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Clinical and Etiological Profile of Patients Presenting with Atrial Fibrillation – A Hospital Based Study

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Abstract:

Background: *Atrial fibrillation is the most common sustained cardiac arrhythmia encountered in clinical practice. This study was based on clinical and etiological profile of patents presenting with Atrial fibrillation.*

Objective: *To assess etiology and risk factors of patients with AF and to risk stratify them for aggressive medical treatment to prevent adverse outcome.*

Material and methods: *Our study was hospital based prospective study with total number of 400 patients enrolled; who presented to outpatient department or admitted in medical and cardiology wards of S.M.H.S hospital.*

Results: *The mean age of our patient cohort was 60.83 +/- 16.86 yrs with a range of 16 to 90yrs with 48 % (192) males and 52 %(208) females. In our study HTCVD was the most common etiological cause of AF accounting for 37 % of the total burden, followed by RHD (18.5%), CAD (16%) , DCM (13%),Idiopathic 5.5% and non- rheumatic valvular lesion in 2.7%. HTN (63.7%) was the most important risk factor , followed by smoking (33%) and both were significantly more common in males. Out of 400 patients 315 patients had non-valvular AF who were risk stratified for stroke using CHADS2 score with 86.35% patients had CHADS2 > 0r = 2. In our study 357 patients had indication for anticoagulation but only 254 (70.9%) received the treatment.*

Conclusion: *Non-valvular AF was more common than valvular AF. HTCVD was the most common etiology. 89.3% patients were eligible for anticoagulation but only 70.9 % received the treatment optimal anticoagulation need to be emphasized:*

Key words: atrial fibrillation (AF), hypertensive heart disease (HTCVD), Rheumatic heart disease(RHD)

INTRODUCTION

Atrial fibrillation (AF) is the most common cardiac rhythm disturbance. On electrocardiogram, AF is characterized by replacement of consistent P waves by rapid oscillations or fibrillatory waves that vary in size, shape and timing associated with an irregular, frequently rapid ventricular response when AV conduction is intact (Bellet 1953). In an untreated patient the ventricular rate also tends to be rapid and is entirely dependent on the conduction properties of the AV junction. Although typically the rate will vary between 120 & 160 beats per minute. In some patients it can be > 200 beats per minute.

In other patients, because of heightened vagal tone or intrinsic AV nodal conduction properties, the ventricular response is < 100 beats per minute and occasionally even profoundly low(Longo et al. 2011).

The incidence of AF increases with age such that >5% of the adult population over 70 will experience the arrhythmia(Longo et al. 2011). The prevalence of AF is estimated at 0.4% in general population increasing with age. AF is uncommon in childhood except after cardiac surgery(OSTRANDER et al. 1965). AF accounts for 34.5% of patients hospitalized with a cardiac rhythm disturbances(Bialy D, Lehmann MH, Schumacher DN, Steinman RT 1992). The frequency of AF increases with increase in severity of congestive cardiac failure or valvular heart disease. The frequency of lone atrial fibrillation is less than 12%. The age adjusted prevalence is higher in men(Furberg et al. 1994).

The total mortality rate is approximately double in patients with AF compared with patients with normal sinus rhythm and is linked to the severity of underlying heart disease(Krahn et al. 1995). The risk of ischemic stroke among patients with non-rheumatic AF averages 5 % per year which is 2 to 7 times more than in people without AF. One out of six strokes occurs in patients with AF(Flegel, Shipley, and Rose 1987; Hart and Halperin 1999).

Important predictive and causative factors of atrial fibrillation include hypertension, diabetes, left ventricular hypertrophy, coronary artery disease mainly in older patients. Other causes of AF include hypertrophic cardiomyopathy and dilated cardiomyopathy, chronic obstructive pulmonary disease (COPD), pericarditis and congenital heart disease. AF occurring in the absence of any detectable organic disease is called lone atrial fibrillation. In about 30% cases the term idiopathic AF implies the absence of any detectable etiology including

hyperthyroidism, overt sinus node dysfunction and overt or concealed pre-excitation(Levy 2002).

The independent risk factors for atrial fibrillation are age, smoking, diabetes, electrocardiographic left ventricular hypertrophy, hypertension, myocardial infarction, congestive heart failure and valvular disease(Benjamin et al. 1994).

During AF, three factors can affect hemodynamic function: loss of synchronous atrial mechanical activity, irregularity of ventricular response, and inappropriately rapid heart rate. A marked decrease in cardiac output can occur with the loss of atrial contraction, especially in patients with impaired diastolic ventricular filling, hypertension, mitral stenosis, aortic stenosis, hypertrophic cardiomyopathy (HCM), or restrictive cardiomyopathies. The variation in RR intervals during AF can also result in hemodynamic impairment. A persistently rapid atrial rate can adversely affect atrial mechanical function (tachycardia-induced atrial cardiomyopathy). Such changes in atrial tissue might explain the delayed recovery of atrial contractility in patients after cardio-version in sinus rhythm.

A persistently elevated ventricular rate during AF can produce dilated ventricular cardiomyopathy. It is critically important to recognize tachycardia-induced cardiomyopathy, because control of the ventricular rate can lead to partial or even complete reversal of the myopathic process(Morillo et al. 1995; Packer et al. 1986; Grogan et al. 1992; PHILLIPS and LEVINE 1949; Kieny et al. 1992).

Ischemic stroke and systemic arterial occlusion in AF are generally attributed to embolism from the left atrium (LA). The pathogenesis of thromboembolism is complex(Fuster et al. 2001). Thrombus associated with AF arises most frequently in the left atrial appendage (LAA). Transesophageal Doppler echocardiography provides a sensitive and specific method to assess LAA function and to detect thrombotic material. LAA

flow velocities are reduced because of loss of organized mechanical contraction during AF(Aschenberg et al. 1986; Mügge et al. 1994).

Because the pathophysiology of thromboembolism in patients with AF is uncertain, the mechanisms that link risk factors to ischemic stroke in AF are also incompletely defined. The strong association between hypertension and stroke in AF is probably mediated primarily by embolism that originates in the LAA. But hypertension also increases the risk of non-cardioembolic strokes in AF. Hypertension in AF patients is associated with reduced LA flow velocity and spontaneous echo contrast, which predisposes the patient to thrombus formation. The effect of advancing age to increase stroke risk in AF is multifactorial(Miller et al. 1993).

