

KSC 2021 DAILY

Today's Highlights

Heart Failure 3

Update of Latest Clinical Trial

What's New? Update of Key Clinical Trials 2021
08:30-10:00 / Channel 3

Vascular

Guideline Review

How to Apply Guideline in My Practice
10:10-11:40 / Channel 3

Basic Research

Geriatric Cardiology

Frailty in Cardiovascular Disease
12:50-14:20 / Channel 6

Update on Latest Clinical Trial and Guideline Review

Heart Failure



**Jin Joo Park, MD,
PhD**
Seoul National
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Heart failure (HF) is a disease with high morbidity and mortality. In 2018, 1,159,776 people (2.24% of the total population) were estimated to have HF in Korea. The classification of HF has been redefined in the new Europe-

an Society of Cardiology (ESC) guidelines. The new universal definition of HF classifies 1) HF with reduced ejection fraction (HFrEF) as HF with left ventricular ejection fraction (LVEF) $\leq 40\%$; 2) HF with mildly reduced ejection fraction (HFmrEF) as HF with LVEF 41–49%; 3) HF with preserved ejection fraction (HFpEF) as HF with LVEF $\geq 50\%$; and 4) HF with improved ejection fraction (HFimpEF) as HF with a baseline LVEF $\leq 40\%$, a ≥ 10 point increase from baseline LVEF, and a second measurement of LVEF $>40\%$.

but not in HFpEF. Hence, the latest HF clinical practice guidelines recommend no specific drug therapy for HFpEF patients except for diuretics. Regarding the metabolic pathways, sodium-glucose cotransporter-2 (SGLT2) inhibitors have shown to consistently improve the clinical outcomes in HFrEF. Multiple *post hoc* analyses suggest that SGLT2 inhibitors can prevent diabetes, reduce major adverse cardiovascular events (MACE), prevent and treat HF, and most importantly, reduce deaths. Therefore, SGLT2 inhibitors are considered the first

antidiabetic drug class that can alter the cardiovascular disease continuum for the first time.

Most striking results were derived from a very recent trial. In the EMPEROR-Preserved (EMPagliflozin outcome tRial in patients with chrOnic hearT failure with Preserved ejection fraction) study, the effects of empagliflozin in HFpEF was evaluated. In this study, the use of empagliflozin was associated with 21% reduction of the composite of cardiovascular deaths or hospitalization for HF (**Figure 1**). This is the first drug that improved outcomes in HFpEF patients. Whether empagliflozin will also show positive results in HFpEF patients is currently being investigated in the DELIVER (Dagliflozin Evaluation to improve the Outcomes of patients with pReserved ejection fraction heart failure) study.

Continued on page 3

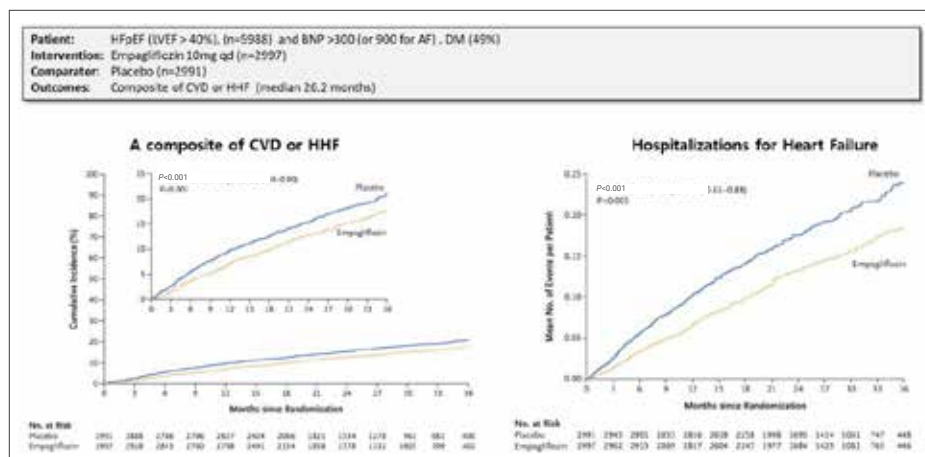


Figure 1. EMPEROR-Preserved clinical trial outcome (Adapted from Anker SD, et al. *N Engl J Med* 2021;385(16):1451-61.)



In terms of drug treatment, drugs targeting neurohumoral pathways, such as angiotensin receptor neprilysin inhibitor (ARNI)/angiotensin-converting enzyme inhibitors (ACEi)/angiotensin II receptor blockers (ARB), β -blockers, mineralocorticoid receptor antagonists (MRAs) have proved clinical benefit in HFrEF

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Program at a glance: Day 3, Oct 18, 2021

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Abstract Library
08:30-10:00	Cardiac Pathology Immunohistochemistry and Molecular Diagnosis of Cardiac Biopsies	Heart Failure 3 Debate: Hot Issues in HF Management	Update of Latest Clinical Trial What's New? Update of Key Clinical Trials 2021	Cardiometabolic Syndrome Debate Session: Beyond Statin	Oral Abstracts 3 19-27	Smart Health Cross-talk between Clinicians and Industry	Abstract 1-270
10:10-11:40	Vascular Precision Medicine in Vascular Aging and CV Risk	Cardiogenic Shock Management of Cardiogenic Shock According to the Etiology	Guideline Review How to Apply Guideline in My Practice	Basic Research Novel Insight and Mechanism of Heart Failure	Oral Abstracts 4 28-36	Cardio-Oncology Cardio-Oncology in New Decade: What is New and Where to Go	
11:50-12:30	Scientific Session [Bayer] Patient Protection in Focus: Role of Rivaroxaban in High Risk Vascular Disease Patients	Scientific Session [Celltrion Pharm/Dong-A ST] BP Control Strategies for Preventing Cardiovascular Disease	Scientific Session [Daiichi Sankyo/Daewoong] Update on Diagnosis and Treatment of AF in Clinical Practice		최우수 한글 초록 구연 1 37-40	최우수 한글 초록 구연 2 41-44	
12:30-12:50	Break						
12:50-14:20	Intervention 5 Current Treatment - Aorta & Peripheral Artery Disease	Arrhythmia 5 SCD	Healthcare Policy 심혈관질환의 관리 개선	Echocardiography 5 Echocardiography in Critical Care Medicine	Oral Abstracts 5 45-53	Geriatric Cardiology Frailty in Cardiovascular Disease	
14:30-16:00	Intervention 6 Technical Pearls for Complex TAVR Procedures: Case-Based Learning	Arrhythmia 6 CIED	Insurance Issues 심혈관계 분야 보험 관련 현안 및 전략	Echocardiography 6 How I Learned from My Counterpart	Oral Abstracts 6 54-62	Nurse-Technician Session Coronary Report Form	



대한심장학회
APSC 2025
부산 유치



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

김효수 이사장
APSC President
-Elect 당선

임기: 2023-2025



APSC, Asian Pacific Society of Cardiology

Scientific Session	
Scientific Session [Bayer]	
Patient Protection in Focus: Role of Rivaroxaban in High Risk Vascular Disease Patients	
11:50-12:10	Clinical Benefits of Rivaroxaban in Patients with AF and Vascular Disease
12:10-12:30	What is Optimal Anti-thrombotic Treatment Strategy in Poly-vascular Patients?
» Oct 18, 11:50-12:30, Channel 1	
Scientific Session [Celltrion Pharm/Dong-A ST]	
BP Control Strategies for Preventing Cardiovascular Disease	
11:50-12:10	Importance of 24h BP Control for Reducing CVD Risk
12:10-12:30	BP Control Strategy in Patients with Hypertension Complications
» Oct 18, 11:50-12:30, Channel 2	
Scientific Session [Daiichi Sankyo/Daewoong]	
Update on Diagnosis and Treatment of AF in Clinical Practice	
11:50-12:10	Screening for Atrial Fibrillation with Wearable Device
12:10-12:30	Safety and Effectiveness of Edoxaban in a Real-world Clinical Setting: Focus on ETNA AF Study
» Oct 18, 11:50-12:30, Channel 3	

Oral Abstracts Session

Oral Abstracts 3 [19-27]
» Oct 18, 08:30-10:00, Channel 5

Oral Abstracts 4 [28-36]
» Oct 18, 10:10-11:40, Channel 5

최우수 한글 초록 구연 1 [37-40]
» Oct 18, 11:50-12:30, Channel 5

최우수 한글 초록 구연 2 [41-44]
» Oct 18, 11:50-12:30, Channel 6

Oral Abstracts 5 [45-53]
» Oct 18, 12:50-14:20, Channel 5

Oral Abstracts 6 [54-62]
» Oct 18, 14:30-16:00, Channel 5



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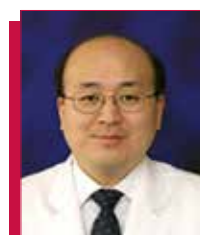
Lastly, Professor Park will comment that as SGLT2 inhibitors and sacubitril/valsartan seem to be effective in HF across all EF spectrum, some authors are already suggesting a new classification of HF. With more data expected from the upcoming clinical trials, classification and treatment of HF will experience a dynamic change in near future.

