

First catheter ablations in the Ministry of Health system of Peru: Report of the initial experience☆☆☆

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ABSTRACT

Background: In 2015, the Ministry of Health (MINSA) of Peru inaugurated the first national center for electrophysiology studies in a public tertiary referral hospital with the purpose to provide healthcare access to the most underserved population. This study aims to describe the rate of success and complications of catheter ablation in this center since its inception, as well as the demographic characteristics of these patients.

Methods: This study is descriptive and retrospective. We used the medical record of the patients who underwent catheter ablation (first-time and re-do procedure) in the center from July 2015 to February 2018.

Results: 55 catheter ablations were performed in 53 patients, who were 35 (± 15) years old and 47% male. 63.6% had a full MINSA health coverage, while 16.4% and 20% had partial MINSA coverage and no health coverage, respectively. Atrio-ventricular reentrant tachycardia mediated by accessory pathways was the most common (76.4%) electrophysiology diagnosis. The overall immediate success rate was 96.4%. No complications were reported.

Conclusions: The efficacy and safety of this procedure are comparable to international standards. The main limitations might be the insufficiency of resources and inadequate diffusion of our center activity.

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1. Introduction

Cardiac electrophysiological procedures remain underdeveloped in low-income countries [1]. In 2015, the Latin American Society of Electrophysiology and Cardiac Stimulation (SOLAECE) published the first registry of this procedure in 13 countries of Latin America, including Peru [2].

Peruvian health system is administered by 5 entities: the Ministry of Health (MINSA), which provides public health services for 70% of the Peruvian population; the Social Security Health System (EsSalud), which provides for 25% of the population; the Armed Forces (FFAA),

National Police (PNP), and private sector, which together provide health services to the remaining 5% [3,4]. SOLAECE's study included 4 Peruvian centers, two represented EsSalud and the other two from the private sector [2].

In July 2015, MINSA inaugurated the first national center for electrophysiology studies in a public tertiary referral hospital ("Dos de Mayo" Hospital) located in the capital of Peru: Metropolitan City of Lima; with the purpose to provide healthcare access to cardiac arrhythmia patients with public health insurance across the country. The aim of this study is to describe the rate of success and complications of catheter ablation in this center since its inception. It also describes the socio-demographic characteristics of the population who underwent this procedure.

2. Methods

This study is descriptive and retrospective. The primary source was the medical record of the patients who underwent catheter ablation (first-time and re-do procedure) in the center from July 2015 to February 2018.

☆ The authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

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2.1. Socio-demographic variables

The following variables: *age, gender, health insurance status, educational level and place of residence* were obtained from the virtual record of the center and confirmed with the paper medical records (PMRs).

2.2. Catheter ablation-related variables

The number of catheter ablations per year, the electrocardiographic (ECG) diagnosis before the procedure and the electrophysiology (EP) diagnosis were included in the description. The success and complication rates were evaluated in the immediate term, the earliest being defined by the non-recurrence of the arrhythmia at the end of the procedure.

2.3. Data description

Qualitative data was presented as frequencies and quantitative data was summarized using the mean and standard deviation (SD). We used the statistical software Microsoft Excel version 14.0.

2.4. Ethics

Confidentiality of subject data was maintained using numerical codes for each patient and assigning a security code to the virtual registry, with unique access to the authors of the study. The protocol was approved by the ethical committee of the hospital.

3. Results

A total of fifty-five catheter ablations were performed during the study period, which corresponded to fifty-three patients. The selection criteria for catheter ablation were the refractoriness to medical treatment. The mean annual average of catheter ablations was eighteen ablations per year. The population was 35 (SD ±15) years old and 47% were male; 15% of the total (n = 8) was pediatric population. 63.6% had a full MINSA health coverage, while the other 16.4% and 20% had a partial MINSA coverage and no health insurance, respectively (Table 1). 65.5% (n = 36) of the patients came from the department of Lima. On the other hand, 11 out of the 24 departments of Peru did not referred cardiac arrhythmia patients to the center (Fig. 1). Those who came from the department of Lima almost exclusively were from the Metropolitan City of Lima (97.2%).

The most common ECG diagnoses were Wolff-Parkinson-White (WPW) pattern (56.4%) and Paroxysmal Supraventricular Tachycardia (PSVT) (29.1%). Atrio-ventricular reentrant tachycardia (AVRT) mediated by accessory pathways (76.4%) was the most common EP diagnosis, followed by Atrio-Ventricular Nodal Reentrant Tachycardia (AVNRT). The most common etiologies, post-electrophysiology study, of WPW pattern and PSVT were left accessory pathway (AP) and concealed AP, respectively (Table 1).

