

KSCC 2021 DAILY

Today's Highlights

APSACHD 1~6

08:50-16:50 / Channel 3

Featured Education Session 1~2

09:00-12:10 / Channel 1

Cross Specialty: Heart Failure & Arrhythmia

Cross Specialty Debate: Hot Issues in HF & EP
13:20-14:50 / Channel 2

JCS-KSC Joint Session: Heart Failure

Controversies and Advances in Heart Transplant (HTx)/LVAD
13:20-14:50 / Channel 4

Cardiac Surgery

Back to the Basic; Surgical Correction of Degenerative Mitral Regurgitation
13:20-14:50 / Channel 6

Myocardial Infarction 1

Recent Advancement and Future in Treatment of AMI
15:00-16:30 / Channel 1

Echocardiography 1

Echocardiography for Intervention
15:00-16:30 / Channel 4

Welcome Message



Tae Hoon Ahn, MD, PhD
Chairperson, The Korean Society of Cardiology

I am pleased to announce the hosting of the 65th Annual Scientific Meeting of the Korean Society of Cardiology (KSCC 2021) to be held in a virtual platform during October 16-18, 2021.

With the efforts and enthusiasm of seniors, colleagues, and junior members, I believe that it has developed into a world-class academic society in the field of cardiology.

For the continuous growth of our society, I strongly believe the role of our annual meeting is very important. Although the meeting will be held online due to COVID-19, I hope it will be a meaningful opportunity for many recent studies to be introduced and an abundance of knowledge to be shared.

I welcome all scientists, health professionals, educators, and those working for the advancement of cardiology and for promoting the importance of cardiovascular diseases-related research. I also look forward to our young cardiologists learning more about the new progresses in all aspects of cardiology including medical and technological advances at KSCC 2021.

I wish you all to stay safe and healthy under the difficult conditions of COVID-19.



Hyo-Soo Kim, MD, PhD
President and CEO, The Korean Society of Cardiology

On behalf of The Korean Society of Cardiology, I am honored and pleased to welcome all of the attendees at KSCC 2021 (The 65th Annual Scientific Meeting of The Korean Society of Cardiology), which is being held from October 16th to 18th in a virtual platform.

The organizing committee has gone to great lengths to plan a meaningful meeting and to ensure the attendees to be satisfied. This meeting aims to explore the latest research findings and to share insights into the latest discoveries and cutting-edge scientific opinions with healthcare professionals in the field of cardiology.

To awaken the interest in all fields of cardiology from basic to clinical research, we have come up with series of sessions, 'Basic Research Hot Sessions' and the latest studies from top-class cardiologists, as well as updated contents of guidelines in the 'Guideline Review Session'.

As there are various sub-specialties in cardiology, we also prepared 'Cross Specialty Sessions' to discuss and debate interactively on the latest issues with professionals from each and every sub-specialty. Moreover, we ensured to provide young researchers with abundant opportunities to present their studies through case and abstract sessions.

Although we are unable to meet in person in light of the COVID-19 pandemic, we hope this virtual meeting provides an opportunity for everyone to enjoy without restrictions or concerns in terms of location or time.

Program at a glance: Day 1, Oct 16, 2021

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Abstract Library
09:00-10:30	Featured Education Session 1. Instruction of Clinical Research Instruction of Clinical Research for Research Beginners	Intervention 1 Tough Calls During PCI	08:50-10:00 APSACHD ¹⁾ 1 Heart Failure in ACHD	Young Investigator Award Competition 1 1-6	Young Investigator Award Competition 2 7-12	전공의 Awards Oral 1-9	Abstract 1-270
10:40-12:10			10:10-11:10 APSACHD 2 Valvular Problem in ACHD				
12:20-13:00	11:20-12:20 APSACHD 3 My Tips for ACHD with Heart Failure	Scientific Session [Amgen] Lipid Management After ACS: The Role of PCSK9 Inhibition	Scientific Session [Organon] Early & Lower for Longer: Prevention of Cardiovascular Disease	Scientific Session [Hanmi] Strategies for Cardiovascular Disease Prevention in Hypertension and Dyslipidemia	Case 1 (Arrhythmia) 1-4		
13:00-13:20	Break						
13:20-14:50	Imaging Imaging for Arrhythmia and Vasculatures	Cross Specialty: Heart Failure & Arrhythmia Cross Specialty Debate: Hot Issues in HF & EP	13:30-14:30 APSACHD 4 Heart Failure & Rhythm Problem in ACHD	JCS ²⁾ -KSC Joint Session : Heart Failure Controversies and Advances in Heart Transplant (HTX)/LVAD	Case 2 (Heart Failure) 5-13	Cardiac Surgery Back to the Basic; Surgical Correction of Degenerative Mitral Regurgitation	
15:00-16:30			14:40-15:40 APSACHD 5 What We Need to Be Aware of				
16:40-18:10	15:50-16:50 APSACHD 6 Multidisciplinary Case Based Approach to ACHD	Echocardiography 2 Debates in Multimodality Imaging	Oral Abstracts 2 10-18	개원의 연수강좌 2 Practical Guide for Non-drug Risk Factor Modification: Diet, Exercise, Weight Control, Psychologic Support			
	Myocardial Infarction 1 Recent Advancement and Future in Treatment of AMI				Arrhythmia 1 Basic, Digital Health & Innovations in EP	Myocardial Infarction 2 Practical Tips and Tricks for the Management of AMI	

1) APSACHD: Asia Pacific Society for Adult Congenital Heart Disease 2) JCS: Japanese Circulation Society

개원의 연수강좌 1

고혈압 관리(Practical Issues in Home BP Monitoring and Smart Device)

» Saturday, Oct 16, 15:00-16:30, Channel 6

- 15:00-15:20 가정혈압의 표준 측정법, 어떻게 교육할까?
- 15:20-15:40 가연 고혈압, 백의 고혈압, 아침 고혈압의 정의와 생활습관 교정
- 15:40-16:00 가정 혈압 측정 결과를 반영한 약제 치료
- 16:00-16:20 Smart Device의 발전과 가정혈압 측정
- 16:20-16:30 Discussion

개원의 연수강좌 2

Practical Guide for Non-drug Risk Factor Modification: Diet, Exercise, Weight Control, Psychologic Support

» Saturday, Oct 16, 16:40-18:10, Channel 6

- 16:40-17:00 심혈관질환 예방과 관리에 도움을 줄 수 있는 한국인의 밥상은?
- 17:00-17:20 심혈관 환자들을 위한 안전하고 효과적인 가정 운동법
- 17:20-17:40 체중감량이 고혈압, 고지혈증, 당뇨 관리에 얼마나 도움이 될까?
- 17:40-18:00 심혈관 질환 위험 인자 관리를 위한 심리 상담 프로그램의 효과
- 18:00-18:10 Discussion

Diamond & Scientific Session

Diamond Session [BMS/Pfizer]

Latest Insights of Anticoagulation Management

12:20-12:40 2021 EHRA Practical Guide on the Use of NOAC in Patients with Atrial Fibrillation

12:40-13:00 Anti-Coagulation in Different Patient Populations: Frailty and Advanced Age

» Oct 16, 12:20-13:00, Channel 1

Diamond Session [Viatrix]

Unchangeable 1st Option of Lipid Management

12:20-12:40 Why Treatment Continuum is Important?: A Tolerable Statin as a First Treatment Option and Ezetimibe/atorvastatin Combination as a Next Choice

12:40-13:00 Lower for Longer: Impact of Statins on CV Outcomes

» Oct 16, 12:20-13:00, Channel 2

Scientific Session [Amgen]

Lipid Management After ACS: The Role of PCSK9 Inhibition

12:20-12:35 Early Optimization of Lipid Lowering Therapy Post-ACS

12:35-12:50 Patient Centricity: Evolocumab For Whom, When and How?

12:50-13:00 Discussion

» Oct 16, 12:20-13:00, Channel 3

Scientific Session [Organon]

Early & Lower for Longer: Prevention of Cardiovascular Disease

12:20-12:40 Early for Longer: The Benefit of Atorvastatin/Ezetimibe Combination Therapy for Primary Prevention of CAD

12:40-13:00 Lower for Longer: Reducing Cumulative Exposure to Elevated LDL-C to Prevent Cardiovascular Disease

» Oct 16, 12:20-13:00, Channel 4

Scientific Session [Hanmi]

Strategies for Cardiovascular Disease Prevention in Hypertension and Dyslipidemia

12:20-12:40 The Recent Trend of Simultaneous Management of Hypertension and Dyslipidemia

12:40-13:00 Why Should We Consider Strongly Rosuvastatin/Ezetimibe Fixed-Dose Combination?