Update of Latest Clinical Trial

What's New? Update of Key Clinical Trials 2021

» Monday, Oct 18, 08:30-10:00, Channel 3

How to Apply 2017 ACC/AHA Hypertension Guideline to Clinical Practice



Sungha Park, MD, PhD
Yonsei University
Severance Hospital,
Korea

The key findings from the 2017 American College of Cardiology (ACC) and American Heart Association (AHA) hypertension guideline are as follows: **1) Strong emphasis on standardized measurement of office blood pressure (BP), including the use of unattended automated office BP measurement (AOBP).** Recent studies have shown that AOBP has a better association with ambulatory blood pressure monitoring (ABPM) than attended office BP measurement and reduces the inci-

dence of white coat hypertension. However, as Professor Park further explained, the widespread use of unattended AOBP may not be feasible as it requires many waiting rooms and spaces in the out-patient-clinic. Thus, the guideline emphasizes the standardization of office BP measurement, both attended and unattended; **2) Emphasis on the use of out-of-office BP measurements, both ABPM and home BP monitoring, for confirming hypertension and titrating BP medications.** This recommendation is based on the fact that studies have shown out-of-office BP measurements better predict cardiovascular outcomes. Also, they are required to rule out white coat hypertension and masked hypertension. In addition, use of out-of-office BP measurements for BP medication titration is recommended to optimize the benefit of anti-hypertensive treatment while minimizing the risk of side effects from too much lowering; **3) Recommendation on defining stage 1 hypertension as BP above 130/80 mmHg.** However, anti-hypertensive drug treatment is recommended in only those patients with atherosclerotic cardiovascular disease (ASCVD) risk of more than 10%. Also, the target BP for all hypertensive patients, regardless of underlying risk or comorbidities, have been lowered to 130/80 mmHg. Lastly, Professor Park will comment that the guideline omitted β -blockers from the list of first-line drugs unless the patient has ischemic heart disease or heart failure. Also, there is a strong recommendation for not using atenolol in hypertensive patients regardless of

comorbidities, as atenolol has been shown to increase the risk of stroke in patients with hypertension.

Evidence-based VTE Management in My Experience



Sang-Hoon Na, MD, PhD
Seoul National
University Hospital,
Korea

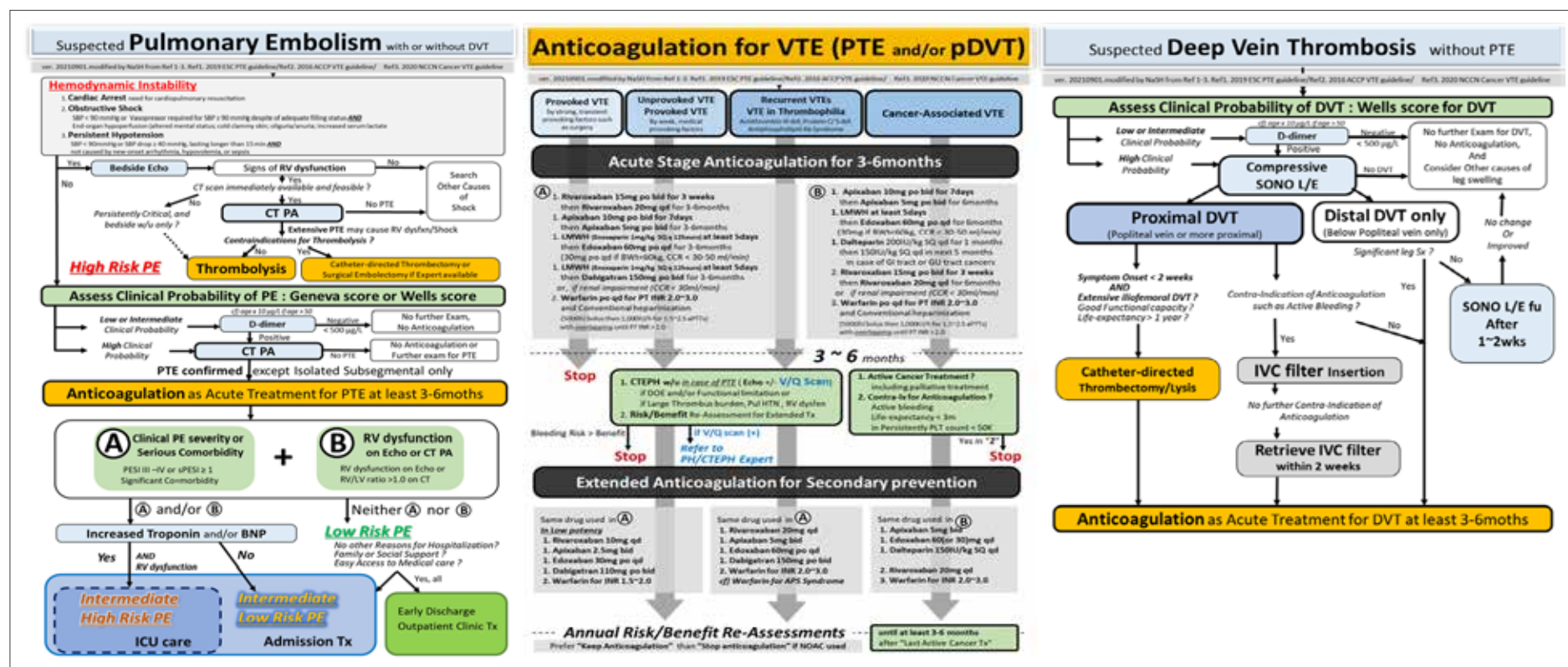
Venous thromboembolism (VTE) is one of the major causes of death in hospitalized patients. Currently, most VTE patients are anticoagulated with non-vitamin K antagonist oral anti-coagulants (NOAC). The most widely referred guidelines are the 2019 European Society of Cardiology (ESC) pulmonary thromboembolism (PTE) guideline, 2016 American College of Clinical Pharmacology (ACCP) 10th guideline for VTE, 2021 American Society of Hematology (ASH) guideline for general VTE, 2021 ASH guideline for cancer associated VTE, and 2020 National Comprehensive Cancer Network (NCCN) practice guideline.

Professor Na will present his own algorithmic approach to managing VTE patients (Figure 2) in real practice.

Guideline Review

How to Apply Guideline in My Practice

» Monday, Oct 18, 10:10-11:40, Channel 3



Cardiac Pathology

Immunohistochemistry in Cardiac Research



Jeong-Wook Seo,
MD, PhD
Incheon Sejong
Hospital, Korea

Immunohistochemistry (IHC) and molecular diagnosis (MD) are important guides of precision medicine, particularly for diagnosis and treatment of cancer. What about cardiology? Although it is true that

IHC and MD are less used in cardiology than in oncology, this session will demonstrate the critical value of IHC and MD in the diagnosis of various cardiac diseases.

