



Age as the Important Independent Risk Factor of Atrial Fibrillation in Isolated Rheumatic Mitral Stenosis

Yaşın Önemi: İzole Mitral Darlıkta Atriyal Fibrilasyon İçin Bağımsız Risk Faktörü

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Abstract

Aim: Atrial fibrillation is frequent in patients with rheumatic mitral stenosis. Numerous factors have been proposed to support the pathogenesis of atrial fibrillation in mitral stenosis. Because of the most leading rhythm disorder for morbidity and mortality, the identification of its independent risk factors is very important for the prevention, and treatment of atrial fibrillation. The present study investigated the risk factors for atrial fibrillations in patients with moderate to severe mitral stenosis.

Material and Method: This retrospective study included 307 patients (217 female, 90 male) with isolated moderate to severe rheumatic mitral stenosis. The patients were divided into two groups according to the existence of atrial fibrillation. Group I included patients with atrial fibrillation (188 patients) and Group II without atrial fibrillation (119 patients). A comparison of two groups was made according to demographical like age and echocardiographic parameters including MVA, MVG, SPAP, left atrium diameter and mean valve score.

Results: In comparison of Group I and Group II, left atrium diameter was 4.60 ± 0.61 vs. 4.73 ± 0.71 ; respectively, $p=0.132$, MVA was 1.09 ± 0.18 vs. 1.20 ± 0.85 ; respectively, $p=0.360$, MVG was 11.31 ± 3.86 vs. 10.78 ± 3.32 ; respectively, $p=0.251$, SPAP was 48.41 ± 14.83 vs. 47.80 ± 13.45 ; respectively, $p=0.813$, and mean mitral valve score was 7.60 ± 1.77 vs. 7.72 ± 1.66 ; respectively, $p=0.613$. All of them were similar in both groups. Only age was significantly higher in patients with atrial fibrillation (42.45 ± 12.37 vs. 34.77 ± 10.50 ; $p<0.001$, respectively)

Conclusion: This study presented that the age is an important factor for development of Atrial fibrillation in isolated rheumatic mitral stenosis.

Keywords: Age, atrial fibrillation, mitral stenosis

Öz

Amaç: Atriyal fibrilasyon ritmi romatizmal mitral darlıklı hastalarda sık görülür. Mitral darlıkta atriyal fibrilasyonun oluşumunda pek çok faktörün etkili olduğu öne sürülmüştür. En önde gelen ölümcül ritim bozukluğu olması nedeniyle, bağımsız risk faktörlerinin bilinmesi atriyal fibrilasyonun tedavisi ve önlenmesi için çok önemlidir. Mevcut çalışmada orta ve ileri mitral darlıklı hastalar için atriyal fibrilasyon yönünden risk faktörlerini araştırılmıştır.

Gereç ve Yöntem: Bu çalışma geriye dönük olarak orta ve ileri romatizmal mitral darlık tanılı 307 hastayı (217 kadın, 90 erkek) içerir. Çalışma grupları atriyal fibrilasyon varlığına göre sınıflandırılmıştır. Hastalar iki gruba ayrılmışlardır, grup 1 (atriyal fibrilasyonlu hastalar, 188 hasta), grup 2 (atriyal fibrilasyon olmayan hastalar, 119 hasta). İki grubun karşılaştırılması yaş, ortalama kapak alanı (MVA), ortalama kapak gradiyent (MVG), sistolik pulmoner arter basıncı (SPAP), sol atriyum çapı ve ortalama kapak skora göre yapıldı.

Bulgular: Sol atriyum çapı $4,60 \pm 0,61$ cm ve $4,73 \pm 0,71$ cm; $p=0,132$ idi. MVA $1,09 \pm 0,18$ cm² ve $1,20 \pm 0,85$ cm²; $p=0,360$ idi. MVG $11,31 \pm 3,86$ mmHg ve $10,78 \pm 3,32$ mmHg; $p=0,251$ idi. SPAP $48,41 \pm 14,83$ mmHg ve $47,80 \pm 13,45$ mmHg; $p=0,813$ idi. Ortalama kapak skor $7,60 \pm 1,77$ ve $7,72 \pm 1,66$; $p=0,613$ idi. Yaş ise atriyal fibrilasyonlu hastalarda belirgin olarak daha yüksekti ($42,45 \pm 12,37$ ve $34,77 \pm 10,50$; $p<0,001$).

