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Observational Registry for Cardiac Ablation in Atrial Fibrillation in Mexico (ORCA-AF)

Registro Observacional Mexicano para Ablación Cardiaca en Fibrilación Auricular (ROMA-FA)

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fibrilación auricular, aislamiento de venas pulmonares, radiofrecuencia, tratamiento antiarrítmico, CARTO 3.

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ABSTRACT

Introduction: Atrial Fibrillation (AF) is a prevalent chronic arrhythmia that affects approximately 4% of the Mexican population. AF correlates with an elevated risk of myocardial infarction, increased rate of hospitalizations, and mortality. In recent years, radiofrequency Pulmonary Vein Isolation (PVI) for cardiac ablation has emerged as the frontline intervention for symptomatic AF. **Material and methods:** a retrospective observational study was conducted at General Hospital «Tacuba» ISSSTE to evaluate the clinical characteristics and antiarrhythmic management of patients with AF undergoing PVI utilizing the CARTO 3 three-dimensional electromagnetic mapping system with follow-up assessments conducted at 3, 6, and 12 months post-PVI. **Results:** the median time for patients to discontinue antiarrhythmic treatment post-PVI was three months. Amiodarone was the most prescribed antiarrhythmic drug. A significant reduction in the percentage of patients on antiarrhythmic treatment was observed post-PVI. The study showed a 95.9% success rate for radiofrequency PVI cardiac ablation procedures. **Conclusion:** the study suggests that radiofrequency PVI is an effective and safe treatment for AF in protocolized patients, where ablative therapy has shown the most significant impact on disease control and clinical and likely economic positive effects in reducing the disease burden.

RESUMEN

Introducción: *la fibrilación auricular (FA) es la arritmia crónica más común que afecta aproximadamente a 4% de la población mexicana. La FA se asocia con un mayor riesgo de infarto miocárdico, hospitalizaciones y muerte. En los últimos años el aislamiento de venas pulmonares (AVP) con radiofrecuencia, como parte del manejo ablativo de la enfermedad, se ha establecido como el tratamiento de primera línea para pacientes con FA sintomática.* ***Material y métodos:*** *se realizó un estudio observacional retrospectivo en el Hospital General «Tacuba» ISSSTE para evaluar las características y el tratamiento antiarrítmico de los pacientes con FA sometidos a AVP con radiofrecuencia con sistema de mapeo tridimensional electromagnético CARTO 3 a 3, 6 y 12 meses de seguimiento post-AVP.* ***Resultados:*** *el tiempo promedio para descontinuar el tratamiento antiarrítmico post-AVP fue de tres meses. La amiodarona fue el tratamiento antiarrítmico más prescrito. Se observó una reducción significativa de tratamiento antiarrítmico post-AVP. El estudio demostró que el procedimiento de ablación cardiaca mediante AVP con radiofrecuencia es efectiva con una tasa de éxito del 95.9%.* ***Conclusiones:*** *el estudio sugiere que el procedimiento de ablación cardiaca mediante AVP con radiofrecuencia de alto poder es un tratamiento exitoso y seguro para el control de la FA, en los pacientes debidamente protocolizados y en los que la terapia ablativa ha demostrado mayor impacto en control de la enfermedad y un impacto positivo en la reducción de la carga clínica y seguramente económica de la enfermedad.*

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Abbreviations:
ACT = Activated Clotting Time
AF = Atrial Fibrillation
AT = Atrial Tachycardia
LAD = Left Atrial Diameter
LVEF = Left Ventricular Ejection Fraction
NYHA = New York Heart Association
PRIS = Propofol Infusion Syndrome
PVI = Pulmonary Vein Isolation
SD = Standard Deviation

INTRODUCTION

Atrial Fibrillation (AF) stands as the most prevalent sustained chronic arrhythmia globally, affecting approximately 1-2% of the worldwide population[1,2] and approximately 4% of Mexico's population.[3] Its incidence is notably higher among men and escalates with advancing age, with a discernible rise in occurrence observed from age 40 onwards. Moreover, AF's prevalence amplifies in tandem with predisposing conditions, including obesity, type 2 diabetes, systemic arterial hypertension, obstructive sleep apnea, coronary artery disease, and habits such as tobacco or alcohol consumption.[1,4] AF correlates with an elevated risk of myocardial infarction, heightened hospitalization rates, and increased mortality.[5,6] The aging demographic and improved survival rates amidst chronic ailments further forecast a surge in AF prevalence in the forthcoming years,[1,4] accentuating the need for intensified research endeavors aimed at comprehending this pathology and refining its therapeutic modalities.