» Oct 16, 12:20-13:00, Channel 5

대한심장학회

정기총회

2021.10.17. Sun. 17:50

학회 기간 중
매일 매일 계속되는
경품 추첨 이벤트



애플워치 6
(학회기간 중 매일 1명)
추첨대상: 하루에 모든 세션
강의 이수자



에어팟 Pro
(학회기간 중 매일 2명)
추첨대상: 하루에 5시간 이상
강의 이수자



스타벅스 1만원권
(학회기간 중 매일 30명)
추첨대상: 하루에 산학세션
30분 이상 강의 이수자

*자세한 사항은 추계학술대회 Webinar
'EVENT' 게시판에서 확인 가능합니다.

Young Investigator Award Competition Session

Young Investigator Award Competition 1 [1-6]

» Oct 16, 09:00-10:30, Channel 4

Young Investigator Award Competition 2 [7-12]

» Oct 16, 09:00-10:30, Channel 5

Young Investigator Award Competition 3 [13-18]

» Oct 16, 10:40-12:10, Channel 4

Young Investigator Award Competition 4 [19-24]

» Oct 16, 10:40-12:10, Channel 5

대한심장학회 APSC 2025 부산 유치 & 김효수 이사장 APSC President-Elect 당선



대한심장학회,
APSC 2025 부산유치

일정: 2025. 4. 18. Fri.-19. Sat.
장소: 부산 벅스코(BEXCO)

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Hanmi 한미약품

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단독 요법중인 환자 또는
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강력한 LDL-C의 동시관리⁹

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 1) Kang SM, Yoon JC, Chae SC, et al. Comparative efficacy and safety profile of amlodipine 5 mg/losartan 50 mg fixed-dose combination and amlodipine 10 mg monotherapy in hypertensive patients who respond poorly to amlodipine 5 mg monotherapy: an 8-week, multicenter, randomized, double-blind phase III noninferiority study. *Clin Ther.* 2011 Dec;33(12):1953-63. 2) Hong BK, Park CG, Kim KS, et al. Comparison of the efficacy and safety of fixed-dose amlodipine losartan and losartan in hypertensive patients inadequately controlled with losartan: a randomized, double-blind, multicenter study. *Am J Cardiovasc Drugs.* 2012 Jun;12(3):189-195. 3) Kim SH, Ryu KH, Lee NH, et al. Efficacy of fixed-dose amlodipine and losartan combination compared with amlodipine monotherapy in stage 2 hypertension: a randomized, double-blind, multicenter study. *BMC Res Notes.* 2011 Oct 28;4:461. 4) Hwang SJ, Jeong HS, Han SH, et al. Comparison of Fixed-Dose Combinations of Amlodipine/Losartan Potassium/Chlorthalidone and Amlodipine/Losartan Potassium in Patients with Stage 2 Hypertension Unadequately Controlled With Amlodipine/Losartan Potassium: A Randomized, Double-Blind, Multicenter, Phase II Study. *Clin Ther.* 2017;39(10):2049-60. 5) The SPHYT Research Group. A Randomized Trial of Intensive versus Standard Blood-Pressure Control. *N Engl J Med.* 2015;373:2203-16. 6) Cho EJ, Lee HY, Sung KC, et al. Comparison of 24-hour Ambulatory Central Blood Pressure Reduction Efficacy Between Fixed Amlodipine or Up-Titrated Hydrochlorothiazide Plus Losartan - The K-Central Study. *Am J Hypertens.* 2019 Oct; 32(10): 999-1002. 7) Lee HY, Kim SY, Choi KJ, et al. Evaluate the Efficacy and the Tolerability of a Triple Combination of Amlodipine/Losartan/Rosuvastatin in Patients With Coronary Essential Hypertension and Hyperlipidemia: A Randomized, Multicenter, Double-blind, Placebo-controlled Study. *Clin Ther.* 2017 Dec;39(12):2566-76. 8) Cho EJ, Lee HY, Sung KC, et al. Comparison of 24-hour Ambulatory Central Blood Pressure Reduction Efficacy Between Fixed Amlodipine or Up-Titrated Hydrochlorothiazide Plus Losartan: The K-Central Study. *Am J Hypertens.* 2019 Sep; 32(9):1002-1002. 9) Kim KJ, et al. Effect of fixed-dose combinations of ezetimibe plus rosuvastatin in patients with primary hypercholesterolemia: MRS-EZCZ. Multicenter Randomized Study of Rosuvastatin and ezetimibe. *Cardiovasc Ther.* 2016;34(3):371-382.

Echocardiography

Debates in Multimodality Imaging



CMR in Aortic Stenosis: CMR Should Be Included



Sung-Ji Park, MD, PhD
Sungkyunkwan University Samsung Medical Center, Korea

Aortic valve stenosis (aortic stenosis, AS) has become the most common valvular heart disease with the increase of aging population and life expectancy. Echocardiography is, and will probably always be, the cornerstone of AS evaluation. However, advanced cardiovascular multimodal imaging techniques are continuously developing in order to overcome the inherent limitations of echocardiography.

Cardiac magnetic resonance imaging (CMR) allows a comprehensive morphological and functional evaluation of the aortic valve and myocardium, and provides important data for the diagnosis and risk stratification in patients with AS. CMR can functionally assess the aortic flow using two-dimensional and time-resolved three-dimensional velocity-encoded phase-contrast techniques. Four-dimensional flow magnetic resonance imaging (MRI) is a promising technique for both the assessment and understanding of AS pathophysiology, notably the flow dynamics and their repercussion on the aortic wall. CMR appears to be a good alternative to more invasive techniques (i.e., cardiac catheterization and transesophageal echocardiography) in AS when transthoracic echocardiogram (TTE) results are equivocal, or in the case of poor echocardiographic windows without exposing the patient to ionizing radiation.

As the presentation and progression of the disease can vary by patient, the main utility of CMR in AS appears to be its ability to better stratify patients according to

their myocardial response in terms of fibrosis and morphological and functional cardiac alterations. A number of recent studies are accumulating on this showing the utility of CMR for evaluation of the pressure overloaded myocardium in more details. However, further prospective studies are necessary before patients can be referred for aortic valve replacement (AVR) based solely on the CMR findings.

Despite its relatively low availability and its operator dependency, the role of CMR in AS is expanding, and improvements in techniques and technologies should enhance its utility in routine clinical practice in the near future.

Wait, Not Yet!



Kye Hun Kim, MD, PhD
Chonnam National University Hospital, Korea

With the dramatic increase in lifespan worldwide, aortic stenosis (AS) is one of the most common valvular heart diseases that ultimately require either surgical or transcatheter aortic valve replacement (SAVR or TAVR) in developed countries such as Korea. Transthoracic echocardiography (TTE) is the gold standard for the diagnosis of AS, as well as its role for assessment of AS severity and prognosis. TTE also allows accurate assessment of the valve anatomy and the etiology of AS, concurrent valvular heart disease, and abnormalities associated with AS, such as aortic dilation.

Because TAVR has become a reasonable alternative for SAVR for severe AS patients with high surgical risk, the use of additional imaging modalities including cardiac CT or MR (CMR) is also gradually increasing. In the current guidelines, however, the use of CMR is

limited in patients with inadequate echocardiographic quality or results that are discrepant with patient presentation. With the technical advances, CMR provides unparalleled characterization of the soft tissue and enables the identification and measurement of both diffuse interstitial and replacement forms of myocardial fibrosis in AS, which is associated with prognosis. Current studies have demonstrated that myocardial fibrosis can be measured with various CMR techniques, such as late gadolinium enhancement (LGE), native T1 mapping, post-contrast T1 mapping, or extracellular volume fraction. Myocardial fibrosis is a pathological hallmark of left ventricular decompensation, and thus, an important prognostic indicator in patients with AS.

Despite this increasing evidence of the usefulness of CMR in the risk stratification of AS, there is currently no data on whether the non-infarct LGE can be used to optimize the timing of valve intervention. To elucidate this issue, the EVoLVeD (Early Valve replacement guided by biomarkers of LV Decompensation in asymptomatic patients with severe AS) trial (NCT03094143) is currently ongoing.

