Available online at www.sciencedirect.com

ScienceDirect

Journal of Electrocardiology 49 (2016) 18 – 22

JOURNAL OF Electrocardiology

www.jecgonline.com

Transient sinus node dysfunction following sinus node artery occlusion due to radiofrequency catheter ablation of the septal superior vena cava–right atrium junction

Takeshi Kitamura, MD,[a,*] Seiji Fukamizu, MD,[a] Ken Arai, MD,[a] Rintaro Hojo, MD,[a] Yuya Aoyama, MD,[a] Kota Komiyama, MD,[a] Harumizu Sakurada, MD, PhD,[b] Masayasu Hiraoka, MD, PhD[c,d]

[a] *Department of Cardiology, Tokyo Metropolitan Hiroo Hospital, Tokyo, Japan*
[b] *Tokyo Metropolitan Health and Medical Treatment Corporation Ohkubo Hospital, Tokyo, Japan*
[c] *Toride Kitasoma Medical Center Hospital, Ibaraki, Japan*
[d] *Tokyo Medical and Dental University, Tokyo, Japan*

Abstract We performed catheter ablation to septal superior vena cava (SVC)–right atrium (RA) junction rapid firing in a 57-year-old man with paroxysmal atrial fibrillation. He later experienced transient sinus node dysfunction resulting from injury to the sinus node artery (SNA), which branched only from the proximal region of the left circumflex artery. The direction of the SNA should be considered during catheter ablation at the septal SVC–RA junction, especially if the sinus node is supplied by only one SNA from the right coronary artery or the left circumflex artery.

Keywords: Sinus node dysfunction; Sinus node artery; Superior vena cava right atrium junction; Atrial fibrillation; Ablation

Introduction

A prior study described the prevalence, clinical manifestations, and culprit coronary artery injury sites arising after radiofrequency (RF) ablations for atrial tachyarrhythmias [1]. However, direct coronary angiography in patients with sinus node dysfunction (SND) due to coronary artery injury during RF ablation for atrial fibrillation (AF) has not been reported.

Case report

A 57-year-old man had previously undergone pulmonary vein isolation for paroxysmal atrial fibrillation (PAF) and catheter ablation (CA) for recurrence of drug-resistant PAF. His first session (in 2003) of treatment had involved individual pulmonary vein isolation, followed by a second session (on February 25th, 2014) to re-isolate all reconnected pulmonary veins due to PAF recurrence. After second session, sinus rhythm had been maintained for 5 months. The 24-h electrocardiogram recording (on July 26th) showed an average heart rate of 71 beats per min (bpm), an minimal heart rate of 48 bpm at 2 A.M. and a total of 97,343 heart beats, with 2% symptomatic PAF. There were no long sinus pause (>1.5 s) following cessation of the PAF and no findings indicating SND on the 24-h electrocardiogram recording. A third session was performed for the PAF recurrence. An electrocardiogram (ECG) on August 12th was shown on Fig. 1A. Then, because firing from the septal superior vena cava (SVC)–right atrium (RA) junction reproducibly initiated AF during continuous isoproterenol (ISP) infusion at the third session (on August 13th, 2014), we performed CA using an irrigation catheter to treat the firing. Before the ablation session, written informed consent was obtained. During delivery of the RF current at the septal SVC–RA junction during continuous infusion of ISP at 1 μg/min, a junctional rhythm was observed (Fig. 1B). Sinus arrest and junctional rhythm persisted after RF energy delivery. After the ISP infusion was discontinued, sinus arrest with a junctional rhythm continued during the procedure (Fig. 1C). The symptomatic transient sinus arrest persisted for 18 h after the third ablation session (Fig. 1D) (on Aug. 14th). The maximum RR interval was 1542 ms, and the minimum heart rate was 39 beats/min. When the patient's heart rate dropped below 50 beats/min, he experienced severe fatigue. Therefore, ISP administration was necessary to maintain sinus rhythm. We started an ISP

