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CONTENTS

Usefulness of Device Recorded AF Episodes for AF Management

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Atrial Fibrillation (AF) occurs in 1 out of 6 strokes, with devastating consequences. As AF is often asymptomatic, detection of AF has important clinical implications in prevention and therapy of AF related complications such as stroke and heart failure. Short term external recordings of AF are limited by sensitivity and specificity. Prolonged rhythm recordings can be achieved with insertable cardiac monitors (ICMs) and in cardiac implantable electronic devices (CIED) such as pacemakers and cardioverter defibrillators (ICDs).

Prior studies have shown AF can be detected in 2.5 – 7.7% of cryptogenic stroke (stroke without an identifiable cause after Holter, E.C.G. and echo)[1]. The EMBRACE[2] is a prospective study that examined 572 patients with cryptogenic stroke who received a continuous 30 days external event-triggered recorder for AF. AF > 30s was detected in 16.1% versus 3.2%, using Holter recording, resulting in an increase in anticoagulation use. The CRYSTAL AF study[3] carries this further using ICMs in 441 patients with cryptogenic stroke. At 12 month, AF was documented in 12.4 vs 2.4% compared to Holter recording alone. After AF detection, secondary prevention using oral anticoagulants (OAC) can be initiated instead of anti-platelet agents, resulting in better protection for recurrent stroke.

It will be more effective to identify AF before a stroke occurs, such that primary stroke (and heart failure) prevention can be started early. Several prospective studies have examined the outcome of CIED detected AF episodes in thromboembolism (TE). The TRENDS study[4] examined 2,486 patients with CIEDs, and found AF ≥ 5.5 hours to increase TE risk by 2.2 times (p=0.06). The ASSERT study[5] prospectively evaluated 2,580 hypertensive elderly patients without prior history of AF, to see if an atrial high rate episode > 6 min occurring within in 3 months after CIED implantation may predict future AF and TE. The investigators found AF occurred in 10.1% of patients by 3 months, which increased TE and clinical AF risks by 2.9 and 5.0 times respectively, compared to those without AF detected. Furthermore, an AHRE > 17.7 hours was correlated with the occurrence of TE. A meta-analysis[6] showed that all AF episodes > 5 min are predictive of increased TE, and there was a progressive increase in risk that

plateaued when AF ≥ 24h. The $CHADS_2$ scores further refined the risk of subsequent TE. ICM provides an alternative AF recording without implanted leads, and have high predictive value for AF[7].

The question remains if CIED/ICM detected AF in patients without clinical AF or prior stroke should be treated or not. A temporal relationship between AF detection and TE has not been confirmed by subgroup study of the TRENDS[8] and ASSERT[9]. This suggests AF may only be a risk marker of stroke. Alternatively, AHRE may represent early AF in CIED indicated patients that would only be casually related to TE if follow up for longer period. The IMPACT study[10] is a prospective study that randomized high risk patients with CIED to OAC versus no-OAC. The study was prematurely stopped and not yet published. In the absence of randomized intervention study, primary prevention of a detected AF episode can only be an expert opinion. For patients with $CHADS_2$ score = 0, OAC is not necessary. For patients with $CHADS_2 \geq 3$, most would consider OAC therapy. In patients with moderate TE risk at $CHADS_2 = 1$ or 2, some suggest OAC should be balanced against the risk of OAC induced intracranial hemorrhage[11]. The availability of novel OAC with better benefit/risk ratio than OAC may encourage the use of primary stroke prevention earlier in patients with a detected AHRE.

Early detection of AF particularly in conjunction with remote monitoring may be important to reduce AF related complications such as heart failure. The recently published IN-TIME study[12] randomized 716 patients with NYHC II – III heart failure to either remote monitoring or conventional care. Remote monitoring, with early intervention to heart failure and arrhythmias such as AF, significantly reduced worsening in heart failure composite scores compared to conventional care (OR 0.63).

In summary, device recorded AF episodes are useful for secondary prevention in cryptogenic stoke. While AF detection by devices is predictive of future TE events, the role of primary stroke prevention remains undefined. Early AF detection by remote monitoring in CIEDs and treatment may play an important role in preventing worsening heart failure.