IHC is used as the fundamental diagnostic tool for various cardiac diseases, including amyloidosis and cardiac transplant biopsies. The basic principles of IHC and MD will be discussed, and real-world cases will be presented by Professor Jiwon Koh (Seoul National University Hospital), as well as the application of IHC on endomyocardial biopsies by Professor Jung-Sun Kim (Sungkyunkwan University). Professor Jeong-Wook Seo (Incheon Sejong

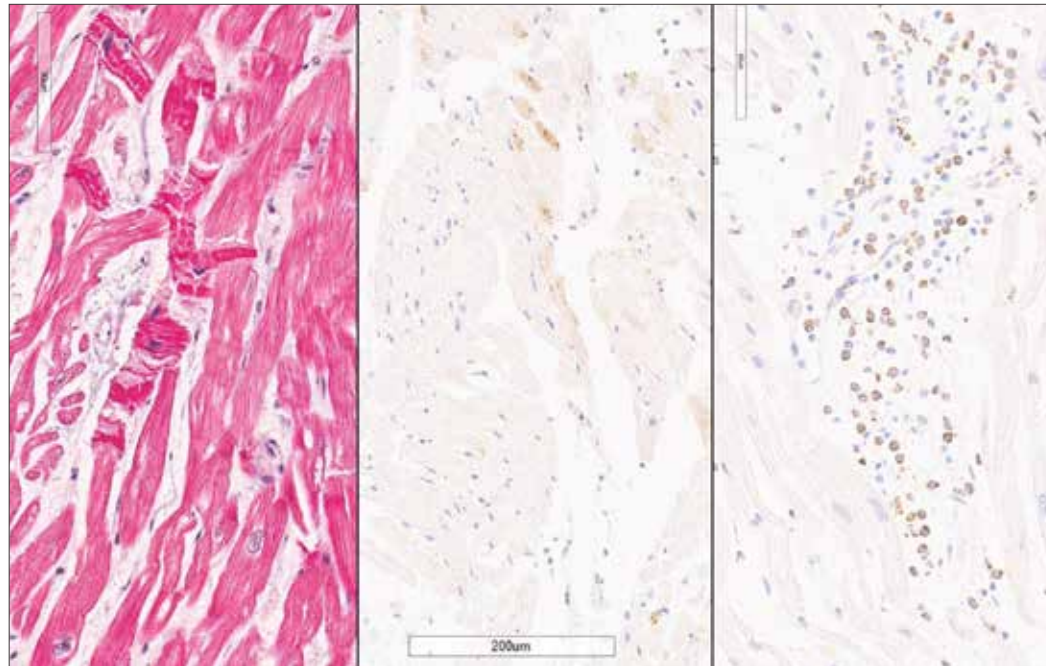


Figure 1. Left: contraction band necrosis. Middle: single cell necrosis on C4d immunohistochemistry. Right: massive infiltration of histiocytes on CD68 staining and paucity of T-cell response

Hospital) will discuss how to apply IHC for basic and applied research in cardiology.

A consultation case from Professor Sanghan Lee and Sangjoon Choi, which presents a case with myocardial lesions after COVID-19 vaccination will also be discussed. Myocarditis in COVID-19 pa-

tients and its rare but sometimes fatal occurrence after COVID-19 vaccination are among critical questions for cardiologists. Based on our limited experiences in the literature, most myocarditis resolves but some are fatal. One of the victims of such case was a young 22-year-old male who

collapsed suddenly on the fifth day after the COVID-19 vaccination. Autopsy revealed three types of myocardial injuries: (1) myocarditis predominantly involving the atrial wall, of which neutrophils and histiocytes were the predominant cellular infiltrates; (2) single-cell necrosis, which was not accompanied by inflammatory infiltrates; (3) numerous foci of contraction band necrosis throughout the myocardium, predominantly in the left ventricle (**Figure 1**). Myocarditis and myocardial injury are different entities and the pathology will clearly delineate the difference. The cardiac pathologists' view of myocardial lesions in COVID-19 disease will be further discussed.

Cardiac Pathology Immunohistochemistry and Molecular Diagnosis of Cardiac Biopsies

» Monday, Oct 18, 08:30-10:00, Channel 1

Cardio-Oncology

Thromboembolism in Cancer Patients



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PhD
Seoul National
University Bundang
Hospital, Korea

Patients with active cancer have a 4 to 7 times higher risk of venous thromboembolism (VTE) when compared to non-cancer patients. They also have a 2 to 9 times higher risk of VTE recurrence despite proper anticoagulation. Low-molecular weight heparin (LMWH) has typically been prescribed for cancer VTE based on its superior efficacy and possible survival benefit compared with vitamin K antagonist. Recently, major guidelines recommend direct oral anticoagulants (DOACs) to be superior or similarly effective in terms of recurrence of cancer VTE based on studies on DOACs for treatment of cancer VTE. However, there are several unsolved concerns regarding (1) bleeding complications, particularly in patients with gastrointestinal (GI) and/or genitourinary (GU) cancer; (2) drug-

drug interaction between DOACs and anti-cancer therapeutics; (3) anticoagulation in special situations such as brain tumor; and (4) the management of recurrent VTE on anticoagulation.

During this session, Korean data on DOACs for VTE treatment in GI or GU cancer patients will be presented, as well as several reports on drug-drug interaction between DOACs and anti-cancer drugs. The international Anticoagulation in Brain Cancer (ABC) registry will also be introduced. Finally, a flow chart for the treatment decision of recurrent VTE during the anticoagulation will be presented to conclude the session.

Cardio-Oncology Cardio-Oncology in New Decade: What is New and Where to Go

» Monday, Oct 18, 10:10-11:40, Channel 6

First and only
국내 유일 아토르바스타틴+에제티미브 복합제 **아토젯**으로
고지혈증 환자의 지질관리를 시작해주세요.^{1,2}

ATOZET
edoxaban and aspirin, MSD

Echocardiography

Echocardiography of Post-MI Patients in ICU



Jae Yeong Cho, MD, PhD
Chonnam National University Hospital, Korea

Post-myocardial infarction (MI) patients can have various complications regardless of coronary revascularization, such as left ventricular aneurysm, cardiac rupture, left ventricular thrombi, ventricular septal defect, acute mitral regurgitation, and so forth. Most of these are easily detected with echocardiography (ECHO) and what the physician has to be aware of is as follows.

- 1) Multiple views should be used to assess for regional wall motion abnormalities.
- 2) Parasternal short-axis view is very useful to confirm the regional wall motion abnormalities.
- 3) Compare one side with the other and the segments at the opposite sides.
- 4) Subcostal short-axis views can be useful in patients with poor ECHO windows.

It is absolutely necessary to be familiar with the myocardial territories supplied by the specific coronary arteries. If there are regional wall motion abnormalities outside of these territories, situations other than MI, such as stress-induced cardiomyop-

athies, should be considered. A segment with thinning, increased echogenicity and akinesia may indicate chronic ischemia rather than recent infarction. In areas of akinetic motion, the examiner should always look for potential thrombus.

One can use off-axis imaging if needed. Occasionally, the development of pericardial effusion is possible after MI, so-called Dressler's syndrome, which is rarely associated with cardiac tamponade. However, in the intensive care unit (ICU) setting, hemopericardium, a more serious condition caused by coronary artery perforation, should be suspected.

Echocardiography has been and is currently a very useful diagnostic method in the ICU because of its versatility and portability. In addition, it is real-time and suitable for measuring cardiac function and blood flow at the bedside. The broad use of echocardiography in the ICU for most post-MI patients cannot be emphasized more.

Echocardiography 5

Echocardiography in Critical Care Medicine

» Monday, Oct 18, 12:50-14:20, Channel 4

How I Learned from My Counterpart



Nuclear Imaging for EchoCG, EchoCG for Nuclear Imaging



Jun-Bean Park, MD, PhD
Seoul National University Hospital, Korea

[Part 1] Although echocardiography has a number of advantages over other diagnostic techniques in terms of versatility, temporal resolution, and the lack of radiation exposure, it also has major limitations such as limited field-of-view or acoustic windows, and poor signal-to-noise ratio. The use of other imaging modalities, such as computed tomography (CT), magnetic resonance imaging (MRI), and nuclear

imaging, can overcome these limitations of echocardiography and ultimately provide essential information for accurate diagnosis and optimal management of patients with cardiovascular diseases (CVDs).

Among these old friends of echocardiography, nuclear imaging, also called molecular imaging, has several noteworthy strengths. The first is that nuclear imaging can evaluate the function of the organ or tissue of interest as well as their structure, by visualizing the extent of radiopharmaceutical uptake in a par-

ticular organ or tissue. For example, increased myocardial Tc-99m 3,3-diphosphono-1,2-propanodicarboxylic acid (DPD) or pyrophosphate (PYP) uptake is directly related to myocardial amyloid burden. Thus, when a diagnosis of a thick myocardium is in doubt on echocardiography, nuclear imaging is useful as a further study. Another example is the use of myocardial F-18 Fluorodeoxyglucose (FDG) uptake as an imaging marker for inflammatory process. F-18 FDG positron emission tomography (PET) aids in the assessment of possible inflammatory or infective disorders affecting the cardiovascular system, such as cardiac sarcoidosis, pericarditis, and infective endocarditis. The second strength of nuclear imaging is its field-of-view allowing the coverage of almost the entire body. Specifically, F-18 FDG PET can help reveal 1) whether extra-cardiac involvement of sarcoidosis is present in a patient who is suspected of having cardiac sarcoidosis; 2) whether tuberculosis or malignancy is present in a patient who is suspected of having pericarditis or pericardial effusion; or 3) whether metastatic infection is present in a patient who is suspected of having infective endocarditis.

