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Outcomes of Flecainide Therapy in Rheumatic Atrial Arrhythmias: A Study on Effectiveness and Safety

Balakrishna Vuyyala[1], Shaik Harun Rasheed[2*], Ramya bejawada[3], Elluri Kavyasree[3], Nagineni Bhavisya[3], Shikari harini[3], Seema sadia[3]

[1]Department of Pharmacology, School of Pharmacy, Gurunanak Institutions Technical Campus, Ibrahimpatnam, Hyderabad, Telangana.

Email ID: balakrishnav.pharmacy@gniindia.org

[2*]Department of Pharmaceutics, School of Pharmacy, Gurunanak Institutions Technical Campus, Ibrahimpatnam, Hyderabad, Telangana.

Email ID: shaikharunrasheed@gmail.com

[3]Department of Pharmacy practice, School of Pharmacy, Gurunanak Institutions Technical Campus, Ibrahimpatnam, Telangana.

Email ID: ramya.pandu030@gmail.com, Email ID: kavyaelluri1122@gmail.com,

Email ID: bhavishyayadav32@gmail.com, Email ID: shikariharini87@gmail.com, Email ID: Seemasadia10@gmail.com

***Corresponding Author:**

Dr. Shaik Harun Rasheed

Department of Pharmaceutics Gurunanak Institutions Technical Campus- School of pharmacy Ibrahimpatnam, Hyderabad Telangana.

Email ID: shaikharunrasheed@gmail.com

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ABSTRACT

Background: Rheumatic heart disease (RHD) results from damage to heart valves following an episode of acute rheumatic fever (ARF). This study aimed to evaluate the efficacy of flecainide in treating rheumatic atrial arrhythmias, assessing the percentage of patients who maintained sinus rhythm and identifying any adverse drug reactions (ADRs).

Method: A prospective observational study was conducted over six months at Care Hospitals, Banjara Hills, Hyderabad; involving 30 patients aged 18 to 65 with various rheumatic atrial arrhythmias. Exclusions included those with structural or ischemic heart disease and individuals unwilling to participate.

Results: Results indicated that rheumatic atrial arrhythmias were present in 20 patients (66.6%). The highest incidence occurred in the 50-60 age group (36.9%), with a predominance of females (63.4%). The mean age of participants was 53.8 ± 0.71 years. Among the 30 patients, 25 had atrial fibrillation; flecainide was effective in 17 patients (68%) and ineffective in 8 (32%). For the 5 patients with atrial flutter, 3 (60%) demonstrated a positive response to treatment. The most commonly prescribed dosage for maintaining sinus rhythm was 50 mg.

Conclusion: In conclusion, rheumatic atrial arrhythmias are more prevalent among females and the middle-aged population. Flecainide was effective in 66.6% of cases, particularly in atrial fibrillation, with initial dosing starting at 50 mg/day, which could be increased to 150 mg/day based on clinical response.

Keywords: *Atrial arrhythmias, Flecainide, Atrial fibrillation, Sinus rhythm, Acute rheumatic fever.*

1. INTRODUCTION

Rheumatic fever:

Rheumatic fever is an inflammatory disorder caused by a gaggle a throat infection infection. It affects the animal tissue of the body, inflicting temporary, painful inflammatory disease and alternative symptoms. In some cases infectious disease causes long injury to the center and its valves. This is called rheumatic heart disease.

Rheumatic Heart Disease:

Rheumatic heart disease (RHD) is damage to one or more heart valves that remains after an episode of acute rheumatic fever (ARF) is resolved. It is caused by an episode or recurrent episodes of ARF, where the heart has become inflamed. The heart valves can remain stretched and/or scarred, and normal blood flow through damaged valves is disturbed. Blood may flow backward through stretched valves that do not close properly, or may be blocked due to scarred valves not opening properly. When the heart is damaged in this way, the heart valves are unable to function adequately, and heart surgery may be required [1].

Prevalence and Incidence:

Although once considered a rarity in the Indian subcontinent, the prevalence of rheumatic heart disease (RHD) is now recognised to be very high, particularly among children and young adults [2]. Indeed, such was the severity of the matter in developing countries that in 1982 the globe Health Organization/International Society and Federation of medicine established a committee to combat the malady over a phased period. As a result, the prevalence of RHD has subsided in certain countries in the Middle East, and in Thailand [3].