Various classification systems have been proposed for AF based on the ECG pattern, epicardial or endocavitary recordings mapping of atrial electrical activity or clinical features.

Paroxysmal AF: Episodes of AF that typically lasts for less than 24 hrs but can last upto 7 days these terminate spontaneously.

Persistent AF: Episodes of AF that last more than 7 days and require either pharmacological or electrical intervention to terminate.

Permanent AF: is continuous AF, which has failed cardio-version or where cardioversion has never been attempted.

Lone AF: AF in individuals without structural or cardiac or pulmonary disease with low risk for thromboembolism. It is applied to patients less than 60 year of age.

The diagnosis of AF requires confirmation by ECG, sometimes in the form of bedside telemetry or ambulatory HOLTER recording. The initial evaluation involves characterizing the pattern of the arrhythmia as paroxysmal or

persistent, determining its cause and defining associated cardiac and extra cardiac factors pertinent to the aetiology and management.

Prevention of thromboembolism is the main tenet of AF management and should begin with individual risk assessment of each patient. Chronic oral anticoagulation is currently the most effective therapy for attenuating the risk of stroke associated with atrial fibrillation. However its initiation needs risk stratification. $CHADS_2$ score is one of the validated risk stratification tools that can categorize non-valvular AF patients as low, intermediate or high risk for stroke taking into account risk factors like age>75 years, hypertension, diabetes, heart failure and prior history of stroke(Jhawar and Flaker 2012).

$CHADS_2$ SCORE

Particular	**Points**
Congestive heart failure	1
Hypertension	1
Age>75years	1
Diabetes	1
Stroke or TIA	2

$CHADS_2$ SCORE AND ANNUAL RISK OF STROKE

Score	**Annual risk of stroke in %**
0	1.9
1	2.8
2	4.0
3	5.9
4	8.5
5	12.5
6	18.2

The present study will be undertaken with this background to assess various aspects of atrial fibrillation in our patient population.

REVIEW OF LITERATURE

AF is the most common arrhythmia treated in clinical practice and the most common arrhythmia for which patients are hospitalized; approximately 33% of arrhythmia-related hospitalizations are for AF. AF is associated with approximately a fivefold increase in the risk of stroke and a twofold increase in the risk of all-cause mortality.

Benjamin EJ et al [1994] studied independent risk factors for atrial fibrillation in a population-based cohort. Their study cohort constituted 2090 men and 2641 women members free of atrial fibrillation and who were followed for 38 years. Upon follow-up 264 men and 298 women developed atrial fibrillation. They found that in addition to intrinsic cardiac causes such as valve disease and congestive cardiac failure, risk factors for cardiovascular disease also predispose to atrial fibrillation.

Modification of risk factor for cardiovascular diseases may have the added benefit of diminishing the incidence of atrial fibrillation(B F Gage et al. 2001).

Levy S et al [1999] studied the characterization of different subsets of atrial fibrillation in general practice in France: the ALFA study. This study demonstrated a shift toward non-rheumatic AF in contrast with prior studies relative prevalence of paroxysmal, chronic and recent onset AF were 22.1%, 51.5% and 26.4% respectively.

Underlying heart disease was present in 70.6% patients. Lone AF was observed in 29.4% of the total patient population despite the wide use of echocardiography. Hypertension (39.4%) was the most common underlying condition and hypertensive heart disease was found in 21.45% of the total patient population. Of interest is the fact that the incidence of coronary artery disease and myocardial disease have reached or exceeded the incidence of valvular heart disease in the total cohort

(15.2%). This large-scale study established the current demographic profile of out-of-hospital patients with AF and highlights some of the changes that have occurred in the past decades, including a particular shift in cardiac causes toward non-rheumatic AF. This study also demonstrates significant differences between various subsets of AF(Benjamin et al. 1994).

Brian F. Gage, et al [2001] assessed the predictive value of classification schemes that estimate stroke risk in patients with AF. They observed that 2 existing classification schemes and especially a new stroke risk Index, CHADS2, can quantify risk of stroke for patients who have AF and may aid in selection of antithrombotic therapy(Levy 2002).

Wilhelmsen L et al [2001] studied the incidence, prevalence, etiology, risk factors and prognosis of hospitalization for atrial fibrillation. In this study a random populatin sample of 7495 men aged 47-55 years was first examined in 1970-73. During follow up until 1996 (mean 25.2 years) 754 men were hospitalized with diagnosis of atrial fibrillation. Definite or possible coronary heart disease was diagnosed in 46% heart failure in further 20.2% and valvular heart disease or cardiomyopathy in 4.5%. Significant risk factors in multivariate analysis were age, odds ratio(OR)[95% confidence interval (CI)]-1.11 (1.07,1.16) per year, hospitalization for coronary heart disease or heart failure -6.77(5.17,8.87), stroke in mother-1.49(1.15,1.93), high body stature -1.04(1.03,1.06) per cm, high body mass index(BMI)-1.07(1.04,1.10) per $kg/m^{2,}$ as well as hypertension -1.33(1.07,1.65).

The mortality was increase by 3.3 times after the diagnosis of atrial fibrillation. They observed that inspite of clinical association with coronary heart diseases, risk factor for atrial fibrillation were only partly the same. Prevention

includes avoidance infarction and heart failure(Brian F. Gage et al. 2001).

Friberg J Scharling et al [2003] studied sex specific increase in the prevalence of atrial fibrillation in Copenhagen city and found that the age adjusted prevalence is more in males than females. They studied temporal changes in the prevalence of AF from 1976 to 1994 in random population aged 50 to 89 years. After adjusting for changes in co-morbidity, body weight and height, the increase in prevalence of AF in men from 1976 to 1978 and from 1991 to 1994 remained significant. The factors responsible for this gender specific increase in the prevalence of this common arrhythmia have yet to be identified(Wilhelmsen, Rosengren, and Lappas 2001).

China Med J (Engl) [2004] in retrospective investigation of hospitalized patients with atrial fibrillation in mainland China most of epidemiological factors of AF from this group showed highly in accordance with those from the reports from other countries such as age distribution, cause and associated conditions type of AF dominantly with approach of rate control. The cases distribution progressively rose with age. The causes and associated conditions of AF: advanced age in 58.1%, hypertension in 40.3%, coronary heart disease in 34.8%, heart failure in 33.1%, rheumatic valvular disease in 23.9%, idiopathic AF 7.4%, cardiomyopathy in 5.4% and diabetes in 4.1%. In non-valvular AF patients the risk factors that are significantly associated with stroke included advanced age, hypertension, coronary heart disease and type of AF. Sixty four percent of these patients received antithrombotic therapy with dominated use of anti-platelet agents. In this investigation patients with anti-platelets as well as with anticoagulants showed significant lower stroke rate in comparisons with those managed with neither. But there was no significant difference between these two kinds of treatment in reducing stroke rate(Friberg et al. 2003).

