



## FREQUENCY OF DIFFERENT COMPLICATIONS OF MITRAL STENOSIS

Areeba Riaz<sup>a</sup>, Majid Kaleem<sup>a</sup>, Hassan Abbas<sup>a</sup>

### ABSTRACT:

**BACKGROUND:** Mitral stenosis is the most common and potentially life threatening valvular heart disease. Several complications are encountered in patients with mitral stenosis. They all are life threatening and need proper diagnosis and medical or surgical management to reduce further morbidity and mortality.

**AIM AND OBJECTIVE:** The objective of this study was to find frequency of different complications of mitral stenosis at Gulab Devi Chest Hospital, Lahore.

**MATERIALS AND METHODS:** A total of 300 consecutive patients aged 14 to 70 years of either gender having mitral stenosis presented to Gulab Devi Chest Hospital, Lahore were included in the study. Purposive sampling technique was used to collect data and it included the history of the patients and clinical findings to study the complications of mitral stenosis. Patients with mitral stenosis under 13 years of age and those who were not diagnosed properly by clinical evaluation were excluded. Statistical package for social sciences (SPSS) version 19 was used for data entry and its analysis. Mean  $\pm$  Standard Deviation was used to express quantitative data while qualitative data like gender and frequency of different complications of mitral stenosis were presented in frequency tables. One sample t-test was used to see the abnormal rise in pulmonary artery systolic pressure.

**RESULTS:** Frequency of complications of mitral stenosis were found as Atrial Fibrillation (48.33%), Left Atrial Clot (25.67%), Systemic Thromboembolism (12%), Cerebrovascular Accidents (10%), Pulmonary Hypertension (92%), Right Heart Failure (29.67%), Pericardial Effusion (7.33%), Pleural Effusion (8.33%), Pulmonary Edema (10.67%), Tricuspid Regurgitation (95%), Respiratory Tract Infection (27.33%) and Infective Endocarditis (2.33%). Results of one sample test reveals that there is an abnormal rise in pulmonary artery systolic pressure in patients with mitral stenosis (p-value < 0.0001).

**CONCLUSION:** Atrial Fibrillation, Pulmonary Hypertension and Tricuspid Regurgitation were the most common complications of mitral stenosis. The onset of each of these complications usually results in explicit symptoms and physical manifestations. These symptoms allow the physician to evaluate and treat the complications appropriately.

**KEY WORDS:** Rheumatic Heart Disease, Mitral Stenosis, Mitral Regurgitation, Complications, Atrial Fibrillation, Pulmonary Hypertension.

### INTRODUCTION:

**A**cute rheumatic fever and its chronic sequel, rheumatic heart disease have become rare in most developed world<sup>1</sup> but remain unchecked in the developing countries, like Pakistan, India and Bangladesh<sup>2,3</sup>. In developing countries, Valvular heart disease represents important cause of cardiovascular morbidity and mortality in young age<sup>4</sup>.

Mitral stenosis (MS) is a valvular heart disease characterized by the narrowing of the orifice of the mitral valve of the heart. Involvement of the mitral

(*J Cardiovasc Dis 2015;13(3):81 -84*) valve represents the most common of all locations of the rheumatic process<sup>5</sup>. Characteristic signs and symptoms of mitral stenosis usually develop and are associated with pulmonary venous congestion or low cardiac output<sup>6</sup>.

Complications of mitral stenosis include atrial fibrillation, Left atrial clot, systemic Thromboembolism, cerebrovascular accidents, pulmonary hypertension, pulmonary edema, respiratory tract infections, right heart failure, pleural effusion, pericardial effusion, tricuspid regurgitation and rarely infective endocarditis<sup>7-12</sup>.

Atrial fibrillation is one of the commonest complications of MS. The incidence of atrial fibrillation in mitral stenosis has been estimated at 40%. It causes clot formation in LA leading to serious life threatening complication as thromboembolism and stroke<sup>13</sup>.

In this study, we examined the frequency of different complications of mitral stenosis which

<sup>a</sup>Gulab Devi Chest Hospital, Lahore.

\* Corresponding author:  
Email: ariaz1891@gmail.com

Date of Submission : 14-06-2017  
Date of Revision: 04-08-2017  
Date of Publication: 30-08-2017



cause severe morbidity and mortality especially in young patients.

