대한심장학회 THE KOREAN SOCIETY OF CARDIOLOGY 심장학연구재단 THE KOREAN CARDIAC RESEARCH FOUNDATION

KSC 2017

DAILY

The 61st Annual Scientific Meeting of the Korean Society of Cardiology

2017. 10. 13. Friday

Today's Highlights

CSC-KSC Joint Symposium (Heart Failure)
Update in the Management of AHF
09:00 AM-10:30 AM
Rm. Grand 1 (B1)

New Frontiers in Cardiology 2
Evolving and Emerging Issue in Cardiology
10:30 AM-12:00 PM
Rm. Theatre (B1)

Cross Specialty Session 2: Heart Failure & Arrhythmia
Device Therapy in Heart Failure
10:30 AM-12:00 PM
Rm. Grand 1 (B1)

Late Breaking & Featured Research from Asia-Pacific 2
14:00 PM-16:00 PM
Rm. Grand 1 (B1)

JCS-KSC Joint Symposium (Basic Research)
Advances in Plaque Biology
16:00 PM-17:30 PM
Rm. Grand 1 (B1)

E-Poster Session
09:00 AM-12:00 PM, 14:00 PM-17:00 PM
Rm. Vista (B2)

New Frontiers in Cardiology 2

What's New in Coronary Stenting?

David J. Cohen, MD, M.Sc.
University of Missouri, USA

Over the past 15 years, drug-eluting stents (DES) have continued to evolve. Nonetheless, current generation DES continue to have important limitations such as very late stent thrombosis, refractory restenosis and requiring long-term dual antiplatelet therapy.

One current approach to these issues has been the development of DES that incorporate bioabsorbable polymers (BP-DES). These newer devices use polymers that gradually dissolve or are metabolized such that ultimately, only a bare metal stent remains. To the extent that late thrombotic or restenotic events represent foreign body reactions stimulated by exposure to polymeric stent coatings, BP-DES have the potential to reduce these problematic late events. Currently several such devices are available worldwide including the Biomatrix (Biosensors), the Synergy (Boston Scientific) and the Orsiro stent (Biotronik). Although late event reduction has yet to be definitively demonstrated with BP-DES, recently in the randomized BIOFLOW-V trial, the Orsiro stent was demonstrated to have superior 1-year outcomes compared with the Xience stent. A second approach is the development of polymer-free drug-eluting stents (PF-DES).These devices use a variety of novel approaches in order to control drug delivery. One such device is the BioFreedom drug-coated stent (DCS), which uses a microstructured surface in order to hold and release biolimus A-9 over 1 month. One of the main advantages of the BioFreedom DCS is that it does not require long-term DAPT. So, the BioFreedom stent may be an ideal device for patients at high risk of bleeding who cannot tolerate long-term DAPT. In the LEADERS-FREE trial, patients who were at high bleeding risk were randomized to receive either a BMS or the BioFreedom DCS and were treated with 1 month of DAPT. In this extremely challenging population, not only was the DCS more effective than BMS but it was also safer with lower rates of death/MI/or stent thrombosis.

Although the above two devices overcome many of the current limitations of DES, both leave a rigid scaffold behind, thus limiting the ability of the vessel to heal and to restore normal vasomotion. To overcome these limitations, device manufacturers have begun to develop fully bioresorbable vascular scaffolds (BVS) such as the Absorb BVS. Although there is tremendous hope that these devices would provide the best of all worlds, to date, the results have been somewhat disappointing. Specifically, clinical trials have demonstrated that the rate of early stent/scaffold thrombosis with the Absorb BVS is 3-4 fold higher than with the Xience EES, leading to higher rates of MI and target lesion revascularization as well. These studies are largely limited to 2-3 year follow-up, however, a time frame during which the Absorb BVS continues to undergo resorption. Longer term follow-up may be necessary to demonstrate the true benefit of these devices over metallic DES. Research is also ongoing to determine whether reductions in scaffold strut thickness, more rapid scaffold resorption, or even use of resorbable metals might overcome these early device limitations. Until these challenges can be overcome, however, the promise of a fully resorbable vascular scaffold remains elusive.

What is a Vulnerable Plaque and How Can It Be Imaged?

Marc Dweck, MD, PhD
University of Edinburgh, UK

The majority of myocardial infarctions (MI) occur as a consequence of acute plaque rupture, often with little or no prior warning. Plaques that rupture have certain common pathological characteristics that include inflammation, a thin fibrous cap, positive remodelling, a large necrotic core, microcalcification

Continued on page 5

Program at a glance: Day2, Oct 13, 2017

	Theatre (B1)	Grand 1 (B1)	Grand 4 (B1)	Grand 5 (B1)	Grand 6 (B1)	Cosmos (3F)	Calla (3F)	Art (4F)	Oak (4F)	Pine (4F)
09:00	Live 1	CSC-KSC Joint Symposium (Heart Failure)	YIC 1	YIC 2	Cardiac Surgery 1	Arrhythmia 3	Smart Healthcare	Echo 3	Oral Abstracts Intervention 2	Oral Abstracts Pediatric Cardiology 1
10:00										
11:00	New Frontiers in Cardiology 2	Cross Specialty Session 2: Heart Failure & Arrhythmia	YIC 3	YIC 4	Oral Abstracts CAD 2	Oral Abstracts Arrhythmia 3	Big Data Research	Echo 4	Oral Abstracts Heart Failure 2	Oral Abstracts Pediatric Cardiology 2
12:00	Scientific Session 6 [BMS]	Scientific Session 7 [MSD]				Scientific Session 8 [Pfizer]	Scientific Session 9 [Ildong]			
12:40		Diamond Session [Bayer]								
13:30										
14:00	Live 2	Late Breaking & Featured Research from Asia-Pacific 2	Pediatric Cardiology 1	Nurse-Technician Session 1	Cardiac Surgery 2	Arrhythmia 4	Imaging 1	Oral Abstracts Arrhythmia 4	Oral Abstracts CAD 3	Oral Abstracts Intervention 3
15:00										
16:00	Live 3	JCS-KSC Joint Symposium (Basic Research)	Pediatric Cardiology 2	Nurse-Technician Session 2	Oral Abstracts CAD 4	Oral Abstracts Arrhythmia 5	Imaging 2	Oral Abstracts Intervention 4	Oral Abstracts CAD 5	KCJ Editors Meeting (CLOSED)
17:00										
17:30	총회									
18:00										

Scientific & Diamond Sessions

Scientific Session 6 [BMS]
Recent Advances in Improving Patient Care with Apixaban
›› Oct 13, 12:00-12:40 Rm. Theatre

Scientific Session 7 [MSD]
The Latest Updates on the Management of Patients with CVD
›› Oct 13, 12:00-12:40 Rm. Grand1

Scientific Session 8 [Pfizer]
Clinical Challenges in Cardiovascular Prevention
›› Oct 13, 12:00-12:40 Rm. Cosmos

Scientific Session 9 [Ildong]
Current Option of Antihypertensive Therapy (Triple Combination Therapy in Hypertensive Patients)
›› Oct 13, 12:00-12:40 Rm. Calla

Diamond Session [Bayer]
Understanding Real World Evidence of Rivaroxaban in the World
›› Oct 13, 12:50-13:30 Rm. Grand1

Presentation

KSC 2017

Case zone

You could be the Case Winner!

Oct.12-14

12:40-13:50

Vista Hall (B2)

Live Sessions

Live 1 : Coronary

1) Complex CTO
2) LM Bifurcation Lesion

Live 2 : Endovascular

1) SFA
2) BTK

Live 3 : TAVI and LAAO

1) TAVI
2) LAAO

2017년
대한심장학회 정기총회

- KSC's 60th Anniversary -

Oct. 13 (Fri)

17:30

Rm. Theatre

Highlights

대한심장학회 60주년 기념 영상 공개

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KSC Awards Ceremony

Young Investigator Award Competition

총회에 참석하시는 분들 중

추첨을 통해 다양한 상품을 드립니다.