Gage BF, Van Walraven C, et al [2004] in their study which was aimed to study the selection of patients with atrial fibrillation for anticoagulation and stroke risk stratification in patients taking asprin. Patients with AF who have high and low rates of stroke when given asprin can be reliably identified, allowing selection of antithrombotic prophylaxis to be individualized(Brian F Gage et al. 2004).

Nieuwlaat R, Capucci A, et al [2005] studied the current AF management in ESC member countries and verification of cardiology practices against guidelines. This survey found one of the highest oral anticoagulants prescription rates in clinical setting until now. In addition, 63% of participating centres had and anticoagulation clinic to monitor INR values. But still 33% of patients with an indication for anticoagulation is not treated with anticoagulation therapy. In contrast, among the eligible patients who did not receive OAC, a significant number may have had contraindications to OAC other than major bleeding or malignancy which prevents reaching 100% in eligible patients. Among those ineligible for OAC half of these patients received it. This may relate to patient preference due to, e.g., fear of disabling stroke. So discordance between guidelines and practice was found regarding several issues on stroke prevention and anti-arrhythmic therapy(Brian F Gage et al. 2004).

Ruigmez A Johnsson et al [2005] studied predictors and prognosis of paroxysmal atrial fibrillation in general practice in the United Kingdom and found that paroxysmal of AF is common arrhythmia in the general practice setting, increasing with age and commonly associated with other heart diseases. This study showed that patients with paroxysmal AF are younger and have less co-morbidity than patients with chronic AF. This age difference could reflect the progressive nature of AF. The differences in morbidity and mortality among the two forms of AF suggest the possibility that paroxysmal and

persistent AF may be different diseases with different risk factors and different pathogenic substrates, although clearly overlapping in part. In this study it was found that close to half of the patients attending general practice with initial paroxysmal AF were not given warfarin or aspirin in the three months after the first detected episode – a higher proportion than the one we observed among patients with chronic forms of AF. This could be due in part to the fact that 37% of patients with paroxysmal AF presented a single episode of paroxysmal AF without any recurrence during the follow up, and consequently anticoagulant or anti-platelet therapies may not be recommended in this subgroup of patients. A history of valvular heart disease and alcohol consumption are associated with this progression(Nieuwlaat et al. 2005).

Murphy NF et al [2007] studied the epidemiology, primary care burden and treatment of atrial fibrillation. The prevalence of was higher in men than in women. Prevalence increased with age from 0.3/1000 in less than 45 years to 30.5/1000 in >85 years. Deprived individuals are less likely to have AF a finding raising concerns about socioeconomic gradients in detection and prognosis. Recommended treatment for AF were underused in women and older people. This is of particular concern, given the current trends in population demographics and the evidence that both groups are at higher risk of stroke(Ruigomez et al. 2005).

Meiltz A et al [2008] study was to characterize the clinical profile of patients with atrial fibrillation in cardiology practice and to assess how successfully guidelines have been implemented in real world practice. The underlying cardiac disorders was present in 82% patients included hypertensive heart disease, valvular heart disease and coronary artery disease. The patients were risk stratified for the indication of oral anticoagulants using $CHADS_2$ score. The mean $CHADS_2$ in the study was 1.43±1.24 and 73.6% patients had a $CHADS_2$

score of ≥1. This study showed one of the highest OAT (oral anticoagulation therapy) prescription rates for AF reported until now. The rate of oral anticoagulation among patients with the indication of the same was 88%. This demonstrated how successfully guidelines can be applied in the real world. A definite over interpretation of current guidelines is observed in low risk patients with AF. True contraindication for oral anticoagulant therapy (4%) and significant bleeding during OAT (1.5%) were rare(Murphy et al. 2007).

Schmutz M et al [2010] studied the prevalence of atrial fibrillation in a population-based sample of adults in Geneva, Switzerland. This population based survey of a general Swiss population indicated that the prevalence of AF remains below 1%. These results are less alarming than those from previous studies based on patients seeking medical care(Schmutz et al. 2009).

Ruiz Ortiz M, et al[2010] studied oral anticoagulation in non-valvular atrial fibrillation in clinical practice: impact of $CHADS_2$ score on outcome. $CHADS_2$ OAC was prescribed to 71% patients. After 2.4±-1.9 years of follow up , the embolic event rates for each stratum of CHADS2 score for patients with or with or without OAC were ¼.1, p=0.23($CHADS_2$=0); 0.6/7.1, p=0.0018($CHADS_2$=1); 0.5/5.1, p=0.0014 ($CHADS_2$=2); 2.4/12.5, p=0.0017($CHADS_2$=3) and 2.9/20, p=0.013($CHADS_2$≥4). They found that oral anticoagulants is effective and safe in daily clinical practice in patients with NVAF and $CHADS_2$ score ≥1(Schmutz et al. 2009).

Sanoski CA [2010] studied prevalence, pathogenesis and impact of atrial fibrillation. The prevalence of AF, a common age related disorder that causes substantial morbidity and mortality, is increasing. Structural heart disease (e.g., coronary heart disease, hypertension, heart failure, valvular heart disease) is a common co-morbidity of and risk factor for AF, although various other factors have been shown to play a role

on the pathogenesis of this disorder. They observed that understanding the pathogenesis and risk factors for AF and using risk-scoring systems to estimate the risk for AF and stroke can facilitate treatment of this rhythm disorder and potentially minimize its morbidity, mortality and costs(Ruiz Ortiz et al. 2010).

Ntep-Gweth et al [2010] studied clinical characteristics, prognosis and adherence to guidelines in Cameroon. Clinical presentation of atrial fibrillation is much more severe than in developed countries. This study also used $CHADS_2$ score as risk stratification system. In this study the vast majority of patients with AF presented with structural heart disease with hypertensive heart disease and rheumatic heart disease as the main etiologies. The mean $CHADS_2$ score was 1.9±1.1. They found that a rate-control strategy is predominant in Cameroon and oral anti-coagulants are prescribed in only 34.2% of eligible patients, despite a high $CHADS_2$ score at inclusion. Death and stroke rate at 1 year are very high in Cameroon possibly because of a lower use of oral anticoagulants and a higher prevalence of rheumatic mitral disease and of more severe morbidities(Sanoski 2010).

