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# Study of Outcome of Ischemic Stroke Patient With Atrial Fibrillation

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## Abstract

**Atrial fibrillation (AF) is a common arrhythmia and a major risk factor for ischemic stroke, especially in the elderly. Patients with nonvalvular AF have a 5-fold excess risk of stroke. However, population-based data are scarce in patients who have experienced a first-ever ischemic stroke in the presence of AF regarding long-term risk of stroke recurrence and case-fatality rate.**

**Aim of the study is to find out the outcome of ischemic stroke patients with Atrial Fibrillation.**

**It was a descriptive type cross sectional study where 125 diagnosed cases of ischemic stroke were included. Presence of atrial fibrillation was detected by electrocardiogram. They were divided into two groups – those with atrial fibrillation and those without. Comparison was done between the two group in term of recurrence, mortality and clinical improvement.**

**Atrial fibrillation was present in 22 (17.6%) of 125 patients with ischemic stroke. Those with AF were more frequently male, aged 45 years and older. The presence of AF was associated with high 3 months ($X^2$ =4.562, df = 1, p<0.05) and 6 months mortality ($X^2$ =7.868, df = 1, p<0.05), with a higher stroke recurrence rate within the first 6 months follow-up (22.7% versus 7.8% (<0.05)). At 3 months follow up clinical deterioration was noted in 9.1% patient with atrial fibrillation compared to 2.9% patients who had no arrhythmia(p<0.01) and at 6 months follow up clinical deterioration was noted in 18.2% patient with atrial fibrillation compared to 4.9% patients who had no arrhythmia(p<0.01). Ischemic stroke patients with atrial fibrillation had significant mortality within the study period compared to those without atrial fibrillation. Significant deterioration in clinical outcome was noted in atrial fibrillation group after six months. Recurrence was more in ischemic stroke patients with atrial fibrillation. Multivariate linear regression analysis shows atrial fibrillation as well as CKD, Diabetes mellitus and smoking as independent risk factor for recurrence.**

**In conclusion, patients who had an ischemic stroke with accompanying atrial fibrillation had higher mortality, grave stroke severity, more recurrences and poorer functional status than those without atrial fibrillation.**

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## Introduction

Globally stroke is a major health problem. It is the third commonest cause of mortality[1] and fourth leading cause of disease burden[2]. It is of two main types - ischemic and hemorrhagic[3]. Among the cardiac risk factors for ischemic stroke the

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incidence of thromboembolism in patients with atrial fibrillation is 4% to 7.5% per year. The prevalence of atrial fibrillation increases with advancing age and is 0.5% for patients aged 50 to 59 years and 8.8% for those aged 80 to 89 years. Chronic non-valvular atrial fibrillation (NVAF), a condition that is associated with an overall risk for stroke of approximately five to six fold, and a mortality rate approximately twice that of age and sex matched individuals without atrial fibrillation[4].By 2050, it is anticipated that 80% of stroke events will occur in people living in developing regions of the world [5,6]. Atrial fibrillation, the most common sustained cardiac arrhythmia in the general population, affects about 1% of adults, is the most common cause for cardioembolic stroke and is a risk factor for future cerebrovascular diseases. Patients with rheumatic atrial fibrillation have a 17-fold increase in stroke incidence[4]. Some studies showed that stroke patients with AF have been shown to have a poorer neurological outcome than stroke patients without AF. But we have very limited studies done in this field in our country perspective.

## Objective

To find out the prevalence of atrial fibrillation and its effect upon the outcome of ischemic stroke patient presented in Rajshahi Medical College Hospital.

## Material and Methods

This study was performed in Neuromedicine department of Rajshahi Medical College Hospital from January 2013 to December 2014. It was a descriptive type cross sectional study. The patients who fulfilled both the inclusion and exclusion criteria were included in our study. ECG was done to find out presence of atrial fibrillation. So two group was found – one with atrial fibrillation and other without atrial fibrillation. Initially they were assessed by Modified Rankin score. Then they were followed up after one month, three months and six-month interval. Outcome was recorded with the help of modified rankin score. Comparison was done between the atrial fibrillation and non-atrial fibrillation group in terms of recurrence, mortality and clinical improvement. Data was collected by face to face interview, physical examination and investigations in a data collection sheet. Some patients were followed up on outdoor service. Data were analyzed on SPSS 16.0. Mean and standard deviation were computed with the students t-test, where non-parametric variables were analyzed by Chi-square method and unless otherwise stated, $p < 0.05$ was taken as significant.

