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FREQUENCY OF ATRIAL FIBRILLATION IN ACUTE ISCHEMIC STROKE PATIENTS

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Abstract

Background: *Acute ischemic stroke (AIS) patients have an increased risk of atrial fibrillation (AF), which can worsen stroke outcomes. Some studies report higher frequencies of AF, but these findings vary across populations. This study was designed to provide a clearer conclusion on the prevalence of AF in AIS patients. By analyzing frequency and risk factors, the study aims to clarify the relationship between AF and AIS, aiding in more informed clinical management.*

Objective: *To compare*

Duration: *Six months w.e.f. 03-08-2024 to 02-02-2025.*

Methodology: *A total of 140 patients with acute ischemic stroke, meeting the inclusion criteria, were enrolled at Punjab Rangers Teaching Hospital, Lahore, after obtaining informed consent. A 12-lead ECG was performed on each patient to confirm atrial fibrillation (AF), which was classified as acute, paroxysmal, persistent, or permanent. To minimize bias, all ECGs were conducted by the same staff using the same machine. Findings were reviewed by a senior consultant, and confounding variables were controlled by exclusion. Patients received treatment as per the department's standard protocol.*

Results: *The study included 140 patients with a mean age of 66.70 ± 8.28 years. Most participants were aged 55-70 years (67.1%), and 52.1% were male. The mean BMI was 27.54 ± 3.36 kg/m², with 54.3% overweight and 25.7% obese. A family history of AF was reported in 6.4%. AF was present in 24.3% of patients, with higher frequencies observed in older age groups, males, obese individuals, and those with a family history, though statistical significance was not reached.*

Conclusion: *In conclusion, this study found that atrial fibrillation (AF) was present in 24.3% of acute ischemic stroke (AIS) patients. Although a higher frequency of AF was observed in older age groups, males, obese individuals, and those with a family history of AF, statistical significance was not achieved in any subgroup, possibly due to the small sample size. Therefore, patients with AIS must be screened for AF to enable anticipatory management and improve clinical outcomes.*

INTRODUCTION

Stroke is a neurological condition caused by the obstruction of blood flow to the brain, either due to a clot or bleeding.[1] In ischemic strokes, blood clots form in brain vessels, obstructing circulation and depriving brain cells of oxygen, leading to their death.[2,3] Hemorrhagic strokes occur when blood vessels rupture, causing bleeding in the brain. Ischemic strokes account for approximately 68% of all strokes globally, making it the leading cause of stroke-related disabilities, while hemorrhagic strokes comprise 32%. Stroke remains a major cause of death and long-term disability worldwide.[4]

The lifetime risk of overt stroke is approximately one in four, while the risk of silent strokes approaches 100%.[5] Before modern interventions, stroke mortality was nearly 10%, and half of patients developed moderate-to-severe disability. Annually, 15 million people experience a stroke. In Khyber Pakhtunkhwa, stroke prevalence is 1.2%, with 271 cases diagnosed.[6] The prevalence of atrial fibrillation (AF), the most common sustained cardiac arrhythmia, continues to rise, even after adjusting for age and structural heart disease. AF increases stroke risk by six times and doubles mortality, with a persistent 1.5-fold increase after accounting for co-morbidities, primarily due to cerebrovascular events, worsening ventricular dysfunction, and heightened coronary mortality.[7,8]

Frequency of atrial fibrillation in patients with acute ischemic stroke (AIS) was reported as 23.0% by Rahim et al. (2023) at Rawal Institute of Health Sciences, Rawalpindi, Pakistan.[9] Likewise findings were given by Goel et al. (2020) in India where frequency of AFI was reported as 25.0% in patients with AIS.[10]

In the light of above studies, it seems highly imperative to extensively evaluate existence of atrial fibrillation in each and every patient of acute ischemic stroke, since it increases the probability of morbidity and death by causing the stroke to recurrence. So that its treatment may be initiated well in time. However, prior to its advocacy and opting to scan each and every patient of AIS for atrial fibrillation, it must be remembered that Pakistan is a low resource country with budgetary constraints in all the spheres and health care system as well. Therefore, judicious decisions making is required especially keeping in view some other studies that have reported otherwise. Eberly et al. (2023) in the US reported frequency of AF to be only 9% in patients with acute ischemic stroke.[11] Poh et al. (2022) also reported similarly where frequency of AF was only 8.5% in patients with acute ischemic stroke.[12] Moreover, frequency of AF in patients with AIS was reported as low as 4% by Sylaja et al. (2018)[13] in India.

Above literature[9-13] was not conclusive and contained controversy. Moreover, to the best of candidate's knowledge there was no other local or international material on the subject. Therefore, purpose of this study was to reconfirm these findings. Results of study will be helpful in making a decision to extensively evaluate these pageants for AF and thus take remedial measures for such patients.