In distinction to previous sources of information upon that to base the prevalence of terrorist group (for example, necropsies, general population surveys, insurance data [4]), prevalence figures over the past five years are derived virtually entirely from college surveys. Between 1940 and 1983, the prevalence rate for FTO varied from one.8 to eleven per a thousand (national average half-dozen per 1000), whereas between 1984 and 1995 the speed varied from 1 to 5.4 per 1000. During similar periods of your time, the prevalence of rheumatic fever ranged from 0.06 to 5.01 and 0.32 to 0.54 per 1000, respectively. Because of the various ways of assembling the information it's unattainable to make sure that these figures represent a fall within the prevalence of terrorist group. By comparison, in western countries the prevalence of RHD in children aged between 5–15 years is below 0.5 per 1000 [5], and for rheumatic fever it is below 1 per 1000.

Age and sex incidence:

Several recent studies conducted in Asian country have additional highlighted the intolerably high prevalence of foreign terrorist organization among kids and adolescents [6-9], and in patients undergoing balloon mitral valvulotomy for juvenile stenosis. Girls and ladies especially appear to be severely affected, possibly as a result of being housebound and having to live in overcrowded conditions. Overpopulation, overcrowding, poverty, and poor access to medical aid are without doubt the most reasons for the high prevalence of terrorist organization in Republic of India.

Another reason may be the inadequate use of penicillin by general practitioners because of fears over allergic reactions [10]. Although antibiotic remains the drug of alternative for foreign terrorist organization and infectious disease, 2 in some Indian states there are government orders prohibiting penicillin injections in hospitals. Fortunately, fears over penicillin allergy are gradually being allayed [11-14].

As for true in different countries within the Indian landmass, there are no recent data available for Pakistan, Sri Lanka, Bangladesh, and Bhutan. However, a recent study in Asian country reported a prevalence of one.2 per 1000 in an isolated school survey involving 4736 pupils [15]

The recent introduction of balloon mitral valvulotomy is proving common in Asian country, as it is much less expensive to carry out and does not result in a chest scar (which carries a stigma in Indian society) [16]. In addition, catheters like the Inoue balloon is reused many times, further helping to reduce costs [17-20]**.**

2. METHODOLOGY

This study, a prospective observational investigation into the effectiveness of Flecainide for rheumatic atrial arrhythmias, unfolded at Care Hospitals in Banjara Hills, Hyderabad. This tertiary care center boasts comprehensive facilities, infrastructure, and a diverse team of specialists across various medical fields, including Electro Physiology, Cardiology, and others. The hospital is also equipped with advanced diagnostic tools such as radiography, CT and MRI scans, ultrasonography, and Holter monitoring.

The Department of Electro Physiology housed this 6-month study, which included 30 patients diagnosed with different types of rheumatic atrial arrhythmia. Data collection occurred as rheumatic atrial arrhythmia cases presented at the hospital and during subsequent follow-up appointments.

The study design was prospective and observational, aiming to track outcomes related to Flecainide use in patients with rheumatic atrial arrhythmias over the study period. This approach allowed for the observation of events as they naturally occurred, relating them to potential factors.

Patient inclusion criteria specified individuals aged between 18 and 65 years, of both genders, who were currently receiving Flecainide treatment for rheumatic atrial arrhythmias. Conversely, exclusion criteria encompassed patients with structural or ischemic heart disease, those unwilling to participate, individuals with high-grade atrioventricular block, and those with pacemakers, ICDs, or CRT devices. Additionally, patients with chronic kidney disease, those on hemodialysis, or those with

chronic liver disease, COPD, or interstitial lung disease were excluded.

The study execution involved three distinct phases:

PHASE I: Preparation, This initial phase involved several key steps: identifying the need for the study, securing consent from the hospital authority, obtaining ethical clearance from the Institutional Ethics Committee (reference number ECR/94/Inst./AP/2013/RR-16/EC approval no-A6), conducting a thorough literature review, and designing the study proforma.

PHASE II: Data Collection, during the 6-month study period, data was collected daily as rheumatic atrial arrhythmia cases were reported and during follow-up visits. This information was meticulously recorded in pre-designed data collection forms (study proformas), focusing solely on parameters crucial for achieving the study's objectives.

PHASE III: Data Analysis: The final phase involved a comprehensive analysis of the collected data to evaluate the outcome of Flecainide use in the treatment of rheumatic atrial arrhythmias.

3. RESULTS

In the study on Outcome use of Flecainide in Rheumatic Atrial Arrhythmias patients30 cases were recorded. In which 11 were male patients and 19 were female patients. In the total of 30 patients, 36.6% were male and 63.4% were female.

Table02: Gender Distribution in Rheumatic Atrial Arrhythmias patients.

