Epidemiologic Burden of Hospitalization Among Adult Filipinos with Supraventricular Tachycardia Requiring Radiofrequency Ablation

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Abstract

INTRODUCTION: Radiofrequency catheter ablation (RFA) is an interventional cardiac electrophysiologic procedure that uses heat energy for definitive management of supraventricular tachycardias. It is a class I recommendation for chronic management of most supraventricular arrhythmias. No local data exist in the incidence hospitalization for SVT and utilization of RFA for this condition. The study aimed to obtain the prevalence of hospitalization of patients with supraventricular tachycardias where RFA is utilized, including the patients' demographic profile, length of hospitalization, and mortality rate.

METHODOLOGY: Philippine Health Insurance Corporation claims for hospitalization from January 1, 2017, to December 31, 2018, were reviewed. Data analysis was done using median and interquartile range for continuous data, and frequency and percentage distribution for categorical data.

RESULTS: There were 1121 and 1149 claims for hospitalization for SVTs (atrial paroxysmal tachycardia, atrioventricular paroxysmal tachycardia, nodal paroxysmal tachycardia, and junctional tachycardia) in 2017 and 2018, respectively. This represents four hospitalization claims for SVT per 10,000 of the total PHIC claims. The majority of patients were female with median age of 52 years. Only 25 and 19 patients underwent radiofrequency ablation in 2017 and 2018, respectively. The majority of these patients were male and younger with a median age of 31 years. No mortality was recorded among patients admitted for catheter ablation.

CONCLUSION: In 2017 and 2018, hospitalization claims for SVT requiring catheter ablation were 0.04% (four hospitalization claims for SVT per 10,000 of the total claims) in both years. The majority of patients were admitted with pharmacologic therapy on discharge with very low utilization of radiofrequency ablation for long-term management.

KEYWORDS: arrhythmia, supraventricular tachycardia, radiofrequency ablation, prevalence, hospitalization

INTRODUCTION

Radiofrequency catheter ablation (RFA) is an interventional cardiac electrophysiologic procedure that uses heat energy for the definitive management of tachycardias. These arrhythmias are usually recurrent, and patients commonly complain of palpitations, dyspnea, chest pain, easy fatigability, dizziness, syncope, and, rarely, sudden cardiac death.[1,2] Radiofrequency catheter ablation is a class I recommendation for chronic management of most of these supraventricular arrhythmias and some ventricular arrhythmias.[1,2]

Nationwide data are not available in the incidence of SVTs and its management. In a study done at the Philippine Heart Center on the profiles and outcomes of patients with SVT who underwent RFA from 2009 to 2018, the most common form of paroxysmal SVT treated was atrioventricular nodal reentrant tachycardia (AVNRT, 42%) followed by arrhythmias associated with Wolff–Parkinson–White syndrome (atrioventricular reciprocating tachycardia, 35%).[3] Atrial flutter was noted in 1.6%.[3] This study excluded patients with atrial fibrillation. Internationally, the current best available data in the United States estimate the prevalence of SVT at 2.29 per 1000 persons and that women are more likely to have the disease compared with men.[4] There are limited data regarding SVT in low- to middle-income countries.[5]

Because of the paucity of data regarding the prevalence of hospitalization of paroxysmal SVT and the number of patients able to undergo RFA, this study aimed to obtain the prevalence of hospitalization of patients with SVT where RFA is utilized among adult patients 19 years or older. The 2017 to 2018 claims database of the Philippine Health Insurance Corporation (PhilHealth), a government-mandated health insurance program, was used in this study as it was the best available data at this time.[6] The study likewise aimed to determine the demographic profile of the aforementioned patients, the duration of hospitalization, mortality rate, and the type of facilities where the patients were confined.

METHODOLOGY

Study Design and Source of Data

This was a retrospective descriptive study that reviewed anonymized records of hospital claims of patients 19 years or older admitted in PhilHealth-accredited hospitals from January 1, 2017, to December 31, 2018. Anonymization was done by PhilHealth.