There is a growing trend toward precision medicine where diagnosis and treatment is tailored to the individual biochemical characteristics. Recent advances in understanding the pathophysiology of numerous CVDs and developing novel radiopharmaceutical agents

enable the introduction of promising noninvasive imaging modalities that target specific mechanisms underlying the pathogenesis in an individual basis. In other words, the recent trend and technological innovation is expected to particularly boost the development of new nuclear imaging techniques. Hence, in the near future, the role of nuclear imaging will expand its role soon and will undoubtedly be one of the cardiologists' best friends.

[Part 2] As echocardiography is the basic imaging modality for cardiac diseases, nuclear medicine physicians often refer to echocardiography, whenever it is available, during the interpretations of nuclear imaging. The contractile function of the myocardium is the most important information that can be obtained from echocardiography. Although contractile function indices can be obtained from myocardial perfusion single-photon emission computerized tomography (SPECT) and PET as well as CT or MRI, gating methods are vulnerable to errors, sometimes by arrhythmia or other ECG abnormalities. For SPECT and PET, wall margin selection error (e.g., in case of perfusion defects) is another source of artifact. Contractile function and volume data from echocardiography is measured on a single beat, and is complementary to gated function images.

Additionally, echocardiography often provides valuable information when in-

terpreting incidental findings on nuclear imaging. Currently, most nuclear imaging is performed for oncological purposes, for example, FDG PET and bone scan for cancer diagnosis. If diffuse hypermetabolism of the right ventricular myocardium is incidentally observed on FDG PET, most nuclear imaging specialist turn to echocardiography for any cases of myocardial work overload, such as valve diseases.

In the recent years, research on nuclear cardiac imaging have focused on specific molecular target imaging. As a basic cardiac imaging modality, functional indices on echocardiography are often used as endpoints in studies that are investigating the efficacy of a specific molecular imaging. For example, correlations are investigated between functional indices on echocardiography and findings on bone scan (Tc-99m PYP or DPD) in cardiac amyloidosis. Although some studies have shown poor correlation between them, this rather suggests the independent and different role of nuclear imaging and echocardiography. It is expected that echocardiography and nuclear imaging would remain good friends as effective complementary tools for each other.

Echocardiography 6

How I Learned from My Counterpart

» Monday, Oct 18, 14:30-16:00, Channel 4

Intervention

2020 NICE Guidelines for AAA Repair: An Essential



Taek Kyu Park, MD, PhD
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Korea

The National Institute for Health and Care Excellence (NICE) issued draft guidelines on the management of abdominal aortic aneurysms (AAA) in the summer of 2018. The first draft concerning AAA management, however, resulted in an unprec-

edented response from individuals, hospitals, specialist societies and industry partners. The main reason for the magnitude of the responses was the controversial recommendation that elective endovascular aneurysm repair (EVAR) should not be offered in any circumstances. The draft guidance suggests that patients deemed fit for open surgery should undergo such surgery, but those thought to be unfit (not accurately defined) should not be treated at all, other than controlling the risk factors. These recommendations are out of tune with guidelines from other societies, and they are contrary to the direction of surgical intervention in general.

So, what is the main concern? Crucially, the NICE has ignored the better results in patients with good anatomy within the instructions for use of most EVAR devices, where durability is much improved. NICE seemed to have only considered the results of EVAR randomized controlled trials which revealed an increase in aortic-related mortality in the EVAR group compared with the open group (Figure 1). Although patients randomized in this trial were within the instructions for use of the devices available at the time, whether the performance of the imaging equipment together with the accuracy of device deployment allowed to achieve the preintervention landing zones is unknown.

Despite all the criticism, the recommendation can be taken into consideration for the elderly patients, as aortic aneurysms are largely asymptomatic and occur in the elderly, who often have limited life expectancy secondary to comorbid conditions, such as ischemic heart disease, chronic obstructive pulmonary disease, cancer, and dementia. As there is no symptomatic benefit in AAA treatment, strong confidence that it will prolong life is needed. Furthermore, treatment must preserve quality of life, and therefore, ongoing sur-

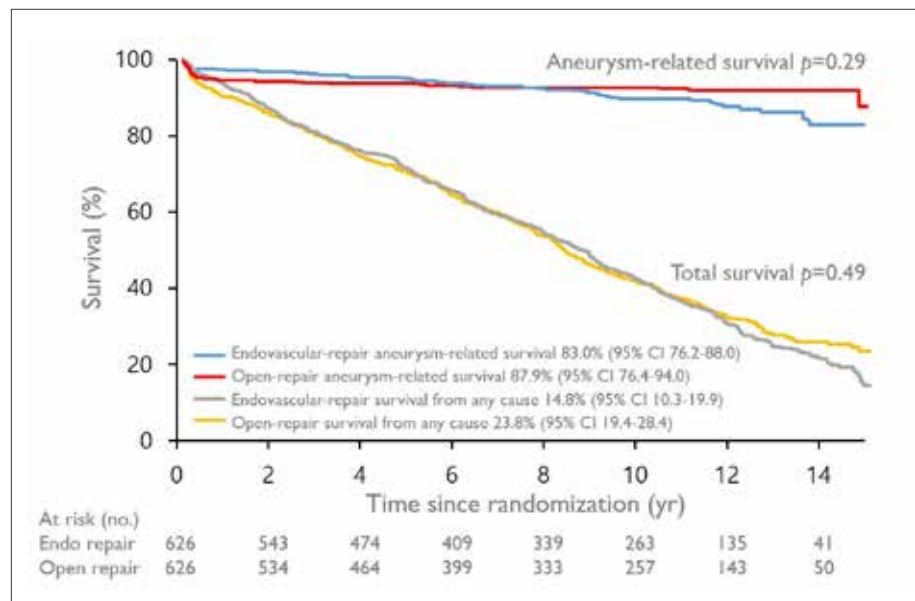


Figure 1. Endovascular versus open repair of abdominal aortic aneurysm in 15-years' follow-up of the UK Endovascular Aneurysm Repair trial 1 (EVAR trial 1) (Adapted from Patel R, et al. Lancet 2016;388(10058):2366-74.)

veillance or further reinterventions should not be intrusive.

In conclusion, the NICE guidance for AAA management highlights the concerns around durability but goes too far in suggesting that EVAR should not be used at all. As EVAR is preferred by patients, durability concerns should not be ignored but acknowledged in order to overcome them as technology continues to advance.

In today's talk, Dr. Park will review and discuss the controversies around the recent NICE guidelines for AAA repair and discuss future direction of AAA treatment.

Intervention 5

Current Treatment - Aorta & Peripheral Artery Disease

» Monday, Oct 18, 12:50-14:20, Channel 1

TAVR for Valve-In-Valve: What We Should be Concerned and How to Do?



Cheol Woong Yu, MD, PhD
Korea University
Anam Hospital,
Korea

Bioprosthetic valves are used for surgical aortic valve replacement with a much greater prevalence than mechanical valves. However, bioprosthetic valves may fail over time because of structural valve deterioration; this often requires intervention due to severe bioprosthetic valve stenosis or regurgitation, or a combination of both. In selected patients, transcatheter aortic valve replacement is an alternative to surgical

aortic valve replacement. Particularly, transcatheter valve-in-valve (ViV) procedures are less invasive than re-do open heart surgery, and have proven relatively safe and effective.

Transcatheter ViV replacement is performed by implanting a transcatheter

devices, although the balloon-expandable SAPIEN valve platform (Edwards Lifesciences Ltd, Irvine, CA, USA) and self-expandable CoreValve platform (Medtronic Inc., MN, USA) have been used in the majority of patients. Transcatheter ViV treatment is appealing as it is less invasive than the conventional surgery, but optimal patient selection is vital to avoid complications such as malposition, residual high gradients, and coronary obstruction. To minimize the risk of complications, thorough procedural planning is critical. In large multicenter registries, morbidity and mortality have been shown to be generally lower than surgery (Figure 2), and improvement in quality of life can be profound. Outcomes continue to improve with advances in the THV technology, techniques, and expertise.