TOTAL NO. OF CASES	MALE	FEMALE
30	11(36.6%)	19(63.4%)

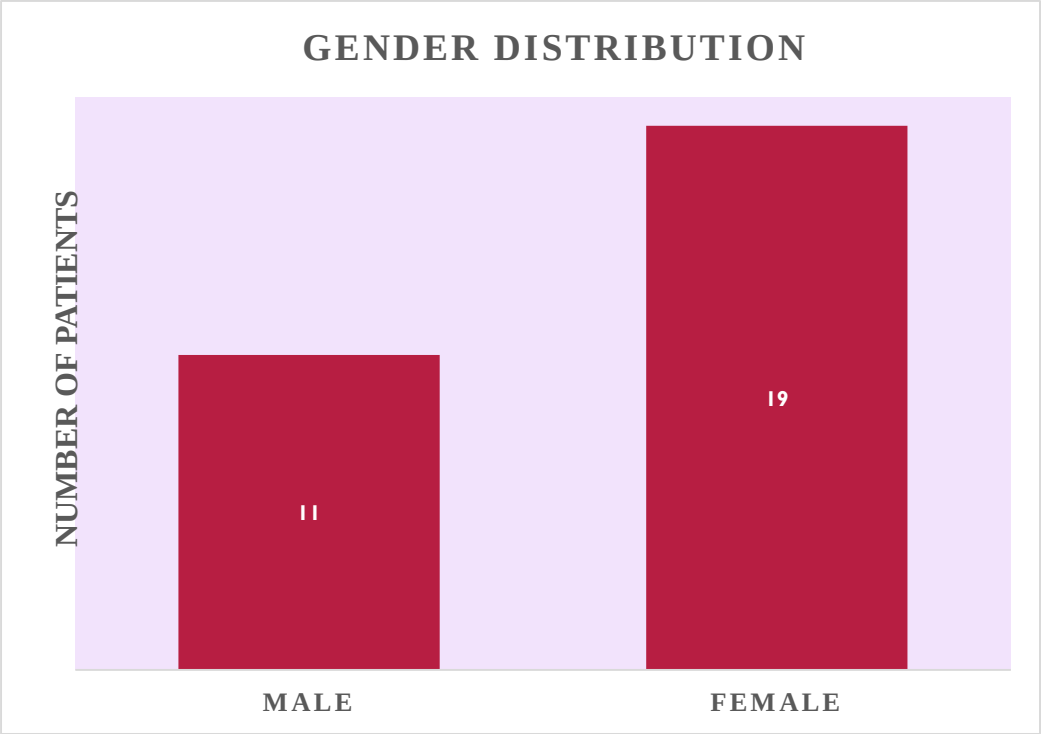

Figure 06: Gender Distribution in Rheumatic Atrial Arrhythmias patients.

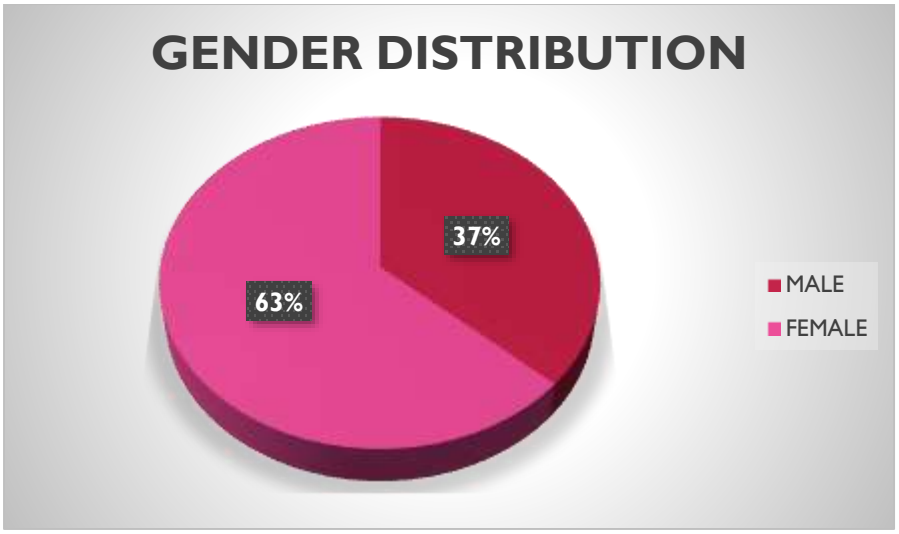

Figure 07: Percentage of Gender Distribution in Rheumatic Atrial Arrhythmias patients.

Among 30 patients who were included in the study, 0patients were below 19 years, 2 patients were between 20 and 29 years, 1 patients were between 30 and 39 years, 7 patients were between 40 and 49 years, 11 patients were between 50 and 59 years and 9 patients were between 60 and 69 years. The mean age of occuranceis 53.8 ± 9.71years.

