

Stroke Patients with Sinus Rhythm and Atrial Fibrillation: Comparison of Echocardiography Findings

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Abstract

Aim: To compare the echocardiographic findings in stroke patients with sinus rhythm and atrial fibrillation (AF).

Materials and Methods: Descriptive, cross-sectional study. Place and Duration of Study: Department of Emergency Medicine, Adıyaman University Education and Research Hospital, from January 2014 to December 2016. Four hundred and sixty-seven subsequent stroke patients were admitted to the study. Data included demographic and echocardiographic findings. Patients are divided into the AF and sinus rhythm groups. Categorical variables were analyzed with the Fischer's Exact Test and parametric variables with the Independent Samples T Test.

Results: AF patients with stroke had a significantly lower ejection fraction, decreased left ventricular function, increased left ventricular diameters, systolic dysfunction, mitral valve insufficiency, and tricuspid valve insufficiency.

Conclusion: AF patients with stroke had a significantly lower ejection fraction, decreased left ventricular function, increased left ventricular diameters, systolic dysfunction, mitral valve insufficiency, and tricuspid valve insufficiency. AF should not be considered as a major cardiac risk factor for stroke. AF may be a consequence of multifactorial cardiac abnormalities that may have a causative effect for stroke.

Keywords: Stroke, atrial fibrillation, echocardiography

Introduction

Atrial fibrillation (AF) is a common type of arrhythmia. It is a major risk factor for ischemic stroke, especially in the elderly (1-4). Its prevalence is 1% in population, and it increases up to 6% in people older than 65 years of age. Patients with non-valvular AF have higher risk of stroke (1,2,4,5).

The aim of the study is to highlight the anatomical disorders accompanying AF in stroke patients. We evaluated the differences

of echocardiographic findings in stroke patients with and without AF.

Materials and Methods

Stroke patients admitted to the emergency department of Adıyaman University Hospital between 2014 and 2016 were analyzed retrospectively. Stroke patients were identified with the ICD code I1.68 and AF patients were identified with the ICD code I48. All subsequent stroke patients' data were recorded to standard



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forms. Data included demographic and echocardiographic findings. Patients were divided into the AF and sinus rhythm groups. 467 patients were included in the study. Hundred and ten patients with recurrent stroke, hemorrhagic stroke, transient ischemic attacks and patients under 18 years of age and with incomplete data were excluded from the study. Patients were divided into the sinus rhythm and AF groups.

Table 1. Initial symptoms of patients in the emergency department

Symptoms	n (%)
Loss of consciousness	92 (19.70)
Headache	37 (7.92)
Hemiplegia, Hemiparesis	313 (67.02)
Convulsion	5 (1.07)
Dysarthria	117 (25.05)
Vertigo	49 (10.49)
General impairment	40 (8.56)

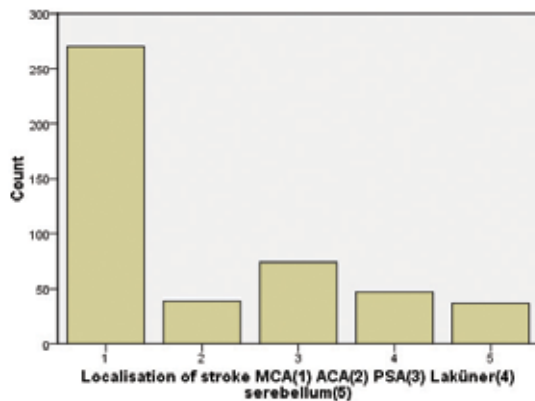


Figure 1. Localization of stroke. Middle cerebral artery (1), anterior cerebral artery (2), posterior cerebral artery (3), lacunar infarct (4), cerebellum (5)

This retrospective observational study was approved by the institutional local ethics committee of Adiyaman University Hospital (2017/5-10).

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) ver. 20. Categorical variables were analyzed with the Fischer’s Exact Test and parametric variables with the Independent Samples T Test. Binary logistic regression was used to calculate odds ratio and 95% confidence interval.

