### ORIGINAL CONTRIBUTIONS

1. **Ulnar Artery Interventions Non-Inferior to Radial Approach: AJmer Ulnar ARtery (AJULAR) Intervention Working Group Study Results**  
   Rajendra Gokhroo, DM; Kamal Kishor, MD, DM; Bhanwar Ramvea, DM; Devendra Bisht, DM; Sajal Gupta, DM; Deepak Padmanabhan, DM; A. Avinash, DM  
   Percutaneous coronary procedures are undergoing a paradigm shift from femoral to forearm approach due to obvious advantages in terms of patient safety and comfort, and faster time to ambulation. Transradial access has been established as a primary forearm access site. We conducted a prospective, single-center study (2532 patients) to assess ulnar artery access as an alternative to radial route and found that transulnar access is an excellent alternative and non-inferior to transradial access if performed by an experienced operator.

**COMMENTARY**

8. **A Call for Comprehensive Forearm Access?**  
   Neal Sawlani, MD; Sunil V. Rao, MD; Deepak L. Bhatt, MD, MPH  
   The potential for transradial interventions to reduce all-cause mortality has mechanistically been attributed to a decrease in major bleeding. Therefore, it stands to reason that transulnar angiography could have similar advantages, and offer yet another option instead of a transfemoral approach.

    Madhusudhan Tarigopula, MD, MPH; Philippe Généreux, MD; Mahesh V. Madhavan, MD; Rupa Parvataneni, MS; Giora Weisz, MD; Roxana Mehran, MD; Gregg W. Stone, MD  
    The optimal revascularization strategy for calcified lesions in patients presenting with non-ST segment elevation acute coronary syndromes (NSTEACS) has yet to be defined. Our aim was to examine outcomes in patients presenting with NSTEACS and moderately or severely calcified target lesions in native coronary vessels (n = 1315) according to revascularization strategy using data from the large-scale, prospective ACUITY trial. An independent angiographic core lab used propensity-adjusted multivariable analysis to identify the independent predictors of events at 30 days.

17. **Detection of Plaque Neovascularization by Optical Coherence Tomography: Ex Vivo Feasibility Study and In Vivo Observation in Patients With Angina Pectoris**  
   Teruyoshi Kume, MD, PhD; Hiroyuki Okiura, MD, PhD; Ryotaro Yamada, MD, PhD; Tenumasa Koyama, MD, PhD; Kenzo Fukuhara, MD, PhD; Ai Kawamura, MD; Kōichirō Imai, MD, PhD; Yōji Neishi, MD, PhD; Shiro Uemura, MD, PhD  
   The purposes of this study were to assess the feasibility of optical coherence tomography for detecting neovascularization and to clarify the impact of plaque neovascularization on coronary vessel behavior over time.

### PERIPHERAL VASCULAR DISEASE

23. **The Medusa Multi-Coil Versus Alternative Vascular Plugs for Iliac Artery Aneurysm Embolization (MVP-EMBO) Study**  
   Jon C. George, MD; Vincent Varghese, DO; Richard Kovach, MD  
   Transcatheter embolization has evolved from the use of autologous clot as the embolic agent, to stainless-steel coils, to braided-nitinol vascular plugs. However, there are disadvantages to platinum and metal coils, including procedural time, radiation exposure, mass effect, risk of distal embolization, recanalization, imaging artifacts, and cost. We report our experience with the endovascular treatment of internal iliac artery aneurysms using platinum coils vs the Medusa Multi-Coil, which is constructed primarily of synthetic fibers.
CONGENITAL HEART DISEASE

30 Safety and Efficacy of Transcatheter Closure of Patent Ductus Arteriosus With Severe Mitral Regurgitation in Adults
Zhongkai Wang, MD; Tao Chen, MD; Liang Chen, MD; Yongwen Qin, MD; Xianxian Zhao, MD
Transcatheter closure is the usual treatment for patent ductus arteriosus (PDA), but its safety and efficacy have not been reported in adult patients with severe mitral regurgitation. We therefore conducted a retrospective study on 27 consecutive adult patients diagnosed with PDA and severe mitral regurgitation who were treated using transcatheter closure.

34 Side-by-Side Comparison of LAA Occlusion Performance With the Amplatz Cardiac Plug and Amplatz Amulet
Ali Abualsaud, MD; Xavier Freixa, MD, PhD; Apostolos Tzikas, MD, PhD; Jason Chan, MD; Patrick Garceau, MD; Arsen E. Basmadjian, MD; Reda Ibrahim, MD
The Amplatz Amulet, a second-generation device for left atrial appendage occlusion, has been designed to facilitate implantation, improve closure, and reduce complications.

ONLINE EXCLUSIVE

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TRANSCATHETER AORTIC VALVE REPLACEMENT

E1 Bail-Out Use of Impella CP as a Bridge to TAVI in a Cardiogenic Shock Patient: The “Pump-Rewiring” Technique
Francesco Buzzotta, MD, PhD; Roberto Nerla, MD; Carlo Trani, MD
The optimal management of cardiogenic shock occurring in the presence of acute coronary syndromes, severe aortic stenosis, and poor LV function has not been established. Recently, the availability of new assistance devices and techniques has provided novel management opportunities.

BRIEF COMMUNICATION

E6 Percutaneous Repair of Aortic Pseudoaneurysms: A Case Series
Zachary L. Steinberg, MD; Creighton W. Don, MD; Jack C.J. Sun, MD; Edward A. Gill Jr, MD; Steven L. Goldberg, MD
Aortic pseudoaneurysms are an uncommon but serious complication of aortic surgery with potentially fatal complications if left untreated. Operative repair is associated with significant morbidity and mortality. We report our experience with percutaneous intervention for the treatment of aortic pseudoaneurysms.

CASE REPORTS

E11 Conservative Management of an Epicardial Collateral Perforation During Retrograde Chronic Total Occlusion Percutaneous Coronary Intervention
Christian Ngo, MD; George Christophoulus, MD; Emmanuel S. Brilakis, MD, PhD
Coronary artery perforation is a highly feared complication of CTO-PCI and can lead to pericardial effusion, tamponade, and, rarely, emergent cardiac surgery. Perforation of epicardial collaterals during retrograde CTO-PCI may be particularly challenging to treat, as embolization from both sides of the perforation may be required to control the bleeding.

E13 A Step Forward: The Use of the CrossLock Catheter in a Patient With Critical Limb Ischemia and a Popliteal Occlusion
Richard R. Heuser, MD; Kerry Zang, MD, DPM; Arthur J. Mollen, DO
The use of the CrossLock catheter in a patient with severe PAD is described.

SCIENTIFIC ABSTRACTS

E17 11th Annual Complex Cardiovascular Catheter Therapeutics: Advanced Endovascular and Coronary Intervention Global Summit (C3)
June 2015, Orlando, Florida.
## ORIGINAL CONTRIBUTIONS

### CORONARY ARTERY DISEASE

### 40 Venous Access Closure Using the Double-ProGlide Preclose Technique After MitraClip Implantation: Long-Term Clinical and Duplex Ultrasound Outcomes

Khung Keong Yeo, MBBS; Jonathan Yap, MBBS; Jack Wei Chieh Tan, MBBS; Soo Teik Lim, MBBS; Tian Hai Koh, MBBS

In order to evaluate the safety and efficacy of the double-ProGlide preclose technique to secure hemostasis in patients with 24 Fr venous access, 42 consecutive patients with severe mitral regurgitation undergoing the MitraClip procedure were evaluated. The double-ProGlide preclose technique was utilized for closure of the femoral vein access site. Duplex ultrasound was performed at 1 month to 1 year after the procedure. The primary study outcome was a composite of major vascular complications, including: (1) the presence of >50% stenosis of the femoral vein; (2) presence of proximal deep vein thrombosis; and (3) significant venous bleeding as evidenced by >1 unit packed red blood cell transfusion within 48 hours of the procedure.

### 44 Angina Severity, Depression, and Response to Percutaneous Revascularization in Patients With Chronic Total Occlusion of Coronary Arteries

Jeffrey T. Bruckel, MD, MPH; Farouc A. Jaffer, MD, PhD; Cashel O’Brien, BA; Luke Stone, BA; Eugene Pomerantsev, MD, PhD; Robert W. Yeh, MD, MS

Depression is common among patients with chronic angina, and portends poor prognosis. CTOs are a common cause of angina. The relationships between angina, depression, and CTO intervention are unknown. This study sought to quantify depression rates in patients referred for percutaneous coronary intervention (PCI) for chronic total occlusion (CTO), assess its relationship to baseline angina symptoms, and compare angina improvement after CTO-PCI between depressed and non-depressed patients.

### 52 Contemporary Use of Veno-Arterial Extracorporeal Membrane Oxygenation for Refractory Cardiogenic Shock in Acute Coronary Syndrome

Smita I. Negi, MD; Mladen Sokolovic, MD; Edward Koifman, MD; Sarkis Kiranmijyan, MD; Rebecca Torquison, MPH; Joseph Lindsay, MD; Itsik Ben-Dor, MD; William Suddath, MD; Augusto Pichard, MD; Lewell Satler, MD; Ron Waksman, MD

Refractory cardiogenic shock (RCS) in acute myocardial infarction (AMI) is associated with high mortality rates. Smaller ventricular assist devices, such as the intraaortic balloon pump, provide limited support. Venoarterial extracorporeal membrane oxygenation (VA-ECMO) offers more robust mechanical ventricular support, but is not widely utilized by interventional cardiologists. This study aimed to evaluate the patient characteristics and outcomes of VA-ECMO with RCS in the setting of AMI.