In recent years, Pulmonary Vein Isolation (PVI) via radiofrequency ablation has emerged as the frontline intervention for managing symptomatic AF –both paroxysmal and persistent– particularly in refractory or intolerance to antiarrhythmic pharmacotherapy.[2,7] Despite the expanding use of PVI with radiofrequency in clinical practice, there is scarce epidemiological data on AF and its treatment landscape in the Mexican population.[3,6,8] Additionally, no comprehensive records documenting patient outcomes after the ablation procedure are available.

A retrospective observational registry was undertaken at the Cardiac Electrophysiology Service of the General Hospital «Tacuba» of the «Instituto de Seguridad Social y Servicios de los Trabajadores del Estado» (ISSSTE) to bridge this knowledge gap. Patient referrals to this center originate from primary care medical units through routine referral systems or direct patient presentations facilitated through institutional channels. Cases were meticulously evaluated, and candidates deemed suitable for ablation were scheduled for PVI employing a radiofrequency catheter equipped with a contact sensor and the CARTO 3 electromagnetic 3D mapping system.

Consequently, the primary objective of this investigation was to delineate and assess the clinical characteristics and antiarrhythmic management of patients afflicted with AF undergoing PVI utilizing the CARTO 3 electromagnetic 3D mapping system with follow-up assessments conducted at 3, 6, and 12 months post-PVI.

MATERIAL AND METHODS

An observational, longitudinal, retrospective, and single-center study was carried out, including all patients with paroxysmal or persistent AF undergoing PVI with radiofrequency between August 2017 and February 2022 at the Cardiology Service of the General Hospital «Tacuba» ISSSTE.

A review of the medical records of all patients was conducted, and relevant information was recorded in a structured database. The collected information included:

1. Sociodemographic and clinical data: age, sex, date of AF diagnosis, type of AF, presence of arterial hypertension, Left Ventricular Ejection Fraction (LVEF), Left Atrial Diameter (LAD), and New York Heart Association (NYHA) functional classification.
2. Specific data on PVI include the date of the procedure, type of sedation, average power used in the procedure, complications during the procedure, and length of hospital stay.
3. Clinical data at 3, 6, and 12 months post-PVI: prescription of antiarrhythmic treatment, date of last intake of antiarrhythmic therapy (if any), transient ischemic attack, acute myocardial infarction, heart failure, ischemic stroke, recurrence of AF/atypical

flutter/Atrial Tachycardia (AT), typical flutter, resumption of antiarrhythmic treatment, progression from paroxysmal to persistent AF, admission to the Emergency Department, reintervention, and death.

Recurrences were distinguished as follows:

1. AF: appearance of arrhythmia characterized by atrial cycle length < 200 bpm, non-discernible P-wave, and variable RR interval in the absence of atrioventricular block, of sufficient duration to be detected in a surface electrocardiogram or at least 30 s in a Holter recording.[9]
2. Atypical flutter: appearance of re-entrant arrhythmia characterized by continuous, uniform, and regular atrial electrocardiographic pattern, with frequency ≥ 240 bpm (re-entrant tachycardia) related to PVI.[10]
3. AT: appearance of arrhythmia characterized by the electrocardiographic pattern with well-defined P-waves separated by isoelectric lines with frequency ≤ 240 bpm.[10]

Recurrence of AF/atypical flutter/AT was only considered if reported after 3 months post-PVI (6- and 12-month follow-up).

Post-PVI events considered were as follows: resumption of antiarrhythmic treatment, progression from paroxysmal to persistent AF, recurrence of AF/atypical flutter/AT, admission to the Emergency Department, reintervention, typical flutter, transient ischemic attack, acute myocardial infarction, heart failure, ischemic stroke, and death.

Based on the collected information, the time elapsed between the diagnosis of AF and the performance of PVI and between the procedure and the last intake of antiarrhythmic treatment was calculated.

PVI procedure

Before the procedure, the patient was referred to the Hospital in two possible ways: routine and personalized.

The most common routine referral was made through an institutional medical referral system, where the patient entered the Health System through evaluation by the general practitioner in a primary care Medical Unit, where symptoms were documented, and diagnostic studies were extended to corroborate the presence of AF. Subsequently, having these studies, the patient was sent to the second level of care, provided by the Cardiology and Cardiac Electrophysiology services, where a specific diagnostic protocol was performed with ambulatory electrocardiographic monitoring and echocardiogram if required. Once the diagnosis of AF was confirmed and the criteria to be a candidate for ablation procedure were met, the patient was scheduled for PVI.