### MATERIALS AND METHODS:

This was a cross sectional descriptive, single-centered study of all patients with mitral stenosis presented at cardiac wards of Gulab Devi Chest Hospital, Lahore. The study was completed in six months from March, 2016 to September, 2016.

Purposive sampling technique was used to collect the data. Patients with mitral stenosis of age 14 to 70 years of either gender and who had their echocardiography done were included in the study. Patients with mitral stenosis under 13 years of age and those who were not diagnosed properly by clinical evaluation were excluded.

Diagnosed cases of mitral stenosis, fulfilling the inclusion criteria, were taken from cardiac wards of Gulab Devi Chest Hospital, Lahore. After taking verbal consent, their demographic information (name, age, gender) were taken. Clinical diagnosis was established based on signs, symptoms and positive findings on electrocardiography, x-ray and echocardiography. Patients were also asked about the previous history of rheumatic fever. All data was collected through pre designed Performa.

Statistical package for social sciences (SPSS) version 19 was used for data entry and its analysis. Mean  $\pm$  Standard Deviation was used to express quantitative data while qualitative data like gender and frequency of different complications of mitral stenosis were presented using frequency tables. One sample t-test was used to see the abnormal rise in pulmonary artery systolic pressure.

### RESULTS:

Table-01 demonstrated the demographic characteristics of 300 patients with mitral stenosis. The results obtained from showed that mitral stenosis was more common in females (63%). 297(99%) patients had a history of rheumatic fever. The mean age of patients was  $34.83 \pm 12.01$ . One sample test revealed that pulmonary artery systolic pressure was elevated in patients with mitral stenosis ( $p$ -value $<0.0001$ ). Frequency of different complications was presented in Table-02.

Among these, tricuspid regurgitation, pulmonary hypertension and atrial fibrillation were the most common complications.

**Table-1: Socio-demographic Profile**

<b>Gender</b> n (%)	<b>Males</b>	111 (37%)
	<b>Females</b>	189 (63%)
<b>Age (Mean<math>\pm</math>S.D)</b>		34.83 $\pm$ 12.01
<b>History of Rheumatic Fever</b> n (%)		297 (99%)

**Table-2: Frequency of Complications of Mitral Stenosis**

	Frequency n=300	Percentage (%)
<b>Atrial Fibrillation</b>	145	48.33
<b>Left Atrial Clot</b>	77	25.67
<b>Systemic Thromboembolism</b>	36	12.00
<b>Cerebrovascular Accidents</b>	30	10.00
<b>Pulmonary Hypertension</b>	276	92.00
<b>Pulmonary Edema</b>	32	10.67
<b>Respiratory Tract Infections</b>	82	27.33
<b>Right heart failure</b>	89	29.67
<b>Pleural effusion</b>	25	8.33
<b>Pericardial effusion</b>	22	7.33
<b>Tricuspid regurgitation</b>	285	95.00
<b>Infective Endocarditis</b>	7	2.33

### DISCUSSION:

Mitral stenosis due to narrowing of mitral valve orifice is an important cause of morbidity and mortality in the developing countries. Rheumatic Fever has been reported to be the most frequent cause of Mitral Stenosis<sup>14</sup>. Movahed et al. showed that there was increased prevalence of mitral stenosis in females as compared to males. Affected individuals included 53% females and 47% males in that study<sup>15</sup>. Our findings of female predominance (63%) were comparable with the findings of Movahed et al.

Atrial fibrillation is one of the most common complications of mitral stenosis. The onset of atrial fibrillation is the most common factor bringing a previously asymptomatic patient into a stage of disability<sup>5</sup>. Our study showed that 48.33% patients had atrial fibrillation, these results were very close to those of Horstkotte et al who showed 40% of their patients with atrial fibrillation.

Hwang et al. reported that 20% patients with predominant mitral stenosis had clots in their left atria and most of these patients had chronic atrial fibrillation<sup>16</sup>. Our study of mitral stenosis accounted for 25.67% cases of Left Atrial Clots and is near to the results of Hwang et al.

Rheumatic heart disease is an important cause of systemic arterial embolism. In study by Saleem et al., the incidence of systemic emboli is found to be higher in patients with pure mitral stenosis (16-6%) and mixed mitral stenosis and incompetence (19-4%) than in patients with mitral incompetence (3-1%)<sup>17</sup>. Here we came across with results that 12% patients had systemic embolism. Our result is strongly supported by the above study as it came up with 6-16% incidence.