To determine who among the patients were admitted for specific arrhythmias of concern, the codes of the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) of the World Health Organization were used.[7] To determine who among the patients admitted underwent RFA, the study utilized the Relative Value Scale (RVS) code of PhilHealth.[8] The data were then requested from and was provided for by the Corporate Planning Unit of PhilHealth. Specific ICD-10 codes and RVS codes of included claims can be found in Appendices 1 and 2, respectively.

Data retrieved from PhilHealth included the patient's demographic profile, diagnosis, region, comorbid conditions, duration of hospitalization and condition on discharge, and facility type where a patient was admitted.
Readmissions were likewise determined. Readmissions refer to any claims for the same patient with multiple admissions for the same disease entity.

Ethical Consideration

Data gathering was done through a review of the anonymized database mentioned in the methodology. The article was approved by De La Salle Health Sciences Institute Ethics Committee in Dasmariñas, Cavite.

Data Analysis

Encoding and analysis of data were done using Microsoft Excel 2016 (Microsoft Corp, Redmond, Washington). Quantitative data were summarized and presented as median value and interquartile range because of the nonnormal distribution of data. Categorical data were tabulated using frequency and percentage distribution.

RESULTS

There were 1121 claims for hospitalization for SVTs (atrial paroxysmal tachycardia, atrioventricular paroxysmal tachycardia, nodal paroxysmal tachycardia, and junctional tachycardia) in 2017. It increased to 1149 in 2018 (Table 1). There were 18 readmissions for SVTs in 2017 and none in 2018. Given the readmissions, the actual number used for the determination of mortality rate for SVT was 1103. In-hospital mortality rate was 1.1% (12 of 1103) in 2017 and 0.6% (7 of 1149) in 2018.

Sixteen and 10 patients underwent electrophysiologic study in 2017 and 2018, respectively. There were 25 patients who underwent catheter ablation in 2017 and 19 patients in 2018. Table 2 demonstrates the number of total claims for procedures of electrophysiology study and catheter ablation.

The demographic profile of patients admitted for SVTs is shown in Table 3. More than half of the patients who were admitted for SVT were females in both years. However, in 2018, the majority of patients who underwent procedures were males. Last 2017 and 2018, the median ages of the patients under medical claims were 52 years (quartile 1 [Q1], 37; quartile 3 [Q3], 64) and 50 years (Q1, 38; Q3, 63), respectively. The median age of patients under procedural claims was younger at 31 years old (Q1, 27.5; Q3, 46).

Table 4 shows the duration of hospitalization of patients with cardiac arrhythmia requiring RFA. Median length of hospital stay was 2 days for medically managed patients, and a median of 3 to 4 days for procedural admissions.

Table 5 shows the type of facility where patients with SVT requiring RFA where admitted. Most patients admitted without intervention (claims under ICD-10 codes) were admitted in

Table 1. Number of Cases of Cardiac Arrhythmias Requiring RFA

Description	2017		2018	
	Total Claims n (%)	Mortality n (%)	Total Claims n (%)	Mortality n (%)
Supraventricular tachycardia, atrial paroxysmal tachycardia, atrioventricular paroxysmal tachycardia, junctional tachycardia, nodal paroxysmal tachycardia	1121	12 (1.1)	1149 (17.0)	7 (0.6)

% per arrhythmia (n/N total claims); % mortality (n/N per arrhythmia); RFA=radiofrequency ablation.

Table 2. Number of Procedures Related to Supraventricular Tachycardia

Procedure		2017		2018	
		Total Claims (n = 41) n (%)	Mortality n (%)	Total Claims (n = 29) n (%)	Mortality n (%)
Electrophysiologic study	Induction of arrhythmia by electrical pacing	3 (7.3)	0	2 (6.9)	0
	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters, with induction or attempted induction of arrhythmia; with right atrial pacing and recording, His bundle recording	13 (31.7)	0	8 (27.6)	0
Intracardiac catheter ablation of arrhythmogenic focus; for treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathways, accessory atrioventricular connections or other atrial foci, singly or in combination		25 (60.9)	0	19 (65.5)	0

% per arrhythmia (n/N total claims); % mortality (n/N per arrhythmia).