It is sure that CMR is an important complimentary imaging technique in the evaluation of AS patients with inadequate echocardiographic quality or discrepant results, and in the evaluation of myocardial changes. However, the routine use of CMR is not warranted yet in patients with AS. Before considering the incorporation of the use of CMR into the clinical decision-making algorithm of AS, we will have to wait the results of large randomized clinical trials such as the EVoLVeD trial.

Echocardiography 2

Debates in Multimodality Imaging

» Saturday, Oct 16, 16:40-18:10, Channel 4

Transcatheter Mitral Edge-to-Edge Repair (MitraClip)



Do-yeon Kang, MD
Ulsan University Asan Medical Center, Korea

Transcatheter mitral edge-to-edge repair (TEER) with MitraClip is becoming more and more popular as an alternative treatment in high-risk mitral regurgitation (MR) patients. TEER is recommended as a treatment strategy for primary MR patients with high surgical risk (IIA, B) and secondary MR patients with left ventricular (LV) ejection fraction 20-50%, LV end-systolic diameter ≤ 70 mm, and pulmonary artery systolic pressure ≤ 70 mmHg (IIA, B) according to the 2020 American Heart Association/American College of Cardiology (AHA/ACC) guidelines for valvular heart disease.

The number of TEER cases is increasing, since it was first introduced in Korea in 2020. Then what do the interventionists want from the echocardiography specialists for

TEER? The answer is, "Everything"! The role of echocardiography is indispensable not only during the procedure, but also before and after the procedure.

Before the procedure, what an interventionist needs is an accurate assessment of the mitral valve anatomy and function. Echocardiography, especially the transesophageal echocardiography (TEE) can help answer these questions: "Why does the mitral valve regurgitate (etiology)?" "Is the MR severe enough for TEER (MR severity)?" "Is the mitral valve favorable for TEER (anatomy)?" and "What would be the appropriate size, and how many clips are needed (procedural planning)?" Traditionally, mitral valve area ≥ 4.0 cm², transmitral pressure gradient < 4 mmHg, and valve anatomy favorable for grasping (flail width < 15 mm and flail gap < 10 mm in degenerative flail MR, coaptation depth < 11 mm and coaptation length > 2 mm in functional MR) have been considered as favorable features for TEER. However, a newer-generation MitraClip G4 with clips of four sizes is expected to expand the anatomic indications of TEER.

During the procedure, the role of the echocardiography specialist is essential. Since the mitral valve leaflet does not have a significant fluoroscopic structure, TEER procedure is fully guided by the TEE images. TEE images guide every step of the procedure:

- 1) Selecting the best transseptal puncture position (4-4.5 cm height from the mitral annulus)
- 2) Navigating the introduction of guiding catheter and clip delivery system
- 3) Guiding the clip implantation
- 4) Assessing the clip results (degree of residual MR, pulmonary vein flow pattern, trans-mitral pressure gradient)
- 5) Deciding whether to finish the procedure

Echocardiography specialists should play the role of the 'conductor' of an orchestra during the TEER. They should present a clear goal before the procedure, guide the procedure, and determine the endpoint of the procedure. For the successful 'conduct', excellent imaging technique,

Continued on page 5

JCS-KSC Joint Session: Heart Failure

Current Status and Future Aspects of HTx and VAD in Japan



Norihide Fukushima, MD, PhD
National Cerebral and Cardiovascular Center, Japan

The world first heart transplantation (HTx) was performed by Dr. Barnard in 1967 and the first one in Japan by Dr. Wada in 1968. Although organ transplantation including HTx from brain dead (BD) donors have increased in USA and European countries, HTx has been established as therapeutic option for end-stage heart failure in the world. However, Dr. Wada's HTx mislead organ donation in Japan, and it took more than 30 years to start HTx in Japan.

The Japanese 'Organ Transplant Act' came into effect in October 1997 and the first heart transplantation under this Act was performed in February 1999. However, the Japan Act required a living written consent for BD persons and organ donation, and did not allow BD donation from children younger than 15 years. For these reasons, only 81 BD organ donations have been performed in Japan during 13 years until the former Act was issued. The cardiac donation rate per million populations in Japan is only 0.08, while it is 7.3 in USA and 0.97 in South Korea in 2007. A mean waiting time for HTx was extraordinary long in Japan, which was 1,026 days in 2010.

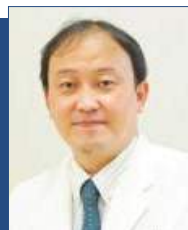
By renewal of the Act in 17th July in 2010, organs can be donated after BD with consent from their family. Although the Act was revised in 2010 and BD organ donation increased from 13 to 84 cases in a year in 2019, the number was still extremely smaller than other developed countries. Dr. Fukushima showed special transplant management doctors (a medical consultant, MC) system since 2002. The role of MC are these: assessing donor organ function, identifying organs useful for transplantation, intensive caring of donor, stabilizing donor hemodynamics, as well as improving donor cardiac and lung function by preventing and treating lung infection before

procurement teams arrived at the donor hospital. By these efforts, out of 761 consecutive BD organ donation between the beginning and the end of June 2021, 594 hearts (77.1%) were transplanted and 5, 10 and 20 years of patient survival was 93.5, 90.5 and 75.5%, respectively.

However, the number of HTx procedures remains low in international terms and the mean waiting period exceeded 1,600 days at the end of December 2020 because of a rapid increase in new registered patients on the waiting list. A bridge to transplantation (BTT) using a left ventricular assist device (LVAD) plays a greater role than before in managing the listed patients. Since insurance coverage was extended to the continuous flow-type of implantable LVAD (CF-LVAD) in April 2011, the total number of CF-LVAD implantation patients enrolled in the Japanese registry for Mechanically Assisted Circulatory Support (J-MACS) increased to more than 1,600 case at the end of July 2021. In May 2021, destination therapy (DT) of ineligible candidates for HTx was approved in Japan, and it may change the field of therapeutic therapy for patients with end-stage heart failure in Japan.

Dr. Fukushima will comment on future need of implantable RVAD or total artificial heart to save patients with severe right heart failure, lethal arrhythmia and so on.

Updated Treatment Strategy for Advanced Heart Failure in Japan



Masaru Hatano, MD, PhD
The University of Tokyo, Japan

The prognosis of heart transplant (HTx) recipients and patients implanted with left ventricular assist device (LVAD) is extremely good in Japan. However, the issue of donor shortage is quite serious. In recent years, while there are around 200 patients newly registered to the HTx waiting list, only 50 to 60 HTx are performed annually. As a result, the waiting period for newly registered patients is estimated to be 6 to 7 years. In Japan, implant-

able LVAD (iLVAD) was reimbursed only for patients waiting for HTx in the past, whereas destination therapy (DT) has been approved and reimbursed this year.

DT made it possible for patients who are not eligible for HTx due to age or comorbidities to be implanted with LVADs. However, the bridge to recovery strategy is considered essential in Japan, as there are few opportunities for patients to receive HTx. Of 230 patients who underwent iLVAD implantation at the University of Tokyo Hospital, 10 patients (7.6%) were able to wean from iLVAD with recovery of their own cardiac function. The INTERMACS Cardiac Recovery Score was high (≥ 7) in all cases.

In cases where weaning from iLVAD can be expected, it is important to properly administer drug treatment for the recovery of cardiac function. Dr. Hatano's group previously reported that in patients administered with low cumulative preoperative β -blocker dose, the recovery of cardiac function could be expected with sufficient titration of β -blocker after LVAD implantation. Based on Dr. Hatano group's recent experience of a case successfully weaned from LVAD by administration of ivabradine, he will summarize that the number of cases of LVAD withdrawal is expected to increase by using these new drugs in the future.

The four drugs – β -blocker, mineralocorticoid receptor antagonist (MRA), sacubitril/valsartan and sodium-glucose cotransporter-2 (SGLT2) inhibitor – are called, "fantastic four". Recently, the early combination use of these drugs is recognized to be efficacious in the treatment of heart failure. Finally, Dr. Hatano will share that the HF specialists in Japan are currently contributing efforts to increase the numbers of cases of advanced heart failure that can be managed without the need for LVAD and HTx through aggressive drug therapy including these new drugs.