* Corresponding author at: Department of Cardiology, Tokyo Metropolitan Hiroo Hospital, 2-34-10 Ebisu, Shibuya-ku, Tokyo, Japan.
E-mail address: take1124@hotmail.co.jp

http://dx.doi.org/10.1016/j.jelectrocard.2015.11.001
0022-0736/

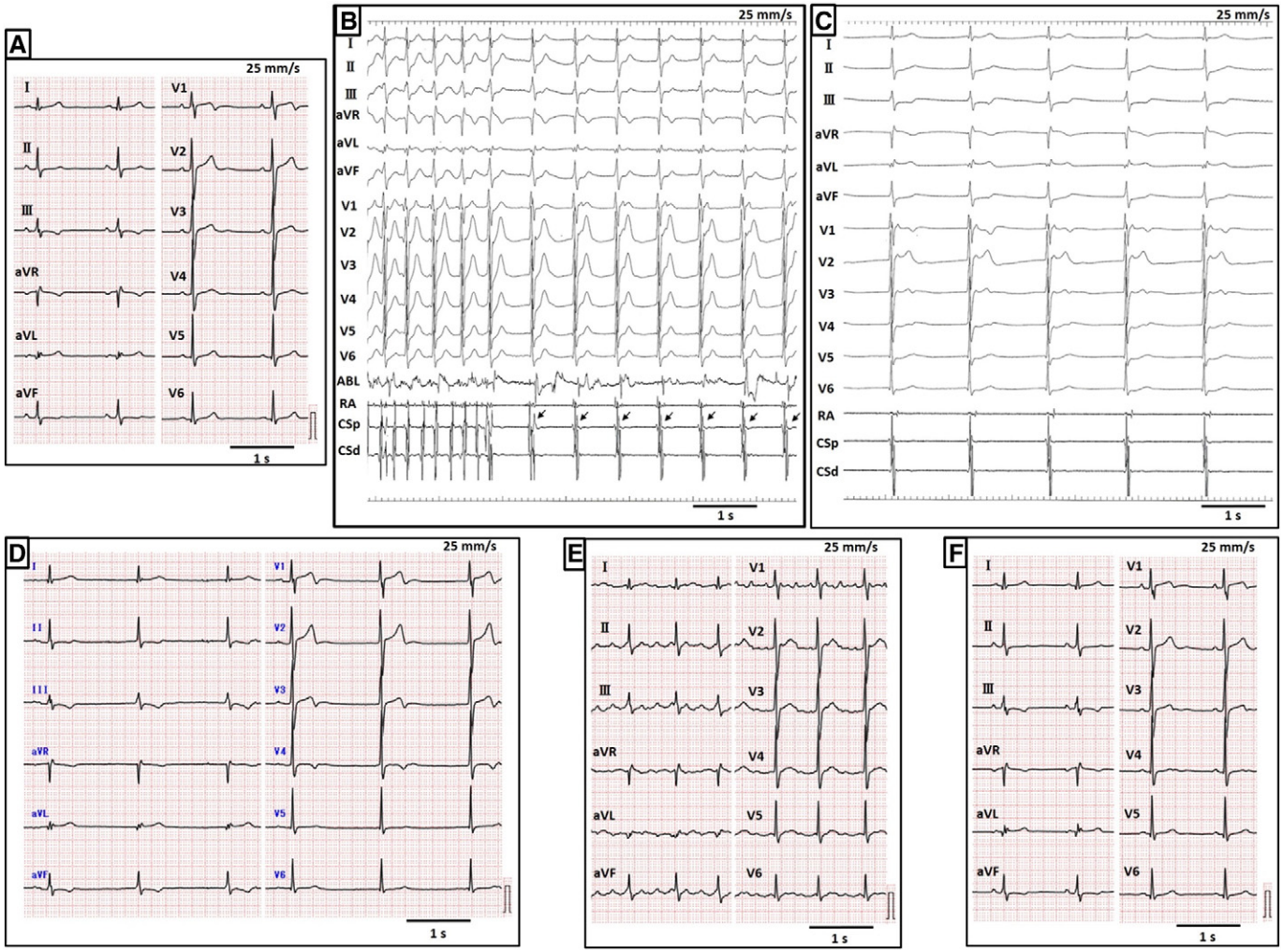

Fig. 1. A series of 12 lead electrocardiograms (ECGs) from before the third session to after the fourth session. Panel A (8/12) shows an ECG of sinus rhythm before the third session. Panel B (8/13 during the third session) shows an ECG and intracardiac electrogram during radiofrequency energy delivery at the septal superior vena cava–right atrium junction during atrial fibrillation induced by isoproterenol continuous infusion. Note that relatively rapid junctional rhythm was observed just after atrial fibrillation stopped. The arrows indicate junctional rhythm. Panel C (8/13 post third session) shows an ECG and intracardiac electrogram at the end of the third session after discontinuing the isoproterenol infusion. Sinus arrest and junctional escape rhythm were recorded. Panel D (8/14) shows an ECG recording 16 h after the third session. Note that sinus arrest and junctional escape rhythm were recorded. Maximum RR interval was 1542 ms. Panel E (8/23) shows an ECG of symptomatic atrial flutter, which necessitated another ablation session. Panel F (8/27) shows an ECG of sinus rhythm just after the fourth session.