EDITOR'S PAGE

The Year in Asian Cardiovascular Field 2023

The Top 10 Papers in Asian Cardiovascular Research

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The year 2023 has witnessed a thriving of research in the Asian cardiovascular field. With nourishment from the Asian wisdom, *JACC: Asia* has entered its third year since its inaugural issue. To fill in the blank of the Asian-population-focused cardiovascular problem, various clinical scientists from Asia worked on randomized clinical trials, cohort studies, and registries, as well as cross-disciplinary translational medicine and cutting-edge technology. There have been significant advancements in the field of cardiovascular research in Asia, as exemplified by the 10 papers chosen for this perspective. To identify the top 10 papers in Asian cardiovascular research, we systematically analyzed the citation count and media impact score of original research articles from Asian authors in the cardiovascular field, sourced from prestigious journals such as *New England Journal of Medicine*, *JAMA*, *Lancet*, *JAMA Cardiology*, *Circulation*, *Journal of the American College of Cardiology*, and *European Heart Journal*. Our selection criteria focused on studies involving Asian population cohorts and those led by teams of Asian researchers. The overall score, which incorporated both citation and media exposure metrics, was adjusted for publication date. Subsequently, all editorial board members collectively voted to determine the top 10 articles from the highest-scoring 20. The results of the Top 10 Asian Cardiovascular Research Selection for the year 2023 are shown in Table 1. In addition, 10 other articles from the highest-scoring 20 were honored as outstanding research in the field of Asian

cardiovascular medicine for the year 2023. Please refer to Table 2 for details.

CORONARY ARTERY DISEASE

Severity and mortality risk prediction for patients with coronary artery disease (CAD) is always a pragmatic clinical interest. Some Asian American researchers have developed and validated a CAD-predictive machine learning model using electronic health records from BioMe and UK Biobank, the in silico scores for CAD.[1] Using machine learning-based quantitative markers for CAD may aid in characterizing the disease state and predicting clinical outcomes in patients, thereby enhancing disease detection and reducing instances of underdiagnosis.

Other than prognosis prediction, lipid-lowering treatment is a mainstay in secondary prevention of CAD. The LODESTAR (Low-Density Lipoprotein Cholesterol-Targeting Statin Therapy Versus Intensity-Based Statin Therapy in Patients With Coronary Artery Disease) trial in South Korea was a head-to-head comparison of the effectiveness of the high-intensity statin treatment (a 50% reduction in low-density lipoprotein cholesterol [LDL-C]) and the treat-to-target statin treatment (titrate to a specific LDL-C goal).[2] The study demonstrates that the treat-to-target strategy was noninferior to the high-intensity statin strategy for the primary endpoint, with comparable rates of major adverse cardiac and cerebrovascular events in both groups. The treat-to-target strategy might enable a personalized approach that takes into account individual variations in drug response to statin therapy. A subgroup analysis of the diabetic cohort in the RACING (Randomized Comparison of Efficacy and Safety of Lipid-Lowering With Statin Monotherapy Versus Statin/Ezetimibe Combination for High-risk Cardiovascular Diseases) trial showed that combination therapy with

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TABLE 1 Top 10 Asian Cardiovascular Research Selection for the Year 2023