Sonuç: Bu çalışma atriyal fibrilasyonun oluşumunda yaşın önemli bir etken olduğunu göstermiştir.

Anahtar Kelimeler: Yaş, atriyal fibrilasyon, mitral darlık



INTRODUCTION

Atrial fibrillation (AF) is common in patients with rheumatic mitral stenosis (MS) and association with increase the risk of systemic embolization and mortality.^[1-4] Moreover, prevalence of systemic emboli at autopsy in MS patients with AF has been founded 41%.^[5] The pathogenesis of AF in MS have been proposed many factors, including mitral valve area, valvular calcification, greater mitral valve score, right atrial pressure, increasing age, duration of mitral valve disease, left atrial dilatation, and fibrosis.^[6,7] Therefore, the recognition of risk factors is important for the prevention, and treatment of AF because of high morbidity and mortality. The aim of this study was to investigate the risk factors for AF in patients with moderate to severe MS.

MATERIAL AND METHOD

This retrospective study included 307 patients (217 female, 90 male) with isolated moderate to severe rheumatic mitral stenosis. The Atilim University Medica International ethics committee approved the study protocol (Ethics Committee-2020/2). The populations were categorized according to the existence of atrial fibrillation. The patients separated into two groups; as Group 1 with atrial fibrillation (188 patients), as Group II without atrial fibrillation (119 patients). A comparison of two groups was made according to age, mean valve area (MVA), mean valve gradient (MVG), systolic pulmonary artery pressure (SPAP), left atrium diameter (LA) and mean valve score (MVS).

Exclusion Criteria

Additional high grade valve disease (moderate or severe mitral regurgitation, aortic stenosis, and aortic regurgitation), valve prosthesis, severe coronary artery disease, left ventricular hypertrophy, left ventricular systolic dysfunction, thyroid disease, diabetes mellitus, chronic obstructive lung disease, primary pulmonary hypertension, systemic arterial hypertension, collagen tissue disease, any type of cardiac surgery.

Echocardiography

Transthoracic echocardiography was done using a 2.5 MHz transducer. All measurements were made following the American Society of Echocardiography's recommendations.^[8] The size of the left atrium was calculated in the parasternal long-axis view by M-Mode echocardiography. Mean transmitral valve gradients (MVG) were measured by continuous-wave Doppler echocardiography. The diastolic pressure half-time method was used for calculating mitral valve area (MVA) and tricuspid regurgitate velocity was used to measure systolic pulmonary artery pressure (SPAP).

The mitral valve score was evaluated using by Wilkins scoring system.^[9] The Wilkins score involves a semi quantitative grading of mitral leaflet thickening, mobility, calcification, and subvalvular thickening, each on a scale of 1 to 4.

Statistical Analysis

Kolmogorov-Smirnov test was used to evaluating with regard to normal distribution of continuous variables. The two independent sample t-test was used to comparison of continuous variables. Multivariate models for age were constructed with Standard regression techniques and considered only variables univariate significant. Comparisons of categorical variables for the two groups were analyzed by Chi-Square test. Relations among study parameters were evaluated using Spearman's test. The effects of age on occurrence of AF were assessed with logistic regression analysis. All continuous variables are presented as mean±SD and all categorical variables are presented as count and percentage. P values <0.05 were considered to indicate statistical significance. This was done using the software program for Windows (SPSS, Inc., Chicago, Illinois).

RESULTS

The study populations was classified according to the existence of atrial fibrillation in electrocardiography: patient who had atrial fibrillation were classified as Group 1 (188 patients; 136 females, 52 males), and those without atrial fibrillation were classified as Group 2 (119 patients; 81 females, 38 males). A comparison of two groups was made according to age, MVA, MVG, SPAP and left atrium diameter and mean valve score.

Left atrium diameter (4.60±0.61 vs. 4.73±0.71; p=0.132), MVA (1.09±0.18 vs. 1.20±0.85; p=0.360), MVG (11.31±3.86 vs. 10.78±3.32; p=0.251), SPAP (48.41±14.83 vs. 47.80±13.45; p=0.813), and mean mitral valve score (7.60±1.77 vs. 7.72±1.66; p=0.613) were similar in both groups. Age was significantly higher in patients with atrial fibrillation (group 2) than in patients without atrial fibrillation (group 1) (42.45±12.37 vs. 34.77±10.50; p<0.001, respectively) (Table 1).