James A et al studied predictors of incident atrial fibrillation and influence of medications in a retrospective case-control study. The findings in study update the risk factors associated with atrial fibrillation and confirm the protective properties of statins and the risk of beta-2 agonists in developing atrial fibrillation but not the supposed protective qualities of glucocorticoids and Renin Aldosterone Angiotensin System agents(Ntep-Gweth et al. 2010).

Freestone B, et al studied the prevalence of atrial fibrillation in the multiracial population of Kuala Lumpur, Malaysia, and the clinical features and management of these patients. Of 1435 acute medical admissions to Kuala Lumpur General Hospital over the 4-week study period, 40 had AF (21

male, 19 female; mean age 65 years). Of these, 18 were Malay, 16 Chinese and six Indian. Nineteen patients had previously known AF (seven with paroxysmal AF) and 21 were newly diagnosed cases. The principal associated medical conditions were ischemic heart disease (42.5%), hypertension (40%) and heart failure (40%). Dyspnoea was the commonest presentation, whilst stroke was the cause of presentation in only two patients. Investigations were under-utilised, with chest X-ray and echocardiography in only 62.5% of patients and thyroid function checked in 15%. Only 16% of those with previously diagnosed AF were on warfarin, with a further three on aspirin. Anticoagulant therapy was started in 13.5% of patients previously not on warfarin, and aspirin in 8%. Records of contraindications to warfarin were unreliable, being identified in only 25%. For those with known AF, 58% were on digoxin. For new onset AF, digoxin was again the most common rate-limiting treatment, initiated in 38%, whilst five patients with new onset AF were commenced on amiodarone. DC cardioversion was not used in any of the patients with new onset AF.

They found amongst acute medical admissions to a single centre in Malaysia the prevalence of atrial fibrillation was 2.8%. consistent with previous similar surveys in mainly western Caucasian populations, standard investigations in this Malaysian cohort were also inadequate and there was underuse of anticoagulation, medication for ventricular rate control and cardioversion to sinus rhythm(Hodgkinson, Taylor, and Hobbs 2011).

Barriales AV et al studied the etiology and associated risk factors in a sample of 300 patients with atrial fibrillation and concluded that atrial fibrillation was more frequent in patients with arterial hypertension, coronary heart disease or valvular heart disease. In the group with atrial fibrillation the etiology in 32% was arterial hypertension, in 20% coronary

heart disease, in 13% valvular heart disease, in 11% heart failure, in 4% hyperthyroidism and in 20% idiopathic. 50% presented hypertension, 29% tobaccoism, 26% left ventricular hypertrophy, 20% consumption of alcohol, 19% hypercholesterolemia and 16% diabetes. Compared with the control group, patients with atrial fibrillation had coronary heart disease ($p < 0.05$), VHD ($p < 0.01$), cardiomyopathy ($p < 0.05$), hypertension ($p < 0.001$), left ventricular hypertrophy ($p < 0.001$), diabetes ($p < 0.01$) and alcohol consumption ($p < 0.01$) more frequently. In the multivariant analysis heart failure (odds ratio 2.1 [1.2-3.3]), the valvular heart disease (odds ratio 2.2 [1.4-3.5]), the coronary heart disease (odds ratio 1.8 [1.2-2.6]), the arterial hypertension (odds ratio 1.7 [1.2-2.3]), the left ventricular hypertrophy (odds ratio 2.6 [1.7-3.8]), the diabetes (odds ratio 1.9 [1.2-2.9]) and alcoholic habits (odds ratio 2 [1.3-3.9]) were independent risk factors for atrial fibrillation in our population. There are other risk factors such as arterial hypertension, diabetes and consumption of alcohol too, the modification of which could diminish the risk of the appearance of atrial fibrillation(Freestone et al. 2003).

Deguchi I et al [2011] studied relationship between $CHADS_2$ score and the rate of antithrombotic drug use and clinical outcomes in patients with an initial cardio-embolic stroke who had non-valvular atrial fibrillation. In 234 patients (135 men and 99 women; mean age [±SD] 76 ± 11 years) with initial cardiogenic cerebral embolism with NVAF who were admitted to our hospital between April 2007 and March 2011, the CHADS(2) score, use of warfarin, and clinical outcomes were retrospectively investigated. The overall warfarin use rate was low in initial cardio-embolic stroke patients with non-valvular atrial fibrillation. Clinical outcomes deteriorated with increases in $CHADS_2$ score, age ≥75 years, and NIHSS (National Institutes of Health Stroke Scale) score on admission

were related to a poor clinical outcome(Barriales Alvarez et al. 1999).

Waldo AL NABOR study (National Anticoagulation Benchmark Outcomes Report) study) et al studied hospitalized patients with atrial fibrillation and confirmed the under-use of warfarin, but also adds to published reports in several regards. Among the 945 patients studied, the mean age was 71.5 (+/- 13.5) years; 43% were >75 years of age, 54.5% were men, and 67% had a history of hypertension. Most (86%) had factors that stratified them as at high risk of stroke, and only 55% of those received warfarin. Neither warfarin nor aspirin were prescribed in 21% of high-risk patients, including 18% of those with a previous stroke, transient ischemic attack, or systemic embolic event. Age >80 years ($p = 0.008$) and perceived bleeding risk ($p = 0.022$) were negative predictors of warfarin use. Persistent/permanent AF ($p < 0.001$) and history of stroke, transient ischemic attack, or systemic embolus ($p = 0.014$) were positive predictors of warfarin use, whereas high-risk stratification was not. It showed that risk stratification, the guidepost for treatment in international guidelines, had little effect on warfarin use, and that age >80 years and AF classification (permanent/ persistent) are factors that influence warfarin use(Waldo et al. 2005).

Nand Vidya et al [2012] studied etiological profile and clinical presentation of patients with atrial fibrillation from a rural area of Bihar. Out of 66 patients of AF, majority of patients were aged between 51-60 years and were males. Valvular heart disease was found to be the most common cause of atrial fibrillation while palpitation was the most common presenting complaint encountered. Nearly 62.1% patients had their left atrial size more than 3.5 cm. Mitral stenosis was noted as most common cause of enlarged left atrium in 47% cases. About half of patients had their left ventricular ejection fraction < 50%(Nand Vidya 2012).