In the personalized referral, data of the patient with a confirmed diagnosis was sent to the institutional email of the Electrophysiology Service of the General Hospital «Tacuba» ISSSTE, which analyzed the case and contacted the patient to provide a date for arrhythmia clinic evaluation with an average attention time of one week. Complementary studies were evaluated, and if the patient was a candidate for an ablation procedure, the patient was scheduled for PVI.

Unlike other protocols, patients did not discontinue anticoagulant or antiarrhythmic treatment in the pre-procedure period *(Figures 1 and 2)*.

Procedures were performed under general sedation. A bilateral femoral vein approach was performed: Sterile drapes were placed before asepsis and antisepsis of both inguinal regions, and 2% lidocaine was infiltrated into the areas of interest. Two venous punctures were performed in the right groin and a single venous puncture in the left groin, placing vascular accesses of 8 Fr, 8 Fr, and 10 Fr, respectively. Through the 8 Fr sheath on the right side, a decapolar catheter was introduced into the coronary sinus, and through the 10 Fr sheath on the left side, an intracardiac ultrasound probe was introduced for intracardiac mapping. The 8 Fr vascular access was exchanged for a preformed FastCath sheath. Subsequently, a transeptal puncture was performed with a BRK needle under continuous visualization by intracardiac echocardiogram (ICE). Once the transeptal puncture was performed, unfractionated heparin was administered at 100 IU per kg of body weight, which was