METHODOLOGY

This study was a descriptive cross-sectional study conducted at the Department of Medicine, Punjab Rangers Teaching Hospital, Lahore, over a duration of six months following the approval of the synopsis. The study included 140 cases, calculated with a 95% confidence level and a 6% margin of error, assuming an expected frequency of atrial fibrillation (AF) to be 23.0% in patients with acute ischemic stroke (AIS).[9] Non-probability, consecutive sampling was used to select patients. Inclusion criteria included patients of both genders, aged 55-90 years, presenting with acute ischemic stroke. Exclusion criteria included patients with transient ischemic stroke, hemorrhagic stroke, cerebral tumors, brain tuberculomas, and abscesses. Acute ischemic stroke was defined as sudden loss of consciousness or unilateral body weakness with associated deviation of the mouth angle and up-going plantar reflex, presenting within 24 hours. Atrial fibrillation was diagnosed based on an irregularly irregular pulse with absent 'P' waves and variable R-R intervals on a 12-lead ECG. A total of 140 patients were enrolled after obtaining informed consent, and a 12-lead ECG was performed on all participants. The presence of AF was categorized into acute (≤1 week), paroxysmal (>1 week to <6 months), persistent (>6 months to <1 year), and permanent (>1 year). Data was entered and analyzed using SPSS version 27. Numerical variables such as age and BMI were

presented as mean ± SD, and categorical variables like gender, family history of AF, vascular territory, and disease duration were presented as frequency and percentage. Stratification was done for age, gender, BMI, and family history of AF, with chi-square tests applied to assess significant relationships ($p \leq 0.05$).

RESULTS

The study sample consisted of 140 patients, with a mean age of 66.70 ± 8.28 years. The majority of participants were in the 55-70 year age group (67.1%, n=94), while 32.9% (n=46) were in the 71-90 year age group. In terms of gender distribution, 52.1% (n=73) were male and 47.9% (n=67) were female. The mean body mass index (BMI) of the participants was 27.54 ± 3.36 kg/m^2. Regarding BMI classification, 20.0% (n=28) of the patients had normal weight, 54.3% (n=76) were overweight, and 25.7% (n=36) were classified as obese. Family history of AF was reported in 6.4% (n=9) of patients, while the remaining 93.6% (n=131) had no family history of AF. Finally, when considering the vascular territory affected by the stroke, 65.7% (n=92) had an anterior circulation stroke, 19.3% (n=27) had a posterior circulation stroke, and 15.0% (n=21) had multiple vascular territories involved. Data is given in Table 1.0. Atrial fibrillation (AF) was present in 24.3% (n=34) of the cases as shown in Table 2.0.

The frequency of AF varied across different subgroups. For the 55-70 years age group, the frequency of AF was 22.3% (n=21), while in the 71-90 years age group, it was 28.3% (n=13), with a p-value of 0.443. Among males, 24.7% (n=18) had AF, while 23.9% (n=16) of females had AF, with a p-value of 0.915. Regarding BMI, the frequency of AF was 21.4% (n=6) in participants with normal weight, 22.4% (n=17) in overweight individuals, and 30.6% (n=11) in obese participants, with a p-value of 0.593. Family history of AF was associated with a higher frequency of AF, as 44.4% (n=4) of those with a family history had AF, compared to 22.9% (n=30) in those without a family history, with a p-value of 0.145. Although the frequency of AF appeared higher in older age groups, male gender, obesity, and family history, statistical significance was not reached, which may be attributed to the small sample size. Data is given in Table 3.0.

Table 1.0 Baseline Characteristics of Study Sample

Characteristics	Study Sample n=140
Age (years)	66.70±8.28
• **55-70 years**	94 (67.1%)
• **71-90 years**	46 (32.9%)
Gender	
• **Male**	73 (52.1%)
• **Female**	67 (47.9%)
BMI (kg/m^2)	27.54±3.36
• **Normal Weight**	28 (20.0%)
• **Overweight**	76 (54.3%)
• **Obese**	36 (25.7%)
Family History of AF	
• **Yes**	9 (6.4%)
• **No**	131 (93.6%)
Vascular Territory	
• **Anterior**	92 (65.7%)
• **Posterior**	27 (19.3%)
• **Multiple**	21 (15.0%)

Table 2.0 Frequency of Atrial Fibrillation in Acute Ischemic Stroke Patients

Description	Study Population (n=140)
Atrial Fibrillation	
• Yes	34 (24.3%)
• No	106 (75.7%)

Table 3.0 Frequency of Atrial Fibrillation in Acute Ischemic Stroke Patients Stratified for Various Subgroups