JCS-KSC Joint Session: Heart Failure Controversies and Advances in Heart Transplant (HTx)/LVAD

» Saturday, Oct 16, 13:20-14:50, Channel 4

Continued from page 4

rich knowledge with clear judgement, good communication skills, and limitless stamina are required.

After the procedure, the echocardiographic outcomes should be carefully evaluated and fully shared with the attending physicians. Continuing the optimal guideline-directed medical therapy, especially in patients with secondary MR, is most important in connecting the

echocardiographic success to the clinical success. Thus, echocardiography should provide clear guides for the optimal treatment throughout the patients' life after TEER.

The role of the echocardiography specialist in the TEER is paramount during the entire journey of the MR treatment. Clear communication between the echocardiography specialist and interventionist is key for successful proce-

dure. Heart team should try to create an open communication system to achieve the best results for patient care.

Echocardiography 1 Echocardiography for Intervention

» Saturday, Oct 16, 15:00-16:30, Channel 4

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A New Paradigm in Hyperlipidemia Treatment

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Cardiac Surgery

Surgical Techniques and Current Results of Surgical Edge-to-Edge Mitral Valve Repair



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Korea

After 30 years since its introduction, the edge-to-edge (E2E) technique has become popular and adopted worldwide for the surgical repair of mitral regurgitation (MR). The success of this procedure could be explained by its simplicity and high reproducibility (Figure 1).

Before the E2E technique, Alain Carpentier's French correction was recognized as the standard surgical technique for MR. However, there are too many challenging anatomies for adequate correction using the French correction, and the technique itself needs a long learning time for beginners or small-volume cardiac center surgeons. Also, the outcome of Carpentier's technique highly depends on the surgeon's experience and ability.

However, the E2E technique possesses the ability to be very versatile, and it has been used in a broad spectrum of mitral valve pathologies and lesions, from degenerative to functional diseases, and from posterior to anterior leaflet lesions, including commissural defects. The rapidity of this easy surgical technique has also enhanced its application in minimally invasive approaches. Finally, it has become a milestone for the era of transcatheter correction of MR.

From many previous studies, the long-term results of E2E technique were reported. A common lesson learned from the

studies was that ring annuloplasty should be combined for the prevention of MR recurrence, especially for functional MR. The E2E technique can induce the most successful long-term result under ring annuloplasty, and in the case of mid-portion (bi-leaflet) prolapse MR, the effectiveness is best.

The E2E technique's target lesions are variable, with the most popular lesion being the bi-leaflet prolapse, such as Barlow's disease. Barlow's disease is generally responsible for lesions involving both leaflets. The presence of redundant myxomatous tissue allows the application of wide and deep E2E stitches, thus reducing the leaflets' height. In addition, unlike longer procedures targeting the chordal/papillary muscle apparatus, it can be easily and quickly performed, thus reducing ischemic time while still achieving excellent results.

The second lesion is anterior leaflet prolapse, the third lesion is para-commissural prolapse, and the fourth lesion is systolic anterior motion in the case of hypertrophic obstructive cardiomyopathy (HOCM). Finally, the technique as a 'rescue' is beneficial in many cases of challenging but correctable MR after various conventional surgical technique trials.

The E2E repair is very useful in various lesions. It is not an intervention. However, it is undoubtedly one of the surgical techniques that can achieve complete correction of MR combined with annuloplasty.

Cardiac Surgery

Back to the Basic; Surgical Correction of Degenerative Mitral Regurgitation

» Saturday, Oct 16, 13:20-14:50, Channel 6

Imaging

Role of CT/MRI for Electrophysiology Procedure: Arrhythmia & Heart structure



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Korea

Imaging helps to easily understand the complex presentations of patients with cardiovascular disease. In the contemporary practice of medicine, integration of a variety of imaging data has become a cornerstone for several critical clinical situations. Further, a recently advanced imaging technique has been applied to electrophysiology procedure for treatment of arrhythmia.

now enables real-time navigation, thus helping to precisely target the arrhythmia substrate with the catheter.

Recently, the active use of catheter ablation has demonstrated the association between the cardiac structural characteristics and the evolution of arrhythmia. Therefore, the need for a comprehensive assessment of the heart structures related to arrhythmia is increasing more than ever. Cardiac magnetic resonance imaging (MRI) enables the assessment of myocardial tissue characteristics, function, and hemodynamics that is not possible with other imaging modalities (Figure 1). One multicenter study reported that an extensive left atrial fibrosis determined with MRI was associated with the recurrence of AF after the catheter ablation.

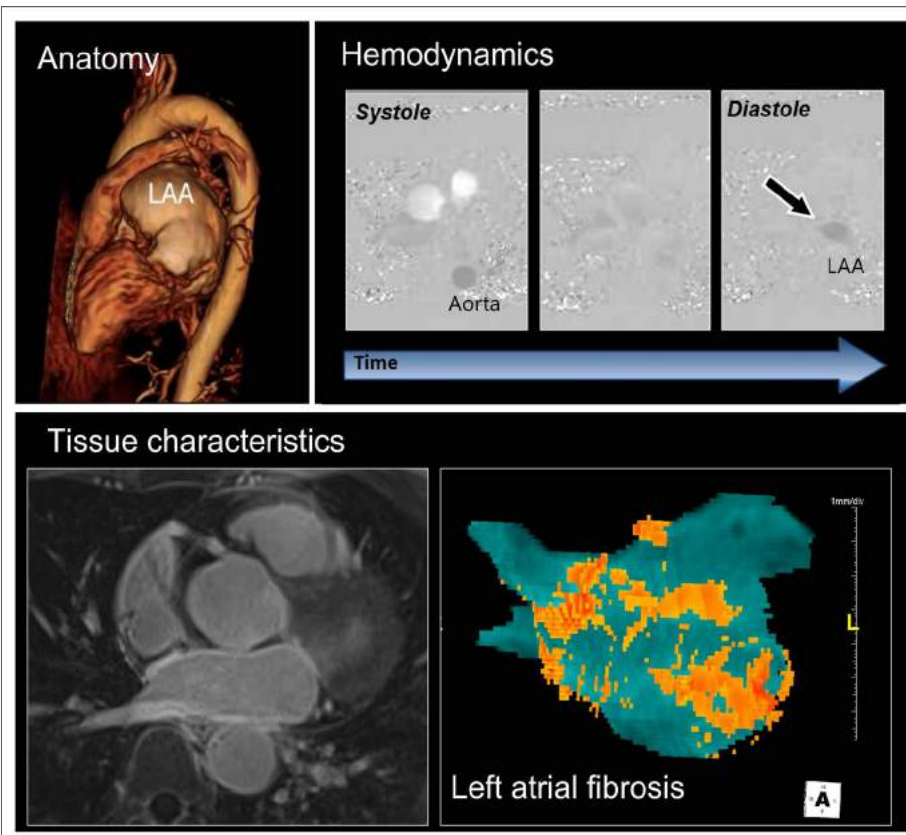
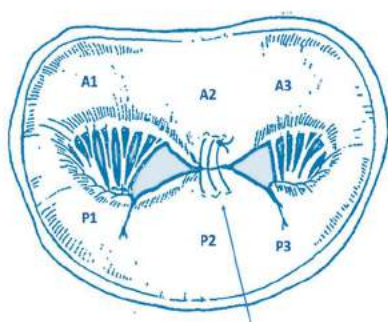


Figure 1. Evaluation of the heart anatomy, hemodynamics, and tissue characteristics with cardiac MRI (Produced by Prof. Hwang SH)

Original surgical edge-to edge technique



- ✓ "Double orifice" repair starts with the inspection of the valve and the analysis of the target lesion
- ✓ The edge-to-edge suture (generally 4-0 polypropylene) is placed exactly in the middle of the leaflet
- ✓ Mattress followed by a running suture is extended on both sides (anterolateral and posteromedial), to cover the regurgitant jet site
- ✓ Directly measured by Hegar dilators (at least 2.5 cm² for a normal size patient)

Figure 1. Central edge-to-edge

Schematic representation of the application of the Alfieri's repair applied in the central portion of the mitral valve (A2-P2), resulting in an artificial double-orifice valve (Adapted from Belluschi I, et al. Mini-invasive Surg 2020;4:58.)