AIMS AND OBJECTIVES

1.To assess the etiology and risk factors of patients with atrial fibrillation.
2.To risk stratify the patients for aggressive medical treatment to prevent adverse outcome.
3.To assess frequency of use of anticoagulant and anti-platelet prescription and compliance (wherever possible).

MATERIAL & METHODS

From year 2012 T0 2014, 400 patients presenting to outpatient department or admitted in cardiology or medical wards of the S.M.H.S hospital Srinagar and found to have atrial fibrillation were studied.

Work up of the patients included detailed medical history with particular emphasis on possible etiological factors like hypertension, coronary artery disease, valvular heart disease, RHD, cardiomyopathy, COPD, thyroid disease etc.

Detailed drug history especially the use of anti-arrhythmic, anti-platelets, anticoagulant, and the frequency of prescription compliance was obtained from all patients.

Physical examination included assessment of pulse, heart rate, blood pressure, evidence of heart failure such as raised JVP, pedal oedema, S3, crepts, heptomegaly and cardiac murmurs.

Investigative work up constituted estimation of CBC, blood sugar, lipid profile, blood urea, serum creatinine, ABG, PFT(selected pts.) thyroid function, ECG, chest X-ray and echocardiography.

Patients presenting for the first time with new onset atrial fibrillation were reassessed on follow up for categorization of atrial fibrillation. Patients with non-valvular atrial fibrillation were stratified for need of oral anticoagulation

to prevent thrombo-embolic phenomenon by $CHADS_2$ score. $CHADS_2$ score constituted assessment of parameters like congestive heart failure, hypertension, age more than 75 years, diabetes and history of stroke or transient ischemic attack. For compliance of treatment and anticoagulated state, International normalised ratio (INR) was taken into account. On the basis of INR, patients were assigned as optimally anticoagulated, over anticoagulated or under anticoagulated.

Statistical methods:

Continuous variables are expressed as mean± standard deviation and categorical variables as percentages. Differences in categorical variables were evaluated using Fisher's exact test. A p-value of less than 0.05 was considered as statistically significant. Data analysis was done using SPSS 11.5 version software.

OBSERVATIONS

The present study was conducted at SMHS Hospital, Srinagar. The patients who presented with atrial fibrillation were included in the study. A total of 400 patients were enrolled.

Demographics

The mean age of our patient cohort was 60.83±16.86 years with a range of 16 to 90 years (Figure 1). The median age was 65 years.

Figure 1: Histogram showing age distribution of 400 patients

Of total 400 patients who had atrial fibrillation, 48% (192) were males and 52% (208) were females (Figure 2).

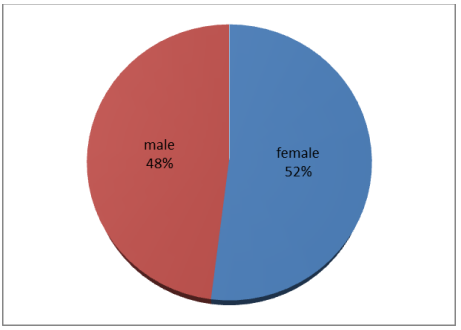


Figure 2: Pie diagram showing sex distribution of patient cohort

Males were older than the females and this difference was statistically significant (62.84±17.8 vs 58.97±15.7, p value 0.015) (Table 1and Figure 3).

Table 1: Table showing demographic characteristics

	Total (n=400)	**Male (n=192)**	**Female (n=208)**	**p value**
Age in years (Mean±SD)	60.83±16.86	62.84±17.84	58.97±15.71	0.015

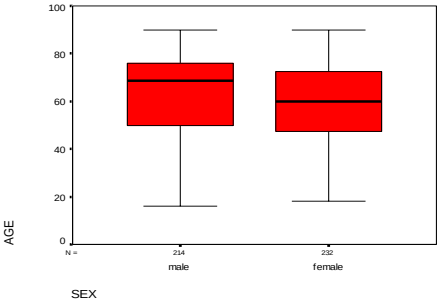


Figure 3: Stem and leaf plot showing age distribution with respect to sex.

Etiology

Table 2: Table showing etiological profile in AF patients

ETIOLOGY	Total N(%) 400(100)	Male N(%) 192(48)	Female N(%) 208(52)	p value
HTCVD	148(37)	62(32.2)	86(41.3)	0.061
RHD	74(18.5)	29(15.1)	45(21.6)	0..093
CAD	64(16)	38(19.7)	26(12.5)	0.047*
DCM	52(13)	29(15.1)	23(11.05)	0.229
IDIOPATHIC	22(5.5)	12(6.2)	10(4.8)	0.527
NONRHEUMATIC	11(2.7)	3(1.5)	8(3.8)	0.163
COPD	10(2.7)	8(4.1)	2(0.9)	0.040*
CHD	9(2.2)	3(1.5)	6(2.8)	0.373
PAH	6(1.5)	4(2.08)	2(0.9)	0.356
HCM	2(0.5)	2(1.04)	0(0)	0.140
ARVD	2(0.5)	2(1.04)	0(0)	0.140

* Statistically significant

In our study, HTCVD was the most common etiological cause of AF accounting for 37 % of the total burden. The next important etiology was RHD which was seen in 18.5% followed by CAD in 16%, dilated cardiomyopathy in 13%, idiopathic in 5.5% and non-rheumatic valvular lesions in 2.7% patients. COPD in 2.5%, severe PAH in 1.5% and cardiomyopathies -HCM and ARVD in 0.5% accounted for the remainder of the etiologies (Table 2).

Prevalence of CAD(19.7% vs 12.5%,p value 0.047) and COPD(4.1% vs 0.9% , p value 0.040) was significantly higher in males as compared to females.

Associated risk factors

When studying the associated risk factors in our patients, we found that 63.7 % (255) of our patients were hypertensives, 33% (132) were smokers and both these factors were significantly more commonly seen in males. Diabetes mellitus was present in 15% (60) patients and 7.% (28) had renal dysfunction associated (Table 3).

Systolic LV dysfunction (LVEF<50%) was documented in 16.5% (66) patients. 67.5% (270) of our total patients were seen to have LA size more than 4cm while 33.7% (135) patients had LA size more than 5.0 cm. the mean LA size of our patient population was 4.7±1.3 cm.