Table 03: Age Distribution in Rheumatic Atrial Arrhythmias patients.

AGE IN YEARS	NO. OF PATIENTS	PERCENTAGE
> 19 YEARS	0	0%
20-29 YEARS	2	6.6%
30-39 YEARS	1	3.3%
40-49 YEARS	7	23.3%
50-59 YEARS	11	36.7%
60-69 YEARS	9	30.1%

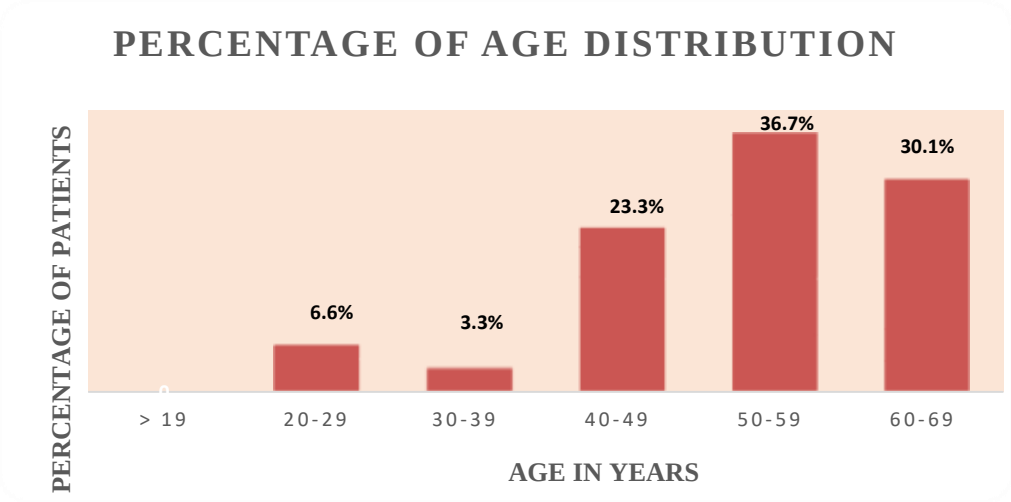

Figure 08: Percentage of Age Distribution in Rheumatic Atrial Arrhythimias patients.

Flecainide's outcome was seen in 20 patients and in 10 patients there was no effect of flecainide. Outcome was observed in 66.6% cases of Rheumatic Atrial Arrhythmias and in 33.4% of patients there was no effect.

Table 04: Outcome of Flecainide in Rheumatic Atrial Arrhythmias patients.

NO. OF CASES	OUTCOME	NO OUTCOME
30	20(66.6%)	10 (33.4%)

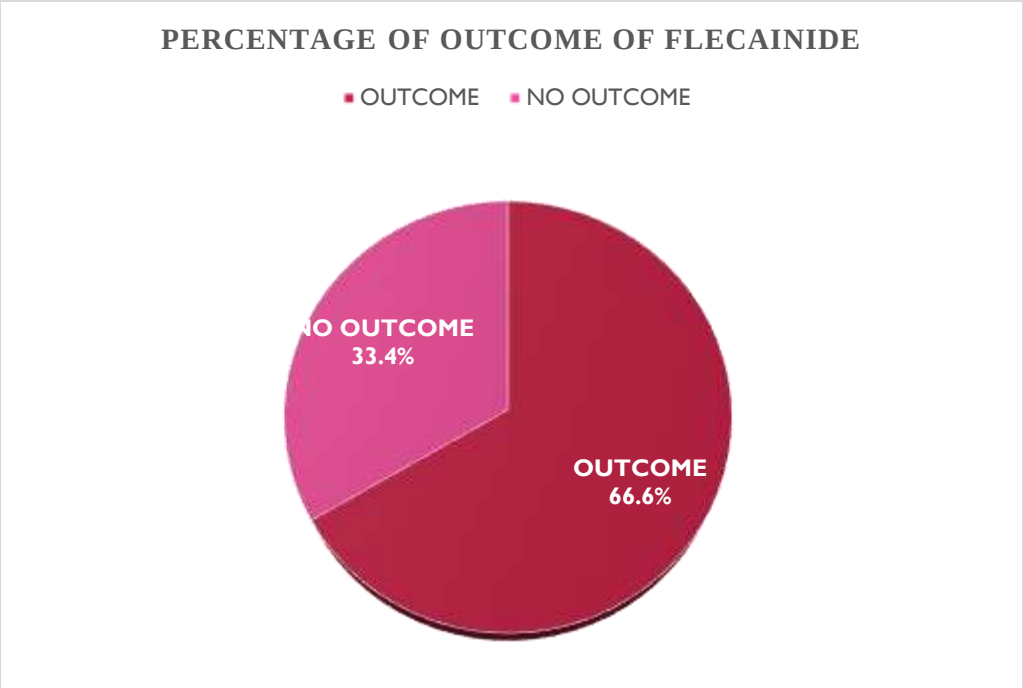

Figure 09: Percentage of Outcome of Flecainide.