Journal	Title	Corresponding Authors	Institutions
Lancet	Machine learning-based marker for coronary artery disease: derivation and validation in two longitudinal cohorts	Ron Do	The Charles Bronfman Institute for Personalized Medicine, Icahn School of Medicine at Mount Sinai, New York, USA
NEJM	Intravascular Imaging-Guided or Angiography-Guided Complex PCI	Joo-Yong Hahn	Heart Vascular Stroke Institute, Samsung Medical Center, Sungkyunkwan University School of Medicine, South Korea
JAMA	Treat-to-Target or High-Intensity Statin in Patients With Coronary Artery Disease A Randomized Clinical Trial	Myeong-Ki Hong	Division of Cardiology, Severance Hospital, Yonsei University College of Medicine, Seoul, South Korea
EHJ	Moderate-intensity statin with ezetimibe vs. high-intensity statin in patients with diabetes and atherosclerotic cardiovascular disease in the RACING trial	Jung-Sun Kim	Division of Cardiology, Severance Hospital, Yonsei University College of Medicine, Korea
NEJM	Trial of Endovascular Therapy for Acute Ischemic Stroke with Large Infarct	Zhongrong Miao, Zeguang Ren, Yongjun Wang	Department of Neurosurgery, the Affiliated Hospital of Guizhou Medical University, China; Department of Neurology, Beijing Tiantan Hospital, Capital Medical University, China; Interventional Neuroradiology, Department of Neurology, Beijing Tiantan Hospital, Capital Medical University, China
JAMA	Intensive vs Conventional Blood Pressure Lowering After Endovascular Thrombectomy in Acute Ischemic Stroke	Hyo Suk Nam	Department of Neurology, Yonsei University College of Medicine, South Korea
Circulation	Optical Coherence Tomography-Guided or Intravascular Ultrasound-Guided Percutaneous Coronary Intervention: The OCTIVUS Randomized Clinical Trial	Duk-Woo Park	Division of Cardiology, Asan Medical Center, University of Ulsan College of Medicine, Korea
Lancet	Tenecteplase versus alteplase in acute ischaemic cerebrovascular events (TRACE-2): a phase 3, multicentre, open-label, randomised controlled, non-inferiority trial Countries	Yongjun Wang	Department of Neurology and Department of Clinical Trial Center, Beijing Tiantan Hospital, Capital Medical University, China
JACC	First-in-Human Transapical Beating-Heart Septal Myectomy in Patients With Hypertrophic Obstructive Cardiomyopathy	Xiang Wei, Song Wan	Division of Cardiovascular Surgery, Tongji Hospital, China; Division of Cardiothoracic Surgery, The Chinese University of Hong Kong, Prince of Wales Hospital, China
Circulation	Edoxaban for 12 Months Versus 3 Months in Patients With Cancer With Isolated Distal Deep Vein Thrombosis (ONCO DVT Study): An Open-Label, Multicenter, Randomized Clinical Trial	Yugo Yamashita	Department of Cardiovascular Medicine, Kyoto University Graduate School of Medicine, Japan

Note: All articles are sorted in alphabetical order based on the first letter of the corresponding authors' surnames.

EHJ = *European Heart Journal*; JACC = *Journal of the American College of Cardiology*; NEJM = *New England Journal of Medicine*.

ezetimibe was comparable to high-intensity statin monotherapy in terms of a 3-year composite of cardiovascular death, major cardiovascular events, or nonfatal stroke among patients with diabetes and atherosclerotic diseases.[3] However, it was associated with fewer intolerance-related drug discontinuations or dose reductions and a higher proportion of patients achieving LDL-C levels <70 mg/dL.

INTRACORONARY IMAGING

Two important randomized clinical trials in South Korea have contributed more data regarding clinical outcomes after different intracoronary imaging-guided percutaneous coronary intervention (PCI) for complex coronary artery lesions. RENOVATE-COMPLEX-PCI (Randomized Controlled Trial of Intravascular Imaging Guidance vs Angiography-Guidance on Clinical Outcomes After Complex Percutaneous Coronary Intervention) showed that intravascular imaging-guided PCI for complex coronary artery lesions led to a lower risk of a composite of death from cardiac causes, target-vessel-related myocardial infarction, or clinically driven target-vessel revascularization than angiography-guided PCI.[4] The OCTIVUS (Optical Coherence Tomography versus Intravascular Ultrasound-Guided Percutaneous Coronary Intervention) trial further compared the different intracoronary imaging methods, optical coherence tomography-guided, and intravascular ultrasound (IVUS)-guided PCI in 2,008 patients with significant coronary artery lesions.[5] Optical coherence tomography-guided PCI was noninferior to IVUS-guided PCI with respect to a primary composite of death from cardiac causes, target-vessel myocardial infarction, or ischemia-driven target-vessel revascularization at 1 year, but had lower procedure-related complications during the index PCI compared with

TABLE 2 Outstanding Research in the Field of Asian Cardiovascular Medicine for the Year 2023