### PERIPHERAL VASCULAR DISEASE

### 58 Long-Term Outcomes of Self-Expandable Nitinol Stent Implantation With Intraluminal Angioplasty to Treat Chronic Total Occlusion in the Superficial Femoral Artery (TransAtlantic Inter-Society Consensus Type D Lesions)

Junya Matsumi, MD; Tomoki Ochiai, MD; Kazuki Tobita, MD; Koki Shishido, MD; Kazuya Sugitatsu, MD; Shingo Mizuno, MD; Futoshi Yamanaka, MD; Masato Murakami, MD; Yutaka Tanaka, MD; Saeko Takahashi, MD; Takeshi Akasaka, MD; Shigeru Saito, MD

This study evaluates long-term outcomes of intraluminal SFA angioplasty with self-expandable nitinol stents for chronic total occlusion in patients with TransAtlantic Inter-Society Consensus (TASC) D lesions.

### COMMENTARY

### 65 Long Superficial Femoral Artery Occlusions: Ready for an Endovascular Intraluminal Approach?

Rajesh V. Swaminathan, MD and Dmitriy N. Feldman, MD
Transcatheter Aortic Valve Replacement

67 Transcatheter Aortic Valve Replacement Complication Rates in Teaching Vs Non-Teaching Centers in the United States

Sadip Pant, MD; Samir Patel, MD; Harsh Gohlwal, MD; Nilesh Patel, MD; Anmbarish Pandey, MD; Apurva Badheka, MD; Kanishk Angihotri, MD; Nilay Patel, MD; Abhishek Deshmukh, MD; Michael P Flaherty, MD

Our objective was to compare TAVR complication rates among teaching vs non-teaching centers in the United States. We identified patients (age ≥18 years) who underwent TAVR from January–December 2012 using National Inpatient Sample data and constructed multivariable models to determine independent predictors of TAVR-associated complications.

Commentary

71 How to Build a Better TAVR

Prakash Balan, MD, JD; H. Vernon Anderson, MD; Tarek Helmy, MD

New Technique

74 A Simple Technique to Facilitate Right Heart Catheter Placement From Right Atrium to Right Ventricle: The Virtual Hydraulic Guidewire Technique

Samir B. Pancholy, MD; Nishith Vayada, MD; Tejas M. Patel, MD

A simple technique is offered to improve the probability of successful passage of a right heart catheter from right atrium to right ventricle.

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CASE REPORT

E22 Initial Experience With the Gaia Composite Core Guidewires in Coronary Chronic Total Occlusion Crossing

Houman Khalili, MD; Minh N. Vo, MD; Emmanuel S. Brilakis, MD, PhD

VA North Texas Health Care System, Dallas, Texas; University of Texas Southwestern Medical School, Dallas, Texas; University of Manitoba, St. Boniface Hospital, Winnipeg, Manitoba, Canada

Application of the Gaia family of coronary guidewires for crossing coronary CTOs using all available crossing strategies (antegrade wire escalation, antegrade dissection/reentry, and retrograde) is described.

CLINICAL IMAGES

E26 An Amulet to Say “Big is Not Enough”

Gianpiero D’Amico, MD; Marco Mojoli, MD; Giuseppe Tarantini, MD, PhD

University of Padua Medical School, Padua, Italy

In the presence of a huge appendage with a narrow neck, as in this case, the Amulet should be considered an available option to ensure the feasibility of percutaneous closure.

LETTER TO THE EDITOR

E27 Transcatheter Aortic Valve Replacement: Still in the Way of Learning

María Martín, MD, PhD; Jesús M. De la Hera, MD, PhD; Ana Fidalgo, MD; Juan Calvo, MD, PhD; Helena Cigarrán, MD; Ana García-Campos, MD; Cecilia Corros, MD; Víctor León, MD; María Luisa Rodríguez MD, PhD; Raquel Del Valle, MD; Pablo Avanzas, MD, PhD; César Morís MD, PhD

Hospital Universitario Central de Asturias, Oviedo, Spain

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Coronary Artery Disease

78 Ultrathin Endoscopy-Guided Pericardiocentesis: A Pilot Study in a Swine Model
Kenji Nakatsuma, MD; Erika Yamamoto, MD; Shin Watanabe, MD; Bingyuan Bao, MD; Hiroki Watanabe, MD; Yoshiaki Kawase, MD; Satoshi Shizuta, MD; Takeshi Kimura, MD; Naritatsu Saito, MD

Pericardiocentesis under echocardiography guidance is a common procedure, but still poses a risk of injury to surrounding tissues. Nowadays, pericardiocentesis is being performed in patients with normal pericardium, for epicardial ablation or atrial appendage exclusion. Access to the normal pericardial space with the conventional needle procedure is very difficult. Thus, development of a novel method enabling safer pericardiocentesis is necessary. The present study aimed to assess the feasibility of using an originally developed ultrathin endoscopy-guided pericardiocentesis device in a swine model.

Radial Access Approach

81 Left Radial Versus Femoral Access for Coronary Angiography in Post-Coronary Artery Bypass Graft Surgery Patients
Thomas F. Pasley, MD; Ali Khan, MD; Lu-Yin Yen, MD; Ruth Newcombe; Hayley Humphreys; Seif El-Jack, MD

It has been recently demonstrated that coronary angiography of native coronary arteries via the radial artery results in reduced morbidity and mortality when compared with a femoral approach. However, the efficacy and safety of the transradial approach in patients with coronary grafts are relatively unknown. We performed a retrospective audit of all patients with a history of previous coronary artery bypass graft (CABG) surgery who underwent diagnostic angiography at our institution from 2008-2012.

Chronic Total Occlusion

88 Efficacy and Safety of Novel NovaCross Microcatheter for Chronic Total Occlusions: First-in-Human Study
Simon Walsh, MD; Dariusz Dudek, MD; Leszek Bryniarski, MD, PhD; Abid Assali, MD; Haim Danenberg, MD; Chaim Lotan, MD; Colum Hannaty, MD; Piotr Wilkolek, MD, PhD; Ran Kornowski, MD

Chronic total occlusions (CTOs) remain the most challenging lesion subset in percutaneous coronary intervention (PCI). Failure to cross to the distal true lumen with the guidewire is one of the major causes of procedural failure in CTO-PCI. The NovaCross microcatheter (Nitiloop, Ltd) is designed to improve antegrade recanalization success. The aim of this first-in-human study was to evaluate the efficacy and safety of the novel NovaCross microcatheter system in eligible consecutive patients with chronic total occlusion.

Commentary

92 Role of Novel Guidewire Support Devices for Crossing Coronary Artery Chronic Total Occlusions
Emmanouil S. Brilakis, MD, PhD and Alfredo R. Galassi, MD

Can these favorable outcomes be achieved at less experienced centers? Bridging the gap in success between experienced and less experienced centers and improving efficiency remain top priorities for CTO-PCI in 2016.
Cardiac Imaging

94 Utility of Frequency Domain Optical Coherence Tomographic Evaluation of Angiographically Optimized Stented Lesions
Mayank Agnawal, MD; Abdil Hakeem, MD; Zubair Ahmed, MD; Barry F. Uretsky, MD

Given its high resolution, optical coherence tomography (OCT) may be a useful clinical tool to optimize stent deployment. Patients with post-PCI OCT who had angiographically-optimized coronary stent implantation (n=100) were reviewed to determine the frequency of further intervention based on OCT pathology. These findings suggest that post-PCI OCT may be a clinically useful tool in angiographically optimized stenting.

Commentary

98 OCT-Guided PCI: Are We There Yet?
Konstantinos Marmagkiolis, MD and Mehmet Cilingiroglu, MD

Using near-infrared light technology, OCT today offers excellent in vivo intravascular imaging of the vessel wall, however, it is unclear whether further stent optimization may allow faster neointimal coverage or alter positive remodeling, which may result in decreased rates of LST or VLST.

Congenital Heart Disease

99 Effectiveness of Alcohol Septal Ablation in Obstructive Hypertrophic Cardiomyopathy With Versus Without Extreme Septal Hypertrophy
Yin-Jian Yang, MD; Chao-Mei Fan, MD; Jin-Qing Yuan, MD; Zhi-Min Wang, MD; Fu-Jian Duan, MD; Shu-Bin Qiao, MD; Shi-Jie You, MD; Jian-Song Yuan, MD; Feng-Huan Hu, MD; Wei-Xian Yang, MD; Xi-Ying Guo, MD; Yi-Shi Li, MD

Data on the effectiveness of alcohol septal ablation (ASA) in patients with hypertrophic cardiomyopathy (HCM) and extreme septal hypertrophy (ESH) are lacking. This study aimed to compare the effectiveness of ASA in patients with vs without ESH.

Coronary Artery Disease

104 Success, Safety, and Efficacy of the Mynx Femoral Closure Device in a Real-World Cohort: Single-Center Experience
David Hutchings, MB Och, MRCP, M Res, B MedSci; AYed Hayat, MBBS, MRCP; Annu Kannakanan, MBBS, MRCP; Nadim Malik, MBBS, MA, MD

Femoral artery closure device use following percutaneous cannulation allows earlier mobilization, reduced staff burden, and improved comfort for patients compared with manual compression. The Mynx device (Access Closure, Inc), a novel extravascular closure device, uses a water-soluble non-thrombogenic polyethylene glycol plug. We report retrospective analysis of success, complication rates, and associated factors in 432 consecutive patients undergoing elective outpatient coronary angiography.

Radial Access Technique

109 “Virtual” 3 Fr Transradial Coronary Stenting With the 5 Fr Meito Masamune Sheathless Guiding Catheter: Feasibility and Safety in an Outpatient Setting
Giovanni Amoroso, MD, PhD; Anneleen van Dullemen, NS; Paul Westgeest, NS; Micke van Duijn, NS

A retrospective analysis was conducted to assess the safety and feasibility of “virtual 3 Fr” transradial percutaneous coronary intervention (TRA-PCI) in an outpatient setting. Virtual 3 Fr TRA-PCI appeared to be feasible and safe in highly selected patients when performed in an outpatient setting.
Congenital Heart Disease

115 Mitral Annuloplasty Device Implantation for Non-Surgical Treatment of Mitral Regurgitation: Clinical Experience After the Approval Studies
Norbert Klein, MD; Dietrich Pfeiffer, MD, Prof; Steven Goldberg, MD; Maika Klein, MD

One option for interventional treatment of secondary mitral regurgitation is the placement of an indirect mitral annuloplasty device (Carillon Mitral Contour System) cinching the mitral annulus to facilitate coaptation of the mitral leaflets. The aim of this study is to evaluate the implantation success and hemodynamic results.