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ECG Quiz

The model commentary will be provided in the next issue No.19

Chiu Shuenn-Nann, MD

National Taiwan University Hospital

A one month old boy was diagnosed as ventricular septal defect one week after birth. He presented with tachypnea, dyspnea, and feeding intolerance. Echocardiography was then performed which showed a 7mm large perimembranous type ventricular septal defect. After medical control with anti-congestive medication, heart failure symptoms persisted. He then received surgical repair of ventricular septal defect at one month of age. After returning to surgical intensive care unit, his vital sign was stable and heart rate was around 140-160bpm initially. However, around 12 hours after operation, tachycardia with heart rate around 200-220bpm was noted at monitor. Complete EKG was performed and was as followed.

Question 1

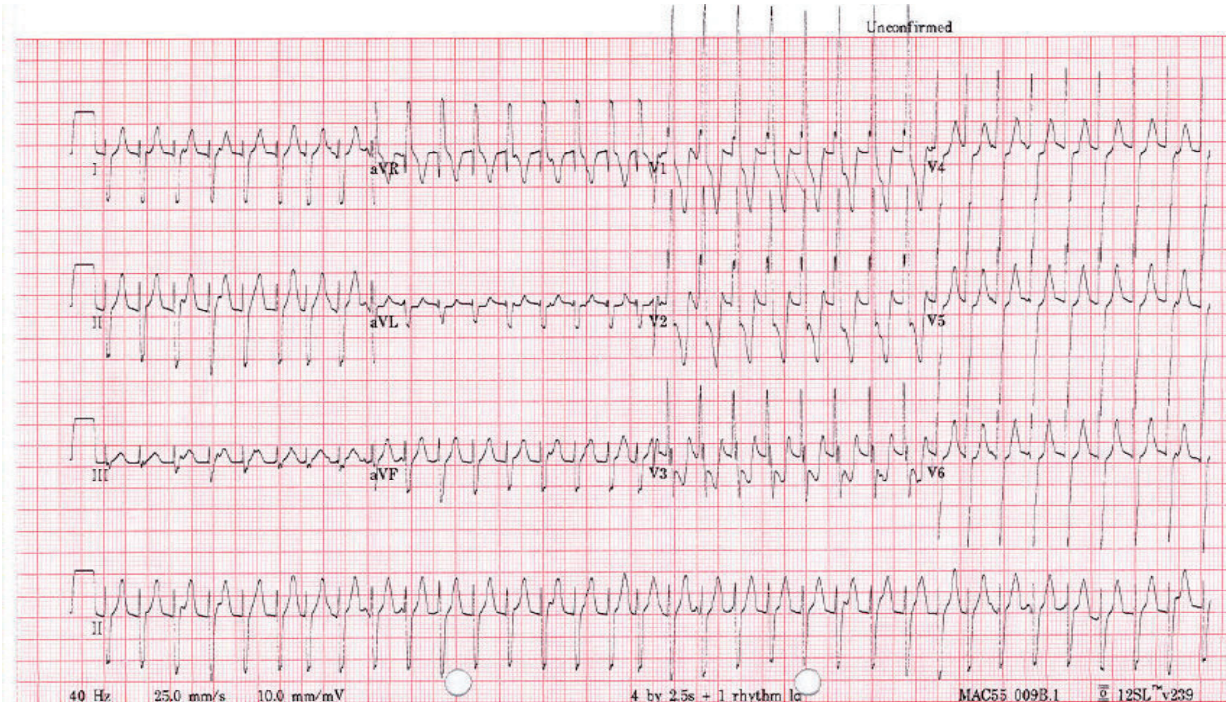
What is the most possible diagnosis of this ECG

1. Ventricular Tachycardia
2. Atrial Tachycardia with CRBBB
3. Junctional Tachycardia with CRBBB
4. Atrial Tachycardia with Pre-excitation
5. Non of above