Journal	Title	Corresponding Authors	Institutions
JAMA	Traditional Chinese Medicine Compound (Tongxinluo) and Clinical Outcomes of Patients With Acute Myocardial Infarction	Runlin Gao, Yuejin Yang	State Key Laboratory of Cardiovascular Disease, Department of Cardiology, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, China
EHJ	Smoking and cardiovascular outcomes after percutaneous coronary intervention: a Korean study	Jung-Kyu Han	Cardiovascular Center, Seoul National University Hospital, South Korea
Circulation	Early Left Ventricular Unloading or Conventional Approach After Venoarterial Extracorporeal Membrane Oxygenation: The EARLY-UNLOAD Randomized Clinical Trial	In-Seok Jeong, Youngkeun Ahn	Division of Cardiology, Department of Internal Medicine, Chonnam National University Hospital, Chonnam National University Medical School, South Korea; Department of Thoracic and Cardiovascular Surgery, Chonnam National University Hospital, Chonnam National University Medical School, South Korea
EHJ	Lack of association between fluoroquinolone and aortic aneurysm or dissection	Jaehun Jung	Artificial Intelligence and Big-Data Convergence Center, Gil Medical Center, Gachon University, Korea
Circulation	Extreme Temperature Events, Fine Particulate Matter, and Myocardial Infarction Mortality	Yuewei Liu	Department of Epidemiology, School of Public Health, Sun Yat-sen University, China
Circulation	Associations of Apixaban Dose With Safety and Effectiveness Outcomes in Patients With Atrial Fibrillation and Severe Chronic Kidney Disease	Jung-Im Shin	Division of Cardiology, Severance Hospital, Yonsei University College of Medicine, Seoul, South Korea
EHJ	Ozone pollution and hospital admissions for cardiovascular events	Shaowei Wu	Department of Occupational and Environmental Health, School of Public Health, Xi'an Jiaotong University Health Science Center, China
JAMA	Aspirin for Secondary Prevention of Cardiovascular Disease in 51 Low-, Middle-, and High-Income Countries	Sang Gune K. Yoo	Cardiovascular Division, John T. Milliken Department of Internal Medicine, Washington University School of Medicine, USA
Circulation	Pregnancy Complications and Long-Term Mortality in a Diverse Cohort	Cuilin Zhang	Yong Loo Lin School of Medicine, National University of Singapore, Singapore
EHJ	Assessment of late gadolinium enhancement in hypertrophic cardiomyopathy improves risk stratification based on current guidelines	Shihua Zhao, Xiuyu Chen	MR Center, Fuwai Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College/National Center for Cardiovascular Diseases, Beijing, China

Note: All articles are sorted in alphabetical order based on the first letter of the corresponding authors' surnames.
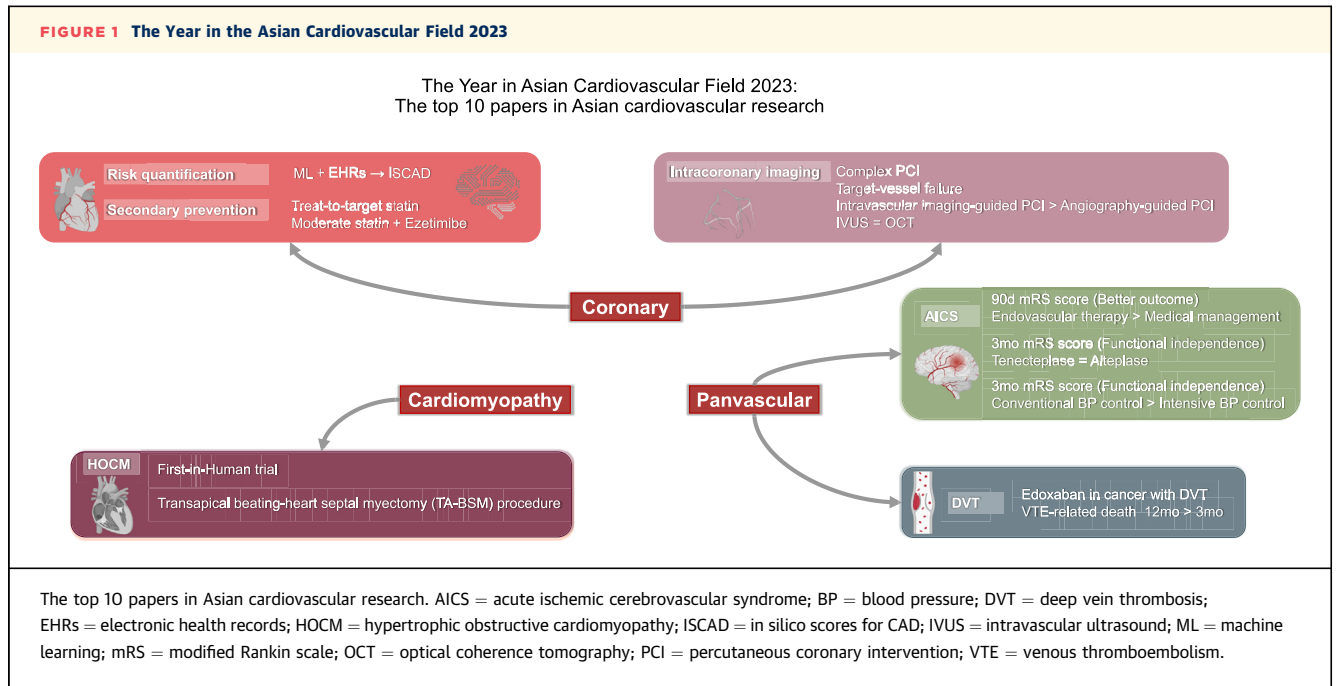
EHJ = European Heart Journal.