Table 1. Comparison of patients with atrial fibrillation and without atrial fibrillation.

	Group I (n=188)	Group II (n=119)	t	p
Age	34.77±10.50	42.42±12.37	5.828	<0.001
MVA (cm ²)	1.09±0.18	1.20±0.85	1.423	0.157
Valve score	7.60±1.77	7.72±1.66	0.628	0.530
MVG (mmHg)	11.31±3.86	10.78±3.32	1.241	0.216
SPAP (mmHg)	48.41±14.83	47.80±13.45	0.332	0.740
LA diameter (cm)	4.60±0.61	4.73±0.71	1.634	0.103

MVG was a significant different between groups after study parameters adjusted for age (Table 2). MVG was lower in group 2 than group 1. In Spearman correlation test, significant correlation was found in comparison MVG, and age (r=-0.260, p<0.001)

There was a significant correlation between AF and age in correlation analysis (Table 3)

Table 2. Multivariate analysis results of patients with atrial fibrillation and without atrial fibrillation (adjusted for age)

	F	P
MVA (cm ²)	2.424	0.090
Valve score	1.559	0.212
MVG (mmHg)	11.012	<0.001
SPAP (mmHg)	2.132	0.120
LA diameter (cm)	1.589	0.206

Table 3. Correlation analysis results of atrial fibrillation and risk factors for AF

	Age	MVA	Valve score	MVG	SPAP	LA diameter
Atrial fibrillation	0.326*	0.053	0.029	-0.066	-0.013	0.086

The relation of AF and age was assessed using Logistic regression analysis that age is important factor on occurrence of AF (Odds ratio=1.061, 95% CI=1.038 -1.085, p<0.001).

The differences between groups and mitral valve calcification score were not statistically significant ($\chi^2=0.946$, $p=0.814$ vs. $\chi^2=2.730$, $p=0.435$, respectively).

There was no significant difference in gender ($\chi=0.642$, $p=0.423$) and RBBB ($\chi=3.726$, $p=0.054$). Left atrial thrombus existence in transesophageal echocardiography was statistically more common in group 2 (15.1%) than group 1 (2.1%) ($\chi^2=18.508$, $p<0.001$).

DISCUSSION

Atrial fibrillation is the most frequent persistent arrhythmia seen in clinic observation. The prevalence of AF has been reported 0.4% in general population.^[10] In another study, the prevalence has established from 0.1% in individuals <55 years old to 9% in >80 years old.^[11] Moreover, Diker E et al.^[12] stated that the frequency of AF was 29% in patients with isolated mitral stenosis. The frequency of persistent AF increases with age. AF seems even more frequent in paroxysmal, asymptomatic cases.^[1]

Structural, inflammatory and fibrotic changes in left atrium have been found to be important in the genesis of atrial fibrillation.^[13-15] Chronic inflammation in the atrial myocardium effects an significant role in the progress of atrial fibrosis in patients with AF. Histological signs of chronic inflammation have been shown powerfully associated with AF.^[16]

Kabukcu M et al.^[7] stated that older patients with AF had a longer disease development and more serious symptoms. The authors claimed that MVA and MVG didn't change in patients with mitral stenosis with and without AF. Another study stated that the age showed to be the only independent factor correlated with the presence of fine subtype of AF in this population.^[17] The presence of mitral annular calcification was predictor for responsible to genesis AF in with mitral stenosis.^[18] We established no association among AF and valve calcification. We found that MVA and MVG were similar

and no differences between groups. However, we establish important relationship between age and AF in patients with mitral stenosis. We detected that the frequency of AF was 38.7% and age was only significant factor on occurrence of AF and more common in older patients with MS. AF and aging have relationships. Both the prevalence and incidence of AF increase sharply above 65 aging.^[19] Unlike, our study population age was younger than many epidemiological studies.

CONCLUSION

This study has revealed that AF is common in patients with MS. The age is a significant factor for genesis of AF.

ETHICAL DECLARATIONS

Ethics Committee Approval: The Atılım University Medica International ethics committee approved the study protocol (Ethics Committee-2020/2).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Status of Peer-review: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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