Table 3. Demographic Profile of Patients Admitted for Supraventricular Tachycardia

Characteristics	2017		2018	
	n = 1121 Medical Claims	n = 25 Procedural Claims	n = 1149 Medical Claims	n = 19 Procedural Claims
Age: median (Q1, Q3)	52 (37, 64)	54 (46, 62)	50 (38, 63)	31 (27.5, 46)
Sex n (%)	M = 366 (32.6) F = 755 (67.4)	M = 13 (0.5) F = 12 (0.5)	M = 423 (36.8) F = 726 (63.2)	M = 12 (63.2) F = 7 (36.8)

F=female; M=male; Q1=quartile 1; Q3=quartile 3.

Table 4. Length of Hospitalization of Patients With Supraventricular Tachycardia Requiring Catheter Ablation

	2017	2018
Length of hospitalization, d Median (Q1, Q3)		
ICD-10/medical claims	2 (2, 3)	2 (2, 3)
RVS/procedural claims	3 (2, 5)	4 (3, 5.5)

ICD-10=International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; RVS=Relative Value Scale.

private institutions. Admissions for RFA (claims under RVS) were mostly in government hospitals.

The regional distribution of hospitalization and procedure claims are presented in Table 6. Most of the medical claims were from the National Capital Region (NCR), followed by Region III and Region VIII for 2017. For 2018, NCR still had the most claims, consistently followed by Region III. All procedural claims for both years were from NCR.

Table 5. Type of Facility Where Patients With Supraventricular Tachycardia Were Admitted

Type of Hospital	2017 No. of Admissions/Claims		2018 No. of Admissions/Claims	
	ICD-10 Codes (n = 1121) n (%)	RVS Code (n = 25) n (%)	ICD-10 Codes (n = 1149) n (%)	RVS Code (n = 19) n (%)
Government hospital	237 (21.1)	16 (64.0)	279 (24.3)	13 (68.4)
Private hospital	882 (78.7)	9 (36.0)	868 (75.5)	6 (31.6)
Facility type not mentioned	2 (0.2)	0	2 (0.2)	0

ICD-10=International Statistical Classification of Diseases and Related Health Problems, Tenth Revision; RVS=Relative Value Scale.

Table 6. Regional Distribution of Hospitalization and Procedures Done for Supraventricular Tachycardia and Cardiac Catheter Ablation

Region	2017		2018		Population, 2015[a]
	Medical n (%)	Procedural	Medical n (%)	Procedural	
Philippines (n)	1121	25	1149	19	100,981,437
Ilocos Region (Region I)	89 (7.9)	0	121 (10.5)	0	5,026,128
Cagayan Valley (Region II)	75 (6.7)	0	81 (7.0)	0	3,451,410
CAR	35 (3.1)	0	28 (2.4)	0	11,218,177
Central Luzon (Region III)	163 (14.5)	0	138 (12.0)	0	14,414,774
NCR	272 (24.3)	25	268 (23.3)	19	2,963,360
Calabarzon (Region IV-A)	71 (6.3)	0	84 (7.3)	0	5,796,989
Mimaropa (Region IV-B)[b]	27 (2.4)	0	56 (4.9)	0	4,477,247
Bicol Region (Region V)	54 (4.8)	0	47 (4.1)	0	6,041,903
Western Visayas (Region VI)	49 (4.4)	0	59 (5.1)	0	4,440,150
Central Visayas (Region VII)	93 (8.3)	0	72 (6.3)	0	3,629,783
Eastern Visayas (Region VIII)	42 (3.7)	0	37 (3.2)	0	4,689,302
Zamboanga Peninsula (Region IX)	11 (0.9)	0	14 (1.2)	0	4,893,318
Northern Mindanao (Region X)	48 (4.3)	0	61 (5.3)	0	4,545,276
Davao Region (Region XI)	29 (2.6)	0	30 (2.6)	0	2,596,709
SOCCSKSARGEN (Region XII)	36 (3.2)	0	37 (3.2)	0	12,877,253
Caraga (Region XIII)	24 (2.1)	0	16 (1.4)	0	1,722,006
ARMM	3 (0.3)	0	0	0	3,781,387

Notations defined as to the geographical classification of the region: CALABARZON, Cavite, Laguna, Batangas, Rizal, Quezon; MIMAROPA, Mindoro, Marinduque, Romblon, Palawan; SOCCSKSARGEN, South Cotabato, Cotabato, Sultan Kudarat, Sarangani, General Santos; NCR, National Capital Region; CAR, Cordillera Administrative Region; ARMM, Autonomous Region of Muslim Mindanao;
[a]100,981,437: population count as of 2015 (latest data provided by Philippine Statistics Authority).[9]
[b]Batangas province is under MIMAROPA region based on the address of the claims facility for this specific province, as per PhilHealth.