Commentary

121 The Impact of Residual MR After Percutaneous Mitral Repair
Ted Feldman, MD and Mayra Guerrero, MD

While the role of mitral repair for degenerative mitral regurgitation is clear, we continue to struggle with whether treating FMR in the setting of LV dysfunction is ultimately beneficial.

REVIEW

Coronary Artery Disease

122 Coronary Artery Perforation Following Percutaneous Coronary Intervention
Michael S. Lee, MD; Albert Shamouelian, MD; Mufaddal Q. Dahodwala, MD

Coronary artery perforation (CAP) is a rare but serious complication of percutaneous coronary intervention. Risk factors for CAP include female gender, older age, and lesion complexity. The most common causes of CAP include wire perforation, atherectomy, and aggressive sizing of balloons and stents. Complications of CAP vary greatly from clinical insignificance to hemodynamic collapse and death, depending on the severity of the CAP. Early recognition is of utmost importance to surviving CAP. Generally accepted treatment options depend on lesion severity, and include balloon inflation to tamponade the vessel, reversal of anticoagulation, covered stents, and embolization. Emergent pericardiocentesis or surgical evacuation may be required for the most severe cases.

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CASE REPORT

E30 Ultrasound-Accelerated Thrombolysis in Patients With Intracardiac Thrombi: A Case-Series
Ajay Yadlapati, MD; Ranya Sweis, MD, MS; Daniel Schimmel, MD, MS
Division of Cardiology, Bluhm Cardiovascular Institute, Northwestern Memorial Hospital,
Northwestern University, Feinberg School of Medicine, Division of Cardiology, Chicago, Illinois

We describe a case series of three patients presenting with intracardiac thrombi treated with standard anticoagulation therapy and intervention with ultrasound accelerated thrombolysis therapy to demonstrate the safety and clinical efficacy of ultrasound accelerated thrombolysis therapy with EKOS infusion catheter system. These cases highlight the use of ultrasound accelerated thrombolysis therapy in resolving intracardiac thrombi and the impedance in the propagation of pulmonary emboli.

CASE REPORT

E34 Minimal Acute Recoil Following Bioresorbable Scaffold Implantation in Fibrocalcific Lesion Detected by Optical Frequency-Domain Imaging
Hiroyoshi Kawamoto, MD1,2; Neil Ruparelia, DPhil, MRCP1,2,3; Akihito Tanaka, MD1,2; Azeem Latib, MD1,2; Antonio Colombo, MD1,2
1Interventional Cardiology Unit, EMO-GVM Centro Cuore Columbus, Milan, Italy; 2Interventional Cardiology Unit, San Raffaele Scientific Institute, Milan, Italy; and 3Imperial College London, United Kingdom

We report a case of minimal acute recoil detected by optical frequency-domain imaging (OFDI) following bioresorbable scaffold (BRS) implantation for the treatment of a fibrocalcific lesion. This case demonstrates that acute recoil appears to be dependent upon plaque characteristics and the presence of malapposed struts.
### Original Contributions

#### Coronary Artery Disease

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<tr>
<td>133</td>
<td>Sequential Organ Failure Assessment Score at Presentation Predicts Survival in Patients Treated With Percutaneous Veno-Arterial Extracorporeal Membrane Oxygenation</td>
<td>Peter Czobor, MD; Joseph M. Venturini, MD; Kishan S. Parikh, MD; Elizabeth M. Retzer, MD; Janet Friant, APN; Valluvan Jeevanandam, MD; Mark J. Russo, MD; Nir Uriel, MD; Jonathan D. Paul, MD; John E. Blair, MD; Sandeep Nathan, MD; Atman P. Shah, MD</td>
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This study sought to investigate demographic, clinical, and procedural determinants of outcomes in patients treated with percutaneous veno-arterial extracorporeal membrane oxygenation initiated in the cardiac catheterization laboratory with a portable system.

#### Commentary

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<td>139</td>
<td>Percutaneous Extracorporeal Membrane Oxygenation: The Newest Iteration of Temporary Mechanical Support for the Left Ventricle</td>
<td>David M. Shavelle, MD</td>
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Use of objective scoring systems, additional operator experience with newer devices, and additional clinical trials will hopefully help clinicians accurately identify patients who will derive benefit from temporary left ventricular support.

#### Coronary Artery Disease

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<td>142</td>
<td>Impact of Contrast Dose Reduction on Incidence of Acute Kidney Injury (AKI) Among Patients Undergoing PCI: A Modeling Study</td>
<td>Hitinder S. Gurm, MD; Milan Seth, MS; Roxana Mehran, MD; Louis Cannon, MD; Cindy L. Grines, MD; Thomas LaLonde, MD; Carlos Briguori, MD; for the Blue Cross Blue Shield of Michigan Cardiovascular Consortium (BMC2)</td>
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Acute kidney injury (AKI) is a common complication associated with angiography and percutaneous coronary intervention (PCI). Increasing doses of contrast are associated with an increase in the likelihood of AKI. The objective of our study was to estimate projected reduction in the burden of AKI in association with varying degrees of contrast media dose reduction among patients undergoing PCI.

#### Coronary Artery Disease

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<td>147</td>
<td>Percutaneous Coronary Intervention in Severely Calcified Unprotected Left Main Coronary Artery Disease: Initial Experience With Orbital Atherectomy</td>
<td>Michael S. Lee, MD; Evan Shlofmitz, DO; Barry Kaplan, MD; Richard Shlofmitz, MD</td>
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Although surgical revascularization is the gold standard for patients with unprotected left main coronary artery (ULMCA) disease, not all patients are suitable candidates. We retrospectively report clinical outcomes of 14 patients who underwent PCI with orbital atherectomy for severely calcified ULMCA disease from May 2014 to July 2015.

#### Transcatheter Aortic Valve Replacement

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<td>152</td>
<td>Spontaneous Echocardiographic Contrast in the Left Atrium During Transcatheter Aortic Valve Replacement is Associated With Worse Outcomes</td>
<td>Tomo Ando, MD; David P. Slovut, MD, PhD; Anthony A. Holmes, MD; Cynthia C. Taub, MD</td>
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Patients undergoing transcatheter aortic valve replacement (TAVR) often have spontaneous echocardiographic contrast (SEC) observed in the left atrium. Mid-term prognosis of patients with SEC following TAVR is not well studied. Therefore, we assessed the impact of SEC on outcomes after TAVR by retrospectively reviewing the medical records of 93 consecutive patients who underwent TAVR at a single center.
Commentary
158 Spontaneous Echo Contrast and TAVR: A Smoking Gun?
Paul N. Fiorilli, MD and Saif Awanuddin, MD

Overall, as the use of TAVR continues to expand, the role for identifying which patients are at a higher risk of an adverse outcome post procedure has become increasingly important.

Review
160 The Impact and Pathophysiologic Consequences of Coronary Artery Calcium Deposition in Percutaneous Coronary Interventions
Michael S. Lee, MD and Neal Shah, MD

The presence of coronary artery calcium is indicative of advanced coronary artery disease. Recognition of the risk factors and clinical implications associated with coronary artery calcium is vital in identifying both preventative measures as well as treatment options.

Chronic Total Occlusions
168 Predictors and Outcomes of Side-Branch Occlusion in Coronary Chronic Total Occlusion Interventions
Phucong-Khanh J. Nguyen-Trong, MD; Bavana V. Rangan, BDS, MPH; Aris Katakakis, MD; Barbara A. Danek, MD; Georgios E. Christakopoulos, MD; Jose Roberto Martinez-Panachini, MD; Erica Rosendes, MS; Colby R. Ayers, MS; Michael Luna, MD; Shuaib Abdullah, MD; Dharam J. Kumbhani, MD; Tajo Addo, MD; Jerrold Grodin, MD; Subhash Banerjee, MD; Emmanouil S. Brilakis, MD, PhD

Side-branch (SB) occlusion during PCI has been associated with periprocedural myocardial infarction and higher incidence of major adverse cardiac events, but has received limited study in CTO-PCI. We investigated whether SB loss during CTO-PCI could adversely impact clinical outcomes.

Commentary
174 Side-Branch Occlusions in Coronary CTO-PCI: Avoid or Forget?
Peter P. Monteleone, MD, MS, and Farouc A. Jaffer, MD, PhD

The results of the Nguyen-Trong study are hypothesis generating and encourage further investigation into the importance of SB loss during CTO-PCI. Should additional studies find conclusively worse outcomes following SB loss, it will become important to evaluate further strategies.
Electrophysiology

176 Using Discrete Event Simulation to Model the Economic Value of Shorter Procedure Times on EP Lab Efficiency in the VALUE PVI Study

Marcin Kowalski, MD; J. Brian DeVille, MD; J. Thomas Svinarich, MD; Dan Dan, MD; Andrew Wickliffe, MD; Charan Kantipudi, MD; Jason D. Foell, PhD; Giovanni Filardo, PhD, MPH; Reece Holbrook, BSEE; James Baker, MD; Hassan Baydoun, MD; Mark Jenkins, MD; Peter Chang-Sing, MD

The VALUE PVI study demonstrated that atrial fibrillation (AF) ablation procedures and electrophysiology laboratory (EP lab) occupancy times were reduced for cryoballoon compared with focal radiofrequency (RF) ablation. However, the economic impact associated with the cryoballoon procedure for hospitals has not been determined. Our objective was to assess the economic value associated with shorter AF ablation procedure times based on VALUE PVI data.

