



Overview of the 80th Annual Scientific Meeting of the Japanese Circulation Society

– The Past, Present and Future of Cardiovascular Medicine in Japan –
– The 5th Anniversary of the Great East Japan Earthquake –

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The 80th Annual Scientific Meeting of the Japanese Circulation Society was held in Sendai, Japan, on March 18–20, 2016, which coincided with the 5th anniversary of the Great East Japan Earthquake that hit the Tohoku area on March 11, 2011. Thus, the main themes for this meeting were “The Past, Present and Future of Cardiovascular Medicine in Japan” and “The 5th Anniversary of the Great East Japan Earthquake”. Despite the provincial location, approximately 15,000 people attended during the 3-day meeting, and there were in-depth discussions in each of the various sessions on these themes. Especially, to our great pleasure, the Japanese Royals, Emperor Akihito and Empress Michiko, kindly visited the panel exhibition of the Great East Japan Earthquake and spoke words of appreciation to us. The meeting successfully completed and we sincerely appreciate the great cooperation and support from all affiliates. (*Circ J* 2016; **80**: 1689–1694)

Key Words: Cardiology; The Great East Japan Earthquake; Japanese Circulation Society

Overview and Meeting Theme

The Japanese Circulation Society (JCS) has made great strides as an academic society for cardiovascular medicine, on a par with the American Heart Association (AHA) and the American College of Cardiology (ACC) in the USA and the European Society of Cardiology (ESC) in Europe. Membership has increased to approximately 26,000, and the total number of attendees for annual scientific meetings has reached more than 15,000, making it one of the nation’s largest scientific meetings today. The number of attendees from abroad is also on the rise. This year, the 80th Annual Scientific Meeting of the JCS was held in Sendai, Japan, on March 18–20 (<http://www2.convention.co.jp/jcs2016/english/index.html>), which coincided with the 5th anniversary of the Great East Japan Earthquake that hit the Tohoku area on March 11, 2011. Thus, it was decided that the main themes for this meeting would be “The Past, Present and Future of Cardiovascular Medicine in Japan” and “The 5th Anniversary of the Great East Japan Earthquake”. The Sendai International Center, of which an exhibition building was newly built in April 2015, was the main venue

(**Figure 1**), while the Tohoku University Centennial Hall (Kawauchi Hagi Hall) and the Sendai Civic Auditorium were also used concurrently. We also used a large parking space on the north side of the International Center Station as the venue for poster and equipment exhibitions. We were thus able to organize the meeting in an environment richly endowed with nature surrounding the Hirose River at the base of Mt. Aoba. Moreover, the Sendai Subway Tozai Line, which opened on December 6, 2015, enabled participants to more easily access the venue from the central part of Sendai City. Despite the provincial location, approximately 15,000 people attended the meeting during the sessional 3 days, and there were in-depth discussions in each of the various sessions on these themes (**Figure 2**). We received 3,818 entries for regular abstracts, of which 2,308 (acceptance rate, 60.5%) were accepted. For the late-breaking sessions, of 65 entries received we finally selected 36 (55%). All told, 815 members accepted the session Chair role for a total of 3,294 presentations, including special programs, regular abstracts, and late-breaking sessions.

In his Congress Chairperson’s lecture entitled “The Past, Present and Future of Cardiovascular Medicine in Japan –