Capsule Coffee machine

Toaster

Action Camera

Happy Snack Event !

Follow KSC 2017 Facebook & Upload the picture of KSC 2017 on your Facebook and get the **'Snack Package'** at the Members' Lounge (Rm.Grand 3), B1!

KSC 2017 Facebook
facebook.com/circulation.KSC

** Foreigner only

Today's Interview

Theatre Lobby

09:00-09:30

Past, Present and Future in Electrophysiology

Interviewer: Seongwook Han
Interviewee: Chun Hwang

10:00-10:30

The Direction of Stent

Interviewer: Kyung Woo Park
Interviewee: David Cohen

13:30-14:00

New Imaging Tool and Definition of Vulnerable Plaque

Interviewer: Bon-Kwon Koo
Interviewee: Marc Dweck

14:00-14:30

Evolving and Emerging Issue in Cardiology

Interviewer: Young-Hoon Kim
Interviewees: Raj Khandwalla, Euan Ashley, Shih-Ann Chen

16:00-16:30

Device Therapy in Heart Failure

Interviewers: Dong-Gu Shin, Sang Weon Park
Interviewees: Jong-Chan Youn, Jin Joo Park

Imaging

Echocardiographic Findings in Cardiac Sarcoidosis

Yeonyee E. Yoon, MD, PhD
Seoul National University Bundang Hospital, Korea

Cardiac manifestation of sarcoidosis is estimated to be about 5%. However, about 20% to 25% of patients with pulmonary/systemic sarcoidosis are expected to have asymptomatic cardiac involvement (clinically silent). Recent studies suggest that cardiac sarcoidosis appears to be increasingly diagnosed, likely due to improvements in imaging and/or more thorough investigation.

The echocardiogram is often abnormal in clinically manifest disease, but is usually normal in clinically silent cardiac sarcoidosis. Abnormalities found on echocardiography are variable and usually nonspecific, although interventricular septal thinning, especially at the basal segment, can be a feature of cardiac sarcoidosis, which can be unrecognized at its early stage. In addition, although less frequently, there may be an increase in myocardial wall thickness, simulating LV hypertrophy or resembling hypertrophic cardiomyopathy. Other abnormalities include left ventricular and/or right ventricular diastolic and systolic dysfunction, isolated wall motion abnormalities, and aneurysm formation. Cardiac sarcoidosis should be suspected in patients with regional wall motion abnormalities not consistent with coronary artery territory.

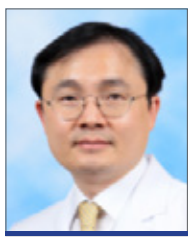
However, all of these echocardiographic findings are clinically manifest at its mid to late stage. Newer techniques, including myocardial strain and/or strain rate, show promise in the early diagnosis of cardiac sarcoidosis according to recent publications, although this should be evaluated further in future trials. Given that extent of LV dysfunction seems to be the most important predictor of prognosis, however, echocardiogram can be of a prognostic value in patients with cardiac sarcoidosis.

Imaging 1

›› Friday, Oct 13, 14:00-16:00 PM / Calla

Late Breaking & Featured Research from Asia-Pacific 2

Coronary Atherosclerotic Precursors of Acute Coronary Syndromes



Hyuk-Jae Chang, MD, PhD
Yonsei University Severance Hospital, Korea

The overall objective of the ICONIC (Incident COroNary Syndromes Identified by Computed Tomography) study was to determine the prognostic significance of APCs for the identification of individuals who will versus will not experience future ACS in a primary prevention population without known coronary artery disease (CAD).

The study was designed as a nested case-control study within a cohort of 25,251 patients from 13 sites in North America, Europe, and Asia, undergoing coronary computed tomographic angiography (CCTA) with follow-up over 3.4+2.1 years. ACS patients and non-events with no prior CAD were propensity matched 1:1 for risk factors and CCTA-evaluated obstructive (≥50%) CAD.

In this case-control study of stable patients without prior CAD, the majority did not possess high-grade coronary stenosis before experiencing ACS. Independent of %DS, coronary atherosclerotic precursors of ACS include fibro-fatty and necrotic core PV, but not total or calcified PV (**Figure 1**). HRP features (positive remodeling, necrotic core, spotty calcifications) offer the greatest prognostic utility to pinpoint patients who will experience future ACS. These results suggest the importance of quantitative characterization of coronary APCs for improved diagnosis of patients who will versus will not experience future ACS.

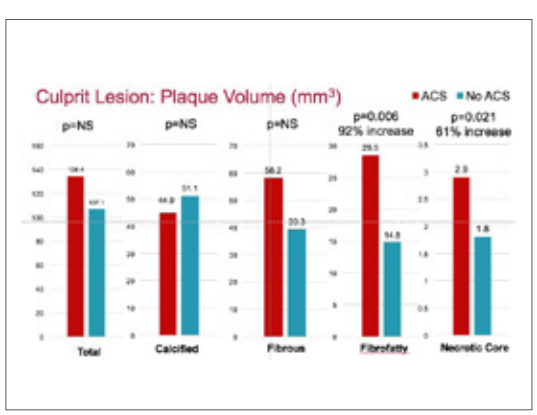


Figure 1. Plaque volumes as coronary atherosclerotic precursors

Post hoc Analysis of the PARADIGM Heart Failure Trial: Pulse Pressure and Outcomes in Heart Failure with Reduced Ejection Fraction

Chen-Huan Chen, MD
National Yang Ming University, Taiwan

Dr. Chen will present the results of his study, where he examined the associations between pulse pressure/pulse pressure change and outcomes in patients with HF-REF in PARADIGM-HF. Patients were randomized in PARADIGM-HF to either sacubitril/valsartan or enalapril. Pulse pressure at baseline (n=8361) and at 4 months (n=7740) were categorized as PP1, ≤40 mmHg; PP2, 41-54 mmHg; and PP3, ≥55 mmHg. At baseline, compared to PP2, neither PP1 nor PP3 was associated with a higher or lower risk of the primary outcome. At 4 months, PP1 had a higher risk than PP2 (hazard ratio 1.28, 95% CI 1.13-1.44, p<0.0001). dPP1 was associated with a higher (1.20, 1.06-1.35, p=0.0046) and dPP3 a lower (0.85, 0.75-0.97, p=0.0128) risk, compared to dPP2. Sacubitril/valsartan reduced pulse pressure by -0.15±12.80 mmHg, whereas enalapril increased pulse pressure by 1.73±12.76 mmHg (p<0.001). Sacubitril/valsartan improved the outcome irrespective of the baseline pulse pressure or the change in pulse pressure. The risk of outcomes did not vary by pulse pressure at baseline in PARADIGM-HF. In contrast, an increase or decrease of PP during treatment may indicate a better or worse outcome in HF-REF, possibly reflecting an improving or worsening of left ventricular function.

^{18}F-Fluorodeoxyglucose PET/CT Predicts the Response of Steroid Therapy in Constrictive Pericarditis

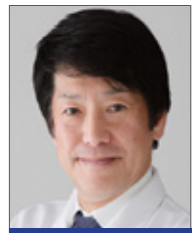
Sung-A Chang, MD, PhD
Samsung Medical Center, Korea

Dr. Chang will present the results of her study, where she hypothesized that ^{18}F-Fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) predicts the response of steroid therapy in constrictive pericarditis. Patients who were diagnosed as constrictive pericarditis (age 18 to 70 years old) were consequently enrolled. All patients had laboratory tests, echocardiography, and ^{18}F-FDG PET/CT at enrollment and were treated with steroid for 3 months. ^{18}F-FDG PET/CT and echocardiography were repeated after 3 months of treatment, and SUVmax (maximum standardized uptake value) of the pericardium was analyzed.