Coronary Artery Disease

183 Novel Technique of Advancing the Rotational Atherectomy Device: “Single-Operator” Technique

Michael Lee, MD; Philipp Wiesner, MD; Seung Woon Rha, MD, PhD

We report the clinical outcomes of the single-operator technique, whereby the operator both advances the rotational atherectomy (RA) device and keeps the distal wire in place. We studied 67 consecutive patients undergoing RA (2012-2015) using successful delivery of the RA device to the lesion without losing wire position as the primary endpoint.

Coronary Artery Disease

187 Impact of Surgical Consultation on Outcomes in Hemodynamically Supported High-Risk Percutaneous Coronary Intervention: Insights From PROTECT II Randomized Study

David M. Shavelle, MD; Ajay J. Kirtane, MD, SM; Theodore L. Schreiber, MD; Neel K. Kapasi, MD; William W. O’Neill, MD; Jeffrey W. Moses, MD; Jeffrey Popma, MD; Ray V. Matthews, MD

In observational studies of patients undergoing percutaneous coronary intervention (PCI), surgical ineligibility is associated with increased mortality. Whether the use of hemodynamic support during PCI can mitigate the adverse prognostic importance of surgical ineligibility is unknown. We sought to evaluate the association between request for surgical consultation prior to PCI and clinical outcomes in 427 patients with multivessel coronary artery disease or unprotected left main disease and severely reduced left ventricular systolic function undergoing PCI assisted by hemodynamic support (intraaortic balloon pump or Impella) from the PROTECT II randomized trial.

Commentary

193 To Protect or Not to Protect: Mitigating the Potential Risk That Surgical Ineligibility Poses in High-Risk PCI

Keshav R. Nayak, MD and Brian E. Jaski, MD

Coronary Artery Disease

196 Right Atrial Vacuum-Assisted Thrombectomy: Single-Center Experience

Ahmed Al Badri, MD; Chad Kliger, MS, MD; Dillon Weiss, BS; Luigi Pirelli, MD; Sean Wilson, MD; Eduard R. DeLaney, MS; Vladimir Jeltn, MD; Itzhak Kronzon, MD; Gila Perk, MD; Jonathan M. Hemli, MD; Nirav C. Patel, MD; Suhail Raoof, MD; Carlos E. Ruiz, MD, PhD

Right heart thrombus in the absence of structural heart disease, atrial fibrillation, or intracardiac catheter is rare. It typically represents a thrombus migrating from the venous system to the lung, known as thrombi-in-transit, and can lead to a life-threatening pulmonary embolism. The optimal therapy for thrombi-in-transit remains controversial. We report our experience using percutaneous removal of right heart thrombus using vacuum aspiration.
Peripheral Vascular Disease

202 Safety and Clinical Outcomes of Endovascular Treatment of Adult-Onset Pulmonary Artery Stenosis
Mujeeb A. Sheikh, MD; Mohammed A. Chowdhury, MD, MRCP (UK); George V. Moukarbel, MD
In order to understand the role of endovascular stent implantation as a therapeutic option for pulmonary artery stenosis (PAS), we performed a retrospective review (PubMed, 1990-2013) of cases of adult-onset PAS and found that endovascular treatment appears safe and effective for symptom relief and should be considered in patients with prohibitive surgical risk.

Commentary

209 Expanding the Horizons for Pulmonary Artery Stenting
Damien P. Kenny, MB, MD, MRCPCH and Ziyad M. Hijazi, MD, MPH

Transcatheter Aortic Valve Replacement

Neil Ruparelia, Dphil, MRCP; Azeen Latib, MD; Hiroyoshi Kawamoto, MD; Nicola Buzzatti, MD; Francesco Giannini, MD; Filippo Figini, MD; Antonio Mangieri, MD; Damiano Regazzoli, MD; Stefano Stella, MD; Alessandro Stich, MD; Akihito Tanaka, MD; Marco Ancona, MD; Eustachio Agricola, MD; Fabrizio Monaco, MD; Pietro Spagnolo, MD; Alaidhe Chieffo, MD; Matteo Monterfino, MD; Ottavio Alfieri, MD; Antonio Colombo, MD
TAVI is the treatment of choice for high-risk patients presenting with severe symptomatic aortic stenosis. We investigated the impact of second-generation devices in comparison with first-generation devices with regard to procedural and short-term clinical outcomes.

NEW TECHNIQUE

E44 Drug-Coated Balloon Venoplasty for In-Stent Restenosis in a Patient With Recurrent Pulmonary Vein Stenosis Post Ablation for Atrial Fibrillation: Initial Experience With a New Treatment Technique
Jonathan Rosenberg, MD; Westby G. Fisher, MD; Mayra Guerrero, MD; Steve Smart, MD; Justin Levisay, MD; Ted Feldman, MD; Michael Salinger, MD
The optimal treatment for recurrent pulmonary vein in-stent restenosis has not been determined. We describe the novel use of a paclitaxel drug-coated balloon for the treatment of in-stent restenosis of the pulmonary veins.

NEW TECHNIQUE

E49 Transcatheter Therapy for a Large Mobile Right Atrial Thrombus and Massive Pulmonary Embolism
Akhil Narang, MD; Anuj Mediratta, MD; Jeremy R. Estrada, MD; Jonathan Rosenberg, MD; Jeanne M. DeCara, MD; Michael D. Howell, MD; Roberto M. Lang, MD; Jonathan D. Paul, MD; Sandeep Nathan, MD; Atman P. Shah, MD; John E. Blair, MD
A variety of interventional management approaches exist for the treatment of acute pulmonary embolism (PE). However, when PE is accompanied by residual right heart thrombus, the best therapeutic options are less clear. We describe a novel combined technique of percutaneous aspiration of unstable right atrial thrombus followed by ultrasound-directed thrombolysis of massive PE.
ORIGIINAL CONTRIBUTIONS

Coronary Artery Disease

218 Use of Saphenous Vein Bypass Grafts for Retrograde Recanalization of Coronary Chronic Total Occlusions: Insights From a Multicenter Registry
Phuong-Khanh J. Nguyen-Trong, MD; Khaldoon Alaswad, MD; Dimitri Karmpaliotis, MD; William Lombardi, MD; J. Aaron Grantham, MD; Nicholas Lembo, MD; David Kandzari, MD; Aris Karatasakis, MD; Judit Karacsonyi, MD; Barbara A. Danek, MD; Basuna V. Rangan, BDS, MPH; Michele Roesle, RN, BSN; Colby R. Ayers, MS; Craig A. Thompson, MD, MMS; Subhash Banerjee, MD; Emmanouil S. Brilakis, MD, PhD

The use of SVGs for retrograde native vessel CTO-PCI has received limited study. We reviewed the medical records and coronary angiograms of retrograde CTO-PCIs performed through an SVG at 4 U.S. institutions between 2012 and 2013.

Commentary
226 Retrograde CTO-PCI Through Vein Grafts: Come on Down!
Hamza Z. Ansari, MD; Anas Alomar, MD; Jeffrey A. Breall, MD, PhD

Coronary Artery Disease

229 Seven-Year Clinical Outcomes of Successful Versus Failed Revascularization Using Drug-Eluting Stents for the Treatment of Coronary Chronic Total Occlusion
Jong-Pil Park, MD, PhD; Seungbong Han, PhD; Ki-Chul Sung, MD, PhD; Jong-Young Lee, MD, PhD; Hyo-In Choi, MD

The objective of this prospective cohort study was to investigate the long-term, 7-year clinical outcomes of 377 consecutive CTO patients who received successful or failed revascularization using DES. Patients were divided according to successful or failed DES revascularization, and a composite index that consisted of death, MI, stroke, and target-vessel revascularization at 7 years was compared using propensity matching and inverse probability of treatment weighted analyses.

Coronary Artery Disease

238 PCI in Patients Supported With CF-LVADs: Indications, Safety, and Outcomes
Emeka C. Anyanwu, MD; Takeyoshi Ota, MD, PhD; Gabriel Sayer, MD; Sandep Nathan, MD, MS; Valluvan Jeevanandam, MD; Atman Shah, MD; Nir Uriel, MD, MS

Patients with heart failure supported with left ventricular assist devices may require coronary intervention during their support. This case series seeks to explore the indications, safety, and outcomes of PCI in this population.

Commentary
243 Mechanical Circulatory Support in Percutaneous Coronary Interventions: Expanding the Possibilities
Harsh Agrawal, MD and Kul Aggarwal, MD

Coronary Artery Disease

247 Describing Activity in Primary Percutaneous Coronary Intervention: An Exploration of Denominators. From the HEAT Trial – A Systematic Evaluation of PPCI Activations in Liverpool, Explaining Denominators (HEAT-SEALED)
Adeel Shahzad, MRCP; Christine Mars, Dip HE; Ian Kemp, BA; Rob Cooper, MRCP; Paul Arnold; Claire Room, MBBS; Keith Wilson; Jim McLenachan, MD; Huon Gray, MD; John Morris, MD; Rod H. Stables, DM

The provision of PPCI in the emergency management of STEMI is expensive and resource intensive. Accurate data collection is essential to characterize activity and performance for regions, centers, and operators. Inconsistency in the use of denominators currently creates problems in data interpretation. Our objective was to establish a system of denominator groupings to better describe the range of clinical activity resulting from an unselected series of PPCI activations.
Periferal Vascular Disease

Ultrasound-Guided Arterial Access: Outcomes Among Patients With Peripheral Artery Disease and Critical Limb Ischemia Undergoing Peripheral Interventions

J.A. Mustapha, MD; Larry J. Diaz-Sandoval, MD; Michael R. Jaff, DO; George Adams, MD; Robert Beasley, MD; Sara Finton, BSN; Theresa McGoff, BSN; Larry E. Miller, PhD; Mohammad Ansari, MD; Fadi Saab, MD

Arterial cannulation is a vital component of endovascular interventions and often unconventional access approaches are required due to disease complexity. Lack of consensus exists regarding the safest and most effective arterial access method. This study examined the feasibility and immediate outcomes of ultrasound-guided access in traditional and advanced access approaches. Data were analyzed from a cohort of patients enrolled in Peripheral Registry of Endovascular Clinical Outcomes (PRIME).
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ORIGINAL CONTRIBUTIONS

Coronary Artery Disease

265 Use of Resting Non-hyperemic Indices for Avoidance of Fractional Flow Reserve Measurement: The Goal of 100% Accuracy
Khawaja Afzal Ammar, MD; Syed Shahab Kazmi, MBBS; Mirza Nubair Ahmad, MBBS; Mirza Mujadil Ahmad, MBBS; Arsalan Riaz, MBBS; Inman Husain, BS; Fatima Husain, MBBS; Sahail Allaqaband, MD; Tawir Bajwa, MD; Anjan Gupta, MD

Although recent studies have suggested that using ranges of baseline mean coronary pressure (Pd) to mean aortic pressure (Pa) ratio (0.88-0.95) can replace FFR measurement, others show too many significant coronary stenoses are misclassified based on these ranges. We hypothesize that with a certain range of baseline Pd/Pa, 100% positive predictive value (PPV) and negative predictive value (NPV) can be achieved to avoid misclassification.

