



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3406723>Available online at: <http://www.iajps.com>

Research Article

**ASSOCIATION OF LEFT ATRIAL SIZE WITH ATRIAL
FIBRILLATION IN PATIENTS OF MITRAL STENOSIS**¹Dr Muhammad Zulqurnain, ²Dr Rimsha Iftikhar, ³Dr Hussnain Iqbal¹Aziz Fatimah Medical and Dental College, Faisalabad, ²University Medical and Dental College, Faisalabad, ³Shalamar Medical and Dental College, Lahore.**Article Received:** July 2019**Accepted:** August 2019**Published:** September 2019**Abstract:**

Objective: To determine the frequency of atrial fibrillation in rheumatic mitral stenosis and to correlate it with the size of the left atrium.

Methods: 100 consecutive patients with mitral stenosis, aged over 18 years, admitted to the cardiology department enrolled in this study. Patients with ischemic heart disease, thyrotoxicosis, hypertension, chest infections and previous cardiopulmonary interventions were excluded. All patients underwent thyroid function tests, cardiac enzymes and a complete blood test. Basic electrocardiogram, chest radiography and echocardiography were also performed. Other variables studied were the symptomatology.

Results: In one hundred patients, atrial fibrillation was observed in 35 cases (35%). The frequency of atrial fibrillation increased with age, being maximum (75%) after 50 years. Similarly, there was a strong linear correlation between atrial fibrillation and left atrial dimension ($r = 0.0001$). Dyspnea was the most frequent symptom (78%), followed by palpitations (52%).

Conclusions: Rheumatic mitral stenosis is one of the most frequent causes of atrial fibrillation and the enlargement of the left atrium is associated with an increase in the frequency of atrial fibrillation in patients with mitral stenosis.

Key words: Atrial fibrillation, mitral stenosis, size of the left atrium.

Corresponding author:**Dr. Muhammad Zulqurnain,**

Aziz Fatimah Medical and Dental College, Faisalabad.

QR code



Please cite this article in press Muhammad Zulqurnain et al., Association of Left Atrial Size with Atrial Fibrillation in Patients of Mitral Stenosis., Indo Am. J. P. Sci, 2019; 06(09).

INTRODUCTION:

Atrial fibrillation (FA) is the most common sustained arrhythmia in the world and occurs in about 0.4% of the general population [1]. The prevalence of AF increases with age, affecting up to 5% of the population over 69 years of age. Atrial fibrillation is most commonly associated with advanced age, hypertension, valvular heart disease, congestive heart failure and coronary artery disease [2]. It has also been associated with physiological stress, medications, pulmonary embolism, chronic lung disease, hyperthyroidism, caffeine, infections and various metabolic disorders [3]. Other less common cardiac associations include wolf-parkinsonism-white syndrome, pericarditis and cardiomyopathy [4]. Atrial fibrillation due to progressive dilation of the left atrium in mitral stenosis is very common; Its onset precipitates pulmonary edema [5]. Less than 20% of patients remain in sinus rhythm, which is often associated with a small fibrotic left atrium and severe pulmonary hypertension [6]. All patients are predisposed to atrial thrombi and systemic thromboembolism previously accounted for 25% of all deaths in this condition, when anticoagulant therapy was not available [7]. As a third world country, Pakistan should host a large number of cases of atrial fibrillation secondary to mitral stenosis with associated complications⁸. The aim of the present study was to determine the frequency of atrial fibrillation in patients with mitral stenosis and to correlate AF with the size of the left atrium of these patients.

MATERIALS AND METHODS:

An "intentional sampling technique" was used to collect a sample of 100 cases diagnosed with predominant mitral stenosis, aged over 18 years. Patients with ischemic heart disease, thyrotoxicosis, hypertension, chest infections and previous cardiopulmonary interventions were excluded.