Transcatheter ViV procedures will likely to increasingly be favored over reoperation when bioprosthetic heart valves fail, particularly when surgical risks are high. Understanding the complexities of the ViV procedure can lead surgeons to make the optimal decisions during the original

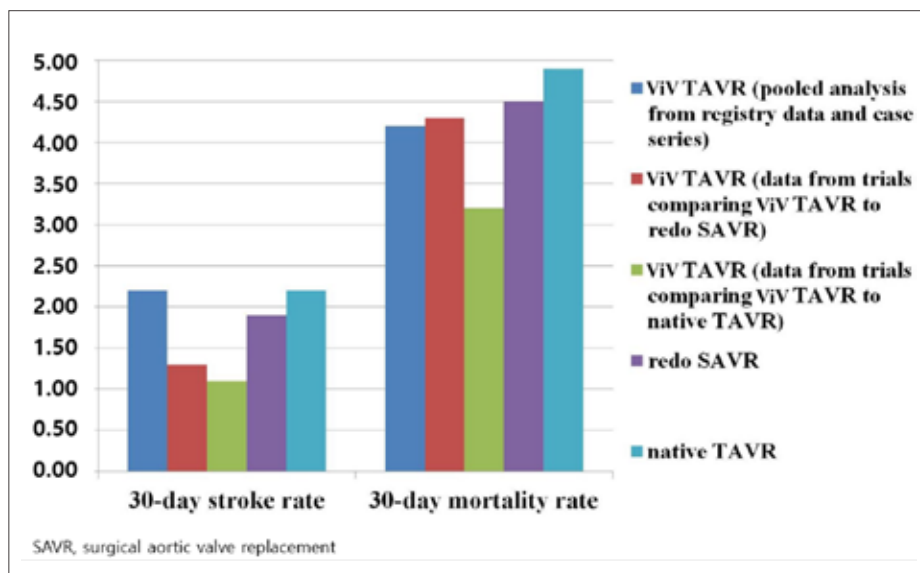


Figure 2. The 30-day stroke and mortality rates following valve-in-valve (ViV) transcatheter aortic valve replacement (TAVR) (Adapted from Macherey S, et al. J Am Heart Assoc 2021;10(6):e019512.)

heart valve within a failing bioprosthetic valve, but it has been associated with specific complications and requires extensive preoperative work-up as well as planning by the heart team. The type, size, and implant position of the transcatheter valve can be optimized for individual patients with the knowledge of detailed dimensions of the surgical valve in addition to radiographic and echocardiographic measurements of the patient's anatomy.

Transcatheter ViV procedures in the aortic position have been performed with a variety of transcatheter heart valve (THV)

surgical valve implantation that can make a future ViV operation more technically feasible years before it is required.

Professor Yu will present on his know-hows and areas to pay attention to during the transcatheter ViV procedures.

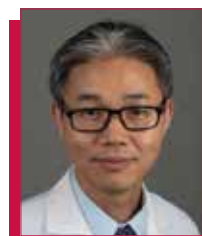
Intervention 6

Technical Pearls for Complex TAVR Procedures: Case-Based Learning

» Monday, Oct 18, 14:30-16:00, Channel 1

Geriatric Cardiology

Frailty Assessment for TAVI Patient



Dae Hyun Kim, MD
Beth Israel
Deaconess Medical
Center, USA

Aortic stenosis is a leading cause of mortality and morbidity in older adults. Due to its safety and comparable efficacy to surgical aortic valve replacement, transcatheter aortic valve implantation (TAVI) is recommended for

older adults who have at least one year of life expectancy remaining with a meaningful quality of life. Challenges remain as to how to predict patient-centered outcomes after TAVI. Accumulating evidence suggests that frailty assessment is useful for prediction of clinical outcomes and functional status after TAVI, beyond the standard risk scores. In this lecture, Dr. Kim will provide an overview of the definition of frailty, common frailty measures, prediction of functional recovery after TAVI, and challenges in implementing frailty in clinical practice. He will illustrate how to

use frailty information for shared decision-making regarding TAVI and development of risk optimization care plan before TAVI.

Comprehensive Geriatric Assessment and Management for Frail Patients with Heart Failure



Mi-Jeong Kim, MD, PhD
The Catholic
University of Korea
Incheon St. Mary's
Hospital, Korea

Frailty is a syndrome of an exaggerated decline in function and reserve of multiple physiological systems, which is not necessarily caused by aging. However, frailty is common in older patients with heart failure (HF), up to 45-75%, and they

share common features with HF, including multi-morbidities, inflammation, insulin resistance, and sarcopenia. As frailty is associated with worse clinical, functional, and patient-reported outcomes, it should be screened and managed in HF patients.

Only recently, several frailty screening tools are emerging to identify frail patients with HF in routine clinical settings (Figure 1). In Fried criteria, physical reserve can be measured across 5 domains: weight loss, weakness, poor endurance, slowness, and low physical activity level. Frailty is identified by fulfilling criteria for ≥ 3 of 5 domains. Fulfilling 1 or 2 domains are classified as "pre-frail". Frailty identified by Fried phenotype criteria has been associated with functional impairment and poor quality of life. Both gait speed and hand grip strength are components of Fried criteria measuring mobility and weakness, respectively. Test performances are known to be less dependent on cardiovascular fitness. Short physical performance battery (SPPB) is a 3-part lower-extremity functional test including balance, strength, and mobility. Serial SPPB results are predictive of functional decline and all-cause mortality.

In summary, frailty is highly prevalent in geriatric patients with HF and results in poor functional status and clinical out-

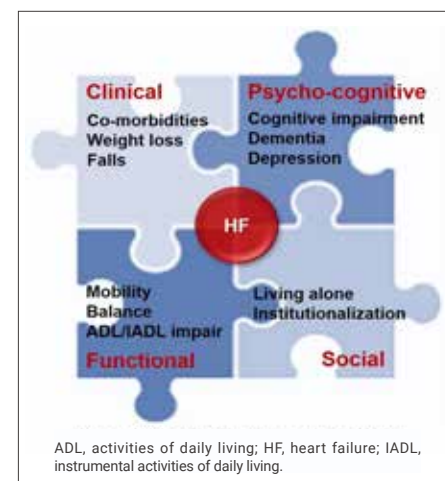


Figure 1. The four main domains – clinical, physical-functional, cognitive-psychological, and social – defining the Heart Failure Association (HFA) Frailty Score (Adapted from Gorodeski EZ, et al. J Am Coll Cardiol 2018;71:1921–36.)

comes. It is the time to incorporate multi-domain frailty screening and management into the routine daily practice of HF.

Geriatric Cardiology Frailty in Cardiovascular Disease

» Monday, Oct 18, 12:50-14:20, Channel 6

Cardiometabolic Syndrome

Colchicine Is Better



Hyun-Jin Kim, MD, PhD
Hanyang University
Guri Hospital, Korea

Colchicine, a microtubule inhibitor, is traditionally used to inhibit or prevent inflammation in disorders such as gout, familial Mediterranean fever and pericarditis. By blocking microtubule formation and propagation, colchi-

cine suppresses inflammation by inhibiting leukocyte locomotion and diapedesis, inflammasome formation, cytokine production, and reactive oxygen species formation. Also, one of the mechanisms by which colchicine exerts anti-inflammatory effects is by inhibiting NLRP3 (nod-like receptor family pyrin domain containing 3)

inflammasome formation and activation. The mechanism of the cardio-protective effect of colchicine has not been fully elucidated, but previous studies suggest that the mechanism is due to the anti-inflammatory action in both systemic and local tissues. In addition, colchicine may have other cardio-metabolic protective mechanisms via non-inflammatory pathways as microtubules are ubiquitous and play many roles within the body.

Although there are no randomized clinical trials (RCTs) on the long-term effects of colchicine in adults with obesity and cardio-metabolic syndrome, there are several studies which reported that colchicine may have cardio-protective effects, and it improves the variables and profile associated with metabolic syndrome. Colchicine (0.6 mg twice daily) has demonstrated to

significantly reduce insulin resistance, homeostasis model assessment of insulin resistance (HOMA-IR), small low-density lipoprotein (LDL), oxidized LDL, as well as inflammatory markers C-reactive protein (CRP), interleukin-6, resistin, vascular-related proteins, erythrocyte sedimentation rate (ESR) and glycoprotein acetylation (GlycA) compared to placebo in adults with diabetes and metabolic syndrome. These effects are highly correlated with the innate immune system, endothelial function, and atherosclerosis, thus benefiting cardiac metabolic syndrome. Given that inflammation plays a pivotal role in the complex pathophysiology of atherosclerosis, the results of previous studies suggesting that colchicine reduced the incidence of major adverse cardiovascular events including acute coronary syndrome (ACS), out-of-hospital cardiac arrest, and

ischemic stroke, and decreased unstable plaque burden in patients with recent ACS should be taken seriously.