Sixteen patients (mean age 63±12 years old and female 12%) were analyzed. Pericardial SUVmax at baseline was 7.8±1.4 in responders and 3.1±1.2 in non-responders (p=0.01). SUVmax was greater than 3.0 in all responders and only in two (29%) non-responders. ^{18}F-FDG PET/CT can predict the reversibility of constrictive pericarditis with 3 month of steroid therapy.

Long-Term Efficacy of Treat and Repair Strategy in Adult Patients with Atrial Septal Defect and Pulmonary Artery Hypertension

The purpose of this study was to evaluate the long-term efficacy of the treat and repair strategy for ASD with significant PAH (mean pulmonary artery pressure [mPAP] >25 mmHg and PVR >3 Wood units). A total of 616 adult patients who underwent transcatheter ASD closure were divided into 3 groups: PAH/specific-medical therapy (n=11), PAH/no-specific-medical therapy (n=43), no-PAH (n=562). The endpoint was defined as cardiovascular mortality and hospitalization for heart failure.



Teiji Akagi, MD
Okayama University, Japan

Initially, the PHM group had higher PVR compared with non-PHM group (9.6±3.8 vs. 4.2±1.0 Wood units, p<0.01). After treatment with PAH-specific medications, PVR in this group decreased to 4.0±0.8 Wood units (p<0.01). In the PHM group, during a treatment period of 52±48 months, the WHO Functional Classification significantly improved (3.0±0.5 to 2.0±0.0, p<0.01), as well as in the non-PHM group (2.1±0.6 to 1.5±0.5, p<0.01). Treat and repair strategy for ASD with severe PAH can be considered as a safe and valuable therapeutic option even in patients complicated with significant PAH.

Late Breaking & Featured Research from Asia-Pacific 2

›› Friday, Oct 13, 14:00-16:00 PM / Grand 1

Nurse-Technician Session

Nurse-Technician Session 1

· **Special Lecture: Diagnosis of ACS**

· **How to Organize the Evaluation of ACS**

›› Oct 13, 14:00-16:00 Rm. Grand5

Nurse-Technician Session 2

Case Presentation: a Variety of ACS Case

›› Oct 13, 16:00-17:30 Rm. Grand5

Korean Circulation Journal

Korean Circulation Journal ('Korean Circ J') is the official journal of the Korean Society of Cardiology, the Korean Pediatric Heart Society, the Korean Society of Lipid and Atherosclerosis, and the Korean Society of Interventional Cardiology.

Korean Circulation Journal, which started in 1971, is a professional peer-reviewed journal covering all aspects of cardiovascular diseases. It includes original articles of basic research and clinical findings, reviews, editorials, images in cardiovascular medicine, and letters to the editor.

Korean Circulation Journal is a bimonthly journal that publishes scientific and state-of-the-art clinical articles in English, aimed at improving human health in general and contributing to the treatment and prevention of cardiovascular diseases in particular.

Korean Circulation Journal, with 2016 Impact Factor of 1.252, is indexed in PubMed, PubMed Central, Science Citation Index Expanded (Web of Science), Scopus, EMBASE, Chemical Abstracts Service, and Google Scholar, and it is easily available to wide international audiences.

Professor and Doctor Yangsoo Jang, MD PhD, Editor-in-Chief of Korean Circulation Journal (KCJ), describes his ambitions for the journal: "The Korean Circulation Journal strives to convey the latest research from top scientists around the globe, as well as share the most up-to-date news in cardiology. Authors can use our new submission system at (http://kcj.edmgr.com), which now utilizes Editorial Manager™, the system preferred by the world's top publications."

KCJ promotes scientific approaches and delivers contemporary therapeutic guidelines for cardiovascular disease to clinicians and researchers with the aim of reducing the burden of cardiovascular disease in the world.

The ultimate aim of KCJ is sharing of the latest knowledge from the world including Korea. Korean Circulation Journal will be the bridge to provide more information on cardiovascular fields and support many people to be free from the suffering of cardiovascular disease.

Continued from page 1

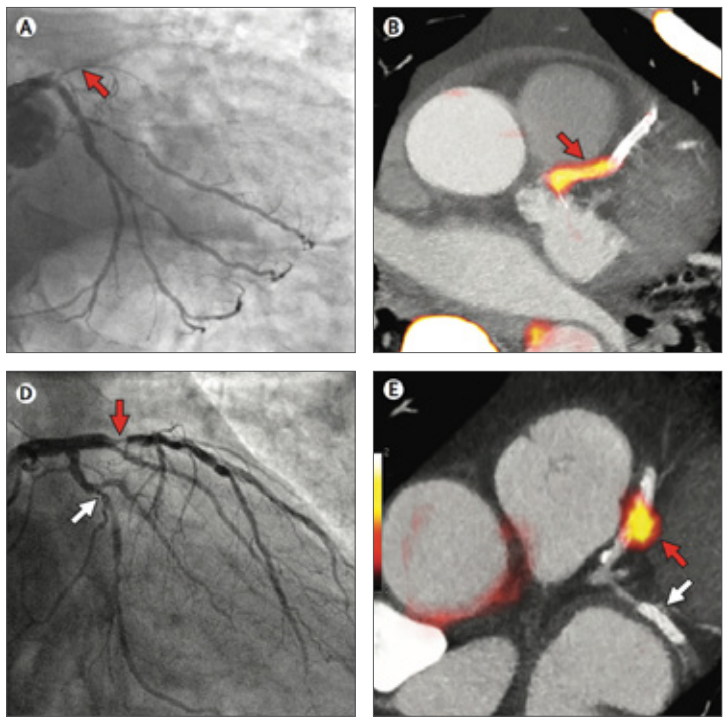


Figure 1. Increased ^{18}F-fluoride PET activity localising to the culprit plaque (red arrows) in two patients following AMI
Reproduced from Joshi et al.

and intraplaque haemorrhage. These features have been used as imaging targets to identify the vulnerable plaque: plaques felt to be at high risk of rupture. Indeed an expanding array of invasive and non-invasive approaches targeting the vulnerable plaque have been investigated in a growing number of clinical trials. These studies have so far suggested that at the individual plaque level the majority of these supposedly high-risk lesions will in fact heal and stabilize without causing a clinical event. This has raised questions about the value of the vulnerable plaque strategy. However, the identification of vulnerable plaque appears to be of greater value at the patient level, with numerous outcome studies demonstrating that patients with vulnerable plaque have up to a 10-fold increased risk of subsequent MI. Interest therefore persists in examining high-risk plaque characteristics in the coronary vasculature with multiple different non-invasive techniques holding particular promise.

Computed tomography (CT) can identify high-risk plaque characteristics in addition to standard assessments of plaque burden and luminal stenosis severity. These include spotty calcification, napkin ring sign, positive remodelling and low attenuation necrotic core. Patients with plaques that have both positive remodelling and low attenuation appear at particularly high risk of future events especially if they also have obstructive coronary artery disease. T1-weighted magnetic resonance (MR) can identify plaques with acute intra-plaque hemorrhage or intraluminal thrombus based upon the high signal in methemoglobin (an important component of newly develop thrombus). This allows detection of these plaque features in the coronary and carotid arteries. Once again patients with high intensity plaque on this technique have an increased risk of future cardiovascular events. For both these CT and MR imaging approaches large-scale multi-centre studies are now required for confirmation.

