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Dominant Type of Arrhythmia Mandating Cardiac Radiofrequency Ablation Over the Course of 12 Months

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Abstract

Radiofrequency ablation proves to be a highly efficient and secure method for managing cardiac arrhythmias. Ablation, widely recognized as the primary approach for treating specific arrhythmias, has overtaken the use of pharmacological interventions involving antiarrhythmic drugs. This study follows a descriptive-observational, cross-sectional, and prospective design, aiming to delineate the attributes exhibited by patients based on the proposed research variables.

The patients in this study had an average age of 61.52, with a Standard Deviation of 18.9. Females constituted the majority, accounting for 53.25% of the participants. Among the comorbidities observed, arterial hypertension was the most prevalent, affecting 19.7% of the patients, followed by Diabetes Mellitus type 2 (DM2) at 9.2%.

In this investigation, radiofrequency ablation was found to be present in 36.8% of patients diagnosed with cardiac arrhythmias. The leading cause of cardiac arrhythmia was atrioventricular block, making up 51.3% of cases. Among the implanted devices, the bicameral pacemaker was the most commonly used, accounting for 56.6% of cases, with a risk type of 1.3%. Approximately 42.1% of the patients did not receive any type of pacemaker implantation. The outcome of the procedure was deemed successful in 100% of cases, with minor complications observed in only 1.30% of patients.

Introduction

Radiofrequency ablation in our environment is an effective and safe procedure for treating cardiac arrhythmias. The common indication of ablation has prevailed over pharmacological treatments with antiarrhythmic drugs [1]. When talking about ablation of arrhythmias, this refers to the application, through a special catheter, of some form of energy, which can produce a controlled and localized lesion of an area of cardiac tissue responsible for the formation of said arrhythmias [2]. Generally, before ablation, an electrophysiological study is performed to reach a definitive diagnosis of the arrhythmia to treat. This type of procedure is currently considered a curative technique in a high percentage of cases, becoming the first-choice treatment in many patients with arrhythmias with a low incidence of complications [3]. The importance of this study lies in establishing an estimate of the number of procedures performed in the previously established time, considering variables such as sex, comorbidities, type of arrhythmia, the procedure performed, success rate, and complications. According to the first registry of radiofrequency ablation in 2012 in Latin American countries, "First Latin American Catheter Ablation Registry," a total of 65 ablation procedures were registered in patients with arrhythmias in 5 centers that participated in the study [4]. Today this figure varies due to different variables, such as the creation of new centers specialized in the procedure, greater affordability of patients to it, and an increase in the incidence of arrhythmia cases. Presently, cardiac arrhythmias continue to be one of the causes with the highest incidence in first-level or emergency unit consultations, and these patholo-

gies constitute an important group within cardiac diseases [4-6]. With age, the sinus node starts to alter, and the interventricular conduction system undergoes a degenerative course with the consequent modification in the formation and propagation of electrical stimulation as a result of the gradual and gradual reduction in the number of specialized cells [7]. Although the forms of clinical presentation of arrhythmias are very diverse in cells, they share common electrophysiological properties. Among the three primary mechanisms of cardiac arrhythmias, we can find alterations in automatism, triggered activity, and reentry. The definitive cure for this pathology is radiofrequency ablation, a procedure in which radio waves are used to heat and destroy abnormal cells. Radio waves travel through electrodes [8].

Materials and Methods

Context

Cardiac arrhythmia refers to any abnormality in the electrical impulses that regulate the heart's rhythm. It encompasses any rhythm that deviates from the normal sinus rhythm of the heart. Detecting and treating common cardiac arrhythmias promptly and accurately can greatly improve and even save the lives of numerous patients. Any irregular rhythm or conduction disorder should be evaluated by a specialized cardiologist. In many cases, medication can effectively manage the condition. However, some patients may require the implantation of a pacemaker, which comes in various types depending on the specific issue being addressed [1-3].

This study aimed to investigate the different invasive procedures performed on patients diagnosed with arrhythmias or conduction disorders at the Corazones Unidos Foundation. It sought to determine the prevalent type of arrhythmia necessitating radiofrequency ablation and gather data from the clinical records of patients registered in the institution's database between January 2022 and December 2022.

Project Modality

This project falls under the research category, aiming to gather new information about the prevalence of radiofrequency ablation and other invasive treatment methods in our country. We aim to obtain up-to-date data that we can share with the public. Invasive techniques for treating cardiac arrhythmias are increasingly becoming the preferred choice for managing these conditions.