Statin-colchicine combination therapy has not been formally evaluated in clinical trials. It is unclear how specific pharmacokinetic parameters may be affected. Clinicians should monitor closely for muscle-related signs and symptoms, and the potential for synergistic muscle-related toxicity when administering statin-colchicine combination therapy. In this session, the clinical usefulness and precautions for the use of colchicine in patients with cardiometabolic syndrome will be discussed in details.

Cardiometabolic Syndrome Debate Session: Beyond Statin

» Monday, Oct 18, 08:30-10:00, Channel 4

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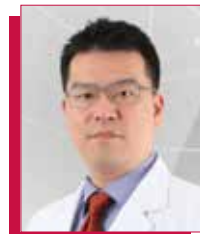


**THANKS TO THE PROTECTION
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Cardiogenic Shock

Cardiogenic Shock Associated with Post-cardiotomy Status



Jae Seung Jung,
MD, PhD
Korea University
Anam Hospital,
Korea

Post-cardiotomy (PC) cardiogenic shock occurs in 3 to 5% of cardiac operations. Furthermore, refractory shock after cardiac surgery occurs in 0.5% of these procedures; the rate of patient survival to discharge is 25 to 44%.

Hence, early aggressive management with extracorporeal membrane oxygenation (ECMO) can offer a survival advantage. Overall criteria for using ECMO include failure to wean off cardiopulmonary bypass in patients receiving maximum inotropic and vasopressor support with or without an intra-aortic balloon pump, postoperative cardiac arrest, and refractory cardiogenic shock (systolic blood pressure less than 80 mmHg, pulmonary capillary wedge pressure greater than 20

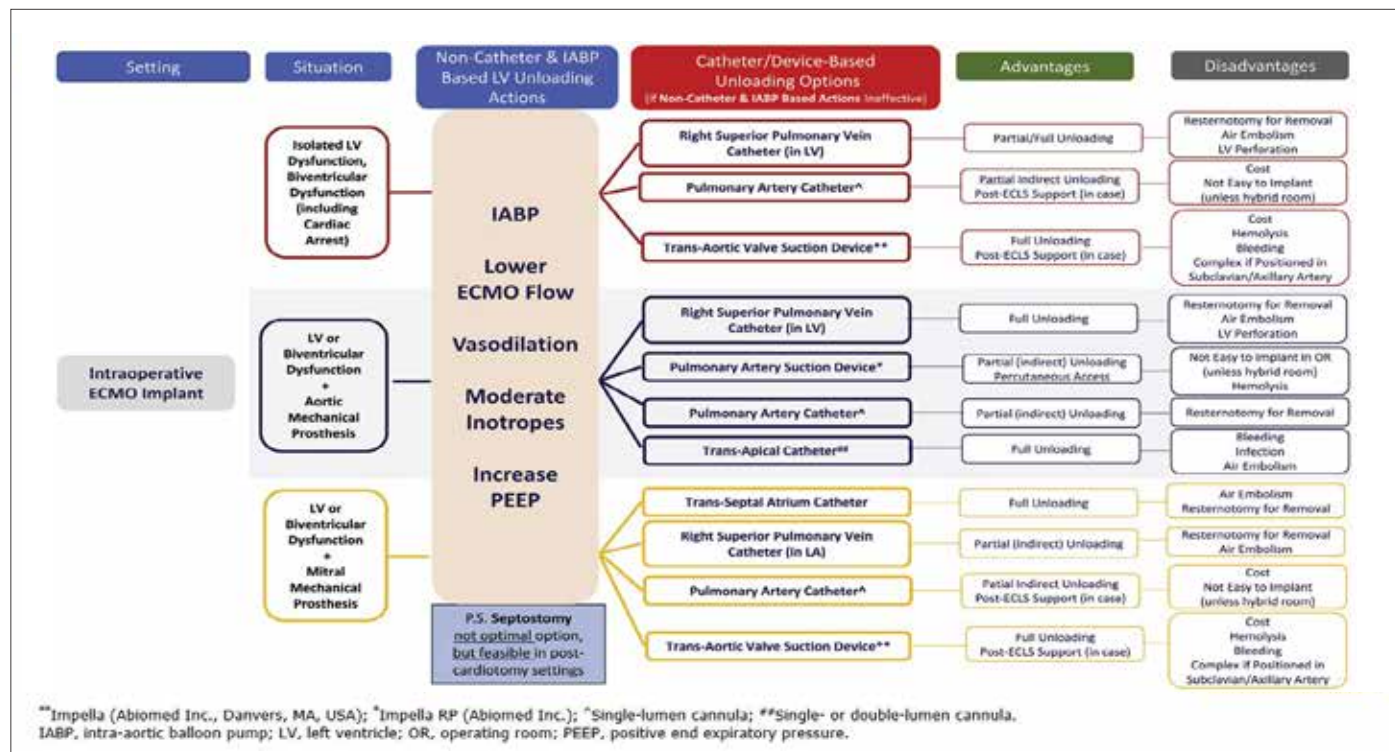


Figure 2. Assessment of left ventricular distension and need for unloading by clinical monitoring (Adapted from Patel B, et al. Anesthesiology 2021;135(3):497-507.)

mmHg, and cardiac index less than 1.8 L/min/m²).

ECMO initiated in the operating room

or the perioperative period after cardiac surgery is referred to as post-cardiotomy (PC)-ECMO. Its most common indications are left ventricular, right ventricular, biventricular, and respiratory failure. ECMO provides cardiocirculatory assistance to support end-organ perfusion while allowing myocardial recovery. If recovery is not achievable, ECMO can bridge patients to durable mechanical circulatory support, heart transplantation, or palliation.

The only absolute contraindication to ECMO is uncontrolled surgical bleeding. However, ECMO should not be considered if myocardial recovery is unlikely and if the patient is not a candidate for ventricular assist device implantation or heart transplant because of other considerations.

PC-ECMO has become the most frequent ECMO application in the United States. Despite its use having rapidly increased with advances in technology, widespread availability, and increasing experience, this change has not been associated with

improved outcomes.

The key management recommendations included early extracorporeal life support (ECLS) cannulation and considering relative contraindications, cannula reconfiguration to optimize oxygenation or limited flows, left ventricular unloading to facilitate recovery, careful coagulation management as guided by multiple assays, and systemic anticoagulation in the absence of bleeding (Figures 1 and 2). Also, preparation of systemic strategies for the common intensive-care unit complications of infection, hypoxia, lung injury, neurologic injury, and renal failure is needed.

Cardiogenic Shock

Management of Cardiogenic Shock According to the Etiology

» Monday, Oct 18, 10:10-11:40, Channel 2

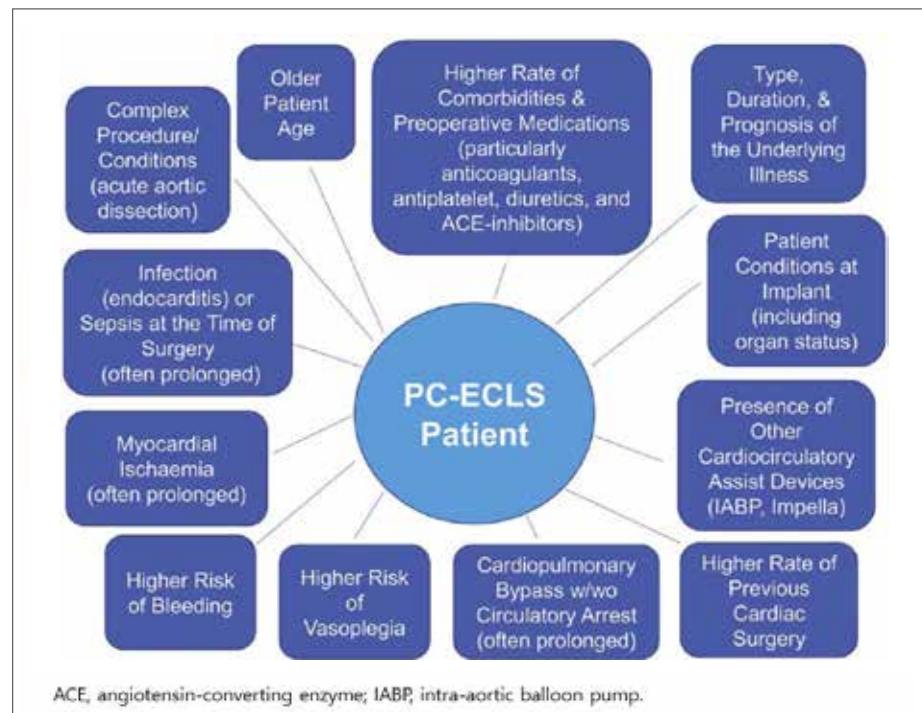


Figure 1. Characteristics of the PC-ECLS patient which impact outcome (Adapted from Lorusso R, et al. J Thorac Cardiovasc Surg 2021;161:1287-331.)