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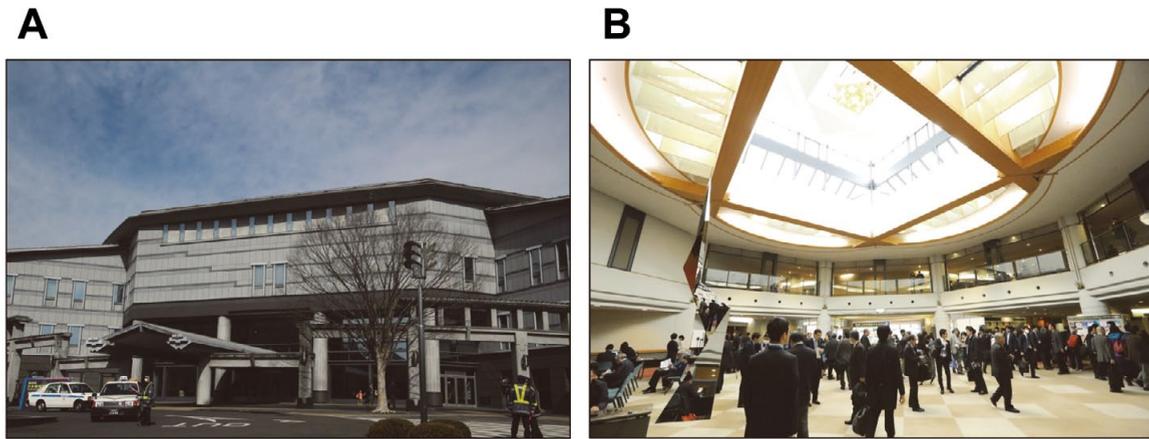


Figure 1. (A) The Sendai International Center. (B) Main hall of the venue.



Figure 2. (A) Oral presentations. (B) Poster presentations. (C) Exhibition hall.

Lessons from the Great East Japan Earthquake”, Dr Hiroaki Shimokawa, talked about the progress of Japanese cardiology, lessons from the Great East Japan Earthquake, findings from his own research, and the importance of education (**Figure 3A**). Dr Masayuki Yamamoto, professor of the Tohoku University Graduate School of Medicine and the executive director of the

Tohoku Megabank Organization, presented the Mashimo Memorial Lecture, and described his distinguished work, including the discovery of the Keap1-Nrf2 system that regulates oxidative stress response. His lecture emphasized the importance of basic research in the development of novel evidence in Japan and its application to clinical research (**Figure 3B**).

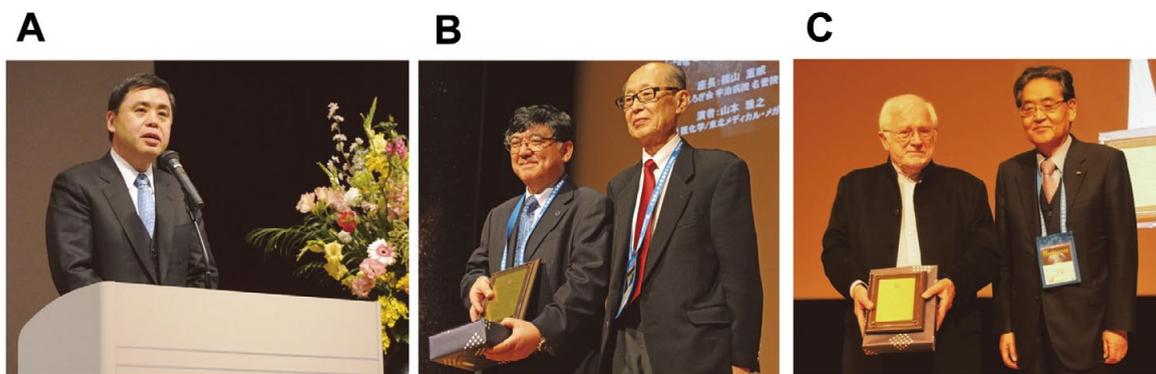


Figure 3. (A) Hiroaki Shimokawa, MD, PhD, Professor of Tohoku University Graduate School of Medicine, presenting the Congress Chairperson's Lecture. (B) Masayuki Yamamoto with the session's chairperson, Shigetake Sasayama, at the Mashimo Memorial Lecture. (C) Paul M. Vanhoutte with the session's chairperson, Yoshio Yazaki, at the Mikamo Lecture.



Figure 4. The Japanese Royals, Emperor Akihito and Empress Michiko, visiting the special exhibition, "The 5th Anniversary of the Great East Japan Earthquake". Their Majesties were given explanations about the panels by the Congress Chairperson, Dr Shimokawa.