Table 3: Table showing associated risk factors in AF patients

Risk Factors	Total N(%) 400(100)	Males N(%) 192(48)	Females N(%) 208(52)	P Value
Hypertension	255(63.7)	134(69.2)	121(58.1)	0.016*
Smoking	132(33.0)	103(53.6)	29(13.9)	0.001*
LV dysfunction	66(16.5)	35(18.2)	31(14.9)	0.371
Diabetes	60(15.0)	31(16.1)	29(13.9)	0.537
Renal dysfunction	28(7)	20(10.4)	8(3.8)	0.010*
LA size >4cm	270(67.5)	125(65.1)	145(69.7)	0.326
LA size >5cm	135(33.7)	56(29.1)	79(37.9)	0.063

*Statistically significant

Risk Stratification and Prescription of Antithrombotic Prophylaxis

Out of total 400 patients, valvular AF (rheumatic and non-rheumatic) was seen in 85 patients. Rest of 315 patients had a non-valvular etiology for their AF. These 315 patients were risk stratified for stroke risk using $CHADS_2$ score. Table 4 and Figure 4 show the $CHADS_2$ score ranging from 0 to 6. Majority of patients had a score of 2 and 3 which accounted for 63.5% of total non-valvular AF patients. Mean $CHADS_2$ score was 2.63±1.5.

Out of these 315 patients, 272 (86.35%) patients had $CHADS_2$ score of ≥2 thereby implying the need for oral anticoagulants as the preferred modality for stroke prevention.

Table 4: Table showing $CHADS_2$ score for risk stratification among non-valvular AF

$CHADS_2$ SCORE	Male N(%)	Female N(%)	Total N(%)
0	7(4.1%)	7(4.7%)	14(4.4%)
1	15(8.9%)	14(9.5%)	29(9.2%)

2	58(34.5%)	52(35.4%)	110(34.9%)
3	53(31.5%)	37(25.2%)	90(28.6%)
4	22(13.1%)	30(20.4%)	52(16.5%)
5	12(7.1%)	6(4.1%)	18(5.7%)
6	1(0.6%)	1(0.7%)	2(0.6%)
TOTAL	168(53.3)	147(46.6)	315(100)

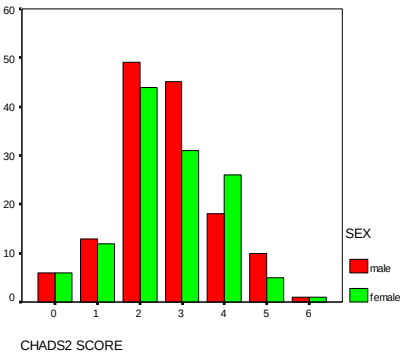


Figure 4: Bar diagram showing frequency of CHADS2 score with respect to sex.

Overall, 23.5% (104) of our patients received anti-platelets. 49.5% (198) patients received OAC and 18.8% (75) received both OAC and anti-platelets. Significantly, 8.2% (33) patients did not receive any form of stroke prevention therapy-neither aspirin nor OAC (Table 5). Table 6 shows the prescription of OAC and antiplatelet in relation to $CHADS_2$ score ranging from 0 to 6 in patients with non-valvular AF. There was no significant difference in OAC prescription between men and women (168/192 (87.5%) vs 147/208 (70.6%), p value 0……).

Table 5: Table showing prescription of antithrombotic prophylaxis

	Total n (%)	**Male n (%)**	**Female n(%)**
Aspirin only	97(24.3)	55(56.7)	42(43.3)
OAC only	180(45)	75(41.7)	105(58.3)
Both	90(22.5)	50(55.6)	40(44.4)
None	33(8.2)	16(48.5)	17(51.5)
Total	400(100)		

Table 6: Table showing antithrombotic prophylaxis in relation to $CHADS_2$ score (non-valvular AF)

Score	0	1	2	3	4	5	6	Total
No. of patients n (%)	14 (4.4)	29 (9.2)	110 (34.9)	90 (28.6)	52 (16.5)	18 (5.7)	2 (0.6)	315 (100)
OAC	5 (35.7)	10 (34.5)	54 (49.1)	24 (26.6)	12 (23.1)	5 (27.8)	0 (0)	110 (34.9)
Aspirin	4 (28.6)	8 (27.6)	22 (20)	41 (45.6)	7 (13.5)	6 (33.3)	1 (50.0)	89 (28.3)
Both	0 (0.0)	4 (13.8)	25 (22.7)	18 (20)	30 (57.6)	7 (38.9)	0 (0.0)	84 (26.7)
None	5 (35.7)	7 (24.1)	9 (8.2)	7 (7.8)	3 (5.8)	0 (0.0)	1 (50.0)	32 (10.1)

Out of 400 patients, 357 (89.3%) patients were found to have indication for prescription of OAC as per guidelines. Of these 357 patients only 71.2 % (254) actually received OAC (Table 7 and Figure 5).

Table 7: Table showing prescription of oral anticoagulants with respect to requirement as per guidelines

		Total n (%)	OAC given n (%)	OAC not given n (%)
OAC requirement	Yes	357(89.3)	254(71.2)	103(28.8)
	No	43(10.7)	18 (41.9)	25(58.1)

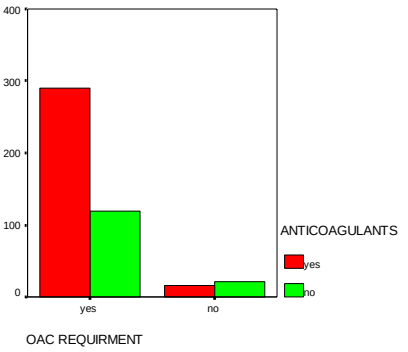


Figure 5: Diagram showing OAC prescription in patients with respect to OAC requirement

However, on sub-group analysis of these OAC requiring patients, we found an adherence to guidelines rate of 92.9% was seen in patients with valvular AF. In patients with non-

valvular AF who had CHADS2 score ≥2, only 64.3% patients actually received OAC. While 35.7% patients who should have been prescribed OAC did not receive it.

It is pertinent to note that 41.9% patients with CHADS2 score <2 also received OAC (Table 8).

