

# Proven isolation of the pulmonary vein antrum with or without left atrial posterior wall isolation in patients with persistent atrial fibrillation

Rong Bai, MD, FHRS, FESC,<sup>\*†</sup> Luigi Di Biase, MD, PhD, FHRS,<sup>\*‡§||</sup> Prasant Mohanty, MBBS, MPH,<sup>\*</sup> Chintan Trivedi, MD,<sup>\*</sup> Antonio Dello Russo, MD,<sup>¶</sup> Sakis Themistoclakis, MD,<sup>#</sup> Michela Casella, MD,<sup>¶</sup> Pietro Santarelli, MD,<sup>\*\*</sup> Gaetano Fassini, MD,<sup>¶</sup> Pasquale Santangeli, MD,<sup>\*</sup> Sanghamitra Mohanty, MD, FHRS,<sup>\*</sup> Antonio Rossillo, MD,<sup>#</sup> Gemma Pelargonio, MD,<sup>\*\*</sup> Rodney Horton, MD,<sup>\*</sup> Javier Sanchez, MD,<sup>\*</sup> Joseph Gallinghouse, MD,<sup>\*</sup> J. David Burkhardt, MD, FHRS,<sup>\*</sup> Chang-Sheng Ma, MD,<sup>†</sup> Claudio Tondo, MD,<sup>¶</sup> Andrea Natale, MD, FHRS<sup>\*§††‡‡</sup>

From the <sup>\*</sup>Texas Cardiac Arrhythmia Institute at St. David's Medical Center, Austin, Texas, <sup>†</sup>Department of Cardiology, Beijing Anzhen Hospital, Capital Medical University, Beijing, China, <sup>‡</sup>Albert Einstein College of Medicine, at Montefiore Hospital, New York, New York, <sup>§</sup>Department of Biomedical Engineering, University of Texas, Austin, Texas, <sup>¶</sup>Department of Cardiology, University of Foggia, Foggia, Italy, <sup>||</sup>Cardiac Arrhythmia Research Centre, Centro Cardiologico Monzino IRCCS, Milan, Italy, <sup>#</sup>Ospedale dell'Angelo, Mestre Venice, Italy, <sup>\*\*</sup>University of Sacred Heart, Rome, Italy, <sup>††</sup>California Pacific Medical Center, San Francisco, California, and <sup>‡‡</sup>Dell Medical School, Austin, Texas.

**BACKGROUND** It is unclear whether isolation of the left atrial posterior wall (LAPW) offers additional benefits over pulmonary vein antrum isolation (PVAI) alone in patients with persistent atrial fibrillation (AF).

**OBJECTIVE** We sought to determine the impact of PVAI and LAPW isolation (PVAI+LAPW) versus PVAI alone on the outcome of ablation of persistent AF.

**METHODS** During the first procedure, PVAI was performed in 20 patients (group 1), whereas in 32 patients (group 2), PVAI was extended to the left atrial (LA) septum and coronary sinus (CS), and isolation of the LAPW was targeted (ePVAI+LAPW). Isolation of the superior vena cava was achieved in both groups. All 6 patients, regardless of arrhythmia recurrence, underwent a second procedure 3 months after the first procedure. In patients with reconnection of pulmonary veins or LAPW, reisolation was performed, and a third procedure was performed 3 months later to verify isolation. Patients entered follow-up only after PVAI (group 1) or PVAI+LAPW (group 2) isolation was proven.

**RESULTS** At the 1-, 2-, and 3-year follow-up examinations, the rates of freedom from atrial tachyarrhythmia without use of an antiarrhythmic drug were 20%, 15%, and 10% in group 1 and 65%, 50%, and 40%

in group 2, respectively (log-rank  $P < .001$ ). The median recurrence-free survival time was 8.5 months (interquartile range 6.5–11.0) in group 1 and 28.0 months (interquartile range 8.5–32.0) in group 2.