Question 2

What will you do in the next ? Choose 2 among followings,

1. Chest CT
2. Echo-cardiography
3. Electrophysiological study
4. Cardioversion
5. Amiodaron infusion



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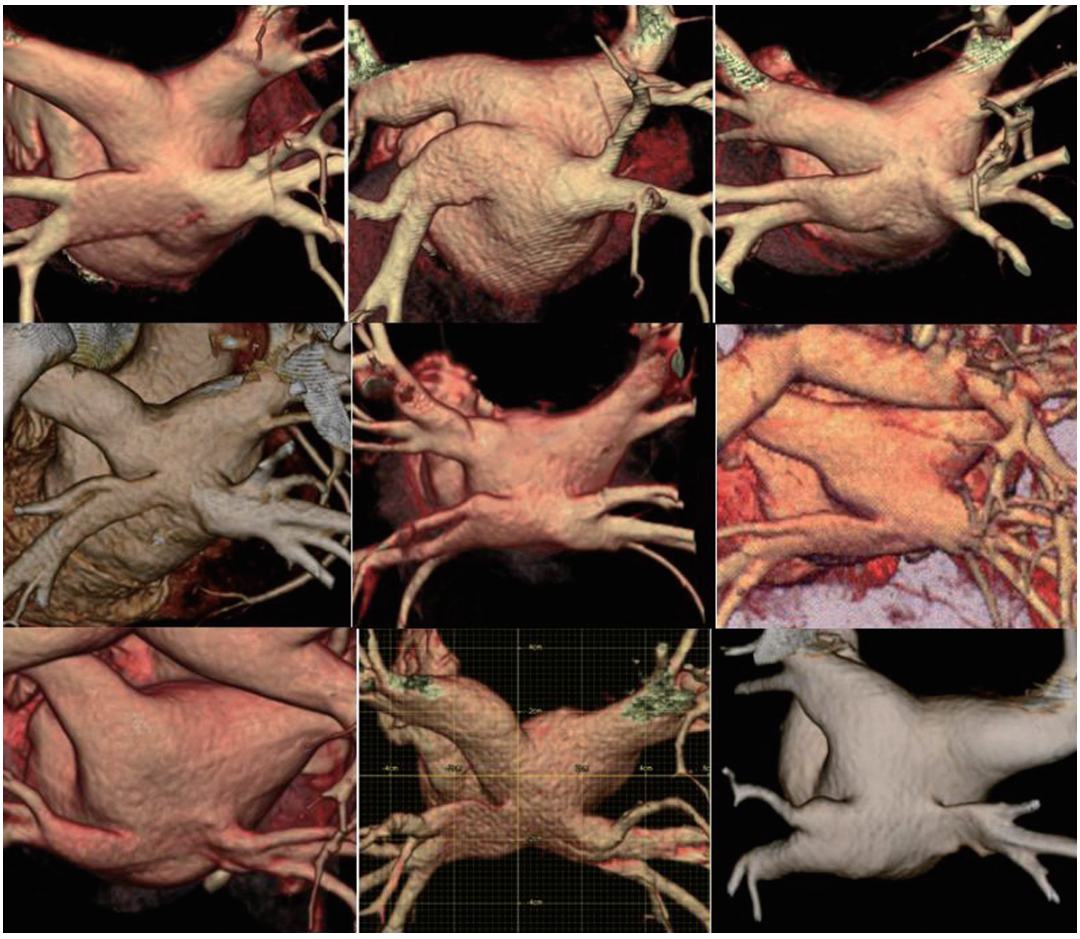
EP Image: Inferior Common Pulmonary Veins

Teiichi Yamane, MD

Jikei University School of Medicine, Tokyo, Japan

Advancement of catheter-based treatment in the left atrium (for atrial fibrillation) has revealed anatomical variance of pulmonary veins in the past decade. Conjunction of neighboring pulmonary veins has been reported as a relatively popular anatomical variation of PVs, especially in the common trunk of the ipsilateral left PVs (≥10%)[1]. On the other hand, confluence of right and left inferior PVs has been reported as a rare anomaly of PVs with an incidence of 1.0~1.5%[2,3] (21 among 2000 ablation cases in our center). As shown in the nine cases in the Figure, both inferior PVs conjoined together before they flowed into the LA (forming a common trunk) in some cases, while both inferior PVs opened together at the junction to the LA in some.

Ablation approaches should be altered in this type of anomaly, since a wide circumferential PV isolation (CPVI), targeting to isolate both ipsilateral superior and inferior PVs together, would not be an appropriate approach. In the new era of balloon-based ablation, we should realize the presence/absence of these anomalous structure of PV before the start of session.