Commentary

271 No Stenosis Left Behind – The Holy Grail of 100% Predictive Accuracy
James R. Wilentz, MD

With growing acceptance and ease of use, short adenosine infusion may not prove the deterrent it once seemed, and some form of pressure-flow measurement will likely advance to the point of gold standard.

Coronary Artery Disease

273 The CardioMEMS Heart Failure Sensor: A Procedural Guide for Implanting Physicians
David Shavelle, MD and Rita Jermyn, MD

The CardioMEMS heart failure system is a recent FDA-approved device that can be implanted in patients with NYHA class III heart failure and allows remote monitoring of pulmonary artery pressures. There is limited published information regarding the implantation procedure. Successful use of the CardioMEMS heart failure system requires an understanding of the technical issues surrounding the implantation procedure. The goal of the present review is to provide a summary of the implantation procedure, discuss the required imaging steps, review procedural supplies, and present a series of case studies to illustrate clinically relevant issues that may arise during sensor implantation.

Peripheral Vascular Disease

281 Drug-Coated Balloons for Infrainguinal Peripheral Artery Disease
Sanjum S. Sethi, MD, MPH and Michael S. Lee, MD

Revascularization of infrainguinal peripheral artery disease has traditionally been accomplished via percutaneous transluminal angioplasty. However, long-term results have been hampered by high rates of restenosis. Along with the advent of stents, paclitaxel-coated balloons are an emerging therapeutic option for the invasive management of infrainguinal peripheral artery disease.

Coronary Artery Disease

288 Contrast Utilization During Chronic Total Occlusion Percutaneous Coronary Intervention: Insights From a Contemporary Multicenter Registry
Georgios E. Christakopoulos, MD; Dimitri Karmpaliotis, MD; Khaldoon Alasoad, MD; Robert W. Yeh, MD; Fareou A. Jaffer, MD, PhD; R. Michael Wyman, MD; William Lombardi, MD; J. Aaron Grantham, MD; David A. Kandzari, MD; Nicholas Lauta, MD; Jeffrey W. Moses, MD; Ajay Kirtane, MD, SM; Manish Parikh, MD; Philip Green, MD; Matthew Finn, MD; Santiago Garcia, MD; Anthony Dzog, MD; Mitul Patel, MD; John Bahadorani, MD; Georgios Christakopoulos, MD; Aris Karatasakis, MD; Craig A. Thompson, MD, MMS; Subhas Banerjee, MD; Emmanouil S. Brilakis, MD, PhD

Administration of large contrast volume during chronic total occlusion (CTO) percutaneous coronary intervention (PCI) may lead to contrast-induced nephropathy. We examined the association of clinical, angiographic, and procedural variables with contrast volume administered during 1330 CTO-PCIs performed at 12 experienced United States centers.
Transcatheter Aortic Valve Replacement

295 Balloon Versus Computed Tomography Sizing of the Aortic Annulus for Transcatheter Aortic Valve Replacement and the Impact of Left Ventricular Outflow Tract Calcification and Morphology on Sizing

Jose F. Condado, MD; Stamatios Lerakis, MD; James Stewart, MD; Hanna Jensen, MD; Travis S. Henry, MD; Sung Min Ko, MD; Arthur Stillman, MD; Mohammad H. Rajaei, MD; Keeton Mavromatis, MD; Chandan Deveddly, MD; Eric Sarin, MD; Brad Leshouwer, MD; Robert Guyton, MD; Brian Kaebnick, MD; Vinod H. Thourani, MD; Peter C. Block, MD; Vasilis Baballanos, MD

Multidetector cardiac computed tomography (MDCT) is the gold standard for aortic annular sizing in transcatheter aortic valve replacement (TAVR). Balloon sizing is increasingly used in patients with borderline annular size and severe calcification. A comparison between these two techniques is needed. To evaluate the role of balloon annular sizing in TAVR, we retrospectively compared baseline characteristics and 30-day outcomes of patients undergoing balloon-expandable TAVR using annular MDCT or balloon sizing. Paravalvular leak rates were compared, adjusting for access site, valve generation, size, and valve calcification.

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CASE SERIES

E59 New Ventricular Septal Defects Following Balloon-Expandable Transcatheter Aortic Valve Replacement

Garvey Rene, MD; Dinesh Jagasia, MD; S. Rasi Wickramasinghe, MD, PhD; Nimesh Desai, MD, PhD; Wilson Szeto, MD; Prashanth Vallabhajosyula, MD; Robert H. Li, MD; Frank E. Silvestry, MD; Jay Giri, MD, MPH; Saurabh Jha, MD; Howard J. Herrmann, MD; Saif Anwaruddin, MD

We report the development of new ventricular septal defects after transcatheter aortic valve replacement in 4 patients with left ventricular outflow tract calcification. We discuss imaging and post-TAVR management of these patients.

CLINICAL IMAGES

E66 Transcatheter Simultaneous Double-Transapical Access for Paravalvular Mitral Leak Closure Using the Occlutech PLD

Vincenzo Pestrichella, MD; Antonio Pignatelli, MD; Rossella Alemanni, MD; Rosamaria Montesanti, MD; Maurizia Braccio, MD; Francesco Greco, MD; Pierpaolo D’Ambrozzo, MD; Cataldo Davide Memmola, MD; Mauro Cassese, MD; Gaetano Contegiacomo, MD; Rodrigo Bagur, MD, PhD

Two Occlutech paravalvular leak devices were successfully delivered using a simultaneous double-transapical access with double-wire technique in a complex patient with a high surgical risk.

CLINICAL IMAGES

E69 Transfemoral Valve-in-Valve Transcatheter Aortic Valve Implantation (TAVI) in a Patient With Previous Endovascular Aortic Repair (EVAR)

Neil Ruparelia, DPhil, MRCP; Vasileios F. Panoulas, MD, PhD; Angela Frame; Anthony W. Nathan, MD, FRCP; Ben Ariff, FRCP; Usman Jaffer, MSc, PhD, FRCS; Nilesh Sutaria, MD, FRCP; Andrew Chukwuemeka, MD, FRCS; Ghada W. Mikhail, MD, FRCP; Iqbal S. Malik, PhD, FRCP

Due to severe transvalvular bioprosthetic regurgitation with preserved left ventricular dimensions and ejection fraction, the heart team decided on valve-in-valve transcatheter aortic valve implantation via the transfemoral route in view of the patient’s prohibitively high surgical and anesthetic risk.
ORIGINAL CONTRIBUTIONS

Plaque Composition and Dynamics

306 Prospective Evaluation of the Impact of Side-Holes and Guide-Catheter Disengagement From the Coronary Ostium on Fractional Flow Reserve Measurements

Krishna S. Patel, BS; Georgios E. Christakopoulos, MD; Aris Katanasakis, MD; Barbara Anna Danek, MD; Phuong-Khanh J. Nguyen-Trong, MD; Sawetha Amsavelu, BS; Jeffrey F. Stetler, BS; Bavana V. Rangan, BDS, MPH; Michele Roesele, RN, BSN; Shuaib Abdullah, MD; Tayo Addo, MD; Subhash Banerjee, MD; Emmanouil S. Brilakis, MD, PhD

We prospectively examined the impact of side-holes and guide-catheter disengagement on fractional flow reserve measurements in 25 patients with intermediate coronary artery stenosis.

Coronary Artery Disease

311 Adoption of Routine Ultrasound Guidance for Femoral Arterial Access for Cardiac Catheterization

Jonathan Soverow, MD, MPH; Jared Oyama, MD; Michael S. Lee, MD

A randomized controlled trial published in 2010 demonstrated that ultrasound-guided femoral artery access for coronary angiography was faster and associated with fewer vascular complications than conventional fluoroscopic-guided access. We surveyed the current knowledge, attitudes, and practices regarding ultrasound use among interventional cardiologists.

Coronary Artery Disease

316 Twelve-Month Outcomes With a Bioresorbable Everolimus-Eluting Scaffold: Results of the ESHC-BVS Registry at Two Australian Centers

Daniel Robaei, MBBS; Liam Back, MBBS; Sze-Yuan Ooi, MD; Mark Pitney, MBBS; Nigel Jepson, MBBS

The Absorb bioresorbable vascular scaffold is designed to provide temporary vessel scaffolding following percutaneous coronary intervention. We report 12-month clinical data on the Absorb bioresorbable vascular scaffold from a real-world registry.