Type of Study

This study employs a descriptive-observational, cross-sectional, and prospective research design to elucidate the characteristics of patients based on the predetermined research variables. Additionally, it adopts a transversal temporality approach, encompassing a predetermined period between January 2022 and December 2022, allowing for a comprehensive analysis within the defined timeframe.

Table 1: Variables and Operationalization

VARIABLE	TYPE	SUB-TYPE	DEFINITION	INDICATOR
Sex	Qualitative	Nominal	Set of biological physical physiological and anatomical characteristics that define human beings as male and female.	Masculine / Feminine
Age	Quantitative	Ordinal	Time that a person or other living being has lived, counting from birth.	18-95
Comorbidities	Qualitative	Nominal	The presence of one or more disorders (or diseases) in addition to the primary disease or disorder.	Arterial hypertension, diabetes mellitus, ischemic heart disease, heart failure, valvular heart disease.
Types of arrythmia	Qualitative	Nominal	Classification of heart rate disorders.	Atrial flutter, atrial tachycardia, intranodal tachycardia, Wolff-Parkinson White, atrial fibrillation, ventricular tachycardia, sick sinus syndrome, atrioventricular block, nonspecific intraventricular conduction disorder
Types of ablations	Qualitative	Nominal	Classification of the procedure performed for the destruction of a malfunctioning cell or tissue	Cryoablation, radiofrequency ablation
Type of implanted antiarrhythmic device	Qualitative	Nominal	Classification of the implantable device for cardiac rhythm control after the ablation procedure	Unicameral, bicameral, implanted in the bundle of his, implantable cardioverter defibrillator, cardiac resynchronizer.
Result of the procedure	Qualitative	Nominal	Classification carried out at the end of the procedure to publicize its effectiveness.	Success, minor complication, major complication.

Methods and Techniques

In this study, we aim to conduct a comprehensive documentary analysis utilizing the indirect observation of clinical records of patients who received treatment and care at the esteemed Corazones Unidos Foundation from January 2022 to December 2022, employing the direct observational technique. The employment of the descriptive method, widely employed in scientific research, is integral in our investigation as it facilitates the evaluation of one or more characteristics pertaining to a specific population or situation. Our objective in this descriptive research is to meticulously depict the behavior or state of multiple variables, diligently tabulating the acquired information to make it readily accessible for further utilization by others.

Data Collecting Methods

An indirect observation was conducted utilizing the technique of documentary analysis. The present study collected data through digitized files from the Corazones Unidos Foundation. Thorough analysis and interpretation of clinical records of patients diagnosed with cardiac arrhythmias and cardiac conduction disorders were undertaken, considering the pertinent socio-demographic data and associated factors essential to this investigation.

Population

For the present investigation, the population was made up of 300 patients diagnosed with some heart rhythm disorder within the Corazones Unidos Foundation and who, at the same time, were managed within it in the period January 2022 - December 2022.

Population: The population consisted of 300 patients.

Sample: The significant sample of this study was 228 people who met the inclusion criteria.

Sampling technique: The sampling technique used is of the non-probabilistic convenience type: non-probability sampling is a sampling technique in which the researcher selects samples based on subjective judgment instead of random selection.

Inclusion Criteria:

- Older adult patients diagnosed with cardiac arrhythmia treated at the Corazones Unidos Foundation.
- Be treated at the Corazones Unidos Foundation.
- Patients with complete clinical history: diagnosis, approach, and treatment.

Exclusion Criteria:

- Elderly patient without a diagnosis of cardiac arrhythmia treated at the Corazones Unidos Foundation.
- Not having received treatment for his cardiac arrhythmia at the Corazones Unidos Foundation.
- Patients with incomplete clinical history: diagnosis, approach, and treatment.

Procedures for Data Processing and Analysis

Once we completed the data collection stage, we organized and tabulated according to the variables and their types; the Excel 2011 office tool was used, which allowed the elaboration of the databases, statistical analysis, and graphs according to the correlations made between the variables.

Ethical Considerations

The approval of the Fundación Corazones Unidos was obtained to carry out this research project. The research protocol was approved by the Universidad Iberoamericana (UNIBE) Institutional Ethics Committee, Institutional Review Board (IRB) approval number IRB00012142. The data collected was used exclusively for academic and scientific interests and will not be subject to manipulation of any kind.

Results

Among the patients included in the study, 30 individuals (13.2%) were found to have ventricular tachycardia, a potentially life-threatening arrhythmia originating in the ventricles. In addition, atrial fibrillation, a common arrhythmia characterized by irregular and rapid atrial contractions, was observed in 21 patients (9.2%). Additionally, 12 patients (5.3%) exhibited atrial flutter, a rapid regular atrial rhythm. Furthermore, Wolf-Parkinson-White syndrome, an electrical disorder of the heart, was identified in 18 patients (7.9%). This syndrome is characterized by an abnormal accessory pathway between the atria and the ventricles, leading to rapid heart rates and potential complications. Lastly, 12 patients (5.3%) were diagnosed with intra-nodal tachycardia, a supraventricular tachycardia originating from the atrioventricular node [Figure 1].