Table 8: Table showing OAC requirement and prescription with respect to valvular and non-valvular etiology

	Total n (%)		**OAC given n (%)**	**OAC not given n (%)**
Valvular	85(21.3)		79(92.9)	6(7.1)
Non-valvular	315(78.7)	$CHADS_2 \geq 2$ 272(86.35)	175(64.3)	97(35.7)
		$CHADS_2 < 2$ 43(13.65)	18(41.9)	25(58.1)

Frequency of use of OAC decreased from 70.4% in patients who did not have stroke to 60.5% in patients who had suffered stroke. 73% patients with LA > 4cm were on OAC where as 86.8% of patients with LA > 5cm were on OAC. In assessing the impact of age on OAC therapy, we analysed there different age groups- ≤65 years, 66-75 years and >75 years. The OAC prescription rates were 84.1%, 64.1% and 60% respectively (Table 9).So rates of OAC prescription decreased with increasing age.

Table 9: Table OAC requirement and prescription according to age

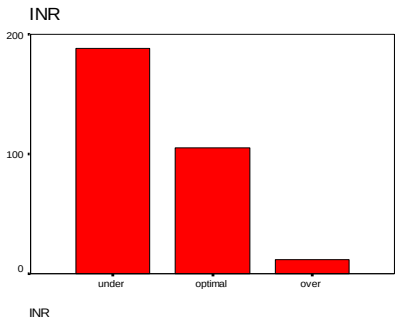
Age group (in years)	**Total n (%)**	**OAC requirement n(%)**	**OAC given n(%)**
≤65	232(58)	202(87.1)	195(84.1)
66-75	78(19.5)	72(92.3)	50(64.1)
>75	90(22.5)	83(92.2)	54(60.1)

Total 272 patients received OAC out of which 254 patients were those who had indication of OAC as per guidelines. In 272 patients taking OAC, adequacy of anticoagulation as per INR report was seen. Patients with INR of 2.0-3.0 were taken as optimally anticoagulated. We found that only 34.5% (94) of

these patients were optimally anticoagulated while the majority i.e 61.4 %(167) had INR<2 i.e were under anticoagulated. 4.05 %(11) patients had INR of >3 (Table 10 and Figure 6). 40.2% of patients with valvular AF and 28.2% of patients with non-valvular AF who received OACs were optimally anticoagulated.

Table 10: Adequacy of anti-coagulation.

	Total n (%)	**Male n (%)**	**Female n (%)**
Under	167(61.4)	74(44.3)	93(55.7)
Optimal	94(34.5)	41(43.6)	53(56.4)
Over	11(4.05)	8(72.7)	3(27.3)
Total	272(100)	123(45.2)	149(54.8)



ADEQUACY OF ANTICOAGULATION

Figure 6: Degree of anticoagulation achieved in patients on oral anticoagulants

DISCUSSION

The present study is the prospective study assessing clinical profile of the patients with AF and adherence to guidelines for stroke prevention at our institution. Of total 446 patients who had atrial fibrillation, 48% were males and 52% were females. In a study of Gweth et al, majority of patients were females (56.4% vs 43.6%)[61]. In another study by Ruigomez et al of 525 patients with paroxysmal AF 51.04% were females and 48.96% were males[55]. However in various other studies prevalence of AF was higher in males. In a study by Murphy et al the

prevalence of AF in Scotland was higher in males (9.4/1000 vs 7.9/1000) than in females[56]. In another prospective study involving 622 patients with AF having age more than 18 years, 62.7% patients were males and 37.3% were females[57,62].

Mean age of our patient population was 60.83±16.86 years. Males were significantly older than females (62.84±17.84 vs 58.97± 15.71 p=0.015). Mean age of presentation of AF was higher in our population as compared to in various other studies. The mean age of patients presenting with AF in a study of Meiltz et al being 69.8±11.8 years[57]. The Euro Heart Survey on AF had 5333 patients with a mean age of 65 years[54]. In a study conducted to assess patients characteristics, prognosis and adherence to guidelines in AF patients in Africa, mean age of patients was 65.8±13 years[61].

In our study 362 (90.5%) out of 400 patients had underlying cardiac disorder. Hypertensive cardiovascular disease (HTCVD) (37%) was the most common etiological factor in our patient population followed by Valvular heart disease (21.2%) including both rheumatic as well as non-rheumatic , coronary artery disease (CAD) (16%) and dilated cardiomyopathy (DCM) (13%). Idiopathic (lone AF) accounted for 5.5% of cases. In a study assessing AF characteristics and prognosis in patients and adherence to guidelines in Cameroon, underlying cardiac disorder was present in 90.7% patients and included HTCVD (47.7%), valvular heart disease (25.6%), DCM (15.6%) and CAD (6%)[61].

Meiltz A et al in their study concluded that underlying cardiac disorder was present in 82% of patient including HTCVD (30%), valvular heart disease (27%), CAD (18%) and myocardial disease (11%) as major etiology in AF[57]. Levy S et al found that cardiac disorders were present in (70.6%) patients including hypertension (39.4%), CAD (16.6%) and myocardial disease (15.3%)[48]. Rheumatic valvular heart disease was present in 15.2% of patients and it was seen to be more common

in females as also in our study. Ruigomez et al found ischemic heart disease (43.23%) as the major etiology and valvular heart disease accounted for only 7.04% patients in their study[55].

In a retrospective study investigating hospitalized patients with AF conducted in mainland China CAD accounted for 34.8% and RHD was seen in 23.9%. Lone AF accounted for 7.4% patients[52]. Barrioles Alvarez V et al analysed their data and found that in patients with AF the etiology in 32% was arterial hypertension, CAD in 20%, valvular heart disease in 13%, heart failure in 11% and idiopathic in 20%[64].

The risk factors which were associated with AF in our study included hypertension 255(63.7%), smoking 132(33%), LV dysfunction 66(16.5%), diabetes 60(15%) and renal insufficiency 28(7%). LA size >4cm was seen in 270 (67.5%) patients. Mean LA size was 4.7±1.3cm. Hypertension was the most common associated condition as seen in various other studies. In a study conducted by Benjamin et al after multivariate adjustment found diabetes [OR (odds ratio) 1.4 for men and 1.6 for women], hypertension (OR, 1.5 for men and 1.4 for women), congestive heart failure (OR, 4.5 for men and 5.9 for women), valvular disease (OR, 1.8 for men and 3.4 for women) were significantly associated with risk for AF in both sexes[47]. In a study by Gweth et al the most common risk factor associated with AF was hypertension (64%) followed by congestive heart failure (58.1%) [61]. In the study by Meiltz A et al, the incidence of hypertension was 56.4% and diabetes was 12.4% [57]. In a study by Levy et al, incidence of hypertension was 39.4%, congestive heart failure was 29.8% and diabetes was seen in 10.7%. Mean left atrium (LA) size of patient population was 43.8±8.6 mm[48]. Ruigomez et al in their study while assessing the predictors and prognosis of AF in general practice found the incidence of hypertension in studied population was 37.5%, diabetes in 6.9% and smoking in 17.9%[55]. Freestone B et al found ischemic heart disease (42.5%),

hypertension (40%) and heart failure (40%) as important medical conditions associated with AF[63].