In 2009, Haïssaguerre M, et al. reported a trigger of atrial fibrillation (AF) from the pulmonary veins. This finding opened the beginning of percutaneous catheter ablation for AF management. Commonly, a catheter-based procedure needs detailed information on the anatomy of the heart. Computed tomography (CT) can clearly visualize the complex anatomy of the heart in detail, especially with the development and application of multi-detector row CT (MDCT). The CT data can be reformatted and displayed according to its purposes. Eventually, the three-dimensional (3D) mapping system merged with the CT data

With the development of cardiac imaging and the integration of multiple imaging results, it has become possible to understand the pathogenesis of an arrhythmia as well as to advance the electrophysiology procedure. In the future, merging new information from CT and MRI with electrophysiology studies may become a turning point that could lead to the future innovation of arrhythmia management.

Imaging

Imaging for Arrhythmia and Vasculatures

» Saturday, Oct 16, 13:20-14:50, Channel 1

Arrhythmia

Artificial Intelligence in Electrophysiology Clinical Practice



Dae In Lee, MD
Chungbuk National University Hospital, Korea

AI and ML in Clinical Cardiac EP: Where Are We Now?

Artificial intelligence (AI) aims to mimic human cognitive abilities. Recently, as a large volume of healthcare data is available and analysis technology is

rapidly growing, AI is expanding its scope to the depths of the healthcare field. Powerful AI technologies can identify medical information hidden in vast amounts of data, and this information will influence health-related decisions. Therefore, I'd like to provide current perspective of how recent AI studies have influenced the direction of clinical practice and research in cardiac electrophysiology (EP), with an emphasis on clinical results rather than detailed technical methodology.

Current research areas using AI (machine learning [ML] or deep learning) in EP are

as follows:

- Arrhythmia detection and diagnosis using mobile technology
- Expansion of the use of the 12-lead electrocardiogram (ECG)
- Development of predictive and prognostic models for response
- Improvement of cardiac resynchronization therapy (CRT) response prediction
- Development of computational modeling and ML to study atrial fibrillation (AF)
- Image-based characterization of AF for ablation
- Clinical phenotyping of AF

Gaps, Needs, and Future Directions

To date, AI in cardiac EP has shown great preliminary promise, but significant needs remain in basic and translational research, institution-level improvement in data collection and harmonization practices, and clinical validation and practical implementation (Figure 1).

In addition, an institution-level focus on improved data collection would only facilitate and strengthen future AI research. Currently, most AI studies are performed

by extracting data independently from within the institution. However, this makes it challenging to combine data across institutions. A concerted effort in collecting and labeling clinical data and outcomes, and harmonizing data across institutions would be immensely beneficial to further advancement of AI.

Arrhythmia 1

Basic, Digital Health & Innovations in EP

» Saturday, Oct 16, 15:00-16:30, Channel 2

Revisiting Rhythm vs. Rate Control; AFFIRM to EAST-AFNET 4



Youngjin Cho, MD
Seoul National University Bundang Hospital, Korea

There are two main categories in treatment approaches for atrial fibrillation (AF): rhythm and rate control. In the famous AFFIRM (Atrial Fibrillation Follow-up Investigation of Rhythm Management) trial, rhythm control was

compared with rate control in 4,060 patients with AF, and there were no significant differences with respect to mortality or the percentage of patients with ischemic stroke during the 5-year follow-up. A meta-analysis of five randomized trials also reported no significant differences between rate and rhythm control with respect to all-cause mortality and stroke. Therefore, current guidelines recommend restoration and maintenance of sinus rhythm mainly in patients with symptomatic AF.

On the other hand, in a *post hoc* analysis of the AFFIRM study, the presence of sinus rhythm showed significant association with a lower risk of death, supporting the benefit of maintaining sinus rhythm itself. Advances in AF catheter ablation achieved greater efficacy and safety, which enabled re-evaluation of the rhythm control strategy. In the CABANA (Catheter Ablation vs. Antiarrhythmic drug therapy for Atrial fibrillation) trial, ablation was associated with a lower risk of recurrent AF and composite of mortality or hospitalization for cardiovascular causes than antiarrhythmic drugs. Efficacy of rhythm therapy appeared to be better when started earlier, probably due to the progressive nature of AF. In the EAST-AFNET 4 (Enter the Early Treatment of Atrial Fibrillation for Stroke Prevention Trial) trial, patients who were randomly assigned to early rhythm control had a lower risk of death from cardiovascular causes, stroke, or hospitalization with worsening of heart failure or acute coronary syndrome, as well as a lower risk of the individual components of death from cardiovascular causes and stroke, suggesting that the use of rhythm control reduces AF-related adverse clinical outcomes when applied early in the treatment of AF patients.

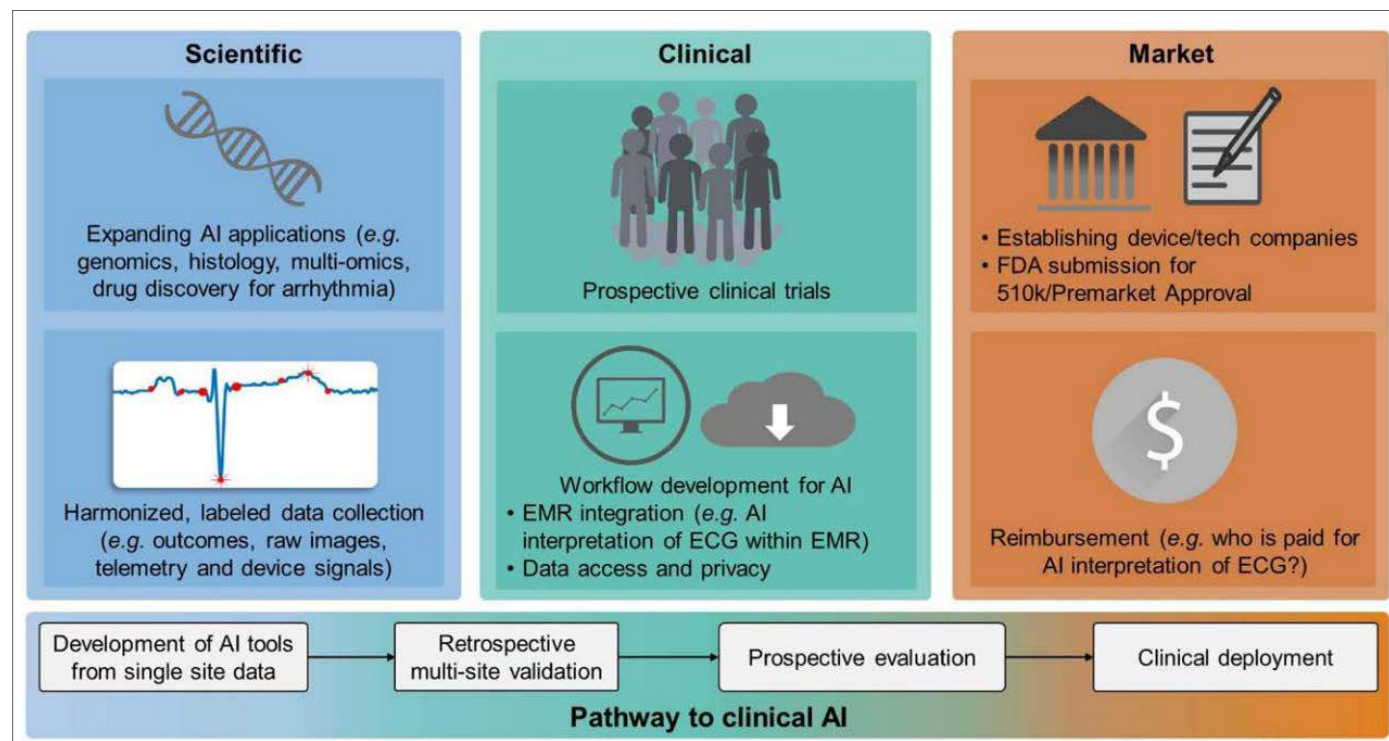


Figure 1. Future directions for artificial intelligence (AI) in cardiac EP (Adapted from Feeny AK, et al. Circ Arrhythm Electrophysiol 2020;13:e007952.)

Arrhythmia 2

AF (Includes Anticoagulation)

» Saturday, Oct 16, 16:40-18:10, Channel 2

APSACHD

Diastolic Heart Failure in Adult Congenital Heart Disease



Yiu-fai Cheung, MD, PhD
The University of Hong Kong, Hong Kong

Heart failure constitutes an important cause of morbidity and mortality, and ascertaining the burden of systolic heart failure has been the focus in adult congenital heart disease (ACHD). Nonetheless, with recognition of ACHD patients having symptoms and signs of heart failure and yet with relatively preserved systemic ventricular ejection fraction, a better understanding of diastolic heart failure, the predominant underlying pathophysiologic process, in these patients is of immense clinical relevance.

