral stenosis were the least common concomitant valvular lesions.

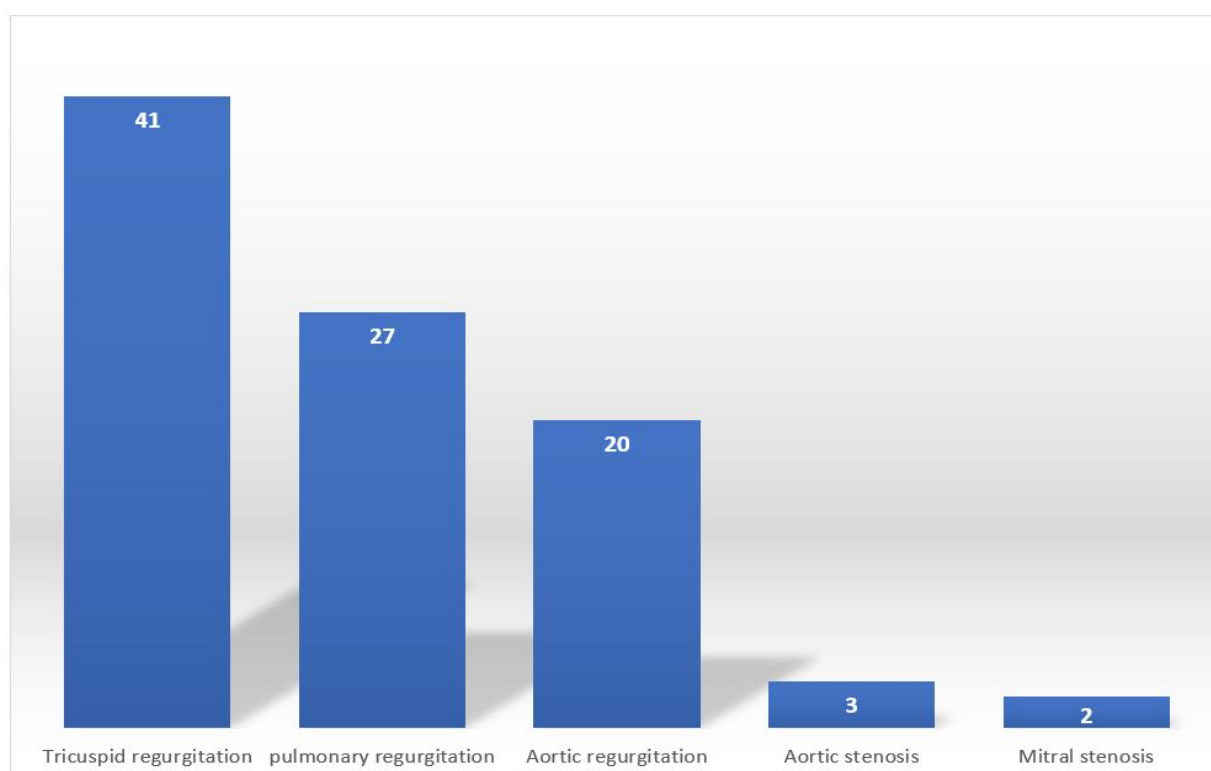


Figure 3.4: Distribution of the study patients with mitral valve regurgitation according to their concomitant valvular lesions.

4. DISCUSSION

Globally, the broad spectrum of valvular heart disorders is a quickly expanding, and little-known health problem. MR is a prevalent valve disease that ranks first in Iraq and second in Europe for valvular surgical indications. Since MR's etiology and treatments differ, it is critical to determine its causes.^[17]

In this study, mitral valve regurgitation was present in 33.8% of the total population. Among these 58.5% being female and 41.5% being male. This indicates a notable prevalence of the condition, with a female majority in the affected subgroup due to the fact that females had more prevalence of mitral regurgitation causative problems such as mitral valve prolapse and rheumatic heart disease leading to these disparities. Similar findings obtained from Ocher et al.^[18] The high prevalence of MR in this study likely reflects a specific patient population involved in this study, such as those with certain medical conditions like type 2 diabetes, hypertension and ischemic heart disease rather than the general population.

In this study, primary causes of mitral valve regurgitation (MR) were found in 72.9% of patients, while secondary causes were identified in 27.1%. Degenerative causes were the most common overall, followed by mitral valve prolapse (MVP). Ischemic cause was the most prevalent secondary cause. Which runs with Hassan et al study findings.^[19]

The study found that the majority of patients had mild mitral valve regurgitation of mild severity, followed by trace severity. Which indicates that most of patients were asymptomatic and need no treatment, this is in agreement with Zamorano et al study findings.^[20]

In the current study, 55% of the total patients had contaminant valvular disease, tricuspid valve regurgitation was the most common accompanying valvular lesion, followed by pulmonary and then aortic regurgitation. while Aortic stenosis and mitral stenosis were the least frequent other valvular lesions observed in these patients. Which confirms a high prevalence of multiple valve issues occurring with mitral regurgitation. Al-Kassou et al showed comparable findings.^[21]

5. CONCLUSION

Mitral regurgitation is prevalent in the Iraqi population. The common cause is the primary cardiac defect. Primary mitral valve regurgitation is often caused by degeneration, while secondary mitral regurgitation is typically caused by an ischemia event. The majority of patients had mild mitral regurgitation, whereas only eight percent had severe mitral regurgitation.

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