Coronary Artery Disease

323 Characteristics of Late-Acquired Incomplete Stent Apposition: A Comparison With First-Generation and Second-Generation Drug-Eluting Stents

Katsuhisa Waseda, MD, PhD; Junya Ako, MD, PhD; Teryoshi Kume, MD, Ph.D; Peter J. Fitzgerald, MD, PhD; Yasuhiro Honda, MD

Characteristics of late-acquired incomplete stent apposition between first- and second-generation drug-eluting stents have not been systematically examined. This study aim was to investigate the morphometric parameters of late-acquired incomplete stent apposition following use of sirolimus-eluting stent, paclitaxel-eluting stent, and zotarolimus-eluting stent.

Peripheral Vascular Disease

330 Safety and Effectiveness of the Nav-6 Filter in Preventing Distal Embolization During Jetstream Atherectomy of Infragenual Peripheral Artery Lesions

Avantika Banerjee, BS; Karan Sarode, MS; Atif Mohammad, MD; Emmanouil S. Brilakis, MD, PhD; Subhash Banerjee, MD; Gail A. Shammas, BSN; Nicolas W. Shammas, MD, MS

The risk of distal embolization during infragenual peripheral artery intervention is often mitigated by the use of embolic protection devices. There are limited data on the use of filters with the Jetstream atherectomy device, a rotational cutter with aspiration capacity. We report use of the Nav-6 filter during infragenual peripheral artery interventions.

Peripheral Vascular Disease

334 Initial Experience Using the Gore Embolic Filter in Carotid Interventions

Marius Hornung, MD; Jennifer Franke, MD; Stefan C. Bertog, MD; Sameer Gafoor, MD; Iris Grunwald, MD; Horst Sievert, MD

This is the first clinical report on experience with the use of the Gore embolic filter in carotid interventions.
Transcatheter Aortic Valve Replacement

341 Balloon Aortic Valvuloplasty in the Transcatheter Aortic Valve Replacement Era
Anindh Kumar, MD; David Paniagua, MD; Ravi S. Hira, MD; Mahboob Alam, MD; Ali E. Denktas, MD; Hani Jneid, MD

The introduction of transcatheter aortic valve replacement (TAVR) has renewed interest in balloon aortic valvuloplasty (BAV) for severe aortic stenosis. It is unclear whether technical advances and increased operator experience associated with TAVR development have resulted in improved BAV outcomes. We performed a systematic review encompassing all published BAV studies and examined the evolution in indications, outcomes, and complications of BAV procedures since its inception.

Commentary

349 The Balloon Aortic Valvuloplasty Makeover: From “Treatment” Procedure to “Bridge” Procedure
Thomas P. Koshy, MD and Dharam J. Kumbhani, MD, SM

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CLINICAL IMAGES

E69 Late Right Coronary Ostium Occlusion After Percutaneous Aortic Paravalvular Leak Closure: Immediate Results Do Not Always Predict Long-Term Performance
Marco Hernández-Enríquez, MD; María Ascasa, MD; Xavier Freixa, MD, PhD; Elena Sandoval, MD; Giuseppe Giachi, MD, PhD; Salvatore Brugaletta, MD, PhD; Victoria Martin-Yuste, MD, PhD; Eduard Quintana, MD, PhD; Manel Sabaté, MD, PhD

We present an 83-year-old woman with history of two aortic valve replacements; 2 years after the last replacement, severe paravalvular leak (PVL) was detected. Percutaneous PVL closure was completed and 2 months later, the patient presented with coronary obstruction requiring emergent surgical revascularization. This is the first report of late coronary obstruction after percutaneous PVL closure.

CLINICAL IMAGES

E71 The Role of Multimodality Imaging in a Case of Traumatic Cardiac Pseudoaneurysm
Brittany N.C. Mcunu, MD; Marina Trilesskaya, MD; Thomas Frohlich, MD

After a 40-foot fall from a balcony, a healthy 21-year-old sustained multiple injuries, including left ventricular pseudoaneurysm. This case demonstrates the critical necessity of the combination of a high index of suspicion and multimodality imaging for diagnosis and prompt intervention.

CLINICAL IMAGES

E73 Radial Artery Embolism: A Rare Complication of Angioplasty
Leonardo Danduch, MD; Vicens Martí, MD, PhD; Joan Garcia-Picart, MD; Antoni Serra, MD, PhD

We present a 55-year-old man with multivessel coronary artery disease previously treated with stenting of the left main, left anterior descending, right coronary, circumflex, and first diagonal branch. He was diagnosed with in-stent restenosis of a diagonal branch, but treatment was complicated by radial artery coronary embolism, which is a rare complication of radial intervention.
ORIGINAL CONTRIBUTIONS

Coronary Artery Disease

351 Heparin Versus Bivalirudin in ST-Segment Elevation Myocardial Infarction: A SCAI-Based National Survey From US Interventional Cardiologists

Harsh Golwala, MD; Sadip Pant, MD; Ambarish Pandey, MD; Michael P. Flaherty, MD, PhD; Glenn A. Hirsch, MD, MHS; Ajay J. Kirtane, MD, SM

The use of antithrombotic therapy (ATT) (bivalirudin or unfractionated heparin) is a class I recommendation for patients undergoing primary percutaneous coronary intervention (PCI) for ST-segment elevation myocardial infarction (STEMI). This survey was conducted to better understand current United States practices in terms of preferences regarding the selection of ATT in STEMI-PCI, particularly in light of recent clinical trials.

Plaque Composition and Dynamics

357 Intravenous Adenosine Infusion is Safe and Well Tolerated During Coronary Fractional Flow Reserve Assessment in Elderly Patients With Severe Aortic Stenosis

Dusan Stanojevic, MD; Prasad Gunasekaran, MD; Peter Tadros, MD; Mark Wiley, MD; Matthew Earnest, MD; Ashwani Mehta, MD; Matthew Lippmann, MD; Micah Levine, MS; Buddhadeb Dawn, MD; Kamal Gupta, MD

This study assessed the safety of intravenous adenosine infusion during fractional flow reserve (FFR) evaluation of intermediate coronary lesions in severe aortic stenosis (AS). In severe AS, the extent of underlying coronary artery disease (CAD) can be an important determinant for deciding between surgical aortic valve replacement (SAVR) and transcatheter aortic valve replacement (TAVR). Hemodynamic assessment of coronary lesion severity using FFR may reduce the extent of revascularization needed and make TAVR more feasible in higher-risk patients (compared with coronary artery bypass graft surgery with SAVR).

Commentary

362 Intravenous Adenosine-Based Fractional Flow Reserve in Pre-TAVR Assessment of Severe AS: Finally Some Clarity?

Vivian G. Ng, MD and Ajay J. Kirtane, MD, SM

Coronary Artery Disease

364 Outcomes After Orbital Atherectomy of Severely Calcified Left Main Lesions: Analysis of the ORBIT II Study

Michael S. Lee, MD; Evan Shlofmitz, DO; Richard Shlofmitz, MD; Sheila Sahni, MD; Brad Martinsen, PhD; Jeffrey Chambers, MD

The ORBIT II trial reported excellent outcomes in patients with severely calcified coronary lesions treated with orbital atherectomy. Severe calcification of the left main (LM) artery represents a complex coronary lesion subset. This study evaluated the safety and efficacy of coronary orbital atherectomy to prepare severely calcified protected LM artery lesions for stent placement.

Advances in Vein Therapy

370 Detecting Venous Reflux Using a Sixty-Degree Reverse Trendelenburg (RT-60) Position in Symptomatic Patients With Chronic Venous Disease

Nicolas W. Shammas, MD, MS; Mary F. Knowles, RVT; W. John Shammas, RA; William Hauber, MS, RTR; Gail A. Shammas, BS, RN; Melissa J. Green, RVS, RCS; Julie Dokas, RDMS, RVT

The optimal technique to detect venous reflux requires a patient to be standing with weight on one leg while the other leg is scanned for superficial venous reflux (standing position [SP] technique). This represents a significant hardship for a subset of patients who are unable to stand and adequately maintain their balance. This study examines the predictability of identifying venous reflux using a reverse Trendelenburg 60° when compared with the SP in the great saphenous vein and small saphenous vein.
Peripheral Vascular Disease

374 Totally Percutaneous Insertion and Removal of Impella Device Using Axillary Artery in the Setting of Advanced Peripheral Artery Disease
Rajiv Tayal, MD, MPH; Mihir Barvalia, MD; Zeshan Rana, MD; Benjamin LeSer, MD; Humayun Ilfikhar, MD; Spas Kotev, MD; Marc Cohen, MD; Najam Wasty, MD

Radial access has limitations when percutaneous procedures requiring larger sheath sizes are performed. We describe a new percutaneous technique utilizing the axillary artery for delivery of cardiac-assist devices for protected PCI in the setting of peripheral artery disease.

Congenital Heart Disease

381 Aortic Valve Morphology Correlates With Left Ventricular Systolic Function and Outcome in Children With Congenital Aortic Stenosis Prior to Balloon Aortic Valvuloplasty
Kevin Gao, MD; Ritu Sachdeva, MD; Bryan H. Goldstein, MD; Sean Lang, MD; Christopher J. Petit, MD

This study sought to determine the relationship between aortic valve morphology and left ventricular systolic function in children with aortic stenosis prior to balloon aortic valvuloplasty.

Commentary

389 Relationship Between Morphology of the Valve and Left Ventricular Systolic Function in Patients With Aortic Valve Stenosis
Ziyad M. Hijazi, MD, MPH and Tarek Helmy, MD

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CLINICAL IMAGES

E75 Closure of Left Atrial Appendage With Persistent Distal Thrombus Using an Amplatzer Amulet Occluder
Mathias Lange, MD; Helmut Büttel, MD; Heinrich Weglage, MD; Patrick Löffeld, MD; Thomas Wichter, MD

This image series illustrates a “no touch” technique that was used to ensure successful implantation of an Amplatzer Amulet LAA occlusion device without the use of an embolization protection system.