Finally positron emission tomography (PET) can be fused with CT and MR imaging of the coronary arteries to provide information about disease activity and plaque vulnerability. The most commonly used tracer 18F-fluorodeoxyglucose can be used to measure vascular inflammation in the carotid arteries with initial data suggesting increased events in patients with the highest uptake. However its use in the coronary arteries is limited prompting exploration of other tracers that are more specific to inflammation including Gallium-68 dotatate. Of perhaps greatest interest 18F-fluoride detects newly developing microcalcification with early studies suggesting that it localizes to plaques with multiple high risk features in patients with increased cardiovascular risk factors. In a study of patients with recent MI 18F-fluoride PET accurately identified the culprit coronary plaque that had ruptured and caused the MI in >90% of cases (**Figure 1**). The multi-centre PREFFIR trial is currently underway which will prospectively assess whether 18F-fluoride PET can accurately identify patients at increased risk of myocardial infarction and improve risk prediction compared to contrast CT angiographic techniques.

New Frontiers in Cardiology 2
Evolving and Emerging Issue in Cardiology

›› Friday, Oct 13, 10:30 AM-12:00 PM / Theatre

Arrhythmia & HF: an Area Where Electricity and Mechanics Merge

Arrhythmia & Heart Failure: Dedicated Collaboration Is Essential to Overcome Heart Failure

Heart failure is a major health problem associated with significant morbidity and mortality. Despite priceless mega-trials which demonstrated the survival benefit of beta blockers, angiotensin converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), mineralocorticoid receptor antagonists, and nephrilysin inhibitors (ARNI), the mortality rate of heart failure is not satisfactory. Patients are getting older, and recent advances in interventional cardiology have substantially prolonged the survival of heart failure patients, which, paradoxically, has now worsened the severity of heart failure.

Beta blockers and ACEi are the cornerstone of heart failure management. Mineralocorticoid receptor antagonists, such as spironolactone, can also increase survival of heart failure patients. However, these drugs cannot immediately improve symptoms of heart failure patients. Rather, they, especially beta blockers, can actually aggravate heart failure symptoms in the initial stage of treatment. For symptomatic care of heart failure, diuretics and inotropics such as digoxin and dobutamine can be used. Vasodilators such as nitroglycerine is also used to manage heart failure. However, these drugs have no effect on improving survival.

Recently, biventricular pacing, also known as cardiac resynchronization therapy (CRT), was introduced. CRT have proven its efficacy in a wide range of heart failure patients. The prime advantage of CRT is that it can improve both survival and symptoms. Furthermore, CRT demonstrated additive benefit in hard clinical outcomes and patient symptoms in patients already taking optimal medical therapy. Therefore, CRT is now a class I indication in selected patients. It has also received class IIa indication in a wide range of heart failure patients. CRT is now a 'must-do' procedure in selected cases of heart failure, and physicians should be fully aware of the current indications of CRT. Implantable cardiac defibrillator (ICD) has also proved its clinical benefit including overall mortality in various heart failure patients. In adequately selected heart failure patients, combining CRT and ICD (CRT-D), is better than either therapy alone. The incidence and prevalence of heart failure patients are rapidly growing in the recent years, and, therefore, appropriate implantation of cardiac electronic devices, such as CRT, ICD, or CRT-D, has become a cornerstone of heart failure management. Four speakers will discuss about clinical benefit, indication, and future perspective of CRT, ICD, and CRT-D.

Jong Chan Youn, MD, PhD
Hallym University Medical Center, Korea

Dr. Youn will discuss about the established indications for CRT and ICD implantation. In brief, all the guidelines strongly recommend CRT for LBBB with QRS duration greater than 150 milliseconds. Lower strength of recommendation is suggested for QRS duration of 120 to 150 milliseconds, especially if not associated with LBBB. CRT is not recommended for a QRS of less than 120 milliseconds. An ICD is recommended to reduce the risk of sudden death and all-cause mortality in patients with symptomatic HF (NYHA Class II–III) and an LVEF ≤35% despite ≥3 months of guideline-directed medical therapy. Dr. Youn will also discuss about the current clinical practice regarding CRT and ICD implantation in the Republic of Korea (**Figure 1**).

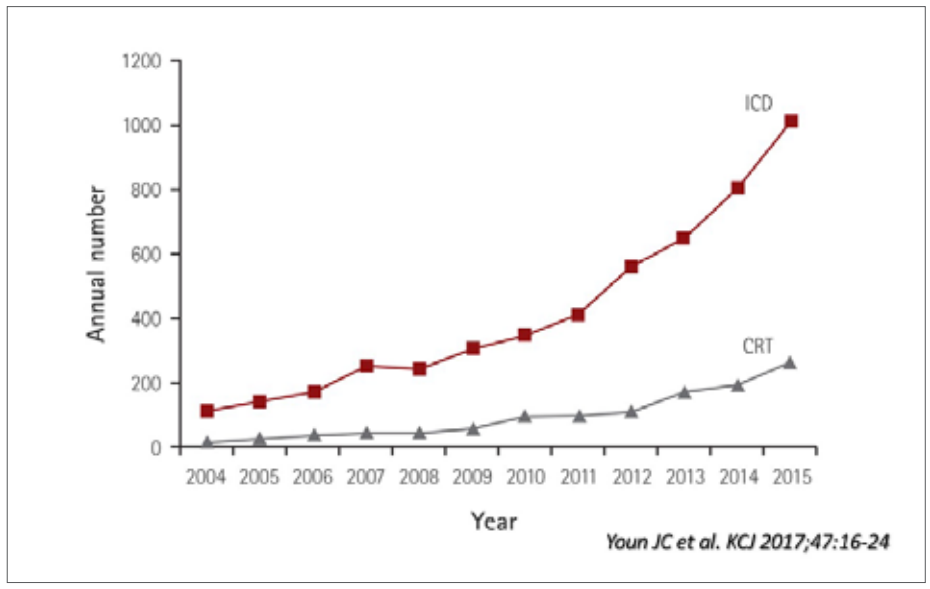


Figure 1. Temporal trends of CIED in Korea

Jum Suk Ko, MD
Wonkwang University Hospital, Korea

Dr. Ko will further discuss about the indications for CRT and ICD implantation. He will give insight on case-by-case indications for implantation of each device as well as simultaneous implantation. It will be particularly interesting to discuss which specific patients will receive the greatest benefit, and which patients will experience serious adverse effects. Decision of adapting defibrillator function in CRT should be considered in most patients with advanced heart failure, but this decision should be based on the initial clinical situation of each patient and clinical follow-up status.

Dr. Joung will share his experience on how to control atrial and ventricular arrhythmias in patients with heart failure. He will discuss about atrioventricular node ablation in conjunction with CRT implantation in heart failure patients accompanied by atrial fibrillation. The role of radiofrequency catheter ablation in such patients will also be discussed. Managing ventricular arrhythmias in heart failure patients is of critical importance. Dr. Joung will present several methods, such as antiarrhythmic drugs, ICD, and catheter ablation to control ventricular arrhythmias in heart failure patients.

Boyoung Joung, MD, PhD
Yonsei University Severance Hospital, Korea

Dr. Park will present off-label use of biventricular pacing in critically-ill patients. Because the major randomized controlled trials with CRT excluded unstable patients, especially those on intravenous inotropic support, CRT is currently reserved for stable patients with heart failure and reduced ejection fraction who do not respond to optimal medical therapy and who have a wide QRS complex (**Figure 2**). Nonetheless, due to theoretical benefit of CRT on cardiac hemodynamics, biventricular pacing has been sporadically used as a "rescue therapy" in critically-ill patients, who are catecholamine dependent, but not a candidate for implantation of left ventricular assisting device or heart transplantation.

Jin Joo Park, MD
Seoul National University Bundang Hospital, Korea

Due to its significant medical burden, extensive resources have been utilized to find a better treatment for heart failure patients. Optimal management of heart failure requires interdisciplinary collaboration: coronary interventionalist, experts in heart failure management, pathologist, radiologist, and those who dedicate in rehabilitation process. After the emergence of biventricular pacing, and demonstration of its astonishing efficacy in heart failure, electrophysiologist is now a key player in the field of heart failure. Treating heart failure has now become a team game.