According to Adler et al<sup>18</sup>, Rheumatic heart disease (RHD) is an important risk factor for ischemic



stroke in developing countries where 3% to 7.5% of all strokes have been estimated to be directly attributable to RHD<sup>18</sup>. Our results showed that 10% patients suffered from cerebrovascular accidents.

In a study conducted by Magne, 78% patients had pulmonary hypertension of which 8.3% had severe hypertension (PASP>85mmHg)<sup>19</sup>. In this study, pulmonary hypertension was present in majority (92%) of cases leading to serious cardiac complications as Right ventricular failure and tricuspid regurgitation.

Lewis et al. reported that the combination of a narrow valve and great increases in pulmonary arteriolar resistance is associated with severe dyspnea, cardiac enlargement, and signs of right ventricular failure<sup>20</sup>. Our study showed that 29.67% patients suffered from Right Heart Failure manifesting as raised jugular venous pulse, pleural effusion, ascites and peripheral edema.

According to Davies et al., Pericardial effusion forms with elevation of the right-sided filling pressure in the heart that usually occurs in right heart failure that is an important complication of mitral stenosis. It also occurs as a result of inflammatory process resulting from rheumatic fever. Incidence of pericardial effusion is very low in valvular diseases accounting for only 10 to 12% of affected individuals. Pericardial Effusion is most commonly associated with mitral valve surgery<sup>21</sup>. Here we came across 7.33% cases of pericardial effusion in mitral stenosis.

Brixey and Light revealed that there is increasing evidence that patients with pulmonary hypertension and isolated right heart failure frequently have pleural effusions which are characteristic features of mitral stenosis. Pleural effusions occur in 14% of patients with pulmonary hypertension<sup>22</sup>. In our study Pleural effusion was present in only 8.33% patients.

Wood estimated 7.5% cases of pulmonary

edema. It is concluded that pulmonary edema tends to occur in relatively young women with average stenosis, when the pulmonary vascular resistance is unusually low<sup>7</sup>. In this study, 10.67% patients suffered from pulmonary edema manifesting as cough, frank sputum, hemoptysis, dyspnea, orthopnea and paroxysmal nocturnal dyspnea.

According to the study of Shiran and Sagie, Tricuspid regurgitation is frequently present in patients with MV disease, and more than one-third of the patients with mitral stenosis have at least moderate TR. Clinically severe TR has been reported in 23% to 37% of patients with rheumatic mitral stenosis<sup>23</sup>. In this study of frequency of different complications of mitral stenosis, 95% of patients had tricuspid regurgitation. Out of these 95% patients, 36.67% patients had mild tricuspid regurgitation, 37.67% patients had moderate tricuspid regurgitation while 20.67% patients had severe tricuspid regurgitation.

In a study done by Wood, attacks of acute bronchitis, commonly in the winter, occurred in 28%<sup>7</sup>. Our study is strongly supported by the study of Wood, as we came across 27.33% patients who complaint off suffering from bronchitis, usually during winter.

The study of Horstkotte et al suggested that Infective endocarditis is very rare in pure mitral stenosis, but its incidence is significant in the patients who, in addition, have aortic or mitral regurgitation<sup>5</sup>. In my study, only 2.33% patients had infective endocarditis and this was typically associated with other valvular abnormalities.

#### **CONCLUSION:**

The onset of complications of mitral stenosis usually results in explicit symptoms and physical manifestations so requires better treatment strategies and control. It is recommended that every patient who presents with mitral stenosis should be given priority for early intervention.



## Author's Contribution

AR: data collection, literature search, manuscript writing, data analysis and interpretation. MK: study design and concept. HA: drafting, revising and proof reading