These findings provide valuable insights into the distribution of arrhythmia subtypes among patients requiring cardiac radiofrequency ablation over 12 months. The prevalence of ventricular tachycardia, atrial fibrillation, atrial flutter, Wolf-Parkinson-White syndrome, and intra-nodal tachycardia underscores the importance of targeted interventions and personalized treatment strategies for individuals with these specific arrhythmias. Further studies are warranted to explore optimal management approaches and long-term outcomes in this patient population.

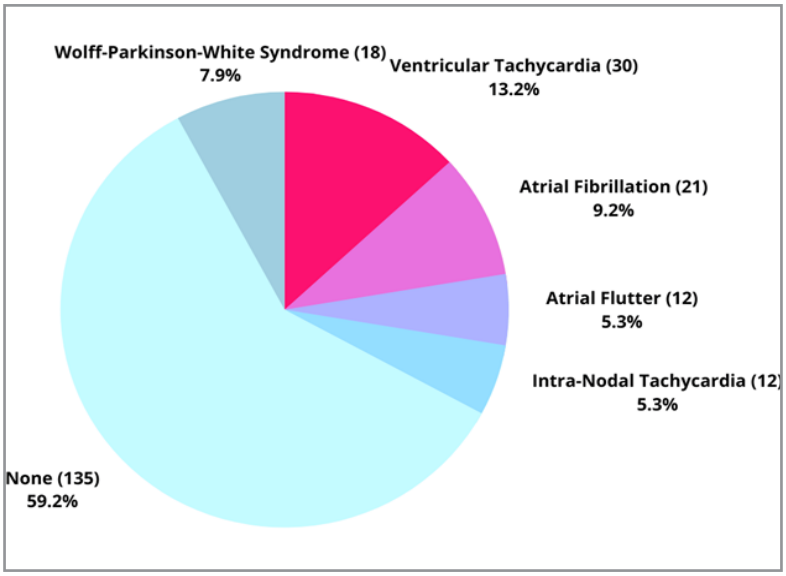

Figure 1: Arrhythmia type distribution of intervened patients with radiofrequency ablation therapy for cardiac arrhythmias at Fundación Corazones Unidos health center over the period January 2022 - December 2022.Figure 2: Sex of patients with cardiac arrhythmias treated with radiofrequency ablation at Fundación Corazones Unidos in the period January 2022 - December 2022.

Demographic Analysis: The most common age group was 60-69 among the female and male participants. In this age bracket, 33 females and 30 males underwent the cardiac radiofrequency ablation procedure, representing a significant proportion of the study population [Figure 2].

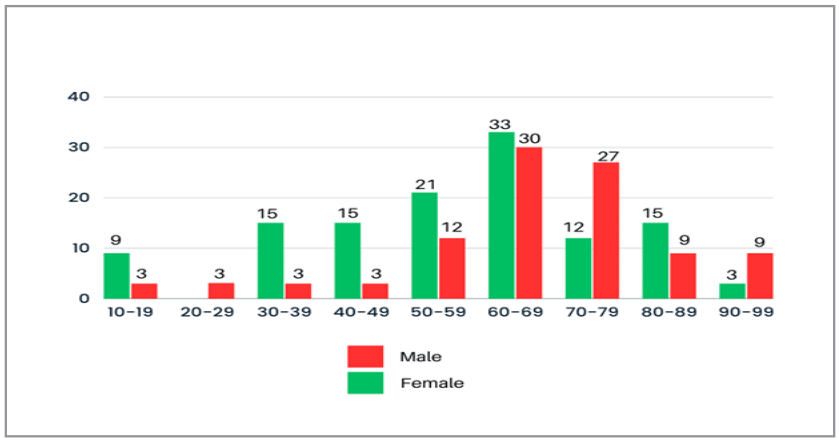

Figure 2: Distribution by age and sex of the patients who underwent radiofrequency ablation for the treatment of cardiac arrhythmias at the Fundación Corazones Unidos health center over the period January 2022 - December 2022.

Discussion

Ventricular tachycardia emerged as the most prevalent form of arrhythmia, accounting for 13.2% of cases, while atrial flutter represented the least frequent, comprising only 5.3%. These findings diverge from those reported by other authors, as Orozco indicates that atrial fibrillation is the most common, Grant and Aguinaga highlight intranodal tachycardia as the most prevalent (30% and 35% respectively), and Helguera identifies atrial flutter as the predominant type (30%) [6-8, 3]. Thus, the existing literature on the frequency of different arrhythmia types exhibits considerable variation.