Cross-Specialty Session 2
Heart Failure & Arrhythmia

›› Friday, Oct 13, 10:30 AM-12:00 PM / Grand 1

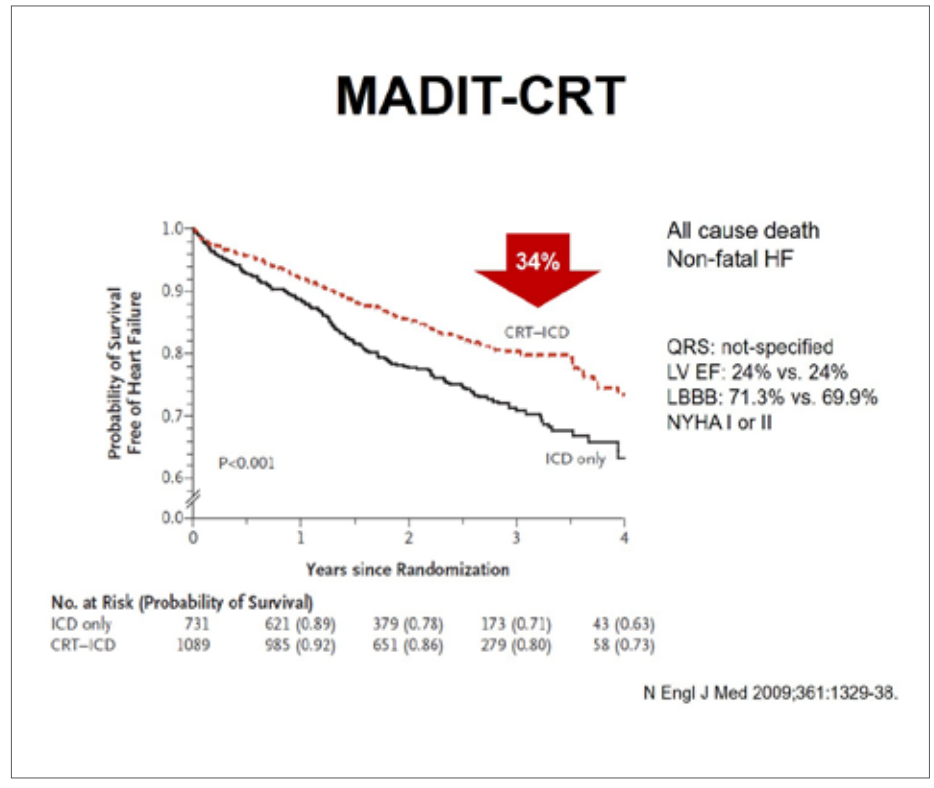


Figure 2. Clinical benefits of added biventricular pacing

Echo

Dilated Cardiomyopathy

Hui-Jeong Hwang, MD, PhD
Kyung Hee University Hospital at Gangdong, Korea

Cardiomyopathy is disease of the heart muscle. Prevalence of cardiomyopathy has been continuously increased. In 1980, first classification of cardiomyopathy was categorized with dilated (DCM), hypertrophic (HCM), restrictive (RCM), arrhythmogenic right ventricular (ARVC) and unclassified cardiomyopathy. Since then, several classifications have been recently suggested (**Figure 1**). In fact, cardiomyopathy has practically been classified into ischemic and non-ischemic cardiomyopathy. Non-ischemic cardiomyopathy has been interchangeably used with DCM. Strictly speaking, however, DCM is defined to a spectrum of heterogeneous myocardial disorders that are characterized by ventricular dilation and depressed myocardial performance in the absence of hypertension, valvular, congenital, or ischemic heart disease.

DCM has been characterized by symptoms/signs including dyspnea, fatigue, general weakness, pulmonary edema/pleural effusion and pitting edema, morphologic/functional cardiac findings including damaged myocardial pathology, ventricular dilation/thinning and depressed myocardial performance and several etiologies including metabolic, endocrine, autoimmune, rheumatologic, infiltrative, genetic, and infectious causes and cardiotoxins.

Management strategies vary depending on the cause, and thus should be individualized. Notwithstanding, the prognosis of DCM has generally improved due to advanced drug therapy, device therapy, and heart transplantation.

Echo 3
Cardiomyopathies
›› Friday, Oct 13, 09:00-10:30 AM / Art

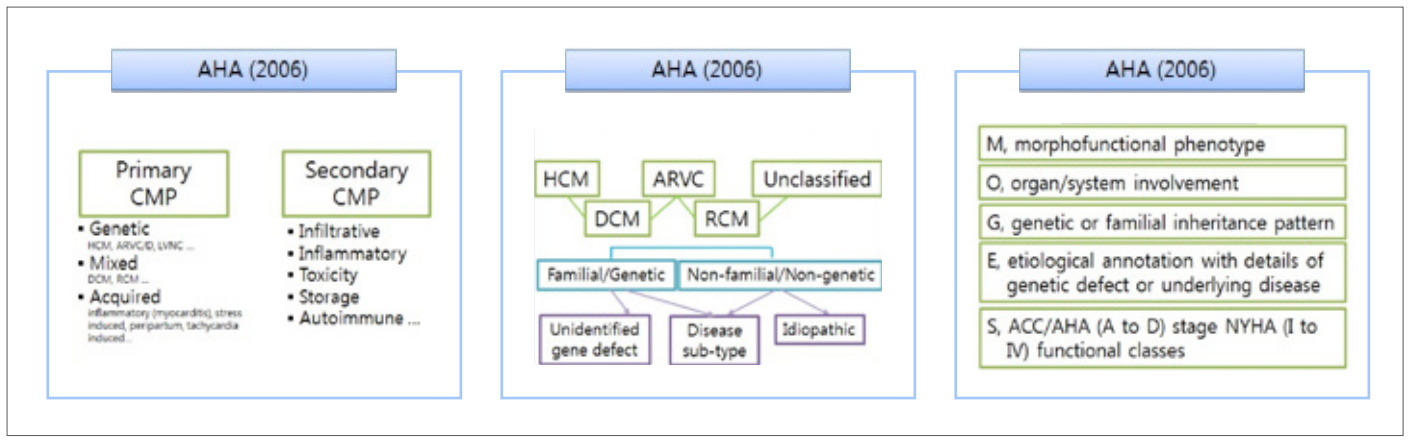


Figure 1. Various classification of cardiomyopathy

Knobology

Hyo-Suk Ahn, MD, PhD
Uijeongbu St. Mary's Hospital, Korea

Yesterday, Prof. Ahn gave an excellent lecture regarding the knobology of echocardiographic machine, stressing the importance of platform manipulation and probe handling to get optimal echocardiographic images. This should help make a correct diagnosis and interpret the patient's condition.

Prof. Ahn first went over the basic controls (**Figure 2**). The gain knob controls the overall brightness of the given images. Time gain compensation (TGC) allows the adjustment of image brightness at selective depth. The depth knob allows the adjustment of the depth of the field of view. The focus knob allows the focusing depth of the ultrasound beam to the area of interest. The frequency knob adjusts the ultrasound frequency to balance depth and resolution needs. High frequency gives better resolution, but limited tissue depth of view, and vice versa. Frame rate is the number of frames per second displayed and must be over 10 frames per second to create the illusion of real-time. The current echocardiographic machine can make more than 20 frames per second. In the color Doppler bar, colors represent the mean velocity in a sample area. Colors represent the direction and velocity of blood flow. The black line at the center of the color Doppler bar indicates zero velocity. The color shown in the upper half of the color bar represents the flow toward the transducer in one color (i.e., red), and the color in the lower half represents the flow away from the transducer (i.e., blue). A focal point can be moved to the area of specific interest to enhance the beam in that area. Doppler spectral information can displayed simultaneously with 2-D image or independently.

Finally, Prof. Ahn concluded his talk by telling that understanding "knobology" is fundamental and is a prerequisite for better imaging acquisition.