Dr Paul M. Vanhoutte, professor of the University of Hong Kong, presented the Mikamo Lecture on endothelium-derived relaxing factors, especially nitric oxide and endothelium-derived hyperpolarizing factor (Figure 3C).

In this scientific meeting, there were 18 special lectures, 11 plenary sessions, 28 symposia, 7 joint symposia with foreign academic societies including the ACC, AHA, ESC and those of Asian nations, 11 roundtable discussions, 8 topic sessions, 6 controversy sessions, 10 meet-the-expert sessions, 29 morning lectures, and more. In the special lectures, the sessions such as "Japan's Contributions to Cardiology" and "The Advancements of 80 Years in the JCS: the Messages from the

Pioneers and Leaders" reaffirmed Japan's contribution to the field of cardiovascular medicine and the progress made by former JCS presidents. Other special programs included "Editors-in-Chief of the Top Medical Journals" featuring the heads of editorial from the leading journals (NEJM, JACC, EHJ, Circulation, ATVB, and Circulation Journal). Moreover, there was educational content in the form of sessions such as "How to Improve Medical Education: Lessons from Japan and USA" and "Three-day Course of Medical Statistics". Additionally, in view of the 5th anniversary of the Great East Japan Earthquake, we held a panel exhibition about the contribution to disaster medicine by university hospitals, major

local hospitals, medical associations, and healthcare services in the Tohoku region. To our great pleasure, The Japanese Royals, Emperor Akihito and Empress Michiko, kindly visited this panel exhibition and spoke words of appreciation to us (Figure 4).

During the meeting, we presented a general overview of several noteworthy sessions with photographs on the website as “JCS2016 Flash Report”. We would like to review those sessions next.

Special Exhibition: The 5th Anniversary of the Great East Japan Earthquake

In the special exhibition, “The 5th Anniversary of the Great East Japan Earthquake”, panels from the hospitals in the disaster area were displayed, showing how severely they were damaged and how rigorously they have revived now; how the medical activity was conducted in the acute and chronic phases after the Earthquake; and how we should prepare for future disasters. In the opening ceremony, Dr Akai (Ishinomaki Municipal Hospital) reported the situation during the first few days after the onset, when the hospital was destroyed and isolated by the tsunami without food, electricity or means of communications. He also reported his medical practice in the temporary medical office. Dr Takita (Takita Clinic) introduced a regional medical information cooperation system based on the information and communication technology that he established in the Kesen area, Iwate prefecture. Their Majesties visited the exhibition and had explanations from Dr Shimokawa, the Congress Chairperson, and others in front of each panel (Figure 4). One of the panels showed a marked and prolonged increase in the occurrence of heart failure after the Earthquake.¹ Also, post-traumatic stress disorder (PTSD) was often observed among the disaster victims with cardiovascular disease (CVD) and had an adverse prognostic effect thereafter.² This special exhibition provided a good opportunity to learn about natural disasters and cardiovascular medicine for many participants of the Meeting.

The Great East Japan Earthquake and Cardiovascular Diseases

After the Great East Japan Earthquake disaster, March 11, 2011, several studies were conducted to elucidate its influence on CVD. In Plenary Session 3 entitled “The Great East Japan Earthquake: What We Learned in the Past 5 Years and Future Perspectives”, the association between the Earthquake disaster and CVD was discussed. Dr Aoki (Tohoku University), Dr Nakamura (Iwate Medical University) and Dr Yoshihisa (Fukushima Medical University) showed a significant increase in the incidence of heart failure after the Earthquake,^{1,3} through patients who discontinued their cardiovascular medicines and residents in the “tsunami area” being more likely to develop heart failure. Furthermore, Dr Aoki reported the results from our CHART Study that heart failure patients with PTSD from the Earthquake had a poorer prognosis than those without it.² Dr Munakata (Tohoku Rosai Hospital) presented results from the Watari Study that showed officers who worked in the disaster area had elevated blood pressure, suggesting the importance of health care not only for evacuees but also for the workers in the reconstruction effort. Dr Hanzawa (Niigata University) indicated that the incidence of venous thromboembolism (VTE) was still high despite past and current educational activity on VTE after disasters, and emphasized that sleeping in a bed, not on the floor, is important to prevent