Conclusion

This project, investigating the dominant type of arrhythmia requiring cardiac radiofrequency ablation over a year has revealed exciting insights into the prevalence of different arrhythmia types. Ventricular tachycardia emerged as the most prevalent form, accounting for 13.2% of cases, while atrial flutter was the least frequent, comprising only 5.3% of cases.

These findings challenge the consensus in the existing literature, which has reported varying dominant arrhythmia types. For example, prior studies by Orozco, Grant, Aguinaga, and Helguera have highlighted atrial fibrillation, intranodal tachycardia, and atrial flutter as the most prevalent types. Such discrepancies suggest that the frequency of arrhythmia types can differ significantly across different patient populations and healthcare settings. The considerable variation observed in the literature underscores the need for further research and comprehensive studies on arrhythmias and their prevalence. A better understanding of the dominant arrhythmia types in specific populations can contribute to more tailored treatment strategies and improved patient outcomes. In addition, future studies should explore the underlying factors contributing to the observed differences and develop standardized methodologies for assessing arrhythmia prevalence.

Overall, our study adds valuable knowledge to the field of arrhythmia management, emphasizing the importance of individualized approaches in identifying and addressing the dominant types of arrhythmias that necessitate cardiac radiofrequency ablation procedures.

Declarations

Ethics Approval and Consent to Participate

The approval of the Fundación Corazones Unidos was obtained to carry out this research project. The research protocol was approved by the Universidad Iberoamericana (UNIBE) Institutional Ethics Committee, Institutional Review Board (IRB) approval number IRB00012142. The data collected was used exclusively for academic and scientific interests and will not be subject to manipulation of any kind.

Consent for Publication

This manuscript has no individual personal data

Availability of Data and Material

An indirect observation was conducted utilizing the technique of documentary analysis. The present study collected data through digitized files from the Corazones Unidos Foundation. Thorough analysis and interpretation of clinical records of patients diagnosed with cardiac arrhythmias and cardiac conduction disorders were undertaken, considering the pertinent socio-demographic data and associated factors essential to this investigation.

Competing Interests

There´s no reportable competing interests on this research project

Funding

No funding's provided on this research project

Authors' Contributions

JP was the head of the investigation, providing substantial contribution on data collecting and analysis, GS contributed as work designer and logistics, CD worked on data interpretation, IR worked on data interpretation and first manuscript draft, CR worked as editor on the first manuscript draft, FM worked on the data interpretation and first draft manuscript, OP, EV, RA, and LA contributed as data collectors.

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References

1. Gaztañaga L, Marchlinski FE, Betensky BP (2012) Mechanisms of cardiac arrhythmias. Spanish Journal of Cardiology 65: 174-185.
2. Morady F (1999) Radio-frequency ablation as treatment for cardiac arrhythmias. N Engl J Med 340: 534-344.
3. Helguera ME, Elizalde GD, Maid G, Corrado G, Cagide A, et al (2003) Radiofrequency ablation for the treatment of cardiac arrhythmias in 500 consecutive patients. ARGENTINE JOURNAL OF CARDIOLOGY 71: 402-408.
4. Kuzmicic CB, Castro GG, Gómez NF, Espinoza PC (2009) Electrophysiological studies, real effectiveness of ablation in arrhythmias and their complications in Antofagasta as a referral center in the second region of Chile. Rev Chil Cardiol 28.
5. Ruiz de Castroviejo EV, Muñoz Bellido J, Lozano Cabezas C, Ramírez Moreno A, Guzmán Herrera M, et al. (2005) Analysis of the frequency of cardiac arrhythmias and conduction disorders from a healthcare perspective. Spanish Journal of Cardiology 58: 657-665.
6. Orosco A, Giniger A, Albina G (2009) Preliminary experience of balloon catheter cryoablation in paroxysmal atrial fibrillation: 100-case series. Rev. argent. Cardiol 83.
7. López JG, Labadet C, González JL (2011) Efficacy and safety of radiofrequency ablation in patients with atrial fibrillation 79: 9. Aguinaga L, Bravo A (2008) One thousand consecutive ablation procedures. Indications, results, complications and long-term follow-up. Journal of the Argentine Federation of Cardiology 37: 224-229
8. Ablation for Arrhythmias (2022) American Heart Association. https://www.heart.org/en/health-topics/arrhythmia/prevention--treatment-of-arrhythmia/ablation-for-arrhythmias.