Among 30 patients, 25 patients (83.4%) were with AtrialFibrillation,4 patients (16.6%) were with Atrial Flutter.

Table05: Different Types of Rheumatic Atrial Arrhythmias

TYPES OF ARRYHTHMIAS	NO. OF CASES	PERCENTAGE
AF	25	83.4%
AFL	5	16.6%

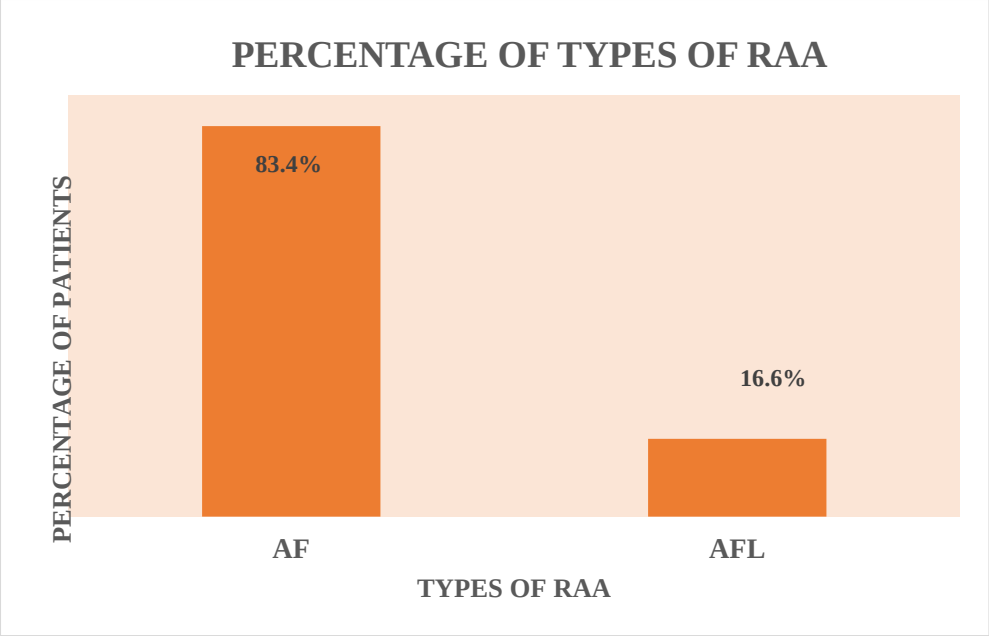

Figure 10: Percentage of Types of Rheumatic Atrial Arrhythmias.

In 30 patients, 25 patients (83.3%) were on 50mg BD dose, 4 patients (13.3%) were on 100mg BD dose, 1 patient (3.3%) were on 25mg BD.

