Korean Circ J. 2021 Jan;51(1):65-67
https://doi.org/10.4070/kcj.2020.0417
pISSN 1738-5520·eISSN 1738-5555

kcj
Korean Circulation Journal

Editorial

Prophylactic Cavotricuspid Isthmus Ablation in Patients without Typical Atrial Flutter: End of the Line

Eue-Keun Choi, MD, PhD

Division of Cardiology, Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea

▸ See the article "Long-term Efficacy of Prophylactic Cavotricuspid Isthmus Ablation during Atrial Fibrillation Ablation in Patients Without Typical Atrial Flutter: A Prospective, Multicentre, Randomized Trial" in volume 51 on page 58.

Received: Oct 5, 2020
Accepted: Oct 13, 2020

Correspondence to
Eue-Keun Choi, MD, PhD
Division of Cardiology, Department of Internal Medicine, Seoul National University Hospital, 101, Daehak-ro, Jongno-gu, Seoul 03080, Korea.
E-mail: choiek17@snu.ac.kr

ORCID iDs
Eue-Keun Choi
https://orcid.org/0000-0002-0411-6372

Funding
The author has received research grants from Bayer, BMS/Pfizer, Biosense Webster, Chong Kun Dang, Daiichi-Sankyo, Samjinpharm, Sanofi-Aventis, Seers Technology, Skylabs, and Yuhan.

Conflict of Interest
The author has no financial conflicts of interest related to this article.

The contents of the report are the author's own views and do not necessarily reflect the views of the *Korean Circulation Journal*.

Atrial fibrillation (AF) is the most common arrhythmia and is frequently accompanied by atrial flutter (AFL) and sinus node dysfuction.[1] The mechanisms of AF and AFL are closely related to each other. The onset of AFL is initiated by a transitional rhythm, usually AF. During long-term follow-up after cavotricuspid isthmus (CTI) ablation for AFL, incidental AF is common, suggesting that AFL is an early marker of atrial myopathy that progresses to AF.[2] Interestingly, a recent meta-analysis reported the benefits of prophylactic pulmonary vein (PV) isolation during CTI ablation among patients without a previous history of AF.[3] However, the role of prophylactic CTI ablation during PV antrum isolation (PVAI) in AF patients without a history of AFL is still unclear. This procedure is frequently performed in addition to PVAI, although evidence supporting the benefit of prophylactic CTI ablation in patients with AF has been limited. Three studies (one randomized controlled trial [RCT] and two retrospective studies) have evaluated prophylactic CTI ablation in AF patients without clinically documented AFL,[4-6] with none showing additional benefit in reducing the recurrence of atrial tachyarrhythmia. A recent meta-analysis reported the role of prophylactic CTI ablation in AF patients with or without documented AFL.[7] This study analyzed five studies: three RCTs and 2 retrospective observational studies matched with propensity scores.[4-6][8][9] Both paroxysmal and non-paroxysmal type of AF were included. Additionally, 2 of the RCTs also included those patients with coexistent AF and AFL. The results showed that PVAI with CTI ablation in patients with AF did not reduce the risk of recurrence of atrial tachyarrhythmia compared to PVAI alone, regardless of the presence of AFL. Furthermore, additional CTI ablation tended to be associated with longer procedural time and higher complication rates. Interestingly, additional CTI ablation did not show better atrial tachyarrhythmia-free survival compared to PVAI alone, even in patients with documented AF and AFL, which supports the importance of the PV trigger in initiating AFL.

In this issue of the *Korean Circulation Journal*, Kim et al.[10] report the role of prophylactic CTI ablation during PVAI in AF patients without typical AFL. In line with previous studies, this study also demonstrates that prophylactic CTI ablation did not show additional benefit in the recurrence of atrial tachyarrhythmia compared to PVAI alone in patients with paroxysmal AF without typical AFL. During a median follow-up of 3.4 years, AF or AFL recurred in about one-fourth of the total population. Most of the recurrences were AF, with recurrent AFL in only 2.4% of the total population. The rate of recurrent AFL was numerically higher in the PVAI-only group than in the PVAI with prophylactic CTI ablation group; however, the difference was not statistically significant

(3.3% vs. 1.6%, p=0.31). Although CTI ablation might reduce the risk of typical AFL recurrence, AF, the main type of atrial tachyarrhythmia recurring after PVAI, was not affected by it.

Despite the negative results, several clinical implications of this study should be mentioned. First, the population in this study is unique and homogeneous in comparison to previous studies. The researchers excluded patients with non-paroxysmal AF and enrolled only those with paroxysmal AF. To include only those without AFL, they also excluded those in whom an electrophysiological study could induce typical AFL. Despite the strict inclusion criteria, this study enrolled 366 patients, which was the largest number among RCTs evaluating prophylactic CTI ablation. Second, the ablation technique and results of the procedure were closer to real-world practice. The procedure time was not increased compared to that in PVAI alone because CTI ablation was mostly performed during the waiting time after PVAI. In addition, there were a few procedure-related complications in both groups. The atrial tachyarrhythmia-free survival was relatively higher than that reported in previous studies, reflecting recent advances in physician experience and technology.