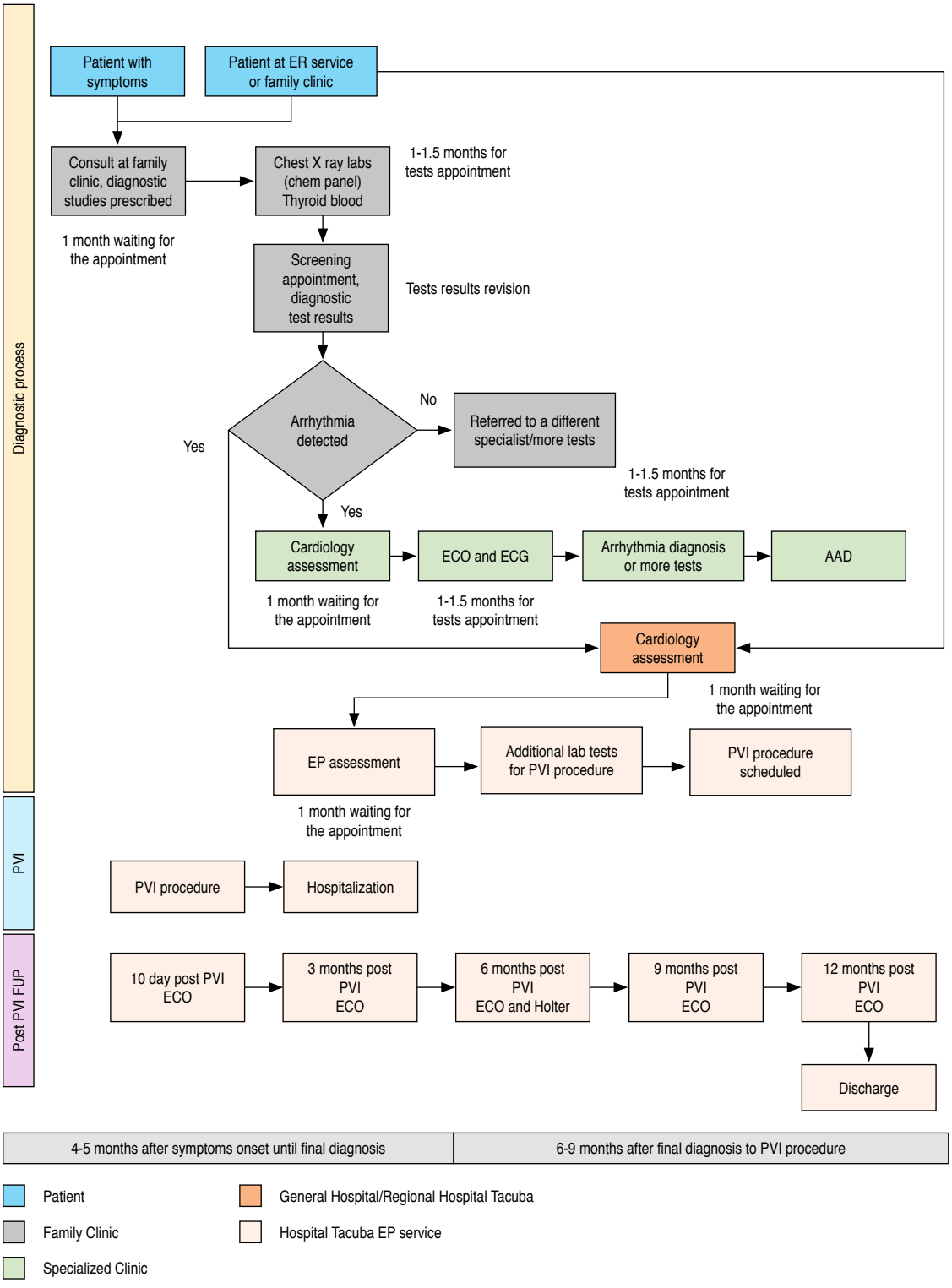

Figure 1: Patient pathway ISSSTE west zone.
AAD = antiarrhytmic drug. ECG = electrocardiogram, ECO = echocardiogram. EP = electrophysiology. ER = emergency room. FUP = follow up. PVI = Pulmonary Vein Isolation.

adjusted to maintain Activated Clotting Time (ACT) between 300-350 s during the procedure, every 30 min. The transeptal puncture sheath was exchanged for a bidirectional guiding sheath (MOBICATH® or CARTO VIZIGO®). A PENTARAY® multielectrode mapping catheter was introduced, and a voltage map was performed to document the connection of the pulmonary veins and fibrotic areas in the atrial body. The PENTARAY® catheter was then exchanged for a radiofrequency ablation catheter, THERMOCOOL SMARTTOUCH® or THERMOCOOL SMARTTOUCH SF®, and pulmonary vein isolation was performed. In cases where fibrosis was observed in the posterior wall, isolation of that zone (BOX technique) was considered. Finally, a voltage map was performed to document the isolation of the four pulmonary veins post-procedure and stimulation within each pulmonary vein to confirm the exit block. The approximate duration of each procedure was two hours. At the same time, fluoroscopy time varied between 1.5-2.5 min, and the ablation index was 420 anterior and 400 posterior in patients who used the Ablation Index module of CARTO 3.

Following the PVI, the patient was transferred to the Coronary Care Unit, where they were monitored, and vascular access was evaluated continuously for 21 hours by nursing staff and cardiologists. If the patient did not present procedure complications during this period, they were discharged home with precise instructions (look for bleeding at the puncture site, changes in lower limb coloration, dyspnea, chest pain, and palpitations, among others). If complications occurred during home follow-up, the patient was instructed to visit the emergency department.

Suspension of antiarrhythmic treatment was indicated 3 months post-PVI and an appointment was scheduled for follow-up evaluation by the Cardiac Electrophysiology Service, including 24-hour electrocardiographic monitoring (24-hour Holter). Anticoagulant treatment was discontinued at the 3-month follow-up visit based on electrocardiographic monitoring results, symptomatology (absence of palpitations for more than 30 s), or electrocardiogram. The patient was also evaluated at 6 and 12 months post-PVI.

Statistical analysis

The statistical analysis was performed using R software (version 4.2.2).[11]

Quantitative variables with normal distribution were described as mean ± Standard Deviation (SD), and variables with non-normal distribution were expressed as median (minimum-maximum). Data normality was determined using the Shapiro-Wilk test. Qualitative variables were described as absolute and relative frequencies according to the number of patients with recorded information. Statistical