Table 06: Flecainide Dose Ranges in Rheumatic atrial Arrhythmias patients

DOSES	NO. OF CASES	PERCENTAGE
50mg BD	25	83.3%
100mg BD	4	13.3%
25mg BD	1	3.3%

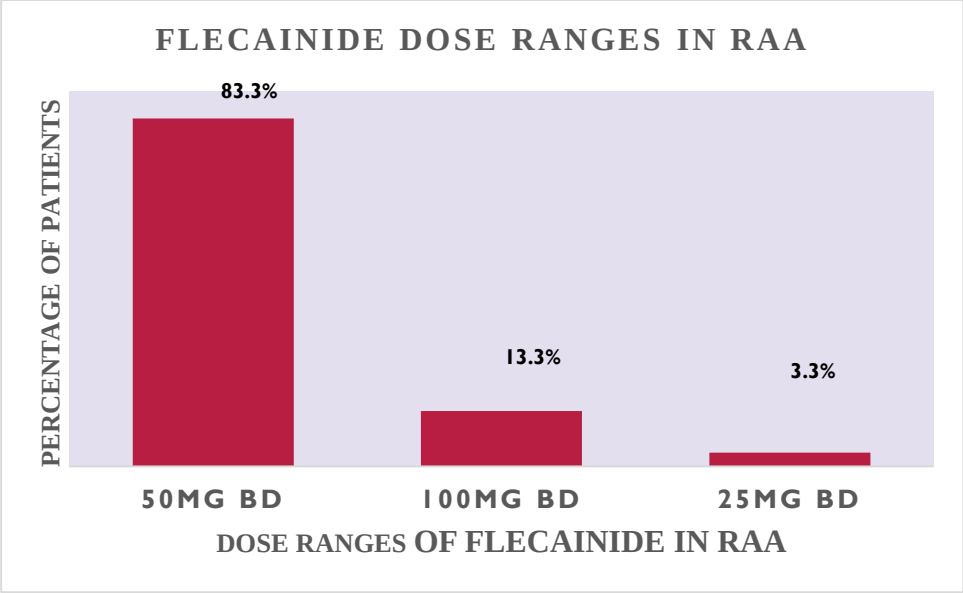

Figure 11: Flecainide Dose Ranges in Rheumatic Atrial Arrhythmias.

Total 25 patients were with Rheumatic Atrial Fibrillation. In that 25 patients, 1 patient (4%) were on 25mg BD dose, 21 patients (84%) were on 50mg BD dose, 3 patients (12%) were on 100mg OD dose.

Table 07: Flecainide Dose Ranges in AF.

DOSES	NO. OF CASES
25mg BD	1 (4%)
50mg BD	21 (84%)
100mg OD	3 (12%)

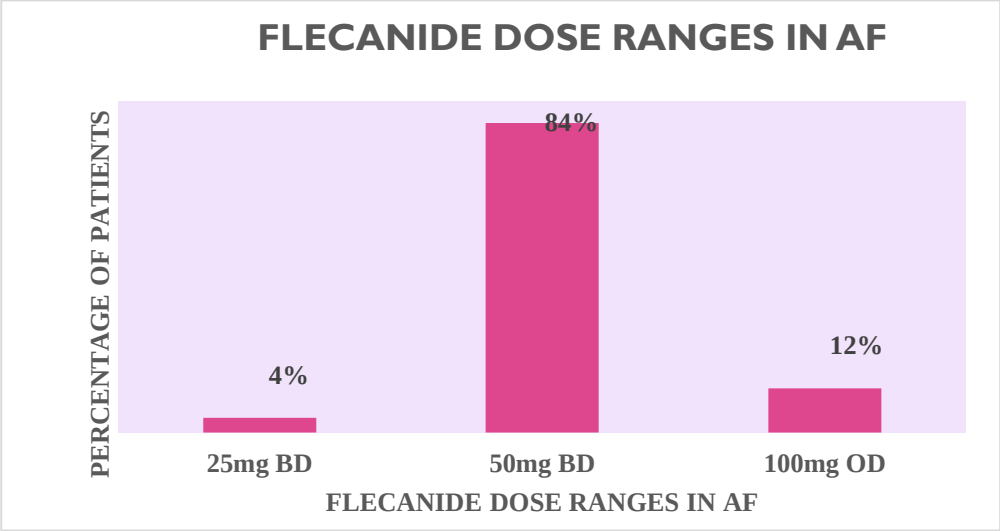

Figure 12: Flecainide Dose Ranges in AF.

In 30 patients, 25 patients were with Atrial Fibrillation. In that 25 patients, flecainide's Outcome was observed in 17 patients (68%), effect was not observed in 8 patients (32%).

Table 08: Outcome of Flecainide in AF.

NO. OF CASES	OUTCOME	NO EFFECT
25	17 (68%)	8 (32%)

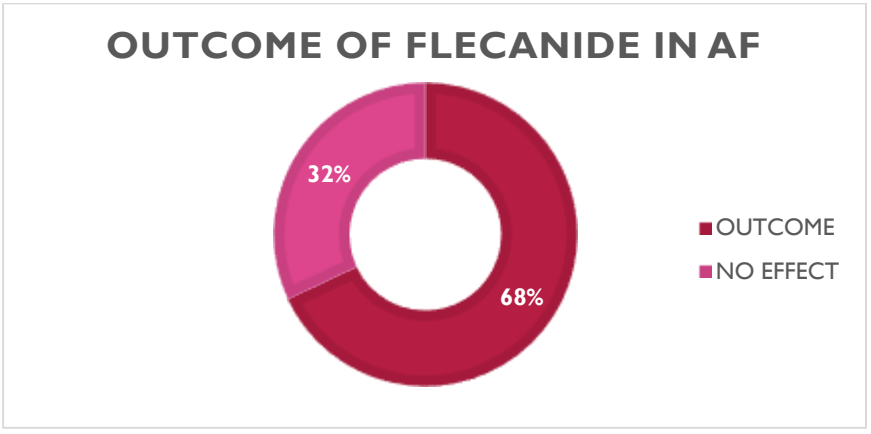

Figure 13: Percentage of Outcome in Atrial Fibrillation.