However, there are several limitations that need to be mentioned. First, the hypothesis and sample size calculation did not seem to have enough supporting evidence. The authors pointed out that the sample size calculation in the previous study was not appropriate, so they calculated the sample size and decided on 160 patients for each group. Considering that there were no previous studies reporting the benefit of prophylactic CTI ablation, the hazard ratio of this study must have been higher than 0.8. Second, the protocol for AFL induction was not standardized. Considering that the number of patients with inducible AFL despite no previous history of AFL was not negligible (8%), detailed information on the induction protocol should be further described. In addition, it is not clear whether the AFL induction test was performed before or after PVAI, which could also affect the induction rate. It would be interesting to show an exploratory analysis of whether prophylactic CTI ablation would have an impact on the outcome in those who had inducible AFL. Third, the follow-up method was 24-hour Holter monitoring, so the recurrence of atrial tachyarrhythmia might have been underestimated. Lastly, the results of this study could not be extrapolated to those with persistent AF. Further studies are needed to test this hypothesis exclusively in those with persistent AF without typical AFL.

In conclusion, this study confirmed no additional benefit of prophylactic CTI ablation in addition to PVAI in patients with paroxysmal AF without clinical AFL. Considering the weak effect of CTI ablation on AF recurrence, PV isolation is the cornerstone of treatment in this population. Routine CTI ablation during catheter ablation for AF consistently showed no additional benefit in the recurrence of atrial arrhythmia, and should not be recommended. Thus, it is the end of the line. Now, it is time to change our unnecessary practice.

REFERENCES

1. Hwang TH, Yu HT, Kim TH, et al. Permanent pacemaker implantations after catheter ablation in patients with atrial fibrillation associated with underlying sinus node dysfunction. *Korean Circ J* 2020;50:346-57.
PUBMED | CROSSREF
2. Pérez FJ, Schubert CM, Parvez B, Pathak V, Ellenbogen KA, Wood MA. Long-term outcomes after catheter ablation of cavo-tricuspid isthmus dependent atrial flutter: a meta-analysis. *Circ Arrhythm Electrophysiol* 2009;2:393-401.
PUBMED | CROSSREF

https://doi.org/10.4070/kcj.2020.0417

3. Koerber SM, Turagam MK, Gautam S, et al. Prophylactic pulmonary vein isolation during cavotricuspid isthmus ablation for atrial flutter: a meta-analysis. *Pacing Clin Electrophysiol* 2019;42:493-8.
PUBMED | CROSSREF

4. Pontoppidan J, Nielsen JC, Poulsen SH, et al. Prophylactic cavotricuspid isthmus block during atrial fibrillation ablation in patients without atrial flutter: a randomised controlled trial. *Heart* 2009;95:994-9.
PUBMED | CROSSREF

5. Mesquita J, Ferreira AM, Cavaco D, et al. Impact of prophylactic cavotricuspid isthmus ablation in atrial fibrillation recurrence after a first pulmonary vein isolation procedure. *Int J Cardiol* 2018;259:82-7.
PUBMED | CROSSREF

6. Lee WC, Fang HY, Chen HC, et al. Additional cavotricuspid isthmus block ablation may not improve the outcome of atrial fibrillation ablation. *Pacing Clin Electrophysiol* 2019;42:1421-8.
PUBMED | CROSSREF

7. Romero J, Patel K, Briceno D, et al. Cavotricuspid isthmus line in patients undergoing catheter ablation of atrial fibrillation with or without history of typical atrial flutter: a meta-analysis. *J Cardiovasc Electrophysiol* 2020;31:1987-95.
PUBMED | CROSSREF

8. Wazni O, Marrouche NF, Martin DO, et al. Randomized study comparing combined pulmonary vein-left atrial junction disconnection and cavotricuspid isthmus ablation versus pulmonary vein-left atrial junction disconnection alone in patients presenting with typical atrial flutter and atrial fibrillation. *Circulation* 2003;108:2479-83.
PUBMED | CROSSREF

9. Mohanty S, Mohanty P, Di Biase L, et al. Results from a single-blind, randomized study comparing the impact of different ablation approaches on long-term procedure outcome in coexistent atrial fibrillation and flutter (APPROVAL). *Circulation* 2013;127:1853-60.
PUBMED | CROSSREF

10. Kim SH, Oh YS, Choi Y, et al. Long-term efficacy of prophylactic cavotricuspid isthmus ablation during atrial fibrillation ablation in patients without typical atrial flutter: a prospective, multicentre, randomized trial. *Korean Circ J* 2021;51:58-64.
CROSSREF