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EP World: Fukuoka Sanno Hospital International University of Health and Welfare, Japan

Koichiro Kumagai, M.D., Ph.D.

Hospital Overview

Fukuoka Sanno Hospital was established in the Seaside Momochi discrict, Fukuoka Prefecture, in 2009 as a general hospital of the Kouhoukai Group Medical Corporation. The Kouhoukai Group founded the International University of Health and Welfare (IUHW) in Tochigi Prefecture, in 1995 as Japan's first university specializing in medical care and welfare. The university currently operates 16 departments in six schools at campuses in Tochigi, Kanagawa, Fukuoka Prefecture where nearly 6,700 students study. The Kouhoukai Group founded four IUHW hospitals (IUHW Hospital, IUHW Shioya Hospital, IUHW Mita Hospital, and IUHW Atami Hospital) and seven clinical research center for medicine (Sanno Hospital, Sanno Medical Center, Chemotherapy Research Institute; Kaken Hospital, Takagi Hospital, Fukuoka Sanno Hospital, Mizuma Kouhoukai Hospital and Yanagawa Rehabilitation Hospital). Fukuoka Sanno Hospital is a hospital with 199 beds in private rooms. It offers an excellent care environment, which overlooks the Hakata Bay and is furnished with the latest medical equipment. Fukuoka Sanno Hospital deserves to be the gateway of Asia, providing highly specialized medical treatment through the heart rhythm center, gynecology department, the reproductive center, the brain/nerve function center and the rehabilitation center.

Fukuoka Sanno Hospital

Fukuoka Sanno Hospital and Fukuoka International College of Health and Welfare

International University of Health and Welfare

Hospital Information

Address 3-6-45, Momochihama, Sawara-ku, Fukuoka City, 814-0001, Japan
Tel: +81-92-832-1100
No. of beds: 199 (all private rooms)
No. of staff: 325 employees (Including 82 physicians and 243 nurses)
No. of inpatients/year: 53,740 (2014)
No. of outpatient-visits/year: 193,103 (2014)

Division of Cardiology

Director of Heart Rhythm Center:
Koichiro Kumagai, M.D. (Professor of IUHW)

Director of Cardiovascular Center:
Hiroyoshi Yokoi, M.D. (Professor of IUHW)

No. of Cardiologist: 9

Clinical Electrophysiologist:
Hideko Toyama, M.D. (Associate Professor of IUHW)

Access Information

From Fukuoka Airport or Hakata Station:

Take Nishitetsu bus to Fukuoka Tower; get off at Fukuoka Tower Minami-guchi bus stop. Then walk about 3 min.

Heart Rhythm Center

The department of cardiology consists of Heart Rhythm Center and Cardiovascular Center which has each catheter lab. EP lab is dedicated to catheter ablation with leading-edge three-dimensional mapping system, NavX and CARTO. Two or three catheter ablations per day are performed in four days per week by two EP doctors, three exclusive nurses and four exclusive medical engineers. In 2014, 337 catheter ablations (299 of them were atrial fibrillation) were performed.

Prof. Koichiro Kumagai has studied the mechanism and treatments of atrial fibrillation, providing the unstable reentrant circuit hypothesis in pericarditis model, role of renin-angiotensin system on atrial remodeling and Box isolation as a new approach of atrial fibrillation ablation. He is one of the frontiers who developed first catheter ablation of atrial fibrillation in Japan.

Kouhoukai Group Medical Corporation

Prof. Kumagai with his Heart Rhythm Center members

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ECG Commentary Related to the Quiz in the No. 17 Issue

Dr. Mohan Nair[a], Dr. Vikas Kataria[b]

[a]Chairman Cardiac Sciences, [b]Senior Consultant Cardiology
Heart Institute, Saket City Hospital, New Delhi, India

The activation pattern in this tracing would suggest either co-existence of dual AV nodal physiology with a left lateral accessory pathway or extension of nodal inputs to the left atrium.

AV nodal extension to the left atrium commonly shows earliest activation in the mid-CS, but more lateral activation may also be seen.

The differentiation in this case was made by

1) Documenting decremental VA activation and blocking of VA conduction by intravenous adenosine.
2) His refractory PVC given during SVT can also be used to differentiate between an accessory pathway and left atrial extension of nodal activation.

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