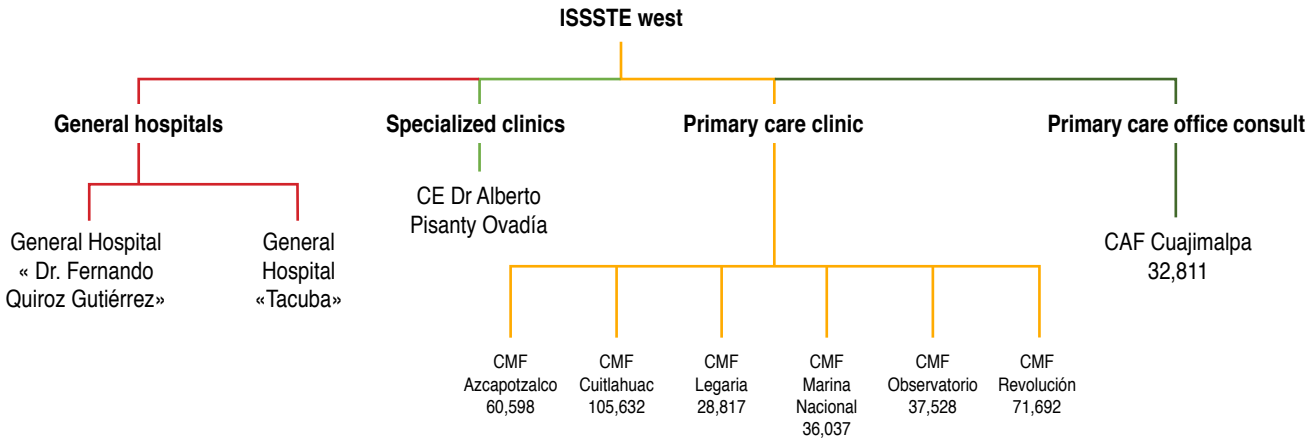

Figure 2: Medical division ISSSTE updated in 2021. Health regulatory authority.
CAF = consultorio de atención familiar. CE = clínica de especialidades. CMF = clínica médica familiar.

Table 1: Baseline characteristics. N = 74.

Variables	n (%)
Sociodemographic characteristics	
Age (years)	64.0 [27.0-84.0]
Gender	
Male	47 (63.5)
Female	27 (36.5)
Clinical characteristics	
Time since AF diagnosis (months)	6.1 [0.1-185.7]
AF type	
AF paroxysmal	53 (71.6)
AF persistent	21 (28.4)
CV risk factors	
Hypertension	32 (43.2)
NYHA (N = 71)	
Class I	42 (60.0)
Class II	25 (35.7)
Class III	3 (4.3)
Left atrial diameter (mm) (N = 71)	45.6 ± 7.2
LVEF (%)	60.0 [25.0-77.0]

Qualitative variables are shown as n (%), mean ± standard deviation for quantitative variables with normal distribution or median [min-max] for non-normal quantitative variables distribution.
AF = Atrial Fibrillation. LVEF = Left Ventricular Ejection Fraction. NYHA = New York Heart Association.

comparisons of qualitative variables were made using the Cochran Q test for comparing three follow-up points or the McNemar test for comparing two follow-up points. A p-value of ≤ 0.05 was considered significant.

The total rate of post-PVI events at 12 months was calculated by dividing the total number of patients who presented resumption of antiarrhythmic treatment, progression from paroxysmal to persistent AF, recurrence of AF/atypical flutter/AT, admission to the Emergency Department, reintervention, typical flutter, transient ischemic attack, acute myocardial infarction, heart failure, ischemic stroke, and/or death during the entire follow-up period by the total number of patients included in the study.

The success rate of PVI at 12 months was calculated by dividing the total number of patients without recurrence of AF/atypical flutter/AT during the entire follow-up period by the total number of patients included in the study.

RESULTS

Between August 2017 and February 2022, at the Cardiology Service of the General Hospital «Tacuba» ISSSTE, 76 patients underwent cardiac ablation procedures using PVI with radiofrequency to treat paroxysmal or persistent AF. Two patients were excluded from the study: one patient died during the follow-up period due to causes unrelated to AF or PVI, and another patient had auricular involvement of more than 90% during intracardiac mapping, leading to the diagnosis of progression from persistent to permanent AF, and did not undergo the PVI procedure. Statistical analysis was conducted with information from 74 patients.

Patients

The baseline sociodemographic and clinical characteristics of the 74 patients included in the study are presented in *Table 1*. The median age of the patients was 64 years (27-84 years), and 63.5% were men. Regarding AF, 71.6% of patients had paroxysmal AF, and 28.4% had persistent AF. 43.2% of patients had arterial hypertension. Only 71 patients had records of the NYHA functional classification of heart failure, of which 60% were assigned to class I, 35.7% to class II, and 4.3% to class III. The median LVEF was 60% (25.0-77.0%), and the mean LAD, reported for only 72 patients, was 45.6 ± 7.2 (SD).

Table 2 presents the characteristics of the PVI procedure. The time elapsed between the diagnosis of AF and the performance of PVI was obtained for all 74 patients, with a median of 6.1 months (0.1-185.7 months). All patients underwent general sedation during the procedure, and the power used was 45.0 Watts (W) (36.0-53.0 W). Five patients (6.8%) experienced complications during the procedure, one patient (1.4%) experienced propofol infusion syndrome (PRIS), and four patients experienced vascular complications. These five patients remained hospitalized for more than 24 hours.

Follow-up post-PVI

Table 3 shows the post-PVI events experienced by patients at 3, 6, and 12 months of follow-up. The total rate of post-PVI events at 12 months

was 6.8% (5 out of 74). The reported events are described below.