Prevention of thromboembolism is the main tenet of AF management and should begin with individual risk assessment of each patient. Chronic oral anticoagulation is currently the most effective therapy for attenuating the risk of stroke associated with atrial fibrillation. However its initiation needs risk stratification. $CHADS_2$ score is one of the validated risk stratification tools that can categorize non-valvular AF patients as low, intermediate or high risk for stroke taking into account risk factors like age, hypertension, diabetes, heart failure and prior history of stroke. We used $CHADS_2$ score to risk stratify the patients with non-valvular AF. Of 400 patients, 315 patients had non-valvular cause of AF. Mean $CHADS_2$ score in our non-valvular patient population was 2.61±1.2. 95.5% (301) of 315 patients had $CHADS_2$ score ≥1 while 86.35% (272) patients had $CHADS_2$ score of ≥ 2.In a study by Hodgkinson et al, mean $CHADS_2$ score was 1.3±1.2[62]. The mean $CHADS_2$ score varied from 1.9±1.1 to 1.43±1.24 in various studies [57, 61]. Our $CHADS_2$ score of ≥1 in 90% of patient population was in agreement with various studies[61,65]. However in a study by Meiltz et al (458/622) 73.6% patients had $CHADS_2$ score ≥1 [57]. In a study by Hodgkinson et al, 85.2% cases had $CHADS_2$ score of ≥ 1 while 53.9% had a score of ≥2[62]. $CHADS_2$ score of ≥2 was present in 60.0% patients in a study by Deguchi et al[65].

Out of 400, 357 (89.3%) patients in our study population had indication for receiving OAC (oral anticoagulation) while 43 (10.3%) patients did not have indication for OAC according to current guidelines. Out of 400 patients, 180 (45%) patients received OAC only, 97 (24.3%) received asprin only, 90 (22.5%) received both OAC and aspirin while 33 (8.2%) patients received neither of the two. Of total 357 patients having indication for OAC, 254 (70.9%) received OAC whereas 29.1% did not receive it despite being eligible. Of 43 patients who had

no indication for OAC, 18 patients received OAC. The rate of prescription of OAC to patients was considerably higher in our study compared to other studies. In a study by Gweth et al among the patients with an indication for OAC, only 34.2% actually received it[61]. In another study by Ruigomez et al involving patients with paroxysmal AF, rate of prescription of OAC was 17.3%[55].In a study by Murphy et al 42% of studied patients received warfarin, 44% received aspirin and 78% received combination[56].

In a study by Levy et al, 273 out of 740 (40%) of study population received OAC[48]. In another study by Meiltz et al, among patients with an indication for OAC, 88% (403/458) effectively received it[57]. This study had one of highest rate of OAC prescriptions. In a study by Nieuwlaat et al OAC was prescribed in 67% patients eligible for OAC and 49% in patients ineligible for OAC[54]. Waldo AL et al found that in reality only 50-60% of patients with AF who were suitable for anticoagulation actually received it preventively[66].

The impact of age on OAC therapy revealed that OAC prescription decreased as age increased. The rates of OAC prescription in our patients in age group, ≤65, 66-75, >75 years were 84.1%, 64.1% and 60% respectively which was in stark contrast to study done by Meiltz et al in which the rate increased from 72% in ≤65 years group to 87% in >75 years group. However, this negative effect of age on rate of OAC prescription has been seen in many other studies by Waldo AL et al [66]. The fact of the matter is that chances of stroke increase with increasing age and it is this population of elderly people who derive the maximum benefits of stroke prevention with OAC. However, the results of our and various other studies reflect the mindset and fear of bleeding in elderly which needs to be corrected to pass on the full benefits to this high risk group of patients.

In our study a total of 272 patients received OAC. Out of 272 patients who received OAC, 61.4% patients were found to be inadequately anticoagulated whereas 34.5% were optimally anticoagulated, rest of the patients were over anticoagulated. Various large randomized trials have evaluated the status of anticoagulant therapy in their patient population. In SPAF III, SPORTIF III, SPORTIF V, ACTIVE W trials only 61%, 66%, 68%, 69% patients respectively had INR in therapeutic range[67-70]. These rates are higher than what we have observed in our study. The above mentioned studies were randomized trials in which lot of attention and close follow up is given to patients and despite that optimal anticoagulation was seen in 60-69% patients. Despite that ours being an observational study we attained 35.6% optimally anticoagulated patients. However, a lot needs to be done in terms of both patient and physician education to increase prescription and compliance rates.

It is pertinent to note that the greatest morbidity in AF patients is because of stroke and it is considered the most dreaded complication of AF. The cost is great not only in terms of human suffering but also in economic terms. Many patients disabled by a stroke consider it a fate worse than death. That is why stroke prevention is the most important aspect of management of AF patients.

Despite recognized indications for OAC use and its efficacy in stroke prevention, OAC remain underutilized and the reasons for this need to be identified and corrected so that increased benefits of stroke prevention in AF are passed on to the patients.

SUMMARY & CONCLUSION

1. Non-valvular AF was more commonly seen than valvular AF.

2. Among the patients with valvular heart disease, rheumatic etiology was the commonest.
3. Among the non-valvular group, hypertension was the most common cause.
4. Overall females outnumbered males with AF.
5. 89.3% patients were eligible for oral anticoagulant therapy but only 70.9% actually received the treatment.
6. The usage of oral anticoagulants was more in valvular AF than in non-valvular AF.
7. Optimal anticoagulant state was more commonly seen among patients with valvular AF as compared to non-valvular AF.
8. The usage of oral anticoagulants decreased with increasing age.
9. Adequacy of anticoagulation was seen in only 34.5% patients
10. Optimal anticoagulation needs to be emphasized on both patients as well as physicians to prevent strokes and achieve better outcomes.

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