Echo 2
Fundamentals of Echocardiography
›› Thursday, Oct 12, 14:00-16:00 PM / Art

Figure 2. Basic controls of knobology

Abstracts

Secular Trend of Mortality Due to Ischemic Heart Disease in Korea, 1983-2015: an Age-Period-Cohort Analysis

Jeong-Su Kim, MD, PhD
Pusan National University Yangsan Hospital, Korea

There has been a noticeable increase in mortality from ischemic heart disease in Korea. They investigated secular trends and age, period, and cohort effects in mortality from ischemic heart disease. They obtained data on deaths from ischemic heart disease between 1983 and 2015 from the Korea National Statistical Office and conducted an age-period-cohort (APC) analysis using cubic splines model. In addition, this study analyzed the effect by gender. While the crude mortality rate has been rising gradually, age-standardized mortality rate shows a downward tendency after 2007 in both genders. Age-specific mortality rate by time period has been increased with age. Age-specific mortality rate by birth control also shows an increasing tendency until the mid-2000s, and, since then, the trend has fallen into a decline. Age, cohort and period effects from the weighted APC model and male to female ratio of mortality by age group according to the APC model are presented in **Figure 4 and 5**. In Korea, the mortality rate from ischemic heart disease has increased steadily until the mid-2000s, and it shows an improving tendency since then. Further efforts from health care workers and national support based on long-term policies are needed.

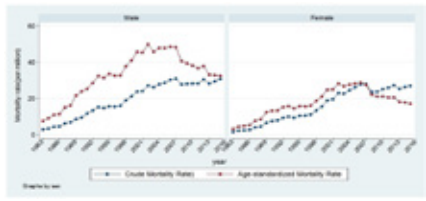


Figure 1. Crude and age-standardized mortality rate of ischemic heart disease in South Korea, 1983~2015

Figure 2. Age-specific mortality rates of ischemic heart disease by time period of diagnosis in Men and Women

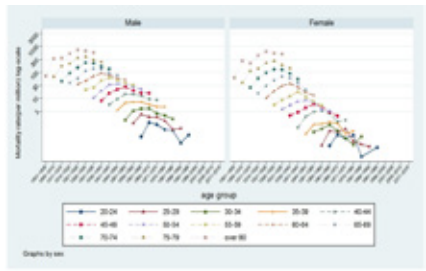


Figure 3. Age-specific mortality rates of ischemic heart disease by birth cohort in Men and Women

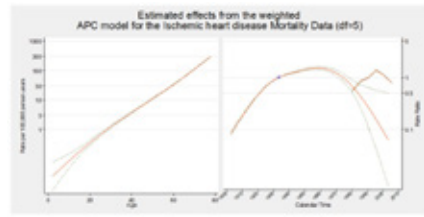


Figure 4. Age, cohort and ceriod effect and 95% CI in South Korea, 1983~2015

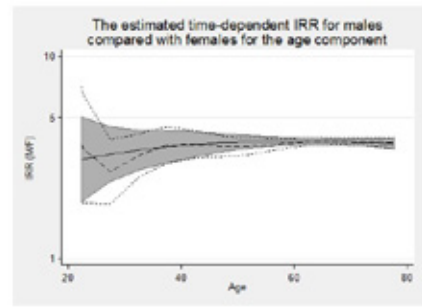


Figure 5. Male to female (M/F) ratios of mortality for ischemic heart disease by age group

Oral Abstracts
Epidemiology & Prevention

›› Thursday, Oct 12, 14:00-16:00 PM / Oak

Best Case Presenter from Case Zone

Case Zone 1: Arrhythmia
Pil-Sung Yang, MD
(Yonsei University, Korea)

Case Zone 2: Heart Failure
Hye Won Lee, MD
(Pusan National University, Korea)

Case Zone 3: AMI & CAD 1
Mohamed Shashet, MD
(Kaohsiung Chang Gung Memorial Hospital, Egypt)

Case Zone 4: AMI & CAD 2
Yongcheol Kim, MD
(Chonnam National University, Korea)

Abstracts

Adverse Plaque Characteristics Predictable from Wall Shear Stress Assessed by Computational Fluid Dynamics

You Jeong Ki, MD
Seoul National University College of Medicine, Korea

This study sought to determine whether computational fluid dynamics (CFD) can be used to predict the adverse plaque characteristics (APC). CFD is a novel noninvasive technology that can provide information of coronary hemodynamics. They retrospectively enrolled 296 lesions in 153 subjects (mean age 66.7±11.3, male 80.4%) who underwent invasive coronary angiography and coronary angiography. The pressure and wall shear stress (WSS) in coronary arteries were analyzed by CFD. The presence of APC, which were defined as low density plaque, positive remodeling, napkin-ring sign and spotty calcification, was assessed in the minimal lumen area segment. High-risk plaques were found in 147 of 296 stenotic lesions (49.7%) and the most common feature was low density plaque (27.7%). The plaques exposed to the highest WSS tertile had a significantly greater proportion of high-risk plaques. The addition of WSS to % diameter stenosis (DS) significantly improved the measures of discrimination and reclassification of high risk plaques (area under the curve from 0.648 to 0.673, p<0.001; category-free net reclassification index 0.351, p<0.001; integrated discrimination 0.021, p=0.010) .The incremental value of WSS over % DS was observed for each feature of APC except for spotty calcification. In the ROC curve analysis, the cut off value of WSS for the prediction of any high-risk feature plaque is 161. Hemodynamics of CT derived computational models is feasible and non-invasive technology, and may be useful in predicting APC.

Oral Abstracts
Intervention 1
›› Thursday, Oct 12, 16:00-18:00 PM / Grand 6

Cases

A New Technique for Lipid Core Plaque Detection by Optical Coherence Tomography for Prevention of Peri-procedural Myocardial infarction

Yongcheol Kim, MD
Chonnam National University Hospital, Korea

A 53-year-old man presented to our department with a 12-hour history of intermittent angina. His admission electrocardiogram demonstrated minimal ST-segment elevation in the inferior leads and a high sensitivity troponin measurement was elevated. We proceeded directly to coronary angiography and delineated a moderate stenosis with haziness in the mid right coronary artery (RCA) (Figure 1A and 1B). The non-flow limiting nature of the lesion and the consideration of using a bioresorbable vascular scaffold (BVS) led to assessment with optical coherence tomography (OCT). The OCT was very instructive, demonstrating a minimal lumen area of 2.5mm2, plaque rupture with associated luminal thrombus and a highly attenuating plaque, representing lipid core plaque (LCP), upstream of the culprit site (Figure 2A, 2B1, and 2C1). Detection of the large lipid core plaque at the site of planned intervention led to use of a filter-based distal protection device to minimize risk of distal embolization. Pre-dilation was undertaken with a 2.5x20mm compliant balloon at 14 atmosphere and a 3.5x28mm BVS (ABSORBTM, Abbott Vascular, Santa Clara, CA, USA) was implanted in the mid-RCA. Post-dilation was achieved with a 3.5x20mm non-compliant balloon and repeated OCT assessment demonstrated excellent stent expansion and good strut apposition with no edge disruption. Angiographic assessment of the filter device suggested capture of material, confirmed by evidence of macroscopic plaque on retrieval of the distal protection device (Figure 1C) and final angiogram demonstrated good distal flow without residual stenosis (Figure 1D).