DISCUSSION

The quality of life and productivity of patients with recurrent SVT are greatly affected because of its distressing presenting symptoms, which include palpitations (22%), chest discomfort (5%), and syncope (4%).[4,10] The use of catheter ablation in the management of supraventricular and ventricular tachyarrhythmias has seen significant progress in the past decade.[5,11] It has been proven to be a safe and effective method to treat these arrhythmias but is greatly dependent on the expertise of the operator and the modernity of facilities used.[5,12,13] Catheter ablation has a high curative rate of 96% to 98% with a low mortality rate. The study focused on SVT with the exclusion of atrial fibrillation as the indication for cardiac catheter ablation primarily because RFA is the treatment of choice for the more common forms of SVT, and RFA for atrial fibrillation is not as widely performed.

There were 2,675,097 total hospitalization claims for medical conditions in 2017 and 2,715,491 in 2018. Hospitalization claims because of SVT in 2017 and 2018 were 1121 and 1149, respectively. These represented 0.04% of all PHIC claims for both years. This is an underestimate of the true prevalence of SVTs as some may not require admission because of shorter durations of episodes or require only emergency room visits for termination.

According to the Asia Pacific Heart Rhythm Society White Book, which is an annual compendium of arrhythmia-related statistical data in the Asia Pacific region, there were 99 and 93 ablation procedures done for SVT (mostly AVNRT and atrioventricular reciprocating tachycardia) in the Philippines in 2017 and 2018, respectively. These data, supplied by the Philippine Heart Rhythm Society, came from the combined census of procedures of all hospitals in the country capable of doing RFA procedures.[14,15] The current claims data showed that only 25 and 19 patients were able to undergo the procedure last 2017 and 2018, respectively. The huge discrepancy in actual numbers may be due to several factors. One possible explanation for the discrepancy might be due to erroneous encoding of the RVS code. For example, a nonmedical clerk will probably have some difficulty in differentiating RVS code 93651, which refers to "intracardiac catheter ablation of arrhythmogenic focus for treatment of supraventricular tachycardia" to RVS code 93650 (intracardiac catheter ablation of atrioventricular node function, atrioventricular conduction for creation of complete heart block, with or without temporary pacemaker placement) and 93652 (intracardiac catheter ablation of arrhythmogenic focus; for treatment of ventricular tachycardia). In addition, readmissions for the same condition cannot be filed if less than 3 months from the last admissions. Nonetheless, even the reported higher numbers of radiofrequency ablation procedures are still low compared with the numbers of patients who require this intervention. Presumably because of the high upfront cost of the procedure, most patients prefer pharmacologic management, despite all higher health-related costs of the latter including hospitalizations, emergency room visits, and pharmacy costs.[5].

Demographic Profile

Atrioventriculonodal reentry tachycardia, which is the most common of SVTs, is mostly seen in females, whereas SVTs mediated by an accessory pathway is mostly seen in males.[4,5,16,17] In an unpublished report of a 10-year retrospective Philippine Heart Center data from 2009 to 2018, most patients who underwent RFA were females (57%) with a mean age of 36 years.[3] In the current study, most patients who were hospitalized for SVT were females in both years. Claims for procedures, however, had a different pattern in sex distribution as this was equal in 2017, and more males underwent RFA in 2018. This is perhaps due to the different types of specific SVT of the patients and other indications for undergoing RFA in the inclusive years of the study. For example, for the latter, RFA might have been done as a pre-employment intervention in male seafarers, because clearance for employment would require procedural intervention aside from medical management.