In ACHD, the substrates that lead to impairment of myocardial relaxation, reduction of myocardial compliance, and poor filling of the hypoplastic ventricular chambers exist in various combinations to cause diastolic ventricular dysfunction. Diastolic dysfunction is recognized in functional single ventricles and the right and left ventricles in the setting of a biventricular circulation. The ACHD patients who are at risk of diastolic heart failure include those after Fontan-type procedure, tetralogy of Fallot repair, biventricular repair of pulmonary atresia with intact ventricular septum, and correction of coarctation of the aorta and those with hypoplastic right and left ventricles that restrict diastolic filling.

Diagnostic evaluation should include as-

essment of conventional diastolic ventricular functional indices, ventricular myocardial deformation and stiffness, myocardial fibrosis, atrial function, and pulmonary hypertension. While evidence-based targeted treatment of diastolic heart failure in ACHD is lacking, results of recent trials on angiotensin-neprilysin inhibition and empagliflozin in non-congenital heart patients with heart failure with preserved ejection fraction have shed light on potential novel therapeutic strategies. Undoubtedly, challenges exist in the clinical recognition, diagnostic evaluation, and management of diastolic heart failure in ACHD and much more research in this area are warranted.

Heart Failure in Single Ventricular Physiology



Hideo Ohuchi, MD, PhD
National Cerebral and Cardiovascular Center, Japan

In general, high central venous pressure (CVP) and low cardiac output (CO) characterize the Fontan circulation. We previously proposed two major failing hemodynamic phenotypes of Fontan circulation: low CO heart failure with high CVP, and high CO heart failure with high CVP. The former is the classic failing phenotype, and the latter is the newly recognized failing phenotype, which has extremely poor outcome and is probably associated with the Fontan-associated liver disease, as well as the main pathophysiological mechanism of protein losing enteropathy.

Although there have been no standardized

management strategies for this failing hemodynamics, we have been applying a novel treatment – arterial vasoconstrictor therapy – to these patients with high CO heart failure, and beneficial effects have been observed in some patients. In this presentation, Dr. Ohuchi will share his experience in severe failing phenotype and vasoconstrictor therapy as a possible strategy for these patients.

APSACHD 1 Heart Failure in ACHD

» Saturday, Oct 16, 09:00-10:00, Channel 3

What to Do for Systemic Atrioventricular Valve Regurgitation in Single Ventricle



Sivakumar Sivalingam, FRCS
Institut Jantung Negara National Heart Institute, Malaysia

Atrioventricular valve regurgitation is associated with increased risk of Fontan circulation failure, morbidity, and premature mortality. A recent publication which reviewed the Australia and New Zealand Fontan registry has shown that a competent functional valve is a key component to a successful Fontan circulation. Furthermore, the atrioventricular valve failure more than doubles the rate of Fontan failure, with two-thirds of patients with a common atrioventricular valve and one-half with a single tricuspid valve (TV) experiencing valve failure by 30 years of age. Atrioventricular valve regurgitation can be caused by many distinct structural valvular abnormalities and functional ventricular etiologies.

Due to the limitations and constraints of each available imaging modality, multimodality imaging is often useful to inform decision making. A transesophageal echocardiography is recommended to be used in the peri-operative period to guide surgical repair.

The most common surgical techniques performed for repair of the atrioventricular valve are partial annuloplasty and commissuroplasty. Edge-to-edge repair has been successful in both tricuspid valve and common atrioventricular valve. In common atrioventricular valve, another repair strategy involves approximation of the leaflets with a polytetrafluoroethylene (PTFE) bridge. In older patients, ring annuloplasty can be safely performed. With annuloplasty, the accepted opening orifice to be achieved would be 100% of a normal TV at the palliative stage, 80% of the normal TV valve annular diameter at the bi-directional cavopulmonary shunt (BCPS) and 80% of the normal mitral valve diameter at the Fontan operation.

In general, the Fontan completion should consist of just that - "Fontan completion". When other significant abnormalities are present, strong consideration should be given to staging the Fontan and correcting the atrioventricular valve regurgitation prior to Fontan. It is recommended to be more proactive and to repair a moderate (functional) regurgitation at the time of BCPS. Valvuloplasty at the time of Fontan completion can be considered when there is moderate regurgitation with a morphologic left ventricle that is not dilated and has preserved function with a structural abnormality with the mitral valve. Valve replacement should only be considered in older patients and in heterotaxy syndrome.

APSACHD 2 Valvular Problem in ACHD

» Saturday, Oct 16, 10:10-11:10, Channel 3

Cardiac Resynchronization Therapy in Adult Congenital Heart Disease



Aya Miyazaki, MD
Shizuoka General Hospital, Japan

Three types of cardiac dyssynchrony are commonly observed in heart failure patients – atrioventricular, intra- and interventricular dyssynchrony – and this is also true for patients with adult congenital heart disease (ACHD). To improve

the intra- and interventricular dyssynchrony, biventricular pacing device is used. When considering cardiac resynchronization therapy (CRT) in ACHD patients, we propose a ventricular morphology-based strategy, where the pacing lead position should be determined based on the ventricular morphology and the types of ventricular dyssynchrony.

In the single ventricular (SV) morphology, a significant interventricular dyssynchrony in the short-axis plane of the SV is commonly observed. The QRS duration has been reported to correlate with the degree of short-axis dyssynchrony in the SV. Also, the QRS duration was reported to increase gradually after the Fontan operation and negatively correlate with peak VO₂. Because CRT in SV is expected to be highly effective, early intervention by CRT should be considered when ventricular dyssynchrony exists.

In the systemic right ventricle (RV), heart failure develops at a high rate with aging. Although pacemaker implantation is one of the risk factors of heart failure, a pacemaker is inevitable to maintain an optimal heart rate. To maintain an optimal heart rate and to

Continued on page 9

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Cross Specialty: Heart Failure & Arrhythmia

Cross Specialty Debate: Hot Issues in HF & EP

Pro: ICD in Non-ischemic Cardiomyopathy- 6 Months of GDMT is Enough



Ji Hyun Lee, MD,
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University Bundang
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In accordance with the advancement of heart failure (HF) medical treatment, the rate of sudden cardiac death (SCD) has declined substantially in HF patients. According to an observational study of 40,195 HF patients, the rate of SCD has decreased by 44% from 1995 to 2014. Therefore, the benefit of primary prevention implantable cardioverter defibrillator (ICD) may be substantially offset by the benefit of the medical treatment in current era of HF management. In fact, prominent ICD trials were conducted during the period of late 1990s to early 2000s, and thus, they do not reflect the current medical treatment of HF. Furthermore, a recent randomized controlled DANISH (Danish study to Assess the efficacy of ICDs in patients with Non-Ischemic Systolic Heart failure on mortality) trial, which showed no survival benefits of ICD in non-ischemic cardiomyopathy (NICMP) patients, raised the question re-

garding the role of primary prevention ICD in this population. However, Professor Lee will point out what's noteworthy in this trial is that cardiac resynchronization therapy was present in 58% of the participants in the DANISH trial, emphasizing the need for careful interpretation. He will also present the fact that a recent meta-analysis including the DANISH trial demonstrated the survival benefit of ICD in NICMP.

The contemporary guideline-directed medical therapy (GDMT) comprises of an angiotensin-converting enzyme inhibitor/angiotensin receptor blocker (or sacubitril/valsartan), a β -blocker and a mineralocorticoid receptor blocker. For all patients with NICMP, it is imperative that the patients are on GDMT for at least 3 months before primary prevention ICD is offered. He agreed that the three months may not be sufficient to truly optimize GDMT including β -blocker and sacubitril/valsartan in clinical practice. A recent dynamic trajectory analysis of left ventricular ejection fraction (LVEF) in HF patients showed that the maximal improvement of LVEF was observed around the first year of medical treatment, followed by a plateau. However, considering some trials, including a Korean observational study with sacubitril/valsartan treatment showing shorter recovery of LVEF, the time point

for improvement of LVEF by greater than 35% was observed much sooner than 1 year (within first 6 months). Professor Lee considers the six-month period of GDMT might be a reasonable waiting period before the ICD implantation. He also thinks positively of the ICD to reduce SCD along with the contemporary GDMT in patients with HF with LVEF \leq 35% and 6 months of GDMT might be enough period for left ventricular reverse remodeling before ICD implantation.