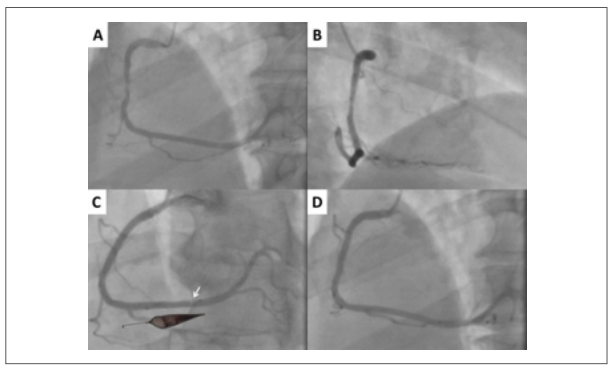


Figure 1. Coronary angiography

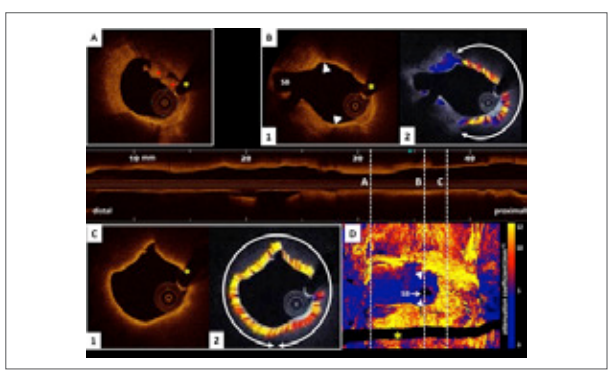


Figure 2. Optical coherence tomography

Intravascular imaging, especially OCT, offers potential in the planning and optimization of percutaneous coronary intervention (PCI), however, image interpretation is challenging. We report a new technique that simplifies interpretation and provides the interventionist with a detailed evaluation of the underlying plaque substrate. Although anecdotal, our case promotes consideration of a concept of 'personalized' intervention to avoid peri-procedural complication and improve outcomes for PCI.

Case Day 1
Case Zone 4: AMI & CAD 2
›› Thursday, Oct 12, 12:40-13:50 PM / Vista Hall

CSC-KSC Joint Symposium

How to Assess Hemodynamic Status of Patients with Acute HF in ER

Jingmin Zhou, MD
Fudan University Zhongshan Hospital, China

Acute heart failure (AHF) is a serious condition needing prompt and accurate management, and hemodynamic evaluation is often the first step. In simple cases, basic hemodynamic monitoring and non-invasive methods may be sufficient, but in some complex cases, invasive and advanced hemodynamic monitoring such as pulmonary artery catheter (PAC) is often needed.

The assessment of congestion and the measure of hemodynamic status is mandatory to initiate therapy. The methods include non-invasive and invasive measurements. Routine physical examination could provide preliminary information on the congestion status. This examination would include blood pressure, rales, third heart sound, jugular venous distension, etc. Chest radiography is another choice However, these modalities all lack sufficient sensitivity, specificity or both. Compensatory lymphatic flow in pulmonary and systemic circulation has long been implicated. Echocardiography provides cardiac output (CO) by pulsed Doppler of the left ventricular outflow tract, PCWP by a regression equation involving mitral and pulmonary venous flow variables, pulmonary artery pressures from tricuspid valve velocities, and pulmonary vascular resistance from previous measurements. Disadvantages of echocardiography is that it is time consuming, requires adequate ultrasound window, demands expertise, and is subject to considerable variability.

Impedance cardiography (ICG) allows calculation of hemodynamic parameters, including flow (stroke volume and CO), afterload (systemic vascular resistance), contractility (velocity and acceleration index), and fluid status (thoracic fluid content). Data suggest that bioimpendance CO has prognostic value and can be used for risk stratification and initiation of therapy in AHF, although a substudy of ESCAPE trial showed that ICG did not have prognostic utility in hospitalized patients with advanced HF.

Figure 1 shows examples of invasive measurements. As basic hemodynamic monitoring, arterial pressure monitoring can be obtained either noninvasively or invasively. Invasive measurement is preferable in AHF patients with shock. The 2016 ESC guidelines of HF recommended that intra-arterial line be considered in patients with hypotension and persistent symptoms despite treatment (IIa, C). Central venous pressure (CVP) reflects right ventricular preload and function, and central venous oxygen saturation (ScvO2) provides information on the adequacy of oxygen transport and, hence, CO.

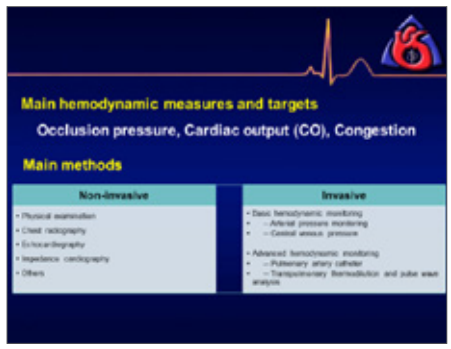


Figure 1. Methods of hemodynamic measurement

Advanced hemodynamic monitoring includes pulmonary artery catheter (PAC), whichcould provide intravascular pressures, CO, and mixed venous blood gas and is more accurate than other assessment methods for hemodynamic monitoring. It was recommended by 2016 ESC guidelines for AHF patients presenting with refractory symptoms (particularly with hypotension and hypoperfusion) despite treatment (IIb, C). PAC also play an important role in guiding the therapy of AHF. Based on previous studies including the ESCAPE trial, and in view of its safety and efficacy, invasive methods such as PAC were not recommended during routine therapy for AHF patients but only for those with cardiogenic shock.

Who should be hemodynamically monitored? The recent ESC HF guidelines recommended that intra-arterial line or pulmonary artery catheter (PAC) be placed in AHF patients with hypotension and persistent symptoms despite treatment. But the criteria for hemodynamic monitoring in patients with AHF are not clearly defined. It was suggested that hemodynamic monitoring should be restricted to severe AHF patients including those with impending or full-blown respiratory or circulatory failure with progressive end-organ failure (renal or hepatic impairment) and those considered for support devices or cardiac transplantation.

Experience from Chinese HF Registry; Why It Is Needed in East Asia

Jiefu Yang, MD
Beijing Hospital, China

Heart failure (HF) is a serious clinical syndrome resulting from any structural or functional cardiac disorder and is associated with increased prevalence, significant mortality and high rehospitalization rate. It is also one of the major cardiovascular diseases of the 21st century. Evidence from epidemiological studies in 2000 has demonstrated that the incidence of HF in Chinese adults is 0.9%. Aging of the population with increased prevalence of CAD, hypertension, DM and obesity, and prolongation of the lives of cardiac patients by modern therapeutic innovations have led to an increasing prevalence of HF in China. CN-HF Research and CHINA-HF Research have shown that the proportion of HF with preserved ejection fraction (HFpEF) is approximately 60%, and HF with reduced EF is about 40% in all hospitalized HF patients.

The medications that improve prognosis for HFrEF, such as β-blockers, ACEI/ARB, and aldosterone antagonists are increasingly used. However, patients received lower doses of these medications rather than the target doses in China. A randomized, multicenter study indicated that herbal capsule (Qiliqiangxin) combined with GDMT for HF can lead to further reduction of the level of NT-proBNP, improving cardiac function and quality of life. Implantation of CRT/ICD in our country per million population is still far lower than the western countries. The ratio of CRT-P to CRT-D is approximately 50% to 50%. Non-ischemic heart disease is the major etiology for the implantation of CRT-P and CRT-D claiming approximately 70% which is quite different from the western countries.

In 2017, the HF Group of Chinese Society of Cardiology and the China Cardiovascular Association launched the Chinese HF Standardized Management Center establishment and certification projects to promote standardized treatment of HF and clinical implementation of guideline-directed evaluation and management (GDEM). Based on the latest HF guidelines and the experience of HF center, "Certification Standards of Chinese HF Standardization Management Center" was developed in line with national conditions by the HF Group of Chinese Society of Cardiology. A multidisciplinary Management team will be formed in the HF center to promote hierarchical treatment and two-way referral system, and to implement guideline-directed standardized treatment and long-term follow-up management of patients. An integrated public healthcare platform will be set up for the registration and certification of HF centers, physician training and patient education. A large database of HF will be established, together with quality management monitoring system and training system, covering different levels of hospitals in different regions. Multicenter randomized controlled clinical studies and real-world studies will be carried out. The core value of certification is to promote the continuous improvement of the quality of HF management and the long-term management of patients with HF.