Informed consent was taken and the data was recorded in a form. Proforma included information regarding

the patient's name, age, gender and address. Complaints regarding atrial fibrillation (AF) and mitral stenosis were recorded under the heading of dyspnea, orthopnea, paroxysmal nocturnal dyspnea (PND), palpitations, etc. Patients underwent a complete general physical and cardiovascular examination. All patients underwent a thyroid function test, cardiac enzymes and a complete blood test. Basic electrocardiograms (EKG), chest radiographs (CXR) and echocardiography were also performed. M-mode and 2-D echocardiographic examinations were performed to document the size of the left atrium (LA). The diameter of LA > 40 mm was considered significant. AF has been defined on the ECG as absent or fibrillating P waves with narrow QRS complexes showing an irregular R-R interval. Mitral stenosis was defined in the echo as mild if the MVA is > 1.5 cm, moderate if it is between 1.5 and 1.1 cm and severe if it is < 1.0 cm. The data was analyzed by SPSS (social science statistical package) version 18.0 for Windows. The variables included were age, sex and symptoms. They were presented as simple descriptive statistics, providing the means and standard deviation for numerical data. The AF frequency was calculated as a percentage of the total cases. Pearson's correlative correlation 'r' was calculated to determine the correlation of atrial fibrillation with the size of the left atrium. For the comparison of our frequencies / percentages with other studies, the proportional test t was used. A p value of 0.05 or less was considered significant.

RESULTS:

Of the 100 patients who participated in the study, AF was observed in 35 patients (35%). The frequency of AF was 33.3% in men, compared with 36.2% of women. Among 100 patients, 58 cases (58%) were women and 42 cases (42%) were men with a male-female ratio of 1: 1.38. The age range of the population in the sample was between 18 and 60 years, with an average age of 31.09 ± 10.19 years. The population medical-demographic data are shown in Table 1.

Table 1: Medico-demographic characteristics of the study population.

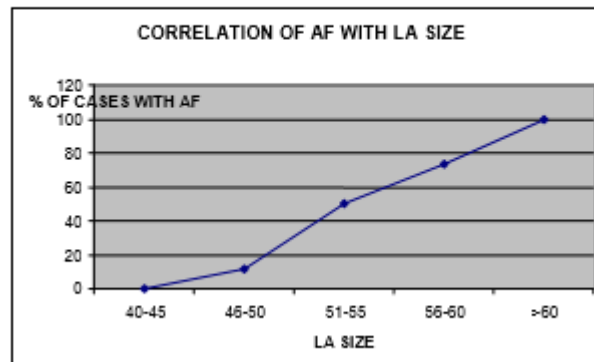
Characteristics	=n
Age (years)	
<30	55(55%)
31-40	26(26%)
41-50	15(15%)
>50	4(4%)
LA size	
<45	25(25%)
46-50	26(26%)
51-55	24(24%)
56-60	19(19%)
>60	6(6%)
Mitral valve area (cm²)	
>1.5	0
1.1-1.5	36(36%)
<1.0	64(64%)

LA size=Left Atrial size

The frequency of atrial fibrillation increased with advanced age, being 21.8% lower among patients under the age of 30, 46.2% between 31-40 years, and 53.3% in patients aged between 41 and 50 years and 75% among patients over the age of 50. The frequency of AF showed a significant correlation ($r = 0.01$) with age. The frequency of atrial fibrillation is increased with the increase in LA dimensions, being absent in

patients with LA dimensions less than 45 mm, 11.5% in those with LA dimensions of 46-50, 50% in patients with LA dimensions 51- 55 mm, 73.7% if LA was 56-60 mm and 100% if the size of LA was greater than 60 mm. Thus, there was a statistically significant association between AF and size of LA ($r = 0.0001$) Figure 1.

Fig. 1. Correlation of AF with LA size in patients with mitral stenosis.



A clot was found in L.A in 16 patients (16%). There was a strong correlation between AF and the clot in LA ($r = 0.0001$) since 11 patients (68.8%) had AF. A non-significant correlation between AF and severity of mitral stenosis was also observed ($r = 0.23$). Many patients have had more than one symptom. The most common symptom was dyspnea, 78%, followed by

palpitation, 52%. Three patients had a history of stroke. When patients with atrial fibrillation were compared with those of sinus rhythm, the mean age and LA size were higher, while the mitral valve area appeared to be relatively smaller in patients with atrial fibrillation (Table 2).

Table 2. Comparison of AF and sinus rhythm in patients with mitral stenosis.