**CONCLUSION** Proven isolation of the LAPW provides additional benefits over PVAI alone in the treatment of persistent AF and improves procedural outcome at follow-up. However, the ablation strategy of ePVAI+LAPW is still associated with a significant high incidence of very late recurrence of atrial tachyarrhythmia.

**CLINICAL TRIAL REGISTRATION** "Outcome of Atrial Fibrillation Ablation After Permanent Pulmonary Vein Antrum Isolation With or Without Proven Left Atrial Posterior Wall Isolation" (LIBERATION). ClinicalTrials.gov Identifier: NCT01660100.

**KEYWORDS** Atrial fibrillation; Catheter ablation; Pulmonary vein antrum isolation; Left atrial posterior wall

**ABBREVIATIONS** AAD = antiarrhythmic drug; AF = atrial fibrillation; AFL = atrial flutter; AT = atrial tachycardia; CS = coronary sinus; ECG = electrocardiogram; ePVAI = extended pulmonary vein antrum isolation; ICE = intracardiac echocardiography; IQR = interquartile ratio; LA = left atrium; LAPW = left atrial posterior wall; OAT = organized atrial

*Clinical Trial registration:* Outcome of Atrial Fibrillation Ablation After Permanent Pulmonary Vein Antrum Isolation With or Without Proven Left Atrial Posterior Wall Isolation" (LIBERATION Trial) ClinicalTrials.gov Identifier: NCT01660100. Dr. Bai was supported by the National Natural Science Foundation of China (NSFC-81370290) and the Program of Beijing High-caliber Talent from Overseas (BHTO201410007). Dr. Di Biase is a consultant for Biosense Webster, St Jude Medical, and Stereotaxis and reports having received speaker honoraria or travel fees from Biotronik, AtriCure, Medtronic, Biotronik, Boston Scientific, and Epi EP. Dr. Natale reports having received speaker honoraria from Boston Scientific, Biosense Webster, Medtronic, and St. Jude. All other authors have reported that they have no conflicts to disclose. Preliminary results of this study were presented as an abstract by Dr. Bai at the 33rd Annual Scientific Sessions of the Heart Rhythm Society, May 9–12, 2012, Boston, MA. **Reprint requests and correspondence:** Dr. Andrea Natale, Texas Cardiac Arrhythmia Institute at St. David's Medical Center, 3000 N. I-35, Suite 720 Austin, TX 78705. E-mail address: dr.natale@gmail.com.

tachyarrhythmia; **PV** = pulmonary vein; **PVAI** = pulmonary vein antrum isolation; **SVC** = superior vena cava

(Heart Rhythm 2015;0:0-9) © 2015 Heart Rhythm Society. All rights reserved.

## Introduction

Catheter ablation has emerged as a promising treatment strategy for atrial fibrillation (AF), and pulmonary vein antrum isolation (PVAI) has become the cornerstone of the ablation technique,<sup>1</sup> but it may not be enough to treat persistent AF. The posterior wall of the left atrium (LA) embryologically originates from the same cells of the primordial pulmonary vein (PV).<sup>2</sup> In addition, spontaneous trigger activity and rotors from the LA posterior wall (LAPW) have been reported in previous studies.<sup>3-5</sup> Therefore, elimination of these arrhythmogenic sites by isolation of the LAPW appears to be an important adjuvant strategy to PVAI in AF ablation, especially when dealing with patients with persistent AF. However, in previous studies, evaluation of the importance of LAPW isolation was based on clinical AF recurrence with or without PV reconnection, which was detected only in redo cases.<sup>6,7</sup> Whether the isolation of LAPW is required or offers additional benefits over PVAI alone in patients with persistent AF is still not clear. In this multicenter study, we sought to determine the impact of proven PVAI and LAPW isolation versus PVAI alone on the outcome of ablation of persistent AF.