VTE, because of the low incidence of VTE in evacuation centers in Western countries where sleeping in beds is common. Finally, Dr Yasuda (National Cerebral and Cardiovascular Center) made a presentation on a business continuity plan for feature earthquake disaster. These experiences from the Great East Japan Earthquake should help us improve disaster medicine in Japan and prepare for future disasters.

Basic Research

One of the recent important areas in cardiovascular research is genomic analysis. Genome-wide association studies (GWAS) have enabled us to identify candidate genes of CVD. Since the genome sequence project was completed, much information has been accumulated about the pathogenesis of several CVD. Furthermore, GWAS have identified several genetic targets that are associated with adverse drug reactions. In Symposium 21 entitled “Emerging Trends in Advanced Genomic Medicine to Elucidate the Molecular Basis of the Cardiovascular System: From Development to Disease”, 5 researchers presented their original data and discussed the role of genomic analyses in the future of cardiovascular research. Dr Watanabe (National Cerebral and Cardiovascular Center) described the possibility that mutations in SCN5A, which encodes the cardiac predominant Na channel α -subunit, account for patients with dilated cardiomyopathy as well as those with Brugada syndrome or long QT syndrome. The role of several SCN5A mutations that have been discovered in a recent GWAS and the loci associated with the susceptibility of each disease were discussed. Dr Ozaki (RIKEN) described a trial to use combinations of SNPs to determine the risk of myocardial infarction. Dr Watabe (Niigata University) noted the possibility that mutations in FBN1 account for patients with Marfan-related genetic aortopathy as well as patients with Marfan syndrome. Dr Manabe (Chiba University) showed a recent detailed analysis of long noncoding RNA. Dr Yamashita (Kobe University) reported the role of the microbiome in CVD. Discovering the genetic basis of CVD may enable us to understand their pathogenesis and to identify patients before the onset of disease.

Arrhythmias

In the Plenary Session 2 entitled “Catheter Ablation: The Current Status and the Future Direction”, the cutting-edge topics of atrial fibrillation (AF) and Brugada syndrome were discussed. Unique mapping methods to pursue the mechanisms of AF were presented. Dr Nogami (Tsukuba University) reported 60 cases of catheter ablation for Brugada syndrome, and emphasized the importance of modification of arrhythmogenic substrates. Furthermore, in this session, the application of photodynamic therapy or heavy particle radiotherapy as novel energy sources for catheter ablation system was introduced, and feasibility for clinical use was discussed. In the Round Table Discussion 2 entitled “The Indications of Biventricular Pacing”, various unsolved problems of cardiac resynchronization therapy (CRT) were discussed. This session focused on the evaluation of left ventricular (LV) dyssynchrony and predictive factors for CRT responders. Dr Seo (Tsukuba University) reported the usefulness of adding a time phase to the speckle-tracking method for the evaluation of LV dyssynchrony, and also proposed the START score to predict CRT responders. The score includes several items, such as BUN level, the extent of mitral regurgitation, and RV pacing. Furthermore, in this session, the following topics were also discussed: the usefulness of combining multiple modalities such as cardiac



Figure 5. Commemorative photograph of the doctors and staff of the Department of Cardiovascular Medicine, Tohoku University.

MRI, CT, and SPECT to predict CRT responders; the characteristics of CRT responders with narrow QRS on ECG; and the effects of CRT on patients with AF.