At the 3-month follow-up, one patient (1.4%) experienced an ischemic stroke, in addition to typical flutter, leading to admission to the Emergency Department and undergoing reintervention of cardiac ablation using PVI. At the 6-month follow-up, one patient (1.4%) presented typical flutter, leading to admission to the Emergency Department and undergoing reintervention of cardiac ablation using PVI; one patient (1.4%) met criteria for recurrence in AF; and another patient (1.4%) discontinued antiarrhythmic treatment at 3 months post-PVI, however, had to resume it during the 6-month follow-up period, and at the 12-month follow-up, presented typical flutter. At the 12-month follow-up, two more patients (2.7%) experienced recurrence in AF, one of whom had already been classified with recurrence since the 6-month follow-up.

Regarding the procedure's success, 72 out of 74 patients did not experience recurrence of AF/atypical flutter/AT post-PVI, resulting in a procedure success rate of 97.3% at 12 months *(Table 4)*.

Table 2: Characteristics of pulmonary vein isolation with radiofrequency.

Variables	n (%)
Sedation	
General	74 (100.0)
Average power used during the procedure (W)	45.0 [36.0-53.0]
Complications during the procedure	5 (6.8)
Propofol induced syndrome	1 (1.4)
Vascular complications	4 (5.4)
Post-procedure hospitalization stays	
24 h	69 (93.2)
48 h	5 (6.8)

Qualitative variables are shown as n (%) qualitative variables or median [min-max] for quantitative variables with non-normal distribution.

Sinus rhythm and antiarrhythmic drug treatment post-PVI

The number of individuals in sinus rhythm and the use of antiarrhythmic drug treatment are shown in *Table 4*. The percentage of patients in sinus rhythm at 12 months post-PVI was 95.9% (71 out of 74).

Table 3: Follow-up findings post pulmonary vein isolation.

Variables	3 months ± 1 month n (%)	6 months ± 1 month n (%)	12 months ± 1 month n (%)
Resumption of antiarrhythmic treatment	0 (0)	1 (1.4)	0 (0)
AF progression paroxysmal to persistent	0 (0)	0 (0)	0 (0)
AF recurrence*	–	1 (1.4)	2 (2.7)
Atypical flutter recurrence*	–	0 (0)	0 (0)
Atrial tachycardia recurrence*	–	0 (0)	0 (0)
ER service admission	1 (1.4)	1 (1.4)	0 (0)
Reintervention	1 (1.4)	1 (1.4)	0 (0)
Typical flutter	1 (1.4)	1 (1.4)	1 (1.4)
Transient ischemic attack	0 (0)	0 (0)	0 (0)
MI	0 (0)	0 (0)	0 (0)
Heart failure	0 (0)	0 (0)	0 (0)
Ischemic stroke	1 (1.4)	0 (0)	0 (0)

The information is shown as n (%), stroke, AF, and atrial tachycardia.
AF = atrial fibrillation. ER = emergency room. MI = myocardial infarction.
* Was considered as recurrence only if reported in the 6- and 12-months follow-up.

Table 4: Sinus rhythm and antiarrhythmic drug treatment post-PVI.

Variables	3 months ± 1 month n (%)	6 months ± 1 month n (%)	12 months ± 1 month n (%)
Subjects in sinus rhythm	74 (100.0)	74 (100.0)	71 (95.9)
Subjects with antiarrhythmic treatment	74 (100.0)	30 (40.5)	15 (20.3)
Antiarrhythmic treatment			
Amiodarone	63 (85.1)	23 (76.7)	12 (80.0)
Propafenone	8 (10.8)	5 (16.7)	2 (13.3)
Dronedarone	1 (1.4)	1 (3.3)	0 (0)
Metoprolol	2 (2.7)	1 (3.3)	1 (6.7)