*Inclusion criteria:*

Clinical and neuroimaging features of ischemic stroke.

*Exclusion criteria:*

Recurrence of stroke

## Result

Total 125 patients who met the inclusion and exclusion criteria were included in the study. Among them atrial fibrillation was present in 22 patients by ECG evaluation on admission. In the atrial fibrillation group 12 (54.5%) were men and 10 (45.5%) were women. On the other hand in the non-atrial fibrillation group 63 (61.2%) were men and 40 (38.8%) were women. So in our study there was male predominance in atrial fibrillation group.

**Table I:** Comparison of recurrence between ischemic stroke patients with atrial fibrillation with those without atrial fibrillation at one, three and six months follow up (N=125)

| | Ischemic stroke patient with atrial fibrillation | Ischemic stroke patient without atrial fibrillation | $X^2$ (p) |
|---|---|---|---|
| **Recurrence at 1 month** | 4 (18.2%) | 2 (1.9%) | 0.009 (<0.05) |
| **Recurrence at 3 months** | 1 (4.5%) | 3 (2.9%) | 0.544 (>0.05) |
| **Recurrence at 6 months** | 0 (0%) | 3 (2.9%) | 0.557 (>0.05) |

Table I shows that recurrence of stroke occurred in 4 patients out of 22 patients who had ischemic stroke with atrial fibrillation and in 2 patients out of 113 patients with ischemic stroke who had no atrial fibrillation at one month follow up. P value ($X^2$ =10.463, df = 1, p<0.05) reached from chi square test. So the test is statistically significant.

At 3 months follow up recurrence of stroke occurred in 1 patient out of 22 patients who had ischemic stroke with atrial fibrillation and in 3 patients out of 113 patients with ischemic stroke who had no atrial fibrillation at one month follow up. P value ($X^2$ =0.156, df = 1, p>0.05) reached from chi square test. So the test is statistically insignificant.

At 6 months follow up recurrence of stroke did not occur in 3 patients who had ischemic stroke with atrial fibrillation and in 3 patients out of 113 patients with ischemic stroke who had no atrial fibrillation at one month follow up. P value ($X^2$ =0.657 df = 1, p>0.05) reached from chi square test. So the test is statistically insignificant.

**Table II:** Comparison of mortality between ischemic stroke patients with atrial fibrillation with those without atrial fibrillation (N=125)

| Death | Ischemic stroke patient with Atrial Fibrillation N (%) | Ischemic stroke patient without Atrial Fibrillation N (%) | $X^2$ (P) |
|---|---|---|---|
| **After one month** | 1 (4.5%) | 1 (1.0%) | 1.471 (>0.05) |
| **After 3 months** | 3 (13.6%) | 3 (2.9%) | 4.562 (<0.05) |
| **After 6 months** | 5 (22.7%) | 5 (4.9%) | 7.868 (<0.05) |

Table II shows that after one month one patient died in each group. P value ($X^2$=1.471, df = 1, p>0.05). It is statistically insignificant. After three months three patient died in each group. P value ($X^2$ =4.562, df = 1, p<0.05). It is statistically significant. After three months five patients died in each group. P value ($X^2$=7.868, df = 1, p<0.05). It is statistically significant.