## Methods

### Study population

Fifty-two consecutive patients with persistent AF (defined as continuous AF that was sustained >7 days) who underwent their primary catheter ablation were enrolled in this study. All patients gave written consent to their procedures. The study protocol conformed to the guiding principles of the Declaration of Helsinki and was approved by the ethics committee.

### Catheter ablation of persistent AF

Our techniques used for catheterization have been reported previously. Briefly, after 2 transseptal punctures, a circular mapping catheter (Lasso, Biosense Webster, Diamond Bar, CA) and a 3.5-mm open-irrigated-tip ablation catheter (Navistar-Thermocool, Biosense-Webster) were advanced into the LA for mapping and ablation. A single left femoral venous access site was used to place a 10F 64-element phased-array intracardiac echocardiography (ICE) imaging catheter (AcuNav, Acuson, Mountain View, CA) in the right atrium. Another venous access site in the right internal jugular vein was obtained to introduce a 20-pole catheter (Livewire Spiral HP, St. Jude Medical, St. Paul, MN), of which the distal 10-pole was positioned in the coronary sinus (CS) while the proximal 10-pole was placed along the crista terminalis.

The 52 patients underwent the ablation procedure between October 2010 and July 2011 and were grouped according to

their procedure date. The first consecutive 20 patients constituted group 1, and the following 32 consecutive patients constituted group 2 of this study. The different ablation strategies used in groups 1 and 2 are described in detail below.

During the first procedure in group 1 (n = 20 patients), only PVAI was performed (PVAI alone) by the ipsilateral circumferential ablation technique (Figure 1A-1C). The procedural endpoint was PV-LA entrance block confirmed by use of a circular mapping catheter. The superior vena cava (SVC) was routinely isolated if potentials were presented. If AF was sustained or converted into an organized atrial tachyarrhythmia (OAT), cardioversion was applied but no further ablations were performed. The patient was given antiarrhythmic drugs (AADs) during the blanking period (defined below).

Three months after the first procedure, all patients regardless of atrial arrhythmia recurrence underwent a second procedure. After a single transseptal access, a circular catheter was introduced into the LA and used to check the connection between the LA and PVs. If all the PVs remained isolated, no ablation was applied, and follow-up began at this time. If there was reconnection between the LA and 1 or more PVs, additional LA and venous access was obtained, and re-isolation of the PV antrum was performed. Cardioversion was applied when sinus rhythm could not be restored during the ablation. Postprocedural care of these patients was similar to that after the first procedure, including up to 3 months of AAD use. Three months later (ie, 6 months after their first procedure), patients who received PV antrum re-isolation during the second procedure underwent a third procedure, for which the process and protocol were identical to the second one. Then, these patients were followed up for outcome with or without a 3-month blanking period depending on whether they received redo ablation in the third procedure.

When patients in group 2 (n = 32) underwent their first procedure, PVAI was extended (ePVAI) all the way to the CS and to the left side of the interatrial septum, along with extensive ablations on the LAPW with an aim to achieve isolation of the entire LAPW (ePVAI+LAPW; Figures 1D-1F and 2A-2B). Similarly, the SVC was empirically isolated when potentials were identified, and cardioversion was applied if necessary. The endpoint of the procedure was isolation of all the PVs and isolation of the LAPW, the latter being defined as entrance block and complete electrical silence on LAPW confirmed by the absence of near-field atrial activity on the circular mapping catheter that was placed on the LAPW (Figures 2A, 2B, 3A, and 3B). Then, AADs were resumed up to 3 months after the ablation.

Irrespective of recurrent atrial arrhythmias, all patients were taken to the catheterization laboratory for a second procedure 3 months after their first procedure. During the second procedure, PV-LA connection and LAPW

166  
167  
168  
169  
170  
171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219

Download English Version:

<https://daneshyari.com/en/article/5959252>

Download Persian Version:

<https://daneshyari.com/article/5959252>

[Daneshyari.com](https://daneshyari.com)