Subgroups	n	Atrial Fibrillation n (%)		P-value
		Yes	No	
Age (years)				
• 55-70 years	94	21 (22.3%)	73 (77.7%)	0.443
• 71-90 years	46	13 (28.3%)	33 (71.7%)	
Gender				
• Male	73	18 (24.7%)	55 (77.5%)	0.915
• Female	67	16 (23.9%)	51 (73.9%)	
BMI (kg/m^2)				
• Normal Weight	28	6 (21.4%)	22 (78.6%)	0.593
• Overweight	76	17 (22.4%)	59 (77.6%)	
• Obese	36	11 (30.6%)	25 (69.4%)	
Family History of AF				
• Yes	9	4 (44.4%)	5 (55.6%)	0.145
• No	131	30 (22.9%)	101 (77.1%)	

Chi square test, taking p-value ≤0.05 as significant

DISCUSSION

Acute ischemic stroke (AIS) patients are at an increased risk for atrial fibrillation (AF), a condition that can exacerbate stroke outcomes.[14,15] Higher frequencies of AF have been reported in some studies, suggesting a potential association between AIS and AF.[16,17] However, the reported frequency of AF varies across different populations and settings.[9-13] This variation prompted the current study, which aimed to provide a more definitive conclusion regarding the prevalence of AF in AIS patients. By analyzing the frequency and potential risk factors, this study seeks to clarify the relationship between AF and acute ischemic stroke, contributing to more informed clinical management.

Mean age of the patients in this study was 66.70 ± 8.28 years. The majority of participants were in the 55-70 year age group (67.1%, n=94), while 32.9% (n=46) were in the 71-90 year age group. Previously, Eberly et al. (2023) reported a median IRQ age of 72.5 (68.5-79.0) years in the US and Sylaja et al. (2018) reported a mean age of 58.3±14.7 years in India.[11,13] Rahim et al. (2023) in Pakistan reported that 12.6% patients of their study sample had age <45 years while 87.5% had age >45 years.[9] Likewise, Mayet et al. (2021) reported that 85% of the patients with acute ischemic stroke had age >45 years.[18] This difference may however be associated with different inclusion criteria.

In terms of gender distribution, 52.1% (n=73) were male and 47.9% (n=67) were female. This male dominance was reported by some other studies also as 62.7% by Sylaja et al. (2018), 69.5% by Goel et al. (2020) and 51.0% by Mayet et al. (2021).[13,18] However, males were only 42.2% in a similar study conducted by Eberly et al. (2023).[11]

The mean BMI of the participants was 27.54 ± 3.36 kg/m^2. Regarding BMI classification, 20.0% (n=28) of the patients had normal weight, 54.3% (n=76) were overweight, and 25.7% (n=36) were classified as obese. Sylaja et al. (2018) reported a mean BMI of

24.5±3.5 kg/m^2 whereas Rahim et al. (2023) reported that 26% patients had normal BMI, 55% were overweight and 19% were obese.[13,9]

In this study, family history of AF was reported in 6.4% (n=9) of patients which is a little higher frequency reported by Rahim et al. (2023) as 4.3%. Atrial fibrillation (AF) was present in 24.3% (n=34) of the cases in this study. Our findings are very close to results of Goel et al. (2020) and Rahim et al. (2023) who reported frequency of AF in patients with AIS to be 25.2% and 23.0%, respectively whereas Khalid et al. (2022) reported it 18.67%.[10,9,19] However, frequency of AF was reported as 4.0% by Sylaja et al. (2018), 8.5% by Poh et al. (2022), 9.0% by Eberly et al. (2023) and 11% by Mayet et al. (2021).[13,12,11]

In this study, the frequency of AF varied across subgroups. In the 55-70 years age group, 22.3% had AF, while 28.3% in the 71-90 years group had AF. Among males, 24.7% had AF, and 23.9% of females had AF. The frequency of AF was 21.4% in normal weight, 22.4% in overweight, and 30.6% in obese participants. Family history showed a higher AF frequency at 44.4%, though statistical significance was not reached, likely due to the small sample size.

CONCLUSION

In conclusion, this study found that AF was present in 24.3% of acute ischemic stroke patients. Although a higher frequency of AF was observed in older age groups, males, obese individuals, and those with a family history of AF, statistical significance was not achieved in any subgroup, possibly due to the small sample size. Therefore, patients with AIS must be screened for AF to enable anticipatory management and improve clinical outcomes

LIMITATIONS & RECOMMENDATIONS

The strengths of this study include its focus on AF in AIS patients and its contribution to understanding the frequency of AF across various subgroups. However, limitations include the small sample size and lack of statistical significance in some findings, which may limit generalizability. Future research with larger sample sizes is necessary to confirm these trends and explore the impact of AF on AIS outcomes, ultimately aiding in more effective clinical management and treatment strategies.

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