CLINICAL IMAGES

E77 Rotational Atherectomy of Three Overlapping Stent Layers
Tiberio M. Frisoli, MD; Harold Friedman; William W. O’Neill, MD

A patient with in-stent restenosis within three layers of underexpanded stents was safely treated with rotational atherectomy.

CLINICAL IMAGES

E80 Atrial Septal Defect Closure for Right-to-Left Shunting Following a MitraClip Repair
Subhi J. Al’Aref, MD; Geoffrey Bergman, MBBS; S. Chiu Wong, MD

We present a case of moderate-to-severe mitral regurgitation treated with a MitraClip procedure, with postprocedural course remarkable for the development of right-to-left shunting and hypoxia.

SCIENTIFIC ABSTRACTS

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**Coronary Artery Disease**

391 Impact of Proximal Cap Ambiguity on Outcomes of Chronic Total Occlusion Percutaneous Coronary Intervention: Insights From a Multicenter US Registry

Aris Karatasakis, MD; Barbara A. Danek, MD; Dimitri Karmpaliotis, MD; Khaldoon Alaswad, MD; Farouc A. Jaffer, MD, PhD; Robert W. Yeh, MD, MBA; Mitul P. Patel, MD; John N. Bahadorani, MD; R. Michael Wyman, MD; William L. Lombardi, MD; J. Aaron Grantham, MD; David E. Kandzari, MD; Nicholas J. Lenbo, MD; Anthony H. Doing, MD; Jeffrey W. Moses, MD; Ajay J. Kirtane, MD; Santiago Garcia, MD; Manish A. Parikh, MD; Ziad A. Ali, MD, DPhil; Judit Karacsonyi, MD; Sanjog Kalra, MD; Banu V. Rangan, BDS, MPH; Pratik Kalsaria, MS; Craig A. Thompson, MD; Subhash Banerjee, MD; Emmanouil S. Brilakis, MD, PhD

We sought to determine the impact of proximal cap ambiguity on procedural techniques and outcomes for coronary chronic total occlusion (CTO) percutaneous coronary intervention (PCI) by examining the clinical and angiographic characteristics and outcomes of 1021 CTO-PCIs performed between 2012 and 2015 at 11 United States centers.

**Coronary Artery Disease**

397 Pericardiocentesis Under Continuous Ultrasonographic Guidance Using a 7 cm Micropuncture Needle

Vladimir Lakhter, DO; Vikas Aggarwal, MD, MPH; Riyaz Bashir, MD; Brian O’Murchu, MD; Howard A. Cohen, MD

Pericardiocentesis commonly utilizes a large-bore 18 gauge needle for access without allowing for continuous visualization of needle entry into the pericardial space. Our goal was to compare procedural success and safety of standard pericardiocentesis with access while using continuous ultrasonographic visualization of a long (7 cm) micropuncture needle.

**Coronary Artery Disease**

403 Influence of Human Immunodeficiency Virus Seropositive Status on the In-Hospital Management and Outcomes of Patients Presenting With Acute Myocardial Infarction

Nathaniel R. Smilowitz, MD; Navdeep Gupta, MD; Yu Guo, MA; John T. Coppola, MD; Sripal Bangalore, MD, MHA

Human immunodeficiency virus (HIV)-seropositive individuals are predisposed to acute myocardial infarction (AMI). We sought to evaluate management strategies and outcomes of AMI in patients with HIV in the contemporary era.

**Coronary Artery Disease**

410 Periprocedural Myocardial Injury and Long-Term Clinical Outcome in Patients Undergoing Percutaneous Coronary Interventions of Coronary Chronic Total Occlusion

Luigi Di Serafino, MD, PhD; Francesco Borgia, MD, PhD; Joren Maeremans; Stylianos A. Pyxaras, MD; Bernard De Bruyne, MD, PhD; William Wijns, MD, PhD; Guy R. Heyndrickx, MD, PhD; Jo Dens, MD, PhD; Carlo Di Mario, MD, PhD; Emanuele Barbato, MD, PhD

The prognostic implication of periprocedural myocardial injury in CTO-PCI remains unclear. We therefore evaluated long-term clinical outcomes in 715 consecutive patients undergoing CTO-PCI at three centers.

**Peripheral Vascular Disease**

415 Comparison of Percutaneous Closure Versus Surgical Femoral Cutdown for Decannulation of Large-Sized Arterial and Venous Access Sites in Adults After Successful Weaning of Veno-Arterial Extracorporeal Membrane Oxygenation

Niolas Majumke, MD; Norman Mangner, MD; Axel Linke, MD; Enno Boudriot, MD; Sandra Erbs, MD; Franziska Tietz, MD; Sabrina Wolff, MD; Stephan Schüter, MD; Gerhard Schuler, MD; Marcus Sandri, MD

This study evaluates the feasibility, safety, and efficacy of a complete percutaneous decannulation procedure after veno-arterial extracorporeal membrane oxygenation compared with the conventional surgical cutdown approach.
Transcatheter Aortic Valve Replacement

421 Sapien 3 Transcatheter Aortic Valve Implantation With Moderate or Without Predilation
Yigal Abramowiz, MD; Hasan Jilaihawi, MD; Tanun Chakravarty, MD; Yoshio Maeno, MD, PhD; Hiroaki Kawamori, MD, PhD; Yoshio Kazuno, MD; Ceesethwar Mangat, MD; Tanya Rami, MS, MBA; Zev Allison, BS; David Anderson, BS; Larry Chan, DO; Wen Cheng, MD; Raj R. Makkar, MD

Aortic valve preparation with balloon aortic valvuloplasty (BAV) has been considered mandatory during TAVI procedures. BAV-inherent risks including stroke, conduction abnormalities, and reduced device profile size established the rationale for safe valve deployment without the need for aggressive valve preparation. We investigate the feasibility and safety of performing Sapien 3 balloon-expandable TAVI with moderate or without predilation.

Commentary

427 Balloon Predilation for TAVR: Over-Inflated or Under-Rated?
Ted Feldman, MD and Michael J. Reardon, MD

The importance of predilation, the trade-off with postdilation, and the impact of BAV on complication rates is a moving target. The analysis from Abramowiz et al shows that the newest iteration of the Sapien family, the Sapien 3, can be delivered without a preprocedure BAV if desired.
### Peripheral Vascular Disease

**430** Infrainguinal CTO Recanalization Assessed by Intravascular Ultrasound: Results of the CENTRAL Study  
*James Torey, PA-C; Anwar Zaitoun, MD; Thomas Lalonde, MD; John Runyon, MD; Jihad Mustapha, MD; Thomas Davis, MD*

The CENTRAL study was designed to evaluate the ability of a recanalization catheter system to cross chronic total occlusions (CTOs) of the superficial femoral artery while staying within the central vessel lumen. The primary endpoint was the successful crossing of the CTO, as confirmed by intravascular ultrasound.

### Coronary Artery Disease

**440** Gender-Based Differences in Outcomes After Orbital Atherectomy for the Treatment of De Novo Severely Calcified Coronary Lesions  
*Michael S. Lee, MD; Evan Shlofmitz, MD; Pejman Mansourian, MD; Sanjum Sethi, MD; Richard A. Shlofmitz, MD*

Female gender is associated with increased risk of adverse clinical events after percutaneous coronary intervention (PCI). Orbital atherectomy is effective in plaque modification, which facilitates stent delivery and expansion. Whether gender differences exist after orbital atherectomy is unclear. This study evaluated the relationship between gender and angiographic and clinical outcomes in patients with severely calcified lesions who underwent orbital atherectomy.

### Commentary

**444** Orbital Atherectomy in Women 2.0 – Another Brick in the Wall  
*Konstantinos V. Voudris, MD and Mladen I. Vidovich, MD*

### Coronary Artery Disease

**446** Reduction in Contrast Nephropathy From Coronary Angiography and Percutaneous Coronary Intervention With Ultra-Low Contrast Delivery Using an Automated Contrast Injector System  
*Shawn C. Kelly, MD; Shenjing Li, MD; Tomasz P. Stys, MD; Paul A. Thompson, PhD; Adam T. Stys, MD*

Current techniques for reducing contrast volumes during angiographies and PCIs require the use of advanced coronary imaging methods. We propose the use of the ACIST CVi automated contrast injector system (Bracco Diagnostics) with a novel programming technique that significantly reduces contrast volumes and contrast-induced nephropathy development.

### Radial Access Technique

**451** ULnar Artery Transient Compression Facilitating Radial Artery Patent Hemostasis (ULTRA): A Novel Technique to Reduce Radial Artery Occlusion After Transradial Coronary Catheterization  
*Michael J. Koutouzis, MD, PhD; Christos D. Maniotis, MD, PhD; Grigorios Avdikos, MD; Andreas Tsoumeleas, MD; Constantinos Andreou, MD, PhD; Zenon S. Kyriakides, MD, PhD*

This study was designed to evaluate the safety and efficacy of a novel technique with simultaneous compression of the ulnar artery in order to reduce the incidence of radial artery occlusion after transradial cardiac catheterizations.

### Editorial

**456** The “May Be Appropriate” PCI: Ambiguities in the Appropriate Use Classification  
*Lloyd W. Klein, MD; Ibett Colina, MD; Charles McKay, MD*

A new revision of the Appropriate Use Criteria for Revascularization (AUC) is anticipated shortly. The AUC has broad implications for the future of cardiovascular health care, especially in regard to reimbursement. In the future, the AUC will become the foundation for tethering payment decisions and quality assessment to patient-centered therapeutic decision-making. When reimbursement criteria are generated that find controversies, differences of expert opinion, or lack of hard scientific “proof” to be fertile ground for payment denial, the ultimate goal of patient-centered care is at risk.
**Commentary**

465 **Our Visible and Invisible Friends and Foes**
*Prakash Balan, MD, JD and H. Vernon Anderson, MD*

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**ONLINE EXCLUSIVE**

**CASE REPORT**

E128 **First Case of Robotic Percutaneous Vascular Intervention for Below-the-Knee Peripheral Arterial Disease**
*Omid Behnamfar, MD; Ali Pourjdjabar, MD; Ethan Yalvac, MD; Ryan Reeves, MD; Ehtisham Mahmud, MD*

We present the first description of robotic PVI with the CorPath Vascular Robotic System (Corindus) for treating below-the-knee peripheral arterial disease.