보령제약

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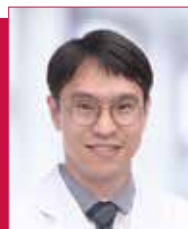
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Heart Failure

Debate: Hot Issues in HF Management

Pro: Central ECMO as a Bridge-to-Transplantation



Jeehoon Kang, MD, PhD
Seoul National University Hospital, Korea

Nowadays the indications of extracorporeal membrane oxygenation (ECMO) have expanded to more prolonged usage in the intensive care unit (ICU), including the bridge-to-transplantation (BTT) for both cardiac and lung transplants. Regarding the venoarterial-ECMO as a BTT method, it can be established via peripheral or central access, while there are a few unique aspects of transplantation that should be considered when selecting the optimal type of ECMO. Professor Kang will present on the pros of central ECMO as a BTT due to the following reasons: firstly, the shortage of available donor organs extend the bridging time to several weeks or to even months; secondly, patients waiting for organ transplantation may benefit from physiologic-to-supra-physiologic circulatory support because this helps to maintain the normal physiology of the remaining organs. Based on

these reasons, Professor Kang believes that central ECMO seems to be the 'right fit' for the BTT role.

Professor Kang will specify various advantages of central ECMO; a good venous drainage and reliable antegrade arterial return to the aorta, a stable long-lasting circulatory support, and the feasibility of patient mobilization. He will also point out on a surprising fact that patients can perform ambulatory walk, which signifies clinical benefit of early mobilization in HF.

Lastly, Professor kang will mention that despite the main disadvantages of bleeding and infection issues, sophisticated management and optimal medical treatment have decreased these complications. Additionally, Professor Kang will clarify that central ECMO should only be performed by teams with sufficient training and experience in its initiation, maintenance, and discontinuation because ECMO is not a disease modifying treatment. In conclusion, he will emphasize that selecting the right patient and the right type of ECMO is essential for the best results for the patients.

Con: Central ECMO as a BTT



Min-Seok Kim, MD, PhD
Ulsan University Asan Medical Center, Korea

Currently, the number of heart transplant recipients bridged with mechanical circulatory support (MCS), of which left ventricular assist device (LVAD) is being used widely, has increased worldwide. However, LVAD implantation is not generally considered in patients with significant cardiogenic shock, who are first supported with temporary MCS (usually venoarterial extracorporeal membrane oxygenation [VA-ECMO]) as a bridge to transplant. But the survival rate is known to be low in post-transplant survival of patients bridged to transplant with VA-ECMO.

The generally prolonged VA-ECMO may jeopardize post-transplant outcomes because of intrinsic complications (LV afterload increase, limb ischemia, bleeding or thrombus associated with cannulas, and poor mobilization). The peripheral VA-ECMO is especially considered as a short-term support device because

of these non-physiologic properties, but central type VA-ECMO provides antegrade perfusion to end-organs with LV unloading, long-standing support with large bore cannulas, and sufficient patient mobilization.

Professor Kim will present against central ECMO as a BTT due to following reasons. VA-ECMO as a BTT is not popular in many countries but is widely accepted in Korea because of a strict regulation of government for the access to LVAD and relatively short waiting period for transplant. However, there are a few studies comparing the two types of VA-ECMO (mainly confined to postcardiotomy shock [PCS]), which reported that central VA-ECMO was associated with greater in-hospital mortality than peripheral VA-ECMO in PCS patients (meta-analysis). Professor Kim will point out that in addition to the need for further investigation, comparison between central and peripheral VA-ECMO could help provide clinical implications in challenging situations where VA-ECMO is mainly used as a BTT.

Heart Failure 3

Debate: Hot Issues in HF Management

» Monday, Oct 18, 08:30-10:00, Channel 2

Table 1. Comparison between central and peripheral ECMO (Produced by Prof. Kang JH and Prof. Kim MS)

	Cannulation site	Merits	Demerits
Central ECMO	Outflow catheter: Right atrium, left atrium, left ventricle apex Inflow catheter: Aorta	Antegrade flow Long-lasting support Higher ECMO flow Patient mobilization No Harlequin syndrome	Opened sternum (not always) High bleeding risk More infection Higher risk of closed aortic valve Resternotomy for catheter removal
Peripheral ECMO	Outflow catheter: Femoral vein Inflow catheter: Femoral artery, axillary artery	No surgical incision Reduced bleeding risk Patent chest wall and sternum Easier switch to VAD implantation	Leg ischemia Retrograde flow Lower ECMO flow Vascular complications

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Arrhythmia

Sudden Cardiac Death in Athletes



Kwang-No Lee, MD
Ajou University
Medical Center,
Korea

Sudden cardiac death (SCD) is the most common cause of sudden death in athletes, aside from accidents. Estimated rate of SCD incidence vary based on the different methodological approaches, which include study popula-

tion, type of database, and definition of the outcome, but it generally ranges from 1/40,000 to 1/400,000. Deaths are more common in competitive sports, males, and younger athletes. Common causes of death are widely different depending on the age groups of athletes. In young athletes (<35 years old), inherited and congenital abnormalities are common (e.g., cardiomyopathy, coronary anomalies, and ion channel diseases). In older athletes (>35 years old), coronary artery disease is common. Preparticipation screening with electrocardiography is effective for identifying serious electrical diseases and raising suspicion of cardiomyopathy. However, electrocardiography results may be normal in the case of coronary artery disease and incomplete expressions of car-

diomyopathy. As a treatment, early cardiopulmonary resuscitation and application of an automated external defibrillator could improve the survival of athletes with unexpected cardiac arrest.

Arrhythmia 5 SCD

» Monday, Oct 18, 12:50-14:20, Channel 2

Implantable Loop Recorder in Clinical Practice



Jong Sung Park, MD
Dong-A University
Hospital, Korea

Undiagnosed arrhythmic diseases, which may cause sudden cardiac death or stroke, are becoming an important health care issue globally. Implantable loop recorder (ILR or insertable cardiac monitor) is a small-sized subcutaneously implantable (or insertable) cardiac rhythm monitoring device that can record and store electrocardiograms (ECGs) (Figure 1). ILR was conventionally used to detect undiagnosed arrhythmias in patients who experienced unexplained syncope or palpitations. Recently, the

scope of the use of ILR is expanding to the detection of undiagnosed atrial fibrillation in patients with embolic stroke or undiagnosed life-threatening ventricular arrhythmia in patients with structural heart diseases at high risk of sudden arrhythmic death. ILR is also used to evaluate the efficacy of antiarrhythmic therapy in patients who underwent antiarrhythmic drug therapy or ablation. Due to recent technologic advances in both hardware and software, smaller-sized devices with longer longevity and elaborate algorithms with higher diagnostic

yield are emerging in the cardiac implantable electronic device market. However, despite remarkable clinical advantages and minimal risk of complications, ILR has been underutilized in clinical practice. Low utilization of ILR in Korea seems to be associated with relatively high medical cost, cultural peculiarities to avoid invasive procedures, and/or lack of physicians' knowledge or interest. Long-term ECG monitoring ability of ILR gives physicians more chances to identify hidden arrhyth-

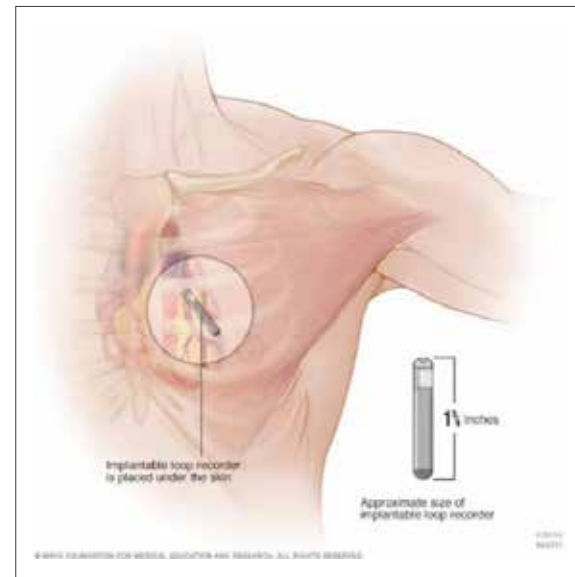


Figure 1. Implantable loop recorder placed subcutaneously in the left parasternal position (Adapted from Mayo Clinic)

mias and treat patients appropriately. Physicians who treat patients with potential arrhythmic diseases should remember that 'undiagnosed arrhythmia is never safe until diagnosed properly' and consider the use of ILR.