Con: ICD in Non-ischemic Cardiomyopathy- 6 Months of GDMT is Too Short



Kyung-Jin Kim, MD,
PhD
Ewha Womans
University Medical
Center, Korea

Guideline-directed medical therapy (GDMT) is generally applied to patients with heart failure (HF) with reduced ejection fraction (HFrEF) to promote left ventricular (LV) reverse remodeling before considering implantable cardioverter defibrillator (ICD). Major guidelines suggest 3 months of GDMT as a minimum recommendation, and the 2010 Heart Failure Society of America (HFSA) guideline suggests 3 to 6 months of GDMT before ICD implantation for primary prevention. However, Professor Kim believes that there are several things to take into consideration, including whether the duration of 3 to 6 months of GDMT is proper before making the decision to implant ICD for primary prevention, especially in patients with non-ischemic cardiomyopathy (NICMP).

Professor Kim will present the following rationales during the 'Con of ICD indication in NICMP' session. First, the improvement of GDMT significantly reduces mortality and sudden cardiac death (SCD) in patients with HF with HFrEF, and these effects can be expected with target dose. Especially during the past decades, clin-

ical trials and epidemiological studies demonstrated that the overall SCD rate has declined, and this decline paralleled with the increased use of GDMT. Professor Kim will present the results of the DANISH (Danish study to Assess the efficacy of ICDs in patients with Non-Ischemic Systolic Heart failure on mortality) trial as evidence; no mortality reduction in patients with NICMP with high rates of GDMT and cardiac-resynchronization therapy. Practically, multi-drug regimens require more time for clinicians to determine the target dose. The stepwise initiation and titration of multi-drug requires 1 to 3 changing of dose with 2 to 8 weeks of titration interval, which means that 3 to 6 months might not be sufficient. Additionally, a recently merged data from the ICD registry, a part of National Cardiovascular Data Registry (NCDR), and Medicare administrative data showed that only 60% of patients were eligible for the prescription of neurohormonal antagonist before ICD implantation for primary prevention. Secondly, Professor Kim will mention the fact that the prescription of GDMT for *de novo* HFrEF in early hospitalization is relatively low. Therefore, proper GDMT for *de novo* HFrEF might be another way to reduce the risk of SCD in early hospitalization. Thirdly, there is evidence that reverse remodeling is greater with multiple drugs and the effect is dose-dependent, and increase in LV ejection fraction as well as decrease in LV volume could occur between 6 and 12 months after GDMT initiation. Therefore, Professor Kim will comment that it is time to reconsider the time frame of GDMT before making the decision of implantation of ICD for primary prevention in patients with NICMP. Moreover, achieving target dose of GDMT with sufficient duration should be considered before ICD implantation.

Continued from page 8

protect cardiac function, it is necessary not to hesitate on the timing of the pacemaker implantation but to actively consider CRT when performing an implantation. The effectiveness of CRT in a systemic RV is reported to be lower than a systemic left ventricle (LV) and SV. Careful consideration of lead approach and lead location may improve the effectiveness of CRT in a systemic RV.

In the diseased subpulmonary RV, RV dyssynchrony is associated with decreased RV ejection fraction and pathological RV remodeling. Acute studies after CRT showed a positive effect on acute hemodynamics,

RV mechanics, and contractility. Permanent RV-CRT should be effective for the patients with subpulmonary RV dyssynchrony. However, further studies are warranted.

Because cardiac function in ACHD tends to worsen with time, cardiac dyssynchrony in ACHD patients needs to be carefully investigated and treated. The disease specificity and early introduction of CRT must be considered.

APSACHD 4
Heart Failure & Rhythm Problem in ACHD
» Saturday, Oct 16, 13:30-14:30, Channel 3

Cross Specialty: Heart Failure & Arrhythmia
Cross Specialty Debate: Hot Issues in HF & EP
» Saturday, Oct 16, 13:20-14:50, Channel 2

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Myocardial Infarction

Hypercoagulability in Acute Myocardial Infarction and Antithrombotic Therapy



Young-Hoon Jeong, MD, PhD
Eulji University
Uijeongbu Eulji Medical Center, Korea

Arterial atherothrombotic events are finely regulated processes involving a complex interplay between vulnerable blood, vulnerable vessel, and blood stasis. Vulnerable blood (i.e., hypercoagulability) comprises of complex interactions between

cellular components and plasma factors such as inflammatory, procoagulant, anticoagulant, and fibrinolytic factors. Platelet reactivity and thrombo-inflammatory axis are important targets of key residual risk pathways in controlling the recurrence of acute myocardial infarction (AMI) event. Diverse thrombo-inflammatory pathways play critical pathologic roles in driving the progression of atherosclerosis and inducing plaque destabilization, thereby precipitating acute coronary syndrome (ACS). Clinical benefit of adjuvant anticoagulant treatment would be different according to the disease activity and phase.

Several recent hemostatic devices are capable of measuring global hemostasis process. Thromboelastography (TEG) can measure platelet-fibrin clot strength (maximum amplitude, MA) and natural fibrinolysis activity (LY30) simultaneously. In the Gyeongsang National University Hospital (GNUH) registry including percutaneous coronary intervention (PCI)-treated patients, high clot strength (MA ≥ 68 mm) and low fibrinolysis potential (LY30 $< 0.2\%$) were significantly associated with the occurrence of AMI events (hazard ratios 1.69 and 1.72). In addition, both risk factors could increase the risk of post-PCI ischemic events synergistically (Figure 1).

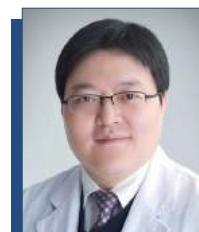
The understanding of the pathophysiological processes involved in the coronary artery thrombus formation has placed anticoagulant and antiplatelet agents at the core of the management of ACS. Increasingly potent antithrombotic agents have since been evaluated, in terms of various association, timing, or dosage, in numerous randomized controlled trials to interrupt the initial thrombus formation, prevent ischemic complications, and ultimately improve survival. The strategy of dual-pathway inhibition with P2Y₁₂ (purinergic receptor P2Y) inhibitors and low-dose non-vitamin K antagonist oral anticoagulant has

brought promising results for the early and late management of ACS patients with and without indication for oral anticoagulation.

Myocardial Infarction 1 Recent Advancement and Future in Treatment of AMI

» Saturday, Oct 16, 15:00-16:30, Channel 1

Acute Myocardial Infarction Guideline: How to Close the Gap between Theory and Practice?



Jang Hoon Lee, MD, PhD
Kyungpook National University Hospital, Korea

European Society of Cardiology (ESC) updated non-ST-segment elevation-acute coronary syndrome (NSTEMI-ACS) guidelines in 2020. However, there were notable gaps between ESC guideline and actual practice in Korea.

First, high-sensitivity cardiac troponin (hs-cTn) based rule-in/rule-out algorithm

ESC guideline recommends using hs-cTn for assessment of NSTEMI-ACS with accelerated protocols using a 0/1-hour protocol or a 0/2-hour protocol. However, hs-cTn were just being approved in Korea. In addition, there are not enough data to support efficacy and safety of 0/1-hour protocol. In Korea, the cost of stay at emergency room department is not expensive compared to those of other countries. Therefore, cost-effectiveness should be assessed before using 0/1-hour protocol.

Second, P2Y₁₂ (purinergic receptor P2Y) pre-treatment

The ESC guideline does not recommend routine pre-treatment with a P2Y₁₂ receptor inhibitor in patients with NSTEMI-ACS whose coronary anatomy is not known and who are undergoing early invasive management. Based on the results of ACCOAST (comparison of prasugrel at PCI or time of diagnosis in patients with non-ST elevation

myocardial infarction), SCAAR (Swedish Coronary Angiography and Angioplasty Registry) registry, and ISRA-REACT 5 (Intra-coronary Stenting and Antithrombotic Regimen: Rapid Early Action for Coronary Treatment 5), there are no evidence for P2Y₁₂ inhibitor pre-treatment benefit. Because potent P2Y₁₂ inhibitors have fast onset of action, loading dose of potent P2Y₁₂ inhibitors should be administered directly before percutaneous coronary intervention (PCI). Moreover, pre-treatment strategy is risky for some patients including aortic dissection or undiscovered bleeding complications. Therefore, it seems to be reasonable to administer P2Y₁₂ just before PCI in the catheterization room. However, in real-world practice, it is difficult to keep P2Y₁₂ inhibitor in the catheterization room for a long time.