CSC-KSC Joint Symposium (Heart Failure)
Update in the Management of AHF

›› Friday, Oct 13, 09:00-10:30 AM / Grand 1

JCS-KSC Joint Symposium

Advances in Plaque Biology

The main theme of JCS-KSC Joint Symposium this year is “Advances in plaque biology”. Four distinguished speakers will present to the attendees the advancements and current research trends in plaque biology. This session will offer opportunities to learn from and interact with the experts from Japan and Korea.

Goo Taeg Oh, PhD, DVM
Ewha Womans University, Korea

Professor Oh will give a lecture on immune and vascular cell network in atherosclerosis. Atherosclerosis is a chronic inflammatory disease in which intense immunological pathways play an essential role. During the progression of atherosclerosis, large numbers of inflammatory and immune cells accumulate in the intima. The accumulated immune cells, including T cells, macrophages, and dendritic cells (DCs), cross-talk each other and affect the development of atherosclerosis. Importantly, they found DCs that were poorly phagocytic but were immune stimulatory in the steady state mouse aorta. By crossing Flt3-/- to Ldlr-/- mice, deficiency of classical CD103+ aortic DCs exacerbated atherosclerosis and fewer Foxp3+ Treg cells. These data indicate that functional DCs are dominant in normal aortic intima, and CD103+ classical DCs are associated with atherosclerosis protection. The function of CD137, a member of the tumor necrosis factor receptor superfamily, in mediating atherosclerosis plaque stability remains unknown. They found that the activation of CD137 signaling decreases the stability of plaques via its combined effects on T cells, vascular smooth muscle cells, and macrophages (**Figure 1**).

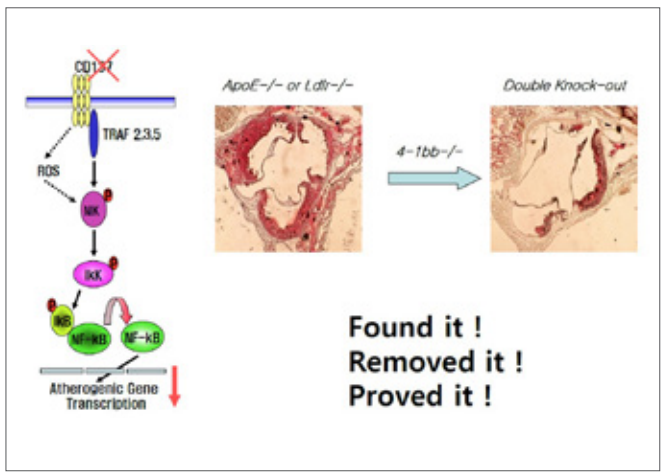


Figure 1. T Cell Co-stimulatory Factor: CD 137

Kimio Satoh, MD, PhD
Tohoku University, Japan

Dr. Satoh will deliver a lecture titled “development of novel therapies for cardiovascular diseases by clinical application of basic research”. Cyclophilin A (CyPA) is secreted from vascular smooth muscle cells, inflammatory cells, activated platelets, and cardiac fibroblasts in response to environmental stimuli. Mechanistically, excessive and continuous activation of the RhoA/Rho-kinase system promotes the secretion of CyPA, resulting in the development of multiple cardiovascular diseases. Basigin (Bsg), a transmembrane glycoprotein that activates MMPs, is one of the extracellular receptor for CyPA and promotes cell proliferation and inflammation. Thus, the CyPA/Bsg system is potentially a novel therapeutic target for cardiovascular diseases. Recently, they reported that plasma CyPA levels are increased in patients with cardiovascular diseases. Moreover, plasma CyPA levels predicted all-cause death in those. Additionally, they reported that plasma soluble Bsg levels are increased and predicted all-cause death in patients with heart failure, suggesting that both CyPA and Bsg are novel biomarkers for cardiovascular diseases. To further discover novel molecules targeting the CyPA/Bsg system, they performed high-throughput screening of 4,452 compounds and found molecules that ameliorate the development of animal model of cardiovascular diseases. Altogether, final goal of their research is to develop novel biomarkers and their inhibitors.

Takahiro Horie, MD, PhD
Kyoto University, Japan

Dr. Horie will give a lecture on the role of microRNAs in atherosclerosis. Recent reports indicated that miR-33a located within the intron of sterol regulatory element-binding factor (SREBF)2 controls cholesterol homeostasis via targeting ATP-binding cassette A1 (ABCA1). ABCA1 is a key molecule to form HDL cholesterol (HDL-C), which contributes to reverse cholesterol transport system in vivo. Indeed, miR-33a deficient mice showed elevated serum HDL-C levels via increased expression of ABCA1 and resistant to atherosclerosis or abdominal aortic aneurysm formation. On the other hand, primates, but not rodents, express a second miR-33 gene (miR-33b) from an intron of SREBF1. To address miR-33b function in vivo, they developed humanized mice, in which a miR-33b transgene is inserted within a Srebf1 intron. MiR-33b knock-in mice for an intron of Srebf1 showed reduced HDL-C level via decreased expression of ABCA1 and promoted atherosclerosis formation. These results indicate that miR-33a/b, which are located in the intron of SREBF2/1 respectively, have a substantial function in regulating lipid metabolism and atherosclerosis development. Thus, miR-33a/b could be a novel therapeutic target for lipid disorder and atherosclerosis.

Ki Hoon Han, MD, PhD
University of Ulsan, Korea

Dr. Han will give a talk on the role of C-reactive protein (CRP) in plaqure progression. CRP is a clinical marker representing the intrinsic inflammatory status. Moreover, CRP detected in plaque, which may originate from blood circulation or de novo synthesis by macrophages and vascular smooth muscle cells (VSMCs), may directly trigger the activation of specific receptors such as Fc-gamma receptors (FcγRs), and induce a number of innate immune responses including complement activation, monocyte recruitment, and the expression of cytokines and inflammatory mediators by macrophages. However, Previous animal intervention studies have reported conflicting results on the direct contribution of human CRP to the progression of atherosclerosis in murine models. CRP was found to be ineffective in murine models dominant in very low density lipoprotein (VLDL). Only one study with apoE(-/-) mice, showing exceptionally high serum CRP level (>100 mg/L), demonstrated aggravation of atherosclerosis, suggesting an atherogenic property of CRP. Kovacs and colleagues showed that the modest expression of CRP (24 to 52 mg/L) was associated with less severe atherosclerosis in ApoB100/100/LDLR(-/-) mice. They developed moderate degree of hypercholesterolemia with a human-like lipoprotein profile in LDLR(-/-) mice. Under these conditions, moderately elevated plasma CRP levels resulted in a 30% reduction of aortic surface atherogenesis compared to wild type LDLR(-/-) littermates. In the series of their work, he suggest that CRP molecule is not biologically inert, but may trigger complex cellular responses, which may result in progression or suppression of atherogenic process.

JCS-KSC Joint Symposium (Basic Research)
Advances in Plaque Biology
›› Friday, Oct 13, 16:00-17:30 PM / Grand 1

2018 춘계심혈관통합학술대회

2018 Annual Spring Scientific Conference of the KSC
in conjunction with KHRS, KSIC, KSE and KSoLA

대한심장학회 | 대한부정맥학회 | 대한심혈관중재학회 | 한국심초음파학회 | 한국지질·동맥경화학회

20(Fri.) – 21(Sat.). April, 2018

DCC, Daejeon

KSC 2018

대한심장학회 제62차 추계학술대회

18.Thu -20.Sat, October | Walkerhill hotel, Seoul

The 62nd Annual Scientific Meeting of The Korean Society of Cardiology