Arrhythmia 6 CIED

» Monday, Oct 18, 14:30-16:00, Channel 2

Smart Health

Vision and Future of Health Data



Young-Hak Kim, MD, PhD
Ulsan University
Asan Medical
Center, Korea

Medical data is considered the most important factor in the development of medical science nowadays. Traditionally, the highest level of evidence is the combination of results from prospective randomized controlled studies. Retrospective research results are also considered important. However,

with recent increase in activities involving big data research recently, medical data is drawing more attention.

Traditional clinical research had been conducted by aggregating clinical characteristics that are considered important based on medical knowledge, whether retrospective or prospective, and tracking clinical outcomes of individual patients. Recently, there have been significant advances in the collection, storage, and analysis of data, making it possible to process and analyze vast amounts of large volume of medical data simultaneously.

Among various types of health data, the data stored in hospital information systems in particular has become the most important factor in the medical big data research, including all medical and personal information from patients. With the development of artificial intelligence technology, understanding of text information that seems to be out of order has increased and image analysis technology has also improved significantly. Artificial intelligence has even reached the level where it can analyze and diagnose images in real time and present appropriate treatment methods. Moreover, as the utili-

zation of personal health records has also increased, bioinformation measured by various sensors combined with medical information allows personalized diagnosis, treatment, and prognosis management. In this lecture, the possibilities and future utilization of medical information will be discussed.

Smart Health Cross-talk Between Clinicians and Industry

» Monday, Oct 18, 08:30-10:00, Channel 6

<p>UNMATCHED FEATURE SUITE</p> <p>Azure™ MRI SureScan™</p>	<p>REDUCE</p> <p>Exclusive algorithms demonstrated to reduce the risk and duration of AF</p> <p>36% relative reduction in Atrial Fibrillation (AF) episodes ≥ 7 days with Reactive ATP™ Algorithm*</p>	<p>Improved Longevity</p> <p>15.8 YEARS* Azure XT SR MRI</p> <p>13.7 YEARS* Azure XT DR MRI</p>
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<p>forxiga</p> <p>(dapagliflozin)</p>	<p>xigduo</p> <p>(dapagliflozin and metformin HCl)</p>
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Vascular

Cardiovascular Imaging of the Aorta in Aging and Risk Assessment



João A. C. Lima, MD
Johns Hopkins
University, USA

This presentation reviews the methodology and emphasizes the potential of magnetic resonance imaging (MRI) imaging for the assessment of aortic stiffness and hemodynamics as a consequence

of aging, exposure to risk factors and disease. Specifically, when cardiovascular aging begins along the human lifespan, and how risk factor exposure induces early vascular aging and predisposes individuals to unfavorable outcomes, including cardiovascular mortality will be discussed.

In clinical practice, MRI is commonly used to assess aortic structure and function, being considered the gold standard technique for the diagnostic and monitoring of aortic disease processes, such as Marfan's aortic disease, aortic coarctation and aortic dissection among several other aortic pathologies. However, for the purposes of investigating prognosis in cardiovascular medicine, MRI has been developed to enable risk prediction by quantifying alterations of aortic function

and structure secondary to risk factor exposures with the aim of studying the pathophysiology of vascular aging and improving event prediction. The precision and good reproducibility of MRI measurements allow for the unique assessment of longitudinal variations of aortic parameters with aging, as well as the effect of pharmacological and non-pharmacological interventions on aortic structure and function.

As humans age, the ability to synthesize elastin is lost and its substitution for collagen leads to aortic wall thickness with increased stiffness. Aortic distensibility drops linearly since age 20 until age 50, continuing at a much slower pace after that. This is accompanied by an increase in pulse wave velocity (PWV), which accelerates after age 50 continuing into the 70s and 80s. Collagen accumulation as a replacement for elastin loss leads to increased aortic thickness, which is most prominent between the 40s and 50s, and continues at a slower pace. PWV, reflecting enhanced aortic stiffness measured by echocardiography with pulsed wave Doppler, is a good predictor of cardiovascular events demonstrated in multiple studies. Aortic imaging has also been used to quantify atherosclerosis and quantify the effect of lipid lowering therapy.

In clinical practice, aortic flow and func-

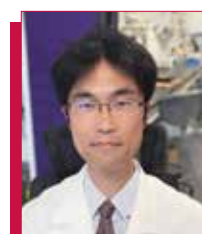
tional assessment could be added to clinical routine cardiac MRI as a comprehensive imaging modality performed primarily for the noninvasive evaluation of left ventricular (LV) function, LV load, and vascular/ventricular coupling. Advanced imaging, such as four-dimensional (4D) flow could further provide noninvasive access to elucidate changes in aortic geometry and function associated with aging or human pathology. MRI provides not only detailed three-dimensional (3D) aortic architecture and function, but also regional, direct, noninvasive measures of aortic strain, distensibility and PWV that characterize regional load and changes in material properties. The excellent reproducibility of MRI methods allows us to assess responses to both pharmacological and non-pharmacological therapy. New techniques such as 4D flow can further elucidate the combined effects of altered aortic geometry and function. Further research including longitudinal studies are needed for a more complete understanding of changes in aortic stiffness and hemodynamics in response to aging and disease processes.

Vascular
Precision Medicine in Vascular Aging and CV Risk

» Monday, Oct 18, 10:10-11:40, Channel 1

Basic Research

Maintenance of Mitochondrial Health Becomes a Therapy for Heart Failure



Ippei Shimizu, MD, PhD
Juntendo
University, Japan

Heart failure increases with chronological aging. Several processes and pathways contribute to age-related cardiac disease, which include fibrosis, inflammation, diastolic dysfunction, mitochondrial dysfunction, increased

apoptosis and loss of regenerative capacity. This session will focus on discussing the role of mitochondria in the failing heart.

Some patients do not respond to optimized therapies for heart failure and are clinically described as "non-responders (non-res)". In these non-res patients, we found reduction of mitofusion1 (*Mfn1*). Additionally, cardiac-specific *Mfn1* de-

pletion resulted in worsening of cardiac phenotype during left ventricle (LV) pressure overload. *In vitro* studies analyzing neonatal rat ventricular myocytes indicated negative regulation of *Mfn1* by the β -AR/cAMP/PKA/miR-140-5p pathway, and Professor Shimizu also found this microRNA increased in non-res patients. Therefore, the suppression of miR-140-5p, and enhancement of *Mfn1* and mitochondrial dynamics would become a novel therapeutic target for heart failure.

Professor Shimizu recently found mitochondrial dysfunction development with a circulating metabolite increasing with age or heart failure. He performed metabolomics studies in aged individuals or patients with heart failure and found that oxidized choline increases under these conditions compared to the respective controls. He generated a murine LV pressure overload model and found oxidized choline increased both in the plasma and the failing heart. Administration of

oxidized choline deteriorated cardiac function. In contrast, a genetic model suppressing this metabolite ameliorated systolic dysfunction in the LV pressure overload model. Proteomic study indicated that oxidized choline reduced the expression of cytochrome c oxidase subunit 1, and metabolomics study showed that both ATP and phosphocreatine levels significantly reduced in the cardiac tissues of wild-type mice administered with this metabolite. Administration of oxidized choline also reduced muscle strength inducing fibrosis in skeletal muscle, and electron microscopy showed an increase in dysfunctional mitochondria both in the heart and the skeletal muscle. Therefore, the suppression of this metabolite may become a next generation therapy for heart failure.

Basic Research
Novel Insight and Mechanism of Heart Failure

» Monday, Oct 18, 10:10-11:40, Channel 4

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