## REFERENCES

1. Carapetis JR, McDonald M, Wilson NJ. Acute rheumatic fever. *The Lancet*. 2005;366(9480):155-68.
2. Rizvi S, Khan M, Kundi A, Marsh D, Samad A, Pasha O. Status of rheumatic heart disease in rural Pakistan. *Heart*. 2004;90(4):394-9.
3. Sadiq M, Islam K, Abid R, Latif F, Rehman A, Waheed A, et al. Prevalence of rheumatic heart disease in school children of urban Lahore. *Heart*. 2009;95(5):353-7.
4. Carapetis JR. Rheumatic heart disease in Asia. *Circulation*. 2008;118(25):2748-53.
5. Horstkotte D, Niehues R, Strauer BE. Pathomorphological aspects, aetiology and natural history of acquired mitral valve stenosis. *Eur Heart J* (1991) 12 (suppl. B): 55-60.
6. Olesen KH. The natural history of 271 patients with mitral stenosis under medical treatment. *British heart journal*. 1962;24(3):349.
7. Wood P. An Appreciation of Mitral Stenosis—I. *British medical journal*. 1954;1(4870):1051.
8. Keren G, Etzion T, Sherez J, Zelcer AA, Megidish R, Miller HI, et al. Atrial fibrillation and atrial enlargement in patients with mitral stenosis. *American heart journal*. 1987;114(5):1146-55.
9. Fraser AG, Angelini GD, Ikram S, Butchart EG. Left atrial ball thrombus: Echocardiographic features and clinical implications. *Eur Heart J*. 1988 Jun;9(6):672-7.
10. Stoddard MF, Dawkins PR, Prince CR, Ammash NM. Left atrial appendage thrombus is not uncommon in patients with acute atrial fibrillation and a recent embolic event: A transesophageal echocardiographic study. *J Am Coll Cardiol*. 1995 Feb;25(2):452-9.
11. Ahmad S, Hayat U, Naz H. Frequency of severe mitral stenosis in young female patients having pure mitral stenosis secondary to rheumatic heart disease. *J Ayub Med Coll Abbottabad*. 2010 Oct-Dec;22(4):19-22.
12. Remetz M, Cleman M, Cabin H. Pulmonary and pleural complications of cardiac disease. *Clinics in chest medicine*. 1989;10(4):545-92.
13. Sueda T, Nagata H, Orihashi K, Morita S, Okada K, Sueshiro M, et al. Efficacy of a simple left atrial procedure for chronic atrial fibrillation in mitral valve operations. *Ann Thorac Surg*. 1997 Apr;63(4):1070-5.
14. Carabello BA. Modern management of mitral stenosis. *Circulation*. 2005;112(3):432-7.
15. Movahed M-R, Ahmadi-Kashani M, Kasravi B, Saito Y. Increased prevalence of mitral stenosis in women. *J Am Soc Echocardiogr*. 2006 Jul;19(7):911-3.
16. Hwang JJ, Chen JJ, Lin SC, Tseng YZ, Kuan P, Lien WP, et al. Diagnostic accuracy of transesophageal echocardiography for detecting left atrial thrombi in patients with rheumatic heart disease having undergone mitral valve operations. *Am J Cardiol*. 1993 Sep 15;72(9):677-81.
17. Salem DN, Stein PD, Al-Ahmad A, Bussey HI, Horstkotte D, Miller N, Pauker SG. Antithrombotic therapy in valvular heart disease--native and prosthetic: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest*. 2004 Sep;126(3 Suppl):457S-482.
18. Adler Y, Koren A, Fink N, Tanne D, Fusman R, Assali A, et al. Association between mitral annulus calcification and carotid atherosclerotic disease. *Stroke*. 1998;29(9):1833-7.
19. Magne J, Pibarot P, Sengupta PP, Donal E, Rosenhek R, Lancellotti P. Pulmonary hypertension in valvular disease: a comprehensive review on pathophysiology to therapy from the HAVEC Group. *JACC Cardiovasc Imaging*. 2015 Jan;8(1):83-99.
20. Lewis BM, Gorlin R, Houssay HE, Haynes FW, Dexter L. Clinical and physiological correlations in patients with mitral stenosis. *V. Am Heart J*. 1952;43(1):2-26.
21. Davies S, Youhana A, Copp M. Severe rheumatic mitral stenosis with pericardial effusion causing left ventricular tamponade. *Br Heart J*. 1992 Mar;67(3):269-70.
22. Brixey AG, Light RW. Pleural effusions occurring with right heart failure. *Curr Opin Pulm Med*. 2011 Jul;17(4):226-31.
23. Shiran A, Sagie A. Tricuspid regurgitation in mitral valve disease: incidence, prognostic implications, mechanism, and management. *J Am Coll Cardiol*. 2009 Feb 3;53(5):401-8.