Characteristics	Study population	Patients with AF	Patients with sinus rhythm
Mean age	31.09±10.1	35.49±10.88	28.72±9.04
Mean LA size	50.23±7.1	56.03±5.8	47.11±5.6
Mean MVA	0.94±0.27	0.92±0.23	0.95±0.28

DISCUSSION:

Despite the rapid and significant progress in prevention and therapeutic modalities, rheumatic heart disease (HRD) remains one of the major health challenges particularly in third world countries [9]. Therefore, we expect to see atrial fibrillation secondary to mitral stenosis with its complications more frequently associated with other causes of atrial fibrillation [10]. In the present study, the frequency of AF in MS was 35%. This result is comparable to the results of Conradie et al, who reported that 28.9% of cases of atrial fibrillation in patients with predominant MS [11]. Augested et al studied MS patients and the AF frequency was 35.4%. Sims et al studied patients undergoing mitral valve replacement and reported that the AF frequency was 45% [12]. Acarturk et al also reported that the AF frequency was 45.8%. Chiang et al found that there was no difference in the frequency of AF compared to the gender of the patients. However, Nadeem et al reported that AF was more common in women [13]. In our study, 33.3% of the cases were men and 36.2% were women. Therefore, our results are comparable to the currently reported estimates. The proportion of men compared to women in our study was 1: 1.38 with a maximum number of cases belonging to the average age of 31.09 ± 10.19. This is similar to studies conducted in this region but different from those reported in the western population, for example Khatouri et al. Sanda et al and Sagie et al reported an average age greater than 40.3 ± 9 years, 51 ± 10 years and 61 ± 14 years respectively [14]. The youngest group in our study was probably due to a first reference to a tertiary care center due to the lack of diagnostic facilities at the basic health center. The frequency of AF increased with age in our study (p = 0.01). The mean age for patients with AF was 35.49 ± 10.88 years compared to patients with sinus rhythm who was 28.72 ± 9.04. This is similar to what had already been reported by Khatouri et al (40.3 ± 9 years vs. 31.4 ± 9.5 years). The currently reported study revealed that there was a significant linear correlation between the AF and LA size (p = 0.0001). The mean LA size of patients with atrial fibrillation was higher than in patients with sinus rhythm (56.03 ± 5.8 mm versus 47.11 ± 5.6 mm). This is similar to what has already been reported by Sims et al (60 vs 52 mm), Khatouri et al (53.3 ± 10.3 mm vs 46.5 ± 8.5 mm) and Keren et al (37, 8 ± 10.8 mm vs 27.8 ± 7.7 mm). In the present study, the frequency of blood clots in LA in

patients with atrial fibrillation was found in 11 of 35 cases (31.4%). Acarturk et al reported clots in LA in 20.8% of patients with atrial fibrillation¹⁵. The prevalence of shortness of breath was around 78%, palpitations 52% and stroke 3% in our study. Augestad et al reported the prevalence of dyspnea in 98.9%, palpitations in 35.4% and stroke in 15 of 216 patients (5.07%), which is comparable to our results.

CONCLUSION:

Rheumatic mitral stenosis is a major cause of atrial fibrillation and there is an increased frequency of atrial fibrillation when the size of the left atrium increases. The prevalence of rheumatic mitral stenosis and atrial fibrillation could be reduced by early diagnosis and treatment of rheumatic fever.

REFERENCES:

1. Blackstone, E.H., Chang, H.L., Rajeswaran, J., Parides, M.K., Ishwaran, H., Li, L., Ehrlinger, J., Gelijns, A.C., Moskowitz, A.J., Argenziano, M. and DeRose Jr, J.J., 2019. Biatial maze procedure versus pulmonary vein isolation for atrial fibrillation during mitral valve surgery: New analytical approaches and end points. *The Journal of thoracic and cardiovascular surgery*, 157(1), pp.234-243.
2. Chen, Jindong, Xiaoyi Xie, Jianfeng Zhang, Hao Wang, Mengmeng Zhou, Jing Zhang, Weihua Wu, and Liang Zhao. "Catheter ablation versus surgical ablation combined with mitral valve surgery for nonparoxysmal atrial fibrillation in patients with moderate mitral regurgitation." *Journal of cardiovascular electrophysiology* 30, no. 3 (2019): 332-338.
3. Peterson, Eric D., Veronica Ashton, Yen-Wen Chen, Bingcao Wu, and Alex C. Spyropoulos. "Comparative effectiveness, safety, and costs of rivaroxaban and warfarin among morbidly obese patients with atrial fibrillation." *American Heart Journal*(2019).
4. Sannino, Anna, Srinivasa Potluri, Benjamin Pollock, Giovanni Filardo, Ambarish Gopal, Robert C. Stoler, Molly Szerlip, Anima Chowdhury, Michael J. Mack, and Paul A. Grayburn. "Impact of mitral stenosis on survival in patients undergoing isolated transcatheter aortic valve implantation." *The American journal of cardiology* 123, no. 8 (2019): 1314-1320.