Coronary Artery Disease

Approximately 20–30% of patients undergoing diagnostic coronary angiography for evaluation of angina are found to have a normal or non-obstructive coronary angiogram. This finding warrants further evaluation of the potential causes for presenting angina. In the Symposium 20 entitled “The Importance of Coronary Vasomotor Function in Coronary Heart Disease”, there was valuable discussion about new knowledge of the mechanisms and pathophysiology of functional disorders involving the epicardial coronary arteries, coronary microcirculation or both. Dr Ishii (Kumamoto University) reported that coronary spasm at the site of organic stenosis was associated with poor prognosis compared with that at sites without organic stenosis. Furthermore, Dr Tsuburaya (Tohoku University) demonstrated that coronary spasm at the site of drug-eluting stent (DES) implantation remained a clinically important issue even in the era of 2nd-generation DES. Thus, treatment for the spasm with medical therapy (eg, long-acting calcium-channel blockers) is important even in patients with severe obstructive coronary artery disease. In addition, the epicardial coronary arteries are only one part of the coronary circulation, and the importance of coronary microvascular dysfunction (CMD) has been emerging. In that session, Dr Arashi (Tokyo Women’s Medical University), Dr Onishi (Hiratsuka Kyosai Hospital), and Dr Noguchi (National Cerebral and Cardiovascular Center) reported that CMD, as evaluated respectively by instantaneous wave-free ratio, index of microcirculatory resistance or perfusion MRI, is involved in several CVD such as LV diastolic dysfunction and acute myocardial infarction.

The adventitia of the arterial wall has recently attracted much attention as a source of inflammation because it harbors nutrient blood vessels, termed the adventitial vasa vasorum (VV). Topic 7 entitled “The Coronary Adventitia”, focused on the important role of the adventitia. First, Dr Tanaka (Tokyo

University) demonstrated adventitial VV augmentation in a variety of atherosclerotic mouse models. Second, Dr Tsuruda (Miyazaki University) reported the inhibitory effects of both adrenomedullin and soluble guanylate cyclase stimulators on pericoronary fibrosis in a hypertensive rat model. Third, Dr Kawabe (Asahikawa Medical University) emphasized the importance of ninjurin-1 in the maturation of adventitial VV.⁴ Subsequently, the clinical significance of enhanced adventitial VV formation was discussed. An optical coherence tomography study by Dr Taruya (Wakayama Medical University) demonstrated that adventitial VV increases with fibrous plaque in humans, whereas intraplaque neovessels are associated with plaque vulnerability.⁵ Dr Nishimiya (Tohoku University) confirmed the accuracy of optical frequency-domain imaging for visualizing adventitial VV, demonstrating that it is dramatically increased in patients with vasospastic angina.⁶ Indeed, more emphasis should be given to the “outside in” pathological involvement in a wide range of CVD in the near future.

Pulmonary Hypertension

Chronic thromboembolic pulmonary hypertension (CTEPH) is a well-known mysterious disease characterized by the presence of organized thrombi in the pulmonary arteries. In Symposium 5 entitled “Frontline of CTEPH Practice in Japan in 2016”, the remarkable progress in both clinical management and understanding of the pathophysiology of the disorder was discussed. As a new finding in the pathophysiology of CTEPH, Dr Yaoita (Tohoku University) reported that thrombin-activatable fibrinolysis inhibitor (TAFI) is substantially involved in the pathogenesis of CTEPH and activated TAFI inhibitor could be a new therapeutic target of the disorder. Pulmonary endarterectomy (PEA) is usually a primary treatment for CTEPH and is potentially curative, although some patients are unsuitable for PEA and require alternative management. Based on the recent results from an experienced PEA center, Dr Ishida (Chiba University) reported that PEA can be indicated for CTEPH patients with distal disease, as well as the central type. Meanwhile, balloon pulmonary angioplasty (BPA) is an alternative therapy for inoperable CTEPH patients, and has been

reported to improve pulmonary hemodynamics, exercise capacity and long-term prognosis. In this session, Dr Hosokawa (Kyushu University) demonstrated that BPA could reduce excessive shear stress and induce vasodilatory effects on the non-BPA-side pulmonary vasculature. Moreover, the morphology of pulmonary arterial lesions in CTEPH patients was discussed from the viewpoint of pathology by Dr Ohta-Ogo (National Cerebral and Cardiovascular Center), and intravascular imaging modalities corresponding to BPA by Dr Ikeda (National Center for Global Health and Medicine) and Dr Nakanishi (Kyoto Prefecture University of Medicine).