**Table III:** Comparison of clinical status (Modified Rankin Score) during admission between ischemic stroke patients with atrial fibrillation with those without atrial fibrillation (N=125).

| Clinical status (Modified Rankin score) | Ischemic stroke patient with Atrial Fibrillation N (%) | Ischemic stroke patient without Atrial Fibrillation N (%) | Clinical status (Modified Rankin score) |
|---|---|---|---|
| MRS 0 (no symptom) | 0 (0%) | 0 (0%) | MRS 0 (no symptom) |
| MRS 1 (no significant disability except symptoms) | 0 (0%) | 0 (0%) | MRS 1 (no significant disability except symptoms) |
| MRS 2 (slight disability | 5 (22.7%) | 6 (5.8%) | MRS 2 (slight disability |
| MRS 3 (moderate disability) | 3 (13.6%) | 16 (15.5%) | MRS 3 (moderate disability) |
| MRS 4 (moderately severe disability) | 2 (9.1%) | 28 (27.2%) | MRS 4 (moderately severe disability) |
| MRS 5 (severe disability) | 12 (54.5%) | 53 (51.5%) | MRS 5 (severe disability) |
| MRS 6 (death) | 0 (0%) | 0 (0%) | MRS 6 (death) |
| Total | 22 | 113 | Total |

Table III shows that severe disability was present more in patients who had atrial fibrillation (54.5% versus 51.5%). P value is <0.05 ($X^2$ =8.434, df = 3, p<0.05). So it is statistically significant. Patients of ischemic stroke with atrial fibrillation had worse clinical status than those without atrial fibrillation.

**Table IV:** Comparison of clinical improvement (Modified Rankin Score) between ischemic stroke patients with atrial fibrillation with those without atrial fibrillation (N=125).

| **Improvement** | | **Ischemic stroke patient with atrial fibrillation N (%)** | **Ischemic stroke patient without atrial fibrillation N (%)** | **t (P)** |
|---|---|---|---|---|
| After one month | Improved | 10 (45.5%) | 65 (63.1%) | 1.559 (>0.05) |
| | Static | 12 (54.5%) | 37 (35.9%) | |
| | Deteriorated | 0 (0%) | 1 (1.0%) | |
| After three months | Improved | 16 (72.7%) | 97 (94.2%) | 3.039 (<0.01) |
| | Static | 4 (18.2%) | 3 (2.9%) | |
| | Deteriorated | 2 (9.1%) | 3 (2.9%) | |
| After six months | Improved | 18 (81.8) | 96 (93.2%) | 2.847 (<0.01) |
| | Static | 0 (0%) | 2 (1.9%) | |
| | Deteriorated | 4 (18.2%) | 5 (4.9%) | |

Table IV shows that after one month 10 patients improved, 12 ware static and no patient deteriorated clinically in atrial fibrillation group. On the other hand, 65 patients improved, 37 patients remained static and 1 patient deteriorated in non-atrial fibrillation group. P value (t=1.559, df = 123, p>0.05). It is statistically insignificant. After three months 16 patients improved, 4 ware static and 2 patient deteriorated clinically in atrial fibrillation group. On the other hand 97 patients improved, 3 patients remained static and 3 patients deteriorated in non-atrial fibrillation group. P value (t=3.039, df = 123, p<0.01). It is statistically significant. After six months 18 patients improved, no patient was static and 4 patients deteriorated clinically in atrial fibrillation group. On the other hand 96 patients improved, 2 patients remained static and 5 patients deteriorated in non-atrial fibrillation group. P value (t=2.847, df = 123, p<0.01). It is statistically significant.

**Table V:** Multivariate linear regression analysis for probability of recurrence

| **Variable** | **Multivariate linear regression analysis** | | |
|---|---|---|---|
| | **OR** | **95% CI** | **P value** |
| **Age** | 1.855 | 0.360 to 9.567 | 0.800 |
| **Hypertension** | 0.770 | 0.223 to 2.657 | 0.298 |
| **Cardiac disease** | | | 0.299 |
| **Dyslipidaemia** | 2.874 | 0.785 to 10.517 | 0.050 |
| **CKD** | 4.5 | 1.004 to 20.168 | 0.030 |
| **Smoking** | 0.156 | 0.020 to 1.244 | 0.042 |
| **Atrial fibrillation** | 3.493 | 1.020 to 11.959 | 0.021 |
| **Diabetes Mellitus** | 2.10 | 0.515 to 8.571 | 0.047 |

In Table V Multivariate linear regression analysisshows atrial fibrillation as well as CKD, Diabetes mellitus and smoking as independent risk factor for recurrence.