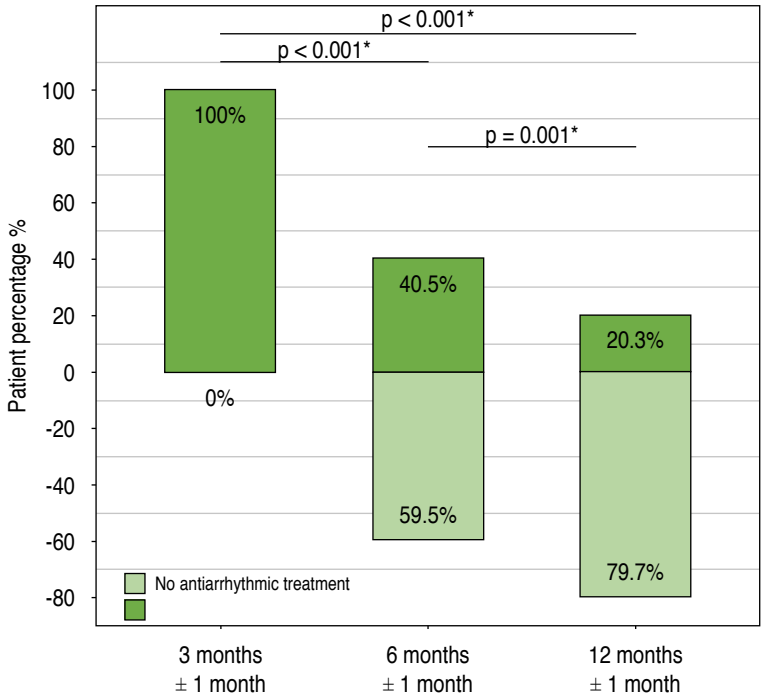

Figure 3: Difference in the percentage of patients with antiarrhythmic treatment post-PVI. The image shows how the percentage of patients with antiarrhythmic treatment decreased after 3, 6, and 12 months of post-PVI follow-up. The p-values were calculated using the McNemar test and adjusted using the FDR method for multiple comparisons.
PVI = Pulmonary Vein Isolation. FDR = False Discovery Rate.
* Statistically significant value, $p \leq 0.001$.

The use of antiarrhythmic drug treatment was recorded for all 74 patients included in the study. The therapy was definitively discontinued in sixty patients and did not resume, with a median time of 3 months (1.6-10.6 months). Of the remaining 14 patients, in one patient, antiarrhythmic drug treatment was discontinued at 3 months post-PVI. However, treatment had to be resumed after approximately four months (at the 6-month post-PVI follow-up), while in the other 13 patients, treatment was not discontinued during the follow-up period.

The percentage of patients with antiarrhythmic drug treatment significantly changed at the three follow-up points (Cochran's Q test, $p < 0.001$), progressively and significantly decreasing between three and six months post-PVI (McNemar's test, adjusted $p < 0.001$), and 12 months post-PVI (McNemar's test, adjusted $p < 0.001$, compared to 3 months; McNemar's test, adjusted $p = 0.001$, compared to 6 months) as shown in *Table 4 and Figure 3*. The most used drug during the follow-up period was amiodarone (76.7-85.1%), followed by propafenone (10.8-16.7%), dronedarone (0-3.3%), and metoprolol (2.7-6.7%), as shown in *Table 4*. Only one patient was recorded to be on a combination of two different antiarrhythmic drugs (metoprolol and amiodarone) at the 3-month follow-up.

DISCUSSION

The General Hospital «Tacuba» of the ISSSTE is a public sector hospital where the Electrophysiology Service was established recently, starting its functions in 2017. Initially, the service was characterized by low-risk procedures using conventional tools (without three-dimensional mapping, using polygraphy and fluoroscopy) with low productivity. In 2018, electroanatomic

mapping tools (CARTO 3) were obtained, allowing the first procedure of catheter ablation with Pulmonary Vein Isolation (PVI) to be performed in the Service. Although productivity was low during that year, it increased considerably by 2019. However, with the arrival of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic, treatment for patients with Atrial Fibrillation (AF) was limited in the Service due to the prioritization of coronavirus disease 2019 (COVID-19) patients, as was the case across the country, with normal functions resuming by late 2021.

Since 2019, efforts have been made to establish a structured protocol for the rapid and effective care of referred patients with AF, which has been improved over the years based on hospital experience. This experience includes, particularly in our service, the high rate of referred patients from primary care units and a low rate of first-contact patients in the hospital's Emergency Department.

Considering the growing experience in AF treatment, the fact that radiofrequency catheter ablation with PVI has become a standard treatment for this condition,[12] and the lack of studies evaluating the progression of patients during and after the procedure in Mexico,[8,13] a retrospective registry was decided upon.

It is known that AF is the most common sustained chronic arrhythmia worldwide, with a prevalence higher in men and increasing proportionally with age.[1,6,14] These epidemiological data are reflected in the present registry, where the median age of the patients was 64 years, and 63.5% were men. Additionally, 43.2% of the patients had hypertension, a disease that, due to its high prevalence in the population, is considered the primary cardiovascular risk factor for the development of AF.[1,14,15]

Catheter ablation with PVI has become a standard treatment for AF. The success rate of this procedure depends directly on the timing of application; in other words, the earlier the procedure is performed, the better the outcome. However, in Mexico's healthcare context, the prolonged time between diagnosis and referral for catheter ablation with PVI continues to be a barrier to AF control. In our unit, the referral time was an average of 6.1 months (0.1 and 185.7 months), mainly due to the lack of timely referral to perform the procedure. Addressing this need, the Cardiac Electrophysiology Service has been structuring a protocol for rapid reference and evaluation of candidates over the years to shorten the time between diagnosis and the performance of catheter ablation with PVI.

