EP LAB SPOTLIGHT: THE ELECTROPHYSIOLOGY TEAM AT THE NATIONAL CEREBRAL AND CARDIOVASCULAR CENTER

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Hospital and EP Program Overview

The National Cerebral and Cardiovascular Center (NCVC), located in Suita, Osaka, is a national referral center specializing in cardiovascular and cerebrovascular diseases. Our institution provides highly specialized care for patients with complex cardiovascular disorders referred from throughout Japan and integrates advanced clinical care with clinical and translational research (Figure 1).

Our electrophysiology program currently includes approximately 25 physicians, including fellows, together with nurses, clinical engineers, radiological technologists, and other allied health professionals. The NCVC has three dedicated catheter ablation laboratories, among the largest dedicated EP facilities in Japan.

Each year, we perform approximately 1,200 catheter ablation procedures and 700 cardiac implantable electronic device procedures. Many patients are referred after previous unsuccessful procedures or because of particularly complex underlying cardiovascular disease. Accordingly, multidisciplinary collaboration with specialists in heart failure, cardiac surgery, congenital heart disease, transplantation medicine, cardiovascular imaging, pediatrics, and medical genetics is an essential part of our daily practice.



Figure 1. National Cerebral and Cardiovascular Center (Top) and members of the electrophysiology team (Bottom)

Catheter Ablation

Atrial fibrillation (AF) represents a major component of our ablation practice. Our laboratory has actively introduced new ablation and mapping technologies. More recently, pulsed-field ablation (PFA) has become an important part of our AF program.

Another major strength of our program is the management of complex ventricular tachycardia (VT) and ventricular fibrillation (VF) associated with structural heart disease. We perform approximately 60 ablation procedures for complex VT/VF each year, including patients referred for recurrent VT/VF after previous ablation at other institutions, those with inherited arrhythmia syndromes, and highly challenging cases involving left ventricular assist devices. For these procedures, we combine three-dimensional electroanatomical mapping and intracardiac echocardiography with advanced multimodality imaging. In particular, cardiac computed tomography and cardiac magnetic resonance imaging are integrated into the procedural strategy to facilitate image-aided substrate identification and ablation (Figure 2).

This integration of complex electrophysiology with advanced cardiac imaging is one of the distinctive strengths of our program and allows us to tailor the ablation strategy to the underlying structural substrate in each patient.

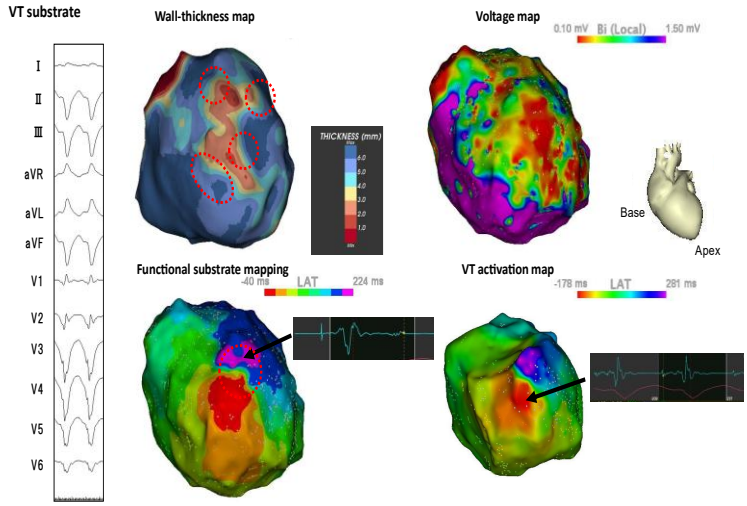


Figure 2. Multimodality image-guided ventricular tachycardia ablation integrating CT-derived wall-thickness mapping with electroanatomical substrate and activation mapping.

Device Therapy

Device therapy represents another major pillar of our program. Approximately 700 cardiac implantable electronic device procedures are performed annually, including pacemaker implantation, implantable cardioverter-defibrillator (ICD) implantation, cardiac resynchronization therapy (CRT), and transvenous lead extraction. In addition, our center performs percutaneous left atrial appendage closure procedures.

Our center is among the highest-volume centers for ICD and CRT-D implantation in Japan.

We are also actively engaged in contemporary device therapies, including leadless pacemakers, conduction system pacing (CSP), and extravascular ICD (EV-ICD) technology.

Complex cases are managed through close multidisciplinary collaboration. Pediatric and congenital heart disease patients are jointly managed with pediatric cardiologists, patients with advanced heart failure with the heart failure and transplantation teams, and challenging lead extraction procedures in collaboration with cardiac surgeons.

Remote monitoring has also become an integral component of device care. A centralized multidisciplinary system enables our team to provide longitudinal surveillance for a large number of patients and to respond efficiently to clinically important alerts.