The overall immediate success rate was 96.4% and only two patients had a failed first-time procedure: one with a right AP plus Ebstein anomaly and the other with a fascicular ventricular tachycardia (VT). Accessory pathways had a success rate of 96.6%. On the other hand, two patients came back to the center with a late recurrence, both with the EP diagnosis of right AP plus Ebstein anomaly. The re-procedure was successful in both of those cases. There were no procedural complications such as hematomas, fistulas or perforations. Two patients had a complete AV block after the procedure, but it was secondary to their underlying cardiac disease: septal AP and sick sinus syndrome, respectively.

Table 1

Sociodemographic and catheterization characteristics of “Dos de Mayo” hospital patients who underwent cardiac ablations.

	Peru		Department of Lima	
	N	%	N	%
Number of interventions	55	100	36	100
Number of patients	53		35	
Age (years, mean, SD)	35.4 (15.2)		38.2 (14.7)	
Male	26	47.3	18	50
Pediatric patients ^a	8	14.5	4	11.1
Health coverage condition	55		36	
Full public coverage	35	63.6	24	66.7
Partial public coverage	9	16.4	4	11.1
Without health coverage	11	20.0	8	22.2
ECG diagnosis	55		36	
WPW pattern	31	56.4	21	58.3
PSVT	16	29.1	10	27.8
VT				
Fascicular	2	3.6	1	2.8
Branch to branch	1	1.8	1	2.8
Auricular flutter	4	7.3	2	5.6
Missing value	1	1.8	1	2.8
EP diagnosis	55		36	
Auricular flutter	4	7.3	2	5.6
AVNRT	6	10.9	5	13.9
AVRT	42	76.4	27	75.0
VT				
Fascicular	2	3.6	1	2.8
Branch to branch	1	1.8	1	2.8
Success rate, immediate	53	96.4	35	97.2
Late recurrence	2	3.6	1	2.8
Complications	0	0.0	0	0.0

Percentages were calculated based on procedures performed. AVNRT, atrio-ventricular nodal reentrant tachycardia; AVRT, atrio-ventricular reentrant tachycardia; ECG, electrocardiogram; EP, electrophysiology; PSVT, paroxysmal supraventricular tachycardia; SD, standard deviation; VT, ventricular tachycardia; WPW, Wolff-Parkinson-White.

^a <18.

4. Discussion

In 1998, the Heart Institute of EsSalud carried out the first catheter ablations in Peru [5]. Seventeen years later, MINSA began to offer this curative intervention. While EsSalud's population belongs to the economically active population, MINSA provides healthcare access to individuals categorized as poor and extremely poor [6]. Most of our patients had full MINSA coverage. Per Peruvian law, only the individuals who qualify as poor or extremely poor can obtain this type of health coverage [7].

Therefore, our institution is the first national center that provides specialized health care to the vulnerable population of Peru (6,906,000 individuals) that suffers from cardiac arrhythmias [6]. On the other hand, the second most common group of patients did not have any type of health insurance, who represents 31% of the Peruvian population [4].

The annual average of procedures per Peruvian center reported by SOLAECE's study was sixty-five [2], significantly higher than the annual average of eighteen catheter ablations performed in our center (Fig. 1). Nevertheless, the target population with cardiac arrhythmia covered by our center (70% of the Peruvian population) doubles the coverage of the centers included by the mentioned study (<30% of the Peruvian population), showing a gap in health services between MINSA and the other health care providers. In 2017, the number of procedures decreased in 32% due to an insufficiency of medical supplies, despite the growing number of patients who were in the waiting list.

The higher number of patients coming from Lima could be explained by the inequitable geographic distribution of human resources in the public health sector. The department of Lima has the highest density of physicians (20.27 per 10,000 inhabitants) in the country, and the other departments where most patients came from (Ancash, Arequipa and Lambayeque) are also among the densest in terms of human resources working for MINSA [8]. Probably the unawareness of the