Total 30 patients, in those 5 patients were with Atrial Flutter. In that 5 patients outcome was observed in 3(60%) patients and effect was not observed in 2(40%) patient.

Table 09: Outcome of Flecainide in Atrial Flutter.

TYPE OF AA	NO. OF CASES	OUTCOME	NO EFFECT
AFL	5	3 (60%)	2 (40%)

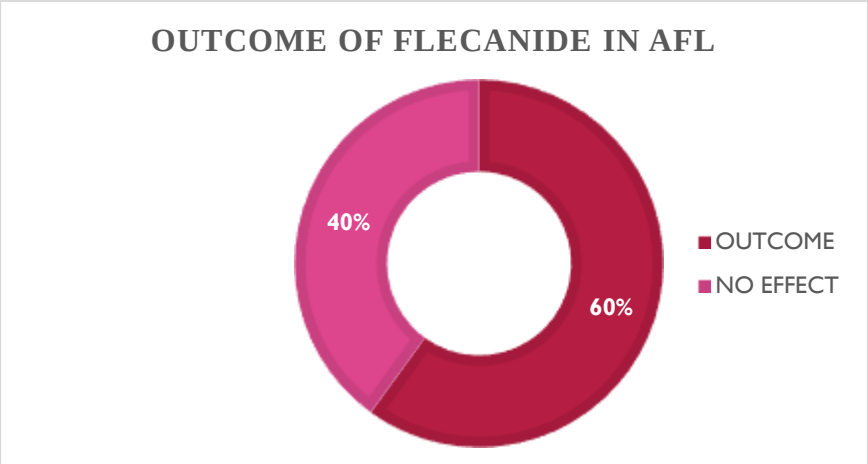

Figure 14: Percentage of outcome of Flecainide in AFL

Among 30patients, 2 patients with Atrial Fibrillationwere developed ADRS with the use of Flecainide. In these patients Flecainide were stopped.

Table 11: Percentage of ADRS

NO.OF CASES	ADRS	PERCENTAGE
30	2	6.66%

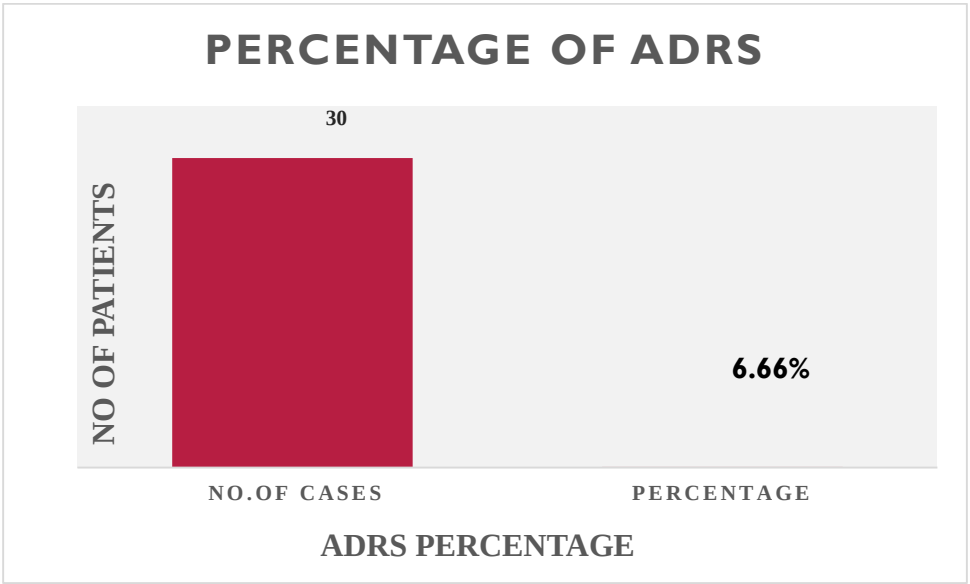

Figure 15: Percentage of ADRS

4. DISCUSSION

The role of flecainide in managing rheumatic atrial arrhythmias is an area where specific clinical data is currently limited, prompting this study to investigate its effectiveness in this patient population.

A normal heart rate typically ranges from 60 to 100 beats per minute. Tachycardia, defined as a heart rate exceeding 100 beats per minute, arises from disruptions in the electrical impulses that regulate the heartbeat, often manifesting as a fluttering sensation [Citation needed for basic cardiac physiology].