Research, Education, and Evidence Generation

Clinical research is central to the mission of our EP program. In addition to observational studies and nationwide registries, we place particular emphasis on investigator-initiated randomized clinical trials designed to answer clinically relevant questions arising from daily electrophysiology practice.

In collaboration with Japanese professional societies, our team has led nationwide registry studies as principal investigators, including J-AB, J-LEX, JLAAO, and JPN-CRT. These registries provide large-scale real-world evidence on catheter ablation, lead extraction, left atrial appendage closure, and cardiac resynchronization therapy in Japan. We have also contributed to JROAD and conducted nationwide multicenter studies of cardiac sarcoidosis, including JACS and MYSTICS. In addition, we participate in the APHRS-Brugada Registry, led by principal investigator Takeshi Aiba..

We have also led multiple prospective multicenter randomized trials evaluating contemporary atrial fibrillation ablation strategies and emerging technologies.

Results from these studies have been presented at major international cardiovascular and electrophysiology congresses, including ESC, AHA, ACC, and APHRS, with several studies selected for Late-Breaking Clinical Trial sessions, reflecting our commitment to generating clinically meaningful evidence from Japan and sharing it with the international community (Figure 3).

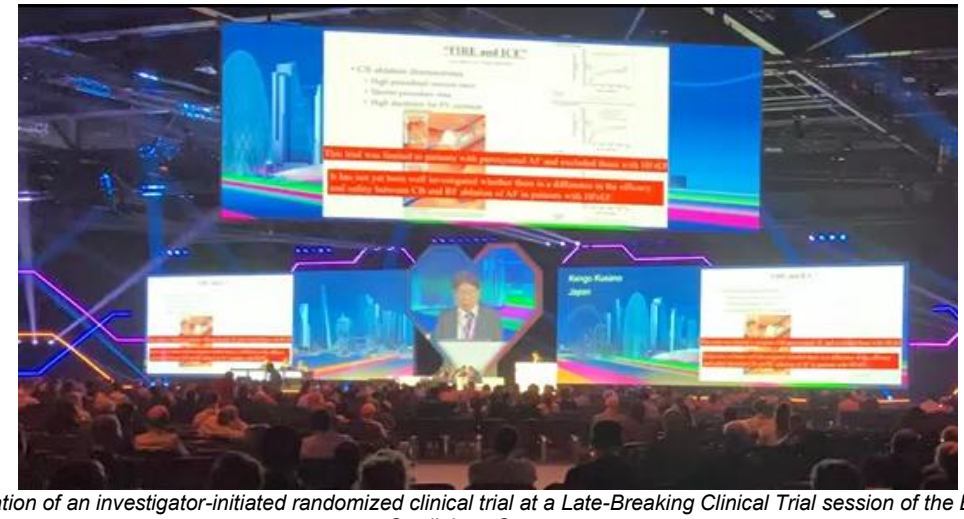


Figure 3. Presentation of an investigator-initiated randomized clinical trial at a Late-Breaking Clinical Trial session of the European Society of Cardiology Congress.

One example is the CRRF-PeAF trial, an investigator-initiated, prospective, multicenter randomized trial involving 500 patients with persistent atrial fibrillation at 12 centers in Japan. The trial demonstrated the non-inferiority of cryoballoon ablation to radiofrequency ablation for atrial tachyarrhythmia recurrence at 1 year, and the results were published in the European Heart Journal in 2025.

Education is a longstanding tradition at the NCVC. For more than 40 years, our residency and fellowship program has welcomed trainees from across Japan. Over its more than 40-year history, the NCVC arrhythmia training program has educated numerous electrophysiologists who have gone on to play leading roles in cardiac electrophysiology at institutions throughout Japan (Figure 4). Fellows are immersed in both procedural training and daily clinical care, gaining experience in the diagnosis and management of a wide range of arrhythmias while learning electrophysiological studies, catheter ablation, and device implantation. Research is closely linked to this clinical training. Fellows are encouraged to develop questions arising from daily practice and to participate in clinical research. Our goal is to train electrophysiologists who are not only technically skilled, but also capable of advancing the field through clinical investigation.



Figure 4. Distinguished alumni of the NCVC arrhythmia programme

What Makes Our EP Team Unique

We believe that the strength of the NCVC EP program lies in the integration of high-volume clinical practice, complex electrophysiology, advanced device therapy, multidisciplinary care, and investigator-initiated clinical research. Procedural volume is not our ultimate goal. Clinical questions encountered in daily practice frequently become the starting point for multicenter studies and randomized clinical trials. By translating these questions into rigorous research and presenting the results at major international scientific meetings, we aim to generate evidence that can influence clinical practice beyond our own institution. Through the close integration of clinical care, education, and national and international research, we hope to continue contributing to the advancement of cardiac electrophysiology in Japan and throughout the Asia-Pacific region

Hospital Information

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