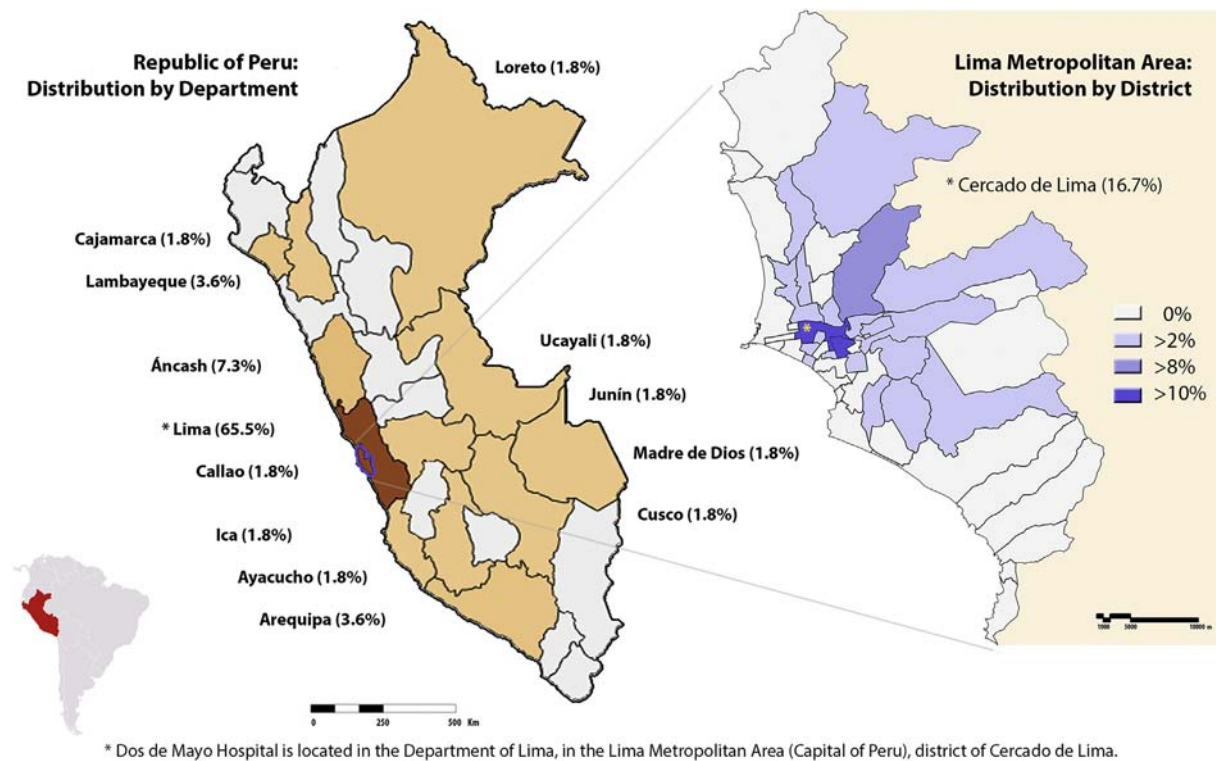


Fig. 1. Geographic distribution of "Dos de Mayo" Hospital patients who underwent cardiac ablations.

existence of this national reference center may have also contributed to this difference.

Although the prevalence of AVNRT is much higher than AVRT mediated by accessory pathways [2,5,9,10], the most common EP diagnosis in our center was AP. This is explained by the selection of patients based on their urgency to perform this procedure due to resource limitations. Patients with: 1) WPW pattern plus atrial fibrillation (AFib) or syncope, 2) wide complex tachycardia, 3) WPW syndrome, and 4) tachycardia refractory to medical therapy were prioritized following this order. Unlike other studies that reported the catheter ablation of AFib [9,11–13], this procedure was not offered in our center as a curative treatment for patients with AFib because we do not possess a 3D mapping system.

The EP procedures were performed by two cardiologists with 8 to 10 years of clinical experience and post-graduate training in cardiac electrophysiology outside of the country. In Peru, cardiac electrophysiology fellowship programs are not offered for clinical cardiologist. On the other hand, the center does not have an exclusive EP laboratory. The catheter ablations were performed in a hybrid operating room that has one cine-angiograph (Philips Allura Xper, biplane X-ray system) with excellent technical characteristics, but limited by the high number of non-electrophysiological procedures. This is a common situation in Latin America where <50% of centers that perform catheter ablation have an exclusive EP laboratory [2].

The overall immediate success rate and the number of complications are comparable to international standards [2,9,10,13]. Two patients had a failed first-time procedure and other two had a late recurrence. The EP diagnoses of these patients were fascicular VT, in one failed first-time procedure, and right AP plus Ebstein anomaly in the other three patients. Even in industrialized countries, the treatment *via* catheter ablation of these types of arrhythmia still remains a challenge [14,15]. Brachmann *et al.* demonstrated that long-term symptom improvement and patient satisfaction could be documented as high, including patients with arrhythmia recurrence [16].

4.1. Limitations

The time frame from symptoms onset to the ablation was not included due to an inconsistency of its report in PMRs. However, the overall missing data was notably low ($n = 3$, 1.1%) (Table 1). On the other hand, even though there are more robust measures of efficacy in catheter ablation [12,17], we used the immediate success rate as an outcome measure because the center has <5 years performing this procedure and the long-term follow-up is still in process.

4.2. Conclusions

The efficacy and safety of the catheter ablations performed in our center are comparable to previous international reports. Insufficient resources and inadequate diffusion of our center activity might be the most important limitations.

Disclosure

The authors of this publication have no financial or nonfinancial relationships to disclose.

Declaration of Competing Interest

The authors report no relationships that could be construed as a conflict of interest.

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