Rheumatic heart disease (RHD) is a consequence of acute rheumatic fever (ARF), resulting in damage to one or more heart valves following the resolution of the acute inflammatory episode. Recurrent episodes of ARF can exacerbate this damage, leading to stretched and/or scarred heart valves. This valvular dysfunction disrupts normal blood flow, causing either backward leakage through incompletely closing valves or obstruction due to inadequately opening scarred valves [21].

Rheumatic atrial fibrillation is characterized by a rapid and irregular beating of the atria. It often begins as brief episodes of abnormal rhythm that can progress to longer and potentially persistent occurrences [Citation needed for definition of AF]. Atrial flutter (AFL) also involves a rapid beating of the atria, resulting in atrial muscle contractions that are faster and out of synchrony with the ventricles [22].

Flecainide, an antiarrhythmic agent, exerts its effect by blocking the Nav 1.5 sodium channel in the heart. This action slows the upstroke of the cardiac action potential, consequently reducing the conduction of electrical impulses within the heart and decreasing myocardial excitability. The most pronounced effects of flecainide are observed in the His-Purkinje system and the ventricular myocardium [Citation needed for flecainide mechanism of action]. Clinically, flecainide is utilized to restore and maintain a regular heart rhythm, particularly in preventing re-entrant arrhythmias such as atrial fibrillation [Citation needed for clinical use of flecainide].

Existing literature suggests a higher prevalence of rheumatic atrial arrhythmia in women compared to men, with some reports indicating approximately 63% of cases occurring in females [Citation needed for gender prevalence in rheumatic arrhythmias]. Furthermore, these arrhythmias tend to affect middle-aged or older individuals, with a reported mean age of onset around 53 years [Citation needed for age prevalence in rheumatic arrhythmias]. Notably, atrial fibrillation appears to be more common than atrial flutter in patients with rheumatic heart disease [Citation needed comparing AF and AFL in RHD].

Our present study, conducted over six months, included 30 patients with rheumatic atrial arrhythmias. Consistent with previous observations, our findings revealed a higher proportion of female patients (19, 63.4%) compared to male patients (11, 36.6%) (Table 2). The age distribution of our study population showed the highest incidence of rheumatic atrial arrhythmias in the 50-59 year age group (36.7%), with a mean age of 53.8 ± 9.71 years (Table 3). This aligns with the reported predilection for middle-aged individuals.

In evaluating the outcome of flecainide use, we observed a positive response in 20 patients (66.6%), indicating effective restoration or maintenance of sinus rhythm. However, 10 patients (33.4%) showed no significant effect from flecainide (Table 4).

Our study also corroborated the existing trend of atrial fibrillation being more prevalent than atrial flutter in this population. Among the 30 patients, 25 (83.4%) presented with atrial fibrillation, while only 4 (16.6%) had atrial flutter (Table 6).

Regarding the dosage of flecainide prescribed to maintain sinus rhythm, the majority of patients (25, 83.3%) were on a 50mg twice daily (BD) dose. A smaller number of patients received 100mg BD (4, 13.3%) or 25mg BD (1, 3.3%) (Table 7). Specifically, among the 25 patients with rheumatic atrial fibrillation, the most common maintenance dose was 50mg BD (21 patients, 84%), with fewer patients on 25mg BD (1 patient, 4%) or 100mg once daily (OD) (3 patients, 12%) (Table 8).

The effectiveness of flecainide differed slightly between the two arrhythmia types. In the atrial fibrillation group (25 patients), a positive outcome was observed in 17 patients (68%), while 8 patients (32%) showed no effect. Among the 5 patients with atrial flutter, flecainide was effective in 3 patients (60%) and ineffective in 2 patients (40%) (Tables 9 and 10). This suggests a potentially similar efficacy of flecainide in both rheumatic atrial fibrillation and flutter in our limited sample.

Notably, flecainide treatment was discontinued in two patients (6.6%) due to QRS widening (Table 11), a known potential proarrhythmic effect of Class IC antiarrhythmics [Citation needed for QRS widening as a side effect of flecainide]. No other systemic side effects were reported in our study cohort.

5. CONCLUSION

In conclusion, this prospective observational study provides preliminary insights into the use of flecainide in managing rheumatic atrial arrhythmias. Our findings indicate that flecainide was effective in maintaining sinus rhythm in a significant proportion of patients with both atrial fibrillation and atrial flutter associated with rheumatic heart disease. The most commonly prescribed maintenance dose was 50mg twice daily. While the study suggests potential utility, the relatively small sample size necessitates further investigation with larger cohorts to definitively establish the role and long-term outcomes of

flecainide in this specific clinical context.

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