

**SHORT TERM AND LONG-TERM RESULTS  
OF RADIOFREQUENCY CATHETER  
ABLATION FOR ATRIOVENTRICULAR  
NODAL REENTRANT TACHYCARDIA AT  
TAM DUC HEART HOSPITAL**

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# BACKGROUND

- AVNRT is the most common form of paroxysmal regular supraventricular tachycardia in adults.
- AVNRT related to the presence of dual anterograde atrioventricular (AV) node pathways with disparate electrophysiological (EP) properties
- Symptom onset occurs between 30-50 years
- Elderly patients (>60 years) represent only 12–22% of those with AVNRT

# BACKGROUND

- Radiofrequency catheter ablation (RFCA) is an effective therapeutic strategy in treating patient who has paroxysmal supraventricular tachycardia, especially AVNRT
- The safety, efficacy, and long term results have not been reported in a large series of consecutive patient with AVNRT in Vietnam.

# OBJECTIVES

- Assess the acute success and long-term results of RF catheter ablation for AVNRT
- Compare the safety and efficacy of slow-pathway RF CA between young patients and elderly patients

# Method

- Between July 2008 and February 2017
- A total of 394 consecutive patients AVNRT have been enrolled
- Patients were divided into 2 groups: group I included 300 patients aged  $<60$  years and group II included 94 patients aged  $\geq 60$  years

# Inclusion criteria

- All patients had symptomatic AVNRT episodes documented by 12-lead surface electrocardiography (ECG) before the ablation procedure
- Refractory to at least one AAD
- EP study confirming AVNRT diagnosis.

# Exclusion criteria

- Arteriosclerosis obliterance
- Acute coronary syndrome
- Heart failure (not induce by arrhythmias)
- Other critical illness
- Severe coagulopathy
- Infection
- The patient does not agree to the procedure

# EP study and mapping

- After obtaining informed consent from patients, EPS was performed for all patients in the fasting and non-sedated state.
- Before the study, all AADs except amiodarone were discontinued for at least 5 half-lives.



# EP study and mapping

- GE electrophysiology recording system
- Approach via the right femoral vein
- Catheters positioned in the high right atrium, the right ventricular apex, and the His bundle region, and the coronary sinus
- EP study was performed by using standard techniques
- Mechanism of the tachycardia was determined by pacing maneuver.

# AVNRT diagnosis criteria

- Anterograde and rarely retrograde dual AV node pathways with or without echo beats
- Induction of tachycardia dependent on a critical delay in the atrial-His (A-H) interval (jump)
- AH jump was defined as the difference between any consecutive AH intervals equal to, or more than, 50ms during programmed or incremental atrial pacing
- Exclusion of an accessory pathway or atrial tachycardia using conventional pacing and mapping techniques

# EP study and mapping

- RF pulses of 60–90s were applied at optimal sites, with a maximum temperature of 60°C and maximum power of 50W
- Power, impedance and temperature were measured and stored during each application of RF energy

# EP study and mapping

- **Acute success:** defined as junctional ectopic beats during ablation, noninducibility of AVNRT with or without infusion of atropine or Isopretenol, with a maximum of 1 AV nodal echobeat, regardless of the persistence of dual AV nodal physiology during programmed atrial stimulation
- All patients were monitored for 3–6h, and 12-lead ECG was taken from all patients immediately after the ablation procedure, before discharge, and 1 month after discharge.

# Clinical Follow-up

- Followed-up 1 month after RFCA and every 3 months thereafter.
- 12-lead ECGs at each visit
- Patients not coming for follow-up were contacted over telephone.
- Recurrences: defined as recurrence of AVNRT (ECG or EP study)

# Statistical Methods

- Data were expressed as the mean  $\pm$  SD or percentage.
- Continuous values were compared by Student T test/ Mann-Whitney U test.
- A chi-square test with Yates' correction or Fisher's exact test was used for categorical data.
- $P < 0.05$  was considered significant.
- SPSS 20.0 (Chicago, IL, USA) was used

# RESULTS (N=394)

## Baseline characteristics of patients with AVNRT

• Age (year)	48.78 ± 15.09 (13-84)
• <b>Gender</b> (male; %)	99 (25.1%)
• <b>Hypertension</b>	103 (26.1%)
• <b>Diabetes mellitus</b>	26 (6.6%)
• Coronary artery disease	6 (1.5%)
• Cardiomyopathy	1 (0.3%)
• Frequency of symptoms (epi/m)	1.4 (0.3-2)
• Duration of symptoms (month)	55.68 ± 54.62

# RESULTS (N=394)

## Co-exist tachycardia

- Co-AF 3 (0.8%)
- Co-Afl 3 (0.8%)
- Co-AT 4 (1%)
- Co-AVRT 5 (1.3%)



# RESULTS

## AADs used before RFCA

# RESULTS

## Baseline Electrophysiologic Characteristics

• BCL (ms)	784 ± 143
• AERP (ms)	231 ± 37
• AV node WCL (ms)	355 ± 66
• Fast ERP (ms)	316 ± 51
• Slow ERP (ms)	271 ± 38
• AH interval (ms)	71 ± 15
• HV interval (ms)	42 ± 8
• <b>AH jump (%)</b>	<b>78.9%</b>
• Multiple AH jumps, n (%)	1 (0.3)
• TCL (ms)	360 ± 58
• SVT rate (b/m)	172 ± 28