IVUS-guided PCI. Despite the results favoring intracoronary imaging-guided PCI, cost-effectiveness analysis is needed to inform clinical decision making.

ACUTE ISCHEMIC CEREBROVASCULAR SYNDROME

Both American and European guidelines have ascertained that endovascular therapy is a standard approach for treating acute ischemic stroke (AIS) resulting from occlusion of large cerebral blood vessels. However, more details in terms of the infarct lesion characteristic, post-procedural blood pressure (BP) control, and the choice of thrombolytic drug for patients who are not eligible for endovascular thrombectomy (EVT) required investigation.

The ANGEL-ASPECT (Endovascular Therapy in Acute Anterior Circulation Large Vessel Occlusive Patients with a Large Infarct Core) trial conducted in China showed a shift in the distribution of scores on the modified Rankin scale toward improved outcomes associated with endovascular therapy as compared with medical management alone.[6] Korean researchers led the OPTIMAL-BP (Outcome in Patients Treated With Intra-Arterial Thrombectomy-Optimal Blood Pressure Control) trial aiming to find the optimal BP control after successful reperfusion with EVT for AIS.[7] Although terminated early for safety concerns after inclusion of 306 patients, the trial demonstrated that intensive BP management (target <140 mm Hg) for 24 hours after successful EVT led to a lower likelihood of functional independence at 3 months compared with conventional BP control (target 140-180 mm Hg). Another noninferiority trial in China, TRACE-2 (Tenecteplase versus Alteplase in Acute Ischaemic Cerebrovascular Events), reported the effect comparison between tenecteplase and alteplase for treating AIS in patients who were ineligible for EVT.[8] The trial found that tenecteplase, which had a similar safety profile to alteplase, was noninferior to alteplase for achieving an excellent functional outcome in patients with AIS within 4.5 hours of symptom onset.

FIGURE 1 The Year in the Asian Cardiovascular Field 2023

The top 10 papers in Asian cardiovascular research. AICS = acute ischemic cerebrovascular syndrome; BP = blood pressure; DVT = deep vein thrombosis; EHRs = electronic health records; HOCM = hypertrophic obstructive cardiomyopathy; ISCAD = in silico scores for CAD; IVUS = intravascular ultrasound; ML = machine learning; mRS = modified Rankin scale; OCT = optical coherence tomography; PCI = percutaneous coronary intervention; VTE = venous thromboembolism.

DEEP VEIN THROMBOSIS

Panvascular medicine, as an emerging discipline focusing on a group of vascular system diseases, attracted the attention of Asian researchers. One of the most common and potentially serious conditions is deep vein thrombosis (DVT), for which the choice of anticoagulant strategy remains debatable in current times.

The ONCO DVT (Edoxaban for 12 Months Versus 3 Months in Patients With Cancer With Isolated Distal Deep Vein Thrombosis) study was an open-label, multicenter, randomized trial conducted at 60 institutions in Japan.[9] The study investigated the effectiveness of 12-month vs 3-month edoxaban treatment for isolated distal DVT in patients with active cancer. From the results of 601 patients included in the intention-to-treat analysis, 12 months was superior to 3 months for edoxaban regarding the primary composite outcome of symptomatic recurrent venous thromboembolism or venous thromboembolism–related death. It warrants the Asian physicians who prolonged anticoagulation therapy demonstrated potential benefits in preventing thrombotic events among cancer patients with isolated distal DVT.

INNOVATIVE TECHNOLOGY FOR HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

Beyond the randomized controlled trials or the cohort studies with clinical guidance implication, some first-in-human trials represent a critical milestone for medical device development in the Asian cardiovascular world.

The novel transapical beating-heart septal myectomy procedure enabled by the beating-heart myectomy device provides real-time evaluation to guide resection during the procedure, making it a safer, more feasible, and efficient procedure compared with conventional surgical septal myectomy.[10]

CONCLUSIONS

We are gratified by the voices of Asian cardiovascular professionals on the international stage. The machine learning–generated prediction score system for CAD and the supportive evidence of moderate-intensity

statin combined with ezetimibe in CAD secondary prevention can have immediate impact on clinical practice. However, more data are required regarding the optimal use of intravascular imaging technique during PCI, ischemic stroke lesion eligibility for endovascular therapy, and duration of anticoagulants for treatment of DVT. The advanced procedure and device for treating hypertrophic obstructive cardiomyopathy needs more trials to validate effectiveness and safety (**Figure 1**).

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