Results

There were 237 (50.7%) males and 230 (49.3%) females. The mean age was 71.71 ± 12.44 years. The mean age of patients with AF was 77.76 ± 8.43 years and the mean age of patients with sinus rhythm was 70.53 ± 12.75 years ($p < 0.05$). Symptoms at admission are shown in Table 1.

Stroke localizations of all patients are shown in Table 2 and Figure 1. AF was noted on the initial electrocardiograms of 76 (16.2%) patients.

The mean ejection fraction of patients was 51.07 ± 10.41 in the AF group and 55.54 ± 9 in the sinus rhythm group. Echocardiographic findings of all patients are shown in Table 3.

Table 2. Localization of stroke

	n (%)
Middle cerebral artery	270 (53.9)
Anterior cerebral artery	39 (7.8)
Posterior cerebral artery	74 (14.8)
Lacunar infarction	47 (9.4)
Cerebellum	37 (7.4)
Total	467

Table 3. Echocardiographic findings

	Sinus rhythm	Atrial fibrillation	p value	Odds ratio	95% CI
Decreased left ventricular function	46	24	0.00006	0.642	0.274-1.504
Increased left ventricular diameters	83	28	0.005	0.882	0.452-1.720
Systolic dysfunction	30	10	0.001	0.615	0.270-1.403
Mitral valve insufficiency	77	32	0.000085	0.723	0.360-1.453
Tricuspid valve insufficiency	25	20	0.000002	0.261	0.113-0603
Diastolic dysfunction	64	9	0.390	-	-
Intracardiac thrombus	15	2	>0.05	-	-
Increased atrial diameters	46	11	0.565	-	-
Total	391	76	-	-	-

CI: Confidence interval

Discussion

AF is a common arrhythmia associated with increased risk of stroke, heart failure and death. AF occurs in 1-2% of the general population. The prevalence of AF increases in the elderly (6,7). In this study, patients with AF were statistically older. AF becomes a global health problem as the life expectancy of general population increases (8-11).

Stroke and AF have a complex interaction. In some cases, AF episodes with very short duration may be related to stroke. In some paroxysmal AF cases, stroke may occur long after the AF period. In some cases, atrial fibrillation may be triggered after a stroke. These various types of interactions between AF and stroke reveal that there is a more complex relationship than the traditional cardioembolic AF hypothesis. AF has strong associations with other cardiovascular diseases, such as heart failure, coronary artery disease (CAD), valvular heart disease, diabetes mellitus, and hypertension. Accompanying cardiac abnormalities may have potential effects on the onset of AF. In our study, AF patients with stroke had a significantly lower ejection fraction, decreased left ventricular function, increased left ventricular diameters, systolic dysfunction, mitral valve insufficiency, and tricuspid valve insufficiency. These findings are commonly associated with heart failure, coronary artery disease, and valvular heart diseases. It may be easily hypothesized that AF is only an independent risk factor for stroke. Our findings suggest that AF may be a consequence of multifactorial cardiac abnormalities that may have a causative effect for stroke (12-19).

Study Limitations

Limitations of the study are that the results of the echocardiographic findings were not assessed due to the retrospective pattern of the study and all patients were not evaluated by the same cardiologists.

Conclusion

AF patients with stroke had a significantly lower ejection fraction, decreased left ventricular function, increased left ventricular diameters, systolic dysfunction, mitral valve insufficiency, and tricuspid valve insufficiency. AF should not be considered as a major cardiac risk factor for stroke. AF may be a consequence of multifactorial cardiac abnormalities that may have a causative effect for stroke.

Ethics

Ethics Committee Approval: This retrospective observational study was approved by the institutional local ethics committee of Adiyaman University Hospital (2017/5-10).

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: M.Ö.E., Concept: A.A., Design: İ.T., İ.A., Data Collection or Processing: A.A., Analysis or Interpretation: M.Ö.E., Literature Search: A.A., S.Ç., H.A., M.A.A., Writing: A.A.

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