Third, early invasive strategy

An early routine invasive strategy within 24 hours is recommended for NSTEMI-ACS determined by hs-cTn measurements, a Global Registry of Acute Coronary Events (GRACE) risk score > 140 , and new dynamic ST-segment changes. This strategy is shown to reduce complications and potentially improve outcomes. Urgent invasive treatment is indicated only for significant ischemic and/or hemodynamic instability. However, in Korea healthcare system, an early conservative strategy seems to be preferred unless there is ongoing chest pain because of the pressure of 52-hour workweek system, particularly in off-time and weekend.

Because ESC or American Heart Association/American College of Cardiology (AHA/ACC) guidelines recommend medical practice based on their healthcare system, they do not fit our healthcare system. Therefore, Korean NSTEMI-ACS guideline should be developed to close the gap between theory and practice.

Myocardial Infarction 2 Practical Tips and Tricks for the Management of AMI

» Saturday, Oct 16, 16:40-18:10, Channel 1

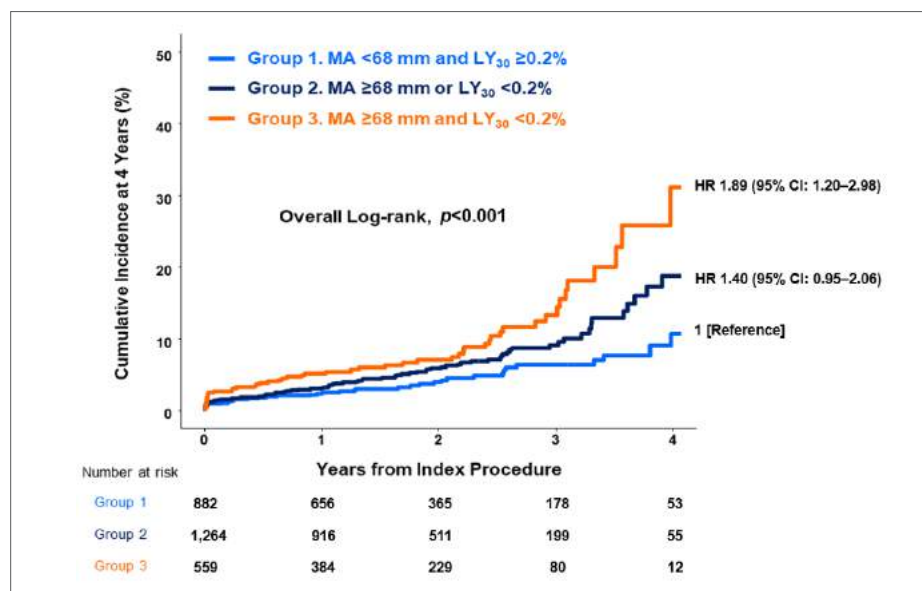


Figure 1. Impact of clot strength and fibrinolytic activity on major adverse cardiovascular events (MACE) in coronary artery disease (CAD) patients (Adapted from GNUH registry)

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Intervention

How to Apply OCT for Myocardial Infarction with No Obstructive Coronary Arteries



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Myocardial infarction with nonobstructive coronary arteries (MINOCA) is characterized by a positive cardiac biomarker and appropriate clinical scenario consistent with acute myocardial infarction (AMI) with a nonobstructive coronary artery on angiography, defined as no coronary stenosis by 50% in any possible infarct-related artery. MINOCA is not a rare syndrome but with various heterogeneous etiologies, including plaque rupture with a nonobstructive stenotic disease, coronary spasm, plaque erosion, spontaneous coronary artery dissection, and coronary thromboembolism. MINOCA was reported in 3.04% to 4.30% of MIs in the Korea Acute Myocardial Infarction Registry (KAMIR). Scientific statements recommended multimodality imaging in MINOCA to find the underlying cause because the prognosis

and treatment of MINOCA are mainly dependent on the underlying mechanism of MINOCA. For evaluating the ischemic mechanism, invasive coronary imaging can provide therapeutic direction for patients with MINOCA (e.g., antiplatelet therapy in plaque rupture or plaque erosion, calcium channel blocker, and nitrate in coronary spasm).

The angiographic appearance may suggest a suspicious finding of plaque disruption or other numerous causes in the epicardial coronary artery; however, a definitive diagnosis cannot be given with the angiographic finding itself. There are countless advantages to adopting intracoronary imaging, especially optical coherence tomography (OCT) in particular, to complement the coronary angiography. OCT can (1) differentiate tissue characteristics including plaque components (fibrous, calcified, versus

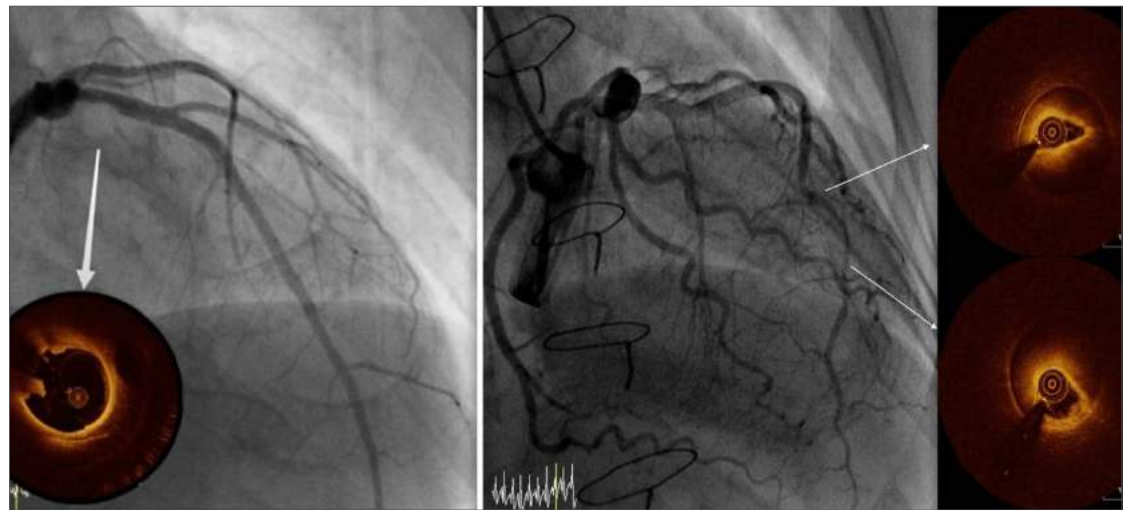


Figure 1. Representative cases of MINOCA: (A) plaque erosion, (B) spontaneous coronary artery dissection (From Keimyung OCT registry)

lipid-rich plaque), (2) identify vulnerable plaque, (3) differentiate plaque rupture vs. erosion, (4) identify red and white thrombi, and (5) identify spontaneous coronary artery dissection. The second consensus document of the European Association of Percutaneous Cardiovascular Interventions (EAPCI) on the clinical use of intracoronary imaging focused on the utility of intravascular ultrasound, OCT, and near infrared spectroscopy in facilitating angiographic interpretation and guidance of treatment

of acute coronary syndromes beyond the mere guidance of stent selection and optimization of deployment.

Hereby, Dr. Yoon will share several representative cases regarding how to apply OCT in patients with MINOCA (Figure 1).

Intervention 2

Master, Please Let Me Know How to Apply Imaging & Physiology in My Practice

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Reference 1, Williams B, et al. Effects of the Angiotensin Receptor Blocker Azilsartan Medoxomil Versus Olmesartan and Valsartan on Ambulatory and Clinic Blood Pressure in Patients With Stage 1 and 2 Hypertension. *Hypertension*. 2015;74:3-10.

Preceding Information [참고문헌] 1. Williams B, et al. Effects of the Angiotensin Receptor Blocker Azilsartan Medoxomil Versus Olmesartan and Valsartan on Ambulatory and Clinic Blood Pressure in Patients With Stage 1 and 2 Hypertension. *Hypertension*. 2015;74:3-10.

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