5. Farese, Gerardo E., Bhupendar Tayal, Stephan Stöbe, Ulrich Laufs, and Andreas Hagedorff. "Regional disparities of left atrial appendage wall contraction in patients with sinus rhythm and atrial fibrillation." *Journal of the American Society of Echocardiography* (2019).
6. Carter-Storch, Rasmus, Jordi S. Dahl, Nicolaj L. Christensen, Redi Pecini, Eva V. Søndergård, Kristian Altern Øvrehus, and Jacob E. Møller. "Postoperative atrial fibrillation after aortic valve replacement is a risk factor for long-term atrial fibrillation." *Interactive cardiovascular and thoracic surgery*(2019).
7. Ad, Niv, Sari D. Holmes, Anthony J. Rongione, Vinay Badhwar, Lawrence Wei, Lisa M. Fornaresio, and Paul S. Massimiano. "The long-term safety and efficacy of concomitant Cox maze procedures for atrial fibrillation in patients without mitral valve disease." *The Journal of thoracic and cardiovascular surgery* 157, no. 4 (2019): 1505-1514.
8. Doshi, Rajkumar, Krunalkumar Patel, Rupak Desai, Keyur Patel, and Rajeev Gupta. "Incidence and impact of new-onset atrial fibrillation on transcatheter mitral valve repair." *European journal of internal medicine* 60 (2019): e18-e19.
9. Arora, Sameer, Sreekanth Vemulapalli, Amanda Stebbins, Cassandra J. Ramm, Andrzej S. Kosinski, Paul Sorajja, Jonathan P. Piccini, Matthew A. Cavender, and John P. Vavalle. "The prevalence and impact of atrial fibrillation on 1-year outcomes in patients undergoing transcatheter mitral valve repair: results from the society of thoracic surgeons/american college of cardiology transcatheter valve therapy registry." *JACC: Cardiovascular Interventions* 12, no. 6 (2019): 569-578.
10. Donmez, Esra, Ernesto E. Salcedo, Robert A. Quaife, Joseph M. Burke, Edward A. Gill, and John D. Carroll. "The acute effects of edge-to-edge percutaneous mitral valve repair on the shape and size of the mitral annulus and its relation to mitral regurgitation." *Echocardiography* (2019).
11. Ma, Wenrui, Wei Shi, Weihua Wu, Wei Ye, Ye Kong, Dan Zhu, and Wei Zhang. "Elevated gradient after mitral valve repair: The effect of surgical technique and relevance of postoperative atrial fibrillation." *The Journal of thoracic and cardiovascular surgery* 157, no. 3 (2019): 921-927.
12. Ju, Min Ho, Jin Hyung Huh, Chee-Hoon Lee, Ho Jin Kim, Hyung Gon Je, Joon Bum Kim, Sung-Ho Jung, and Jae Won Lee. "Robotic-assisted surgical ablation of atrial fibrillation combined with mitral valve surgery." *The Annals of thoracic surgery* 107, no. 3 (2019): 762-768.
13. Rottner, Laura, Christine Lemes, Inge Dotz, Peter Wohlmuth, Tobias Schmidt, Shibu Mathew, Christian-H. Heeger et al. "The clip and the tip: Lessons learned from ablation of atrial fibrillation in patients post percutaneous mitral valve repair." *Journal of cardiovascular electrophysiology* (2019).
14. Kim, Ju Youn, Sung-Hwan Kim, Jun-Pyo Myong, Yoo Ri Kim, Tae-Seok Kim, Ji-Hoon Kim, Sung-Won Jang, Yong-Seog Oh, Man Young Lee, and Tai-Ho Rho. "Outcomes of Direct Oral Anticoagulants in Patients With Mitral Stenosis." *Journal of the American College of Cardiology* 73, no. 10 (2019): 1123-1131.
15. Petrus, Annelieke HJ, Olaf M. Dekkers, Laurens F. Tops, Eva Timmer, Robert JM Klautz, and Jerry Braun. "Impact of recurrent mitral regurgitation after mitral valve repair for functional mitral regurgitation: long-term analysis of competing outcomes." *European heart journal* (2019).