## Discussion

The present study was carried out in Rajshahi Medical College Hospital, Rajshahi. The role of AF was investigated in patients who had a first-ever ischemic stroke documented with brain neuroimaging and electrocardiogram. A total number of 125 patients were included in the study

In our study one-month mortality was not significant in atrial fibrillation group when compared with non-atrial fibrillation group (4.5% versus 1.0%, p>0.05) but after 3 months follow up there was significant case fatality in patients with atrial fibrillation (13.6% versus 2.9%, p<0.05) and after 6 months follow up it was also significant (22.7% versus 4.9%, p<0.05). In a previous study[7] it was found that death was significant in patients with atrial fibrillation after 28 days of hospital admission when compared with non-atrial fibrillation (mortality 11.3% versus 3.4%, p<0.0001). Similar high mortality was noticed by Carini et al. (2005) (32.5%; 95% CI, 29.3 to 35.6). Higher case fatality in hospitalization, 3-month, 6-month and 1-year follow-ups (10.1%, 25.5%, 29.1% and 34.0% vs. 2.0%, 7.4%, 8.8% and 11.6%, respectively, p < 0.001) in the study done by Lin et al. (2011). In the study done by Saposnik et al. (2013) in overall, AF patients had higher risk of death at 30 days (22.3% versus 10.2%; P<0.0001), 1 year (37.1% versus 19.5%; P<0.0001) and death or disability at discharge (69.7% versus 54.7%; P<0.0001) compared with non-AF patients. Significant mortality was also noted by Lin et al. (1996) who had a mortality of 1.84 (95% CI 1.04 to 3.27; P = 0.036).

Mortality was significantly higher in patients with AF at 30 days (19.4% vs. 11.5%), 90 days (27.7% vs. 15.8%) and 365 days (38.5% vs.22.6%) (P value <0.0001) in the study done by Gattellari et al. (2011). So our study showed different result when comparing with this previous result. After one year follow up Lin et al (1996) found significant mortality (63% versus 34%, p<0.001)[14].

In our study MRS score analysis showed that there was significant clinical deterioration in atrial fibrillation group (t=2.847, df = 123, p<0.01)

In our study overall recurrence rate was higher in atrial fibrillation group in comparison to non-atrial fibrillation group (22.7% versus 7.8%, p<0.05). Similar outcome was found in the study by Marini et al. (2005) (6.6% versus 4.4%, p = 0.046), Lip and Beevers (1996) (23% versus 34%, p<0.001) although they studied patients for 1 year. Recurrence was significant at one month follow up but not at 3 months and six months follow up.

Multivariate linear regression analysis for probability of recurrence was done to determine independent risk factor for stroke recurrence. Atrial fibrillation (OR 3.493; 95%CI 1.020 to 11.959; P <0.05) as well as CKD (OR 4.5; 95%CI 1.004 to 20.168; P <0.05), Diabetes mellitus (OR 2.10; 95%CI 0.515 to 8.571; P <0.05) and smoking (OR 0.156; 95%CI 0.020 to 1.244; P <0.05) were independent risk factor for recurrence of stroke. But age (OR 1.855; 95%CI 0.360 to 9.567; P >0.05), hypertension (OR 0.770; 95%CI 0.223 to 2.657; P >0.05), cardiac disease (P >0.05) and dyslipidemia (OR 2.874; 95%CI 0.785 to 10.517; P >0.05) were not independent risk factors.

## Conclusion

Ischemic stroke patients with atrial fibrillation had significant mortality within the study period compared to those without atrial fibrillation. Clinical improvement was not significant within one month but significant deterioration was noted in atrial fibrillation group after six months. Recurrence was more in ischemic stroke patients with atrial fibrillation especially at one month follow up. So, in conclusion patients who had an ischemic stroke with accompanying atrial fibrillation had higher mortality, graver stroke severity, more recurrences and poorer functional status than those without atrial fibrillation.

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