Large Clinical Trials

The Symposium 24, entitled “How Should We Design and Conduct Sensible Clinical Research in Japan?” was held with Chairpersons, Dr Ueda (Ryukyu University) and Dr Node (Saga University). The main purpose of this symposium was to discuss how we can conduct Japanese clinical trials to provide reliable (rather than unduly accurate) evidence for the improvement of clinical practice in cardiovascular medicine. Dr Ueda was the first presenter in this symposium and introduced the Japanese government’s policies to develop newer drugs and medical devices and concluded that adequate development of research questions originating from clinical questions, appropriate study design, follow-up of patients, data collection and management, and handling of confounding factors are necessary to complete the policies. The second speaker, Dr Sakata (Tohoku University) commented on the “HF pandemic” worldwide and underlined that Japan is now expected to provide novel and practical evidence for CHF as one of the most advanced aging countries in the world. In line with this viewpoint, he introduced their experiences and insights from the Chronic Heart Failure Analysis and Registry in the Tohoku District (CHART)-2 Study (N-10,219), a prospective, observational, multicenter cohort study, designed to elucidate the global picture of CHF management in Japan. The third speaker, Dr Higo (Osaka University), referring to GCP (good clinical practice) standards, introduced their efforts in the EPO-AMI-II clinical study, an ongoing prospective clinical study to clarify the safety and efficacy of a single intravenous administration of low-dose EPO in STEMI patients with LV dysfunction. The last speaker, Dr Yoshikawa (Osaka University) introduced the challenges to develop a “Japan Heart Failure Model (JHFM)” as an appropriate model for efficient evaluation of single-armed clinical studies. With these excellent talks, this was the crowning session of the 80th Annual Scientific Meeting of the Japanese Circulation Society.

Imaging

In Topic 6 entitled “Molecular Imaging for Clinical Applications”, Dr Tahara (Kurume University) highlighted positron emission tomography (PET) imaging with ¹⁸F-fluorodeoxyglucose (FDG) imaging to noninvasively assess characterize atherosclerotic plaque biology. FDG-PET has demonstrated the clinical feasibility of detecting atherosclerotic plaque

inflammation and may allow us to evaluate the effect of anti-inflammatory interventions and identify patients at risk of plaque rupture. Dr Naya (Hokkaido University) reported quantification of metabolic activity on ¹⁸F-FDG PET in patients with cardiac sarcoidosis using dedicated software to measure cardiac volume, SUV_{max} polar-map and metabolic volume that enables evaluation of the relationship between clinical variables and serum biomarkers. In addition, it is possible to monitor the effects of steroid therapy on the inflamed myocardium. Dr Kasama (Gunma University) demonstrated cardiac sympathetic nerve imaging evaluated by ¹²³I-MIBG scintigraphy and its application to HF, and the potential importance of serial ¹²³I-MIBG scintigraphy as a more reliable prognostic marker than a one-time scan of CHF patients. Dr Nishimura (Jichi University) reported in vivo imaging analysis of thrombus formation and inflammation using 3 in vivo fluorescence imaging devices (real-time multi-color XYZT multiphoton imaging, macro-imaging system for awake mice and wearable and implantable devices for long-time recording) to cover the micro- and macro-scale, which can evaluate the therapeutic strategies for CVD.

Closing Remarks

The 80th Annual Scientific Meeting of the JCS successfully presented future perspectives in cardiovascular medicine. This report was based on the viewpoint of each of its author. **Figure 5** is a commemorative photograph of the doctors and staff of the Department of Cardiovascular Medicine, Tohoku University, taken just after closing of the Meeting.

Acknowledgments

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