# RESULTS

## Electrophysiologic Characteristics After Successful Radiofrequency Catheter Ablation

- Acute succes (%) 390/394 (99%)
- AV node WCL (ms)  $342 \pm 53$
- AERP (ms)  $248 \pm 54$
- AV ERP (ms)  $292 \pm 59$
- AH interval (ms)  $71 \pm 24$
- HV interval (ms)  $42 \pm 7$
- Post-abl echo beat (%) 5.1%
- Residual SP (%) 4.8%

# RESULTS

## Comparison of Electrophysiologic Characteristics between before and After Radiofrequency Catheter Ablation

	Before	After	p value
•AERP (ms)	228 ± 38	241 ± 44	0.958
•AV node WCL (ms)	347 ± 76	343 ± 59	0.08
•AV ERP (ms)	268 ± 39	297 ± 62	0.228
•AH interval (ms)	70 ± 16	72 ± 24	0.052
•HV interval (ms)	41 ± 7	42 ± 7	0.213

# RESULTS

## Ablation Procedure-Related Data

Total procedure duration (min)	$58 \pm 34$
Total fluoroscopy time (min)	$19 \pm 11$
Number of radiofrequency impulses	$6 \pm 5.5$
Ablation time (min)	$2.2 \pm 2.18$

# RESULTS (N=394)

## Outcome

- Acute success 390 (99%)
- Complication 15 (3.8%)
- Follow-up duration (month) 29.49 ± 24.5
- Recurrent 8 (2%)

# RESULTS

## Complication

- Prolong PR 7 (1.9%)
- Complete heart block 3 (0.76%)  
(Need for PM implantation)
- Fistula 1 (0.3%)
- Hematoma 1 (0.3%)
- Tamponade 1 (0.3%)
- Pneumothorax 2 (0.5%)

# RESULTS

## Comparison of Basic Clinical Characteristics Between the 2 Groups

	Group 1 <60y (n=300)	Group ≥60y (n=94)	p value
• Hypertension	51 (17%)	52 (55.3%)	0.000
• Diabetes mellitus	10 (3.3%)	16 (17.02%)	0.000
• Coronary artery disease	1 (0.3%)	5 (5.3%)	0.001
• Cardiomyopathy	1 (0.3%)	0	0.374
• Co-AF	2 (0.6%)	1 (1.06%)	0.699
• Co-Afl	1 (0.3%)	2 (2.12%)	0.081
• Co-AT	3 (0.9%)	1 (1.06%)	0.957
• Co-AVRT	4 (0.12%)	1 (1.06%)	0.839



# RESULTS

## Comparison of Baseline Electrophysiologic Characteristics of the 2 Groups

	Group 1 <60y (N=300)	Group 2 ≥60y (N=94)	P value
• BCL (ms)	784 ± 145	786 ± 136	0.738
• AERP (ms)	236 ± 42	218 ± 24	0.018
• WCL (ms)	351 ± 69	371 ± 52	0.55
• Fast ERP (ms)	320 ± 47	301 ± 63	0.123
• Slow ERP (ms)	267 ± 34	295 ± 55	0.08
• AH interval (ms)	70 ± 15	74 ± 13	0.036
• HV interval (ms)	41 ± 7	43 ± 11	0.000
• TCL (ms)	354 ± 55	386 ± 65	0.354
• SVT rate (b/m)	174 ± 28	164 ± 27	0.610

# RESULTS

## Comparison of the Ablation Procedure-Related Data Between the 2 Groups

	<b>Group 1 &lt;60y</b> <b>(N=300)</b>	<b>Group 2 ≥60y</b> <b>(N=94)</b>	<b>P value</b>
• Total procedure duration (min)	55.34 ± 33.1	67.7 ± 35.6	0.731
• Total fluoroscopy time (min)	18.31 ± 11.8	20.3 ± 8.3	0.394
• Ablation number	6.1 ± 5.17	7.04 ± 5.4	0.738
• Ablation time (min)	2.49 ± 2.18	2.2 ± 1.2	0.392

# RESULTS

## Comparison of acute success and outcome between the 2 Groups

	<b>Group 1 &lt;60y (N=300)</b>	<b>Group 2 ≥60y (N=94)</b>	<b>P value</b>
• Acute success	296 (98.7%)	94 (100%)	
• Prolong PR	4 (1.3%)	1(1.06%)	0.947
• Complete heart block	2 (0.67%)	1 (1.06%)	0.3
• Fistula	0	1 (1.06%)	0.074
• Hematoma	1 (0.33%)	0	0.173
• Tamponade	0	1 (1.06%)	0.074
• Pneumothorax	1 (0.33%)	1 (1.06%)	0.138
• Recurrent	8 (2.67%)	0	0.11

# Discussion

	Yusuf I. Alihanoglu et al	Udyavar AR et al	Our study
Acute success	99.3%	99.6%	99%
Complications	0.77%	2.6%	3.8%
Recurrence	-	0.3%	2%

# CONCLUSIONS

- RF ablation is very effective to treat AVNRT.
- RF catheter ablation, could be considered as first-line therapy for AVNRT patients older than 60 years as well as younger patients
- There was no significant difference between the 2 groups in respect of the complications rates and recurrence rates.

**Thank you for your attention**