The age of distribution of SVTs likewise depends on the subtypes. For AVNRT, distribution is bimodal, and it occurs in the third and sixth decade of life.[4,5,16,17] In the cohort of patients in this study, the median ages were 52 and 50 years in 2017 and 2018, respectively, for patients who were hospitalized for SVT. On the other hand, patients who underwent ablation were younger with a median age of 31 years (Q1, 27.5; Q3, 46). There is limited available information regarding comorbid conditions of patients with cardiac arrhythmia because of the policy on the encoding of PhilHealth claims. Under the current PhilHealth policy,[18,19] for patients who undergo a procedure, the first case rate should be the RVS code. The second case rate should be a diagnosis that would support the claim for the first case rate. Hence, apart from the procedure and the underlying arrhythmia, data on other comorbid conditions are unavailable.

Length of Hospital Stay

Patients who were hospitalized for SVT have a median length of 2 days of hospital stay, whereas patients who underwent RFA had a median hospital stay of 4 days. Patients with acute episodes of SVT usually undergo acute termination and discharge thereafter on pharmacologic therapy. Patients for RFA are admitted a day before the procedure and discharged a day or two after if free of any complication.

Type of Facility and Regional Distribution

The majority of hospitalizations were in private hospitals in NCR where electrophysiologists and facilities for RFA are available.[15] The least number of hospitalization claims were found in the Autonomous Region of Muslim Mindanao, which may be due to a lack of large tertiary centers capable of handling complicated arrhythmia cases. Although the majority of RFA procedures were done in government hospitals, most patients were still under private admissions.

In general, the presence of SVTs does not confer increased mortality.[4,10] It is still unclear if the recorded mortality in this patient cohort is due to the SVT or other etiology.

LIMITATIONS OF THE STUDY

(1) Lack of information regarding comorbid conditions of the patients admitted because of current PhilHealth policy in terms of encoding of the final diagnosis or diagnoses (claims). As previously explained, these claims were encoded separately under "procedural claims"; that is, PhilHealth would encode the RVS code as the first case rate. For the second diagnosis (50% case rate), PhilHealth would only accept a second diagnosis as per its "List of Medical Conditions and Procedures Allowed as Second Case Rate."[20] This list unfortunately does not include the specific arrhythmias that would have supported why the patient underwent the procedure.

(2) Inconsistency of numbers with Asia Pacific Heart Rhythm Society White Book, possible explanations to which have been previously enumerated.

CONCLUSION

In 2017 and 2018, hospitalization claims for SVT requiring catheter ablation were 0.04% (four hospitalization claims for SVT per 10,000 of the total claims) in both years. The majority of patients were admitted with pharmacologic therapy on discharge with very low utilization of radiofrequency ablation for long-term management. No mortality was recorded among patients admitted for catheter ablation.

ACKNOWLEDGEMENTS

The authors acknowledge the Philippine Heart Rhythm Society for its funding support. The following PhilHealth personnel are likewise acknowledged for support in the collection of data: Francisco Z. Soria, Jr, MD; Arturo C. Alcantara, MD, MBA-H; Loren A. Porciuncula; Allan F. Santilla; Julita A. Presbitero; Arnie Marie G. Hizon; and Roy D. Geronimo.

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APPENDICES

Appendix 1. ICD-10 Codes Corresponding to Cardiac Arrhythmias Requiring Radiofrequency Ablation

ICD-10 Codes	Description
I47.1	Supraventricular tachycardia, atrial paroxysmal tachycardia, atrioventricular paroxysmal tachycardia, junctional tachycardia, nodal paroxysmal tachycardia

Appendix 2. RVS Codes Corresponding to Procedures Done to Patients With Cardiac Arrhythmias Requiring Radiofrequency Ablation

RVS Codes	Description
93618	Induction of arrhythmia by electrical pacing
93620	Comprehensive electrophysiologic evaluation including insertion and repositioning of multiple electrode catheters, with induction or attempted induction of arrhythmia; with right atrial pacing and recording, His bundle recording
93651	Intracardiac catheter ablation of arrhythmogenic focus; for treatment of supraventricular tachycardia by ablation of fast or slow atrioventricular pathways, accessory atrioventricular connections or other atrial foci, singly or in combination