However, there are other significant barriers to care, such as the limited number of specialists in cardiac electrophysiology and the limited availability of the Hemodynamics room, limiting the possibility of treating patients with AF.

Regarding the complications of the catheter ablation with the PVI procedure, five patients with complications during the procedure were reported. One patient had Propofol infusion syndrome (PRIS); while propofol is one of the most used anesthetics in ablation procedures,[16] this syndrome is a rare complication and not directly related to AF[17] or the PVI technique. The other four (5.4%) patients who required hospitalization for more than 24 hours had vascular complications, specifically hematomas, a percentage like that reported in other studies between 2-6%.[18] In all five cases, the patients remained hospitalized for 48 hours post-PVI and were discharged after that time.

AF is associated with a fivefold increased risk of ischemic stroke, a threefold increased risk of heart failure, an increased risk of cognitive impairment (dementia), prolonged hospitalization, higher healthcare costs, and increased mortality. Therefore, the main objective of catheter ablation with PVI for the treatment of AF is to improve the patient's quality of life and reduce the risks and costs associated with managing the disease (use of antiarrhythmic drugs and necessary medical consultations due to AF control).[9,18-21]

In this regard, our experience suggests that catheter ablation with PVI is a safe procedure for treating AF, with a post-PVI event rate of 6.8%, similar to that reported in other studies where it ranges between 3-6%.[22-26] The post-PVI events reported were the resumption of antiarrhythmic treatment, recurrence of AF, typical flutter, ischemic stroke, admission to the Emergency Department, and reintervention of the ablation procedure. No deaths related to AF or the procedure were reported.

Furthermore, it was observed that catheter ablation with PVI is an effective procedure for treating AF, with a success rate of 97.3%, similar to previous values reported between 74-91%.[27-29] Only two patients experienced AF recurrence: one had recurrence at 6 and 12 months post-PVI, while the other only had recurrence at 12 months post-PVI.

On the other hand, 95.9% of the patients remained in sinus rhythm at 12 months post-PVI. Sinus rhythm loss was observed in three patients. One of these patients resumed their antiarrhythmic treatment at 6 months post-PVI and subsequently presented typical flutter at the 12-month follow-up, while another had AF recurrence at the 12-month follow-up.

The median time for patients to discontinue antiarrhythmic treatment after PVI was three months, ranging from 1.6 to 10.6 months. Typically, at our institution, antiarrhythmic treatment is discontinued 3 months after PVI.

A significant decrease in the percentage of patients on antiarrhythmic treatment was observed, indicating that cardiac ablation via PVI reduces the use of antiarrhythmic drugs for AF treatment.[30-32]

Finally, as a result of the extensive and growing experience in AF treatment at the Cardiac Electrophysiology Service of the General Hospital "Tacuba" of the ISSSTE, as well as findings from this study, measures have been initiated to disseminate knowledge on the comprehensive and timely management of AF patients to Family Medicine Units. These measures include the implementation of in-person or online talks with primary care physicians and subspecialists, focusing on diagnostic methods, indications, and treatment therapies, aiming to shorten diagnostic periods and better profile patients suitable for PVI cardiac ablation procedures. Additionally, there is an intention to set up patient information modules in outpatient waiting areas, explaining the concept of AF, its symptoms, and treatment to raise public awareness about the disease and promote timely treatment.

Limitations

This was a retrospective observational study conducted at a single center involving patients of varying ages diagnosed with paroxysmal or persistent AF undergoing PVI. Before the PVI procedure, a protocol was established and followed to determine patient suitability for ablative therapy based on echocardiographic analysis. Despite adhering to this protocol, the SARS-CoV-2 pandemic and related prevention measures were the primary limitations for conducting this retrospective study, as in some cases, it was not feasible to carry out in-person follow-up of patients undergoing PVI in the Cardiology Service, resulting in a lack of close monitoring and non-compliance with post-PVI antiarrhythmic and/or anticoagulant treatment suspension protocols. However, patients were followed up personally, with variations in timing, but compliance was achieved in most cases.

CONCLUSIONS

The authors confirm they have complied with the relevant workplace protocols for patient data use. Furthermore, the authors confirm that the patient has been duly informed and provided written informed consent to publish their images and other clinical information in the journal without identifying details to safeguard their right to privacy. Additionally, the authors attest that no form of generative artificial intelligence was employed in preparing this manuscript or creating figures, graphs, tables, or corresponding captions or legends.

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