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**CLINICAL IMAGES**

E132 **Entrapment of Rotational Atherectomy Burrs in Freshly Implanted Stents: First Illustration of the Rolled-Up Phenomenon**
*Stephane Fournier, MD; Juan F. Iglesias, MD; Andrea Zuffi, MD; Eric Eekhout, MD, PhD; Piergorgio Tozzi, MD; Olivier Muller, MD, PhD*

Image illustrates rotational atherectomy burr entrapment in a coronary stent where the burr was rolled up in the stent’s struts.

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**CLINICAL IMAGES**

E134 **Coronary Fistula and Myocardial Ischemia: What is the Relationship?**
*Ashish H. Shah, MD, MD-Research; Robert J. Cusimano, MD, MSc; Maral Ouzounian, MD, PhD*

We present the case of a 73-year-old male who presented with exertional angina; imaging demonstrated severe coronary artery disease and a large coronary artery fistula. Ligation of a large coronary artery fistula resulted in severe right ventricular failure and cardiogenic shock. After reestablishing flow to the fistula, the patient recovered. To our knowledge, this is the first report describing the critical nutritive value of a coronary fistula.

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**CLINICAL IMAGES**

E136 **The Difference Between Success and Failure: Subintimal Stenting Around an Occluded Stent for Treatment of a Chronic Total Occlusion Due to In-Stent Restenosis**
*James Roy, MB, BCH, FRACP; Andrew Lucking, BMedsic, MBChB, MRCP; Julian Strange, MBChB, MRCP, MD; James C. Spratt, BSc, MD, FRCP*

A chronic total occlusion was safely treated with deliberate passage into the subintimal space outside a previous stent with subsequent subintimal dissection and reentry into the true lumen beyond the occlusion.
**Coronary Artery Disease**

467 Use of the Impella Device for Acute Coronary Syndrome Complicated by Cardiogenic Shock – Experience From a Single Heart Center With Analysis of Long-Term Mortality  
*Marco Robin Schroeter, MD; Herdis Köhler, DMD; Astrid Wachter, MSc; Annalen Bleckmann, MD; Gerd Hasenfuß, MD; Wolfgang Schillinger, MD*

This large series of patients with ACS complicated by cardiogenic shock who underwent Impella implantation provides information on the relevant risk factors for mortality. Early (compared with delayed) initiation of Impella support was a predictor of improved survival in this population of patients.

**Radial Access Approach**

473 Comparison Between Radial Approach and Femoral Approach With Vascular Closure Devices on the Occurrence of Access-Site Complications and Periprocedural Bleeding After Percutaneous Coronary Procedures: A Systematic Review and Meta-Analysis  
*Stefano Rigattieri, MD, PhD; Alessandro Sciahbasi, MD; Karim Ratib, MD; Alessandro Alonso, MD; Nicholas Cox, MD; Piotr Chodör, MD; Andrea Berni, MD; Silvio Fedele, MD; Francesco R. Pagliese, MD; Christopher J. Cooper, MD; Yves Louvard, MD; James Nolan, MD; Sunil V. Rao, MD*

We performed a systematic review and meta-analysis of available studies comparing the efficacy of radial and femoral access (with hemostasis by vascular closure device) on the reduction of access-site complications and/or periprocedural bleedings.

**Coronary Artery Disease**

480 Right Heart Catheterization via Dialysis Arteriovenous Shunts in End-Stage Renal Disease Patients  
*Mu-Yang Hsieh, MD; Tsung-Yan Chen, MD; Lin Lin, MD; Min-Tsui Liao, MD; Ren-Hui Wang, RN; Ruei-Cheng Kuo, RT; Chao-Lun Lai, MD; Chih-Cheng Wu, MD*

Evaluation of the feasibility and safety of using dialysis arteriovenous shunts for access in right heart catheterization.

**Plaque Composition and Dynamics**

485 Near-Infrared Spectroscopy Analysis of Coronary Chronic Total Occlusions  
*Georgios E. Christakopoulos, MD; Judit Karasnyi, MD; Barbara Anna Danek, MD; Aris Kanatasakis, MD; Aya Alame, BS; Pratik Kalsaria, BS; Atd Mohammed, MD; Michele Roesle, RN; Bavana V. Rangan, BDS, MPH; Subhash Banerjee, MD; Emmmanouil S. Brilakis, MD, PhD*

Examination of lipid-core plaques in coronary vessels with chronic total occlusions using near-infrared spectroscopy.

**Commentary**

489 The Evolution of Plaque Composition in CTOs  
*Lloyd W. Klein, MD; Divya Korpu, MD; Ibett Colina, MD*

**Transcatheter Aortic Valve Replacement**

492 Long-Term Mortality and Quality of Life After Transcatheter Aortic Valve Insertion in Very Elderly Patients  
*Paweł Kleczynski, MD, PhD; Artur Dziewierz, MD, PhD; Maciej Bańkowski, MD; Łukasz Rzeszutko, MD, PhD; Danuta Sorysz, MD, PhD; Jarosław Trebacz, MD, PhD; Robert Sobczynski, MD, PhD; Marek Tomala, MD, PhD; Andrzej Czachowski, MD, PhD; Dariusz Dudek, MD, PhD*

We sought to compare long-term mortality and quality of life in very elderly (≥80 years) patients undergoing transcatheter aortic valve implantation in comparison with younger patients (<80 years).
Peripheral Vascular Disease

498 Effects of Percutaneous Transluminal Angioplasty on Diastolic Function in Patients With Chronic Occlusion of Lower-Extremity Artery
Wonho Kim, MD; Ramon Quesada, MD; Melanie B. Schruthaner, MD; Raul E. Herrera, MD; Juan-Carlos Zevallos, MD; Victor N. Becerra, BS; Juan M. Acuña, MD; Barry T. Katzen, MD

An investigation of whether successful revascularization of total occlusion of a large lower-extremity artery is associated with improvement of left ventricular diastolic function.

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CORONARY ARTERY DISEASE / ORIGINAL CONTRIBUTION

E139 Comparison of Drug-Eluting Stents With Bare-Metal Stents for PCI of Saphenous Vein Graft Lesions: Systematic Review and Meta-Analysis
Wassim Mosleh, MB, BCh, BA; Sumeet Gandhi, MD; Mohamed Elsiddig, MB, BCh, BA; Jon-David Schwalm, MD, MSc; Michael E. Farkouh, MD, MSc

The superiority of drug-eluting stent implantation over bare-metal stent implantation in saphenous vein graft lesions is controversial, with significant heterogeneity demonstrated in the literature. To analyze clinical endpoint data, we conducted a study search of 4 randomized controlled trials and 35 observational studies conducted between 2003 and 2015.

COMMENTARY

E170 Comparing Drug-Eluting Stents to Bare-Metal Stents for Saphenous Vein Graft Lesion PCI
Subhash Banerjee, MD and Emmanouil S. Brilakis, MD, PhD

TRANSCATHETER AORTIC VALVE REPLACEMENT / ORIGINAL CONTRIBUTION

E172 Vascular Assessment for Transcatheter Aortic Valve Replacement: Intravascular Ultrasound Compared to Computed Tomography
Essa Essa, MD; Nader Makki, MD; Peter Bittenbender, MD; Quinn Copers IV, MD; Barry George, MD; Gregory Rushing, MD; Juan Crestanello, MD; Konstantinos Boudoulas, MD, PhD; Scott M. Lilly, MD, PhD

Assessment of the femoral and iliac arteries is essential prior to transcatheter aortic valve replacement (TAVR). It is critical for establishing candidacy for a femoral approach and can help predict vascular complications. Although computed tomography angiography (CTA) is the standard imaging modality, it has limitations. Our objective was to compare CTA with intravascular ultrasound in patients undergoing TAVR evaluation.

TRANSCATHETER AORTIC VALVE REPLACEMENT / ORIGINAL CONTRIBUTION

E179 Impact of Coronary Artery Disease on Postoperative Outcomes in Patients Undergoing Transcatheter Aortic Valve Replacement (TAVR):
Dhaval Chauhan, MD; Mohammad Thawabi, MD; Nicky Haik, BA; Bruce J. Haik, MD; Chunguang Chen, MD; Marc Cohen, MD; Mark Russo, MD, MS

Our objective was to study the necessity of preoperative coronary revascularization on postoperative outcomes in patients undergoing TAVR by retrospectively collecting data for 364 consecutive TAVR patients at Newark Beth Israel Medical Center from May 15, 2012 to September 17, 2015.
CORONARY ARTERY DISEASE / ORIGINAL CONTRIBUTION
E185 Impact of Chronic Total Occlusion Revascularization Attempts on Subsequent Clinical Outcomes
Ahmad Jabbar, MD; Georgios Christopoulos, MD; Aris Koratasakis, MD; Omar M. Jeroudi, MD; Georgios E. Christakopoulos, MD; Abdullah El Sabbagh, MD; Barbara Danek, MD; Judit Karacsorony, MD; Michele Roesle, RN, BSN; Banana V. Rangan, BDS, MPH; Jerrold Grodin, MD; Michael Luna, MD; Shuaib Abdullah, MD; Subhash Banerjee, MD; Emmanouil S. Brilakis, MD, PhD
We retrospectively examined a contemporary, unselected cohort of patients with coronary chronic total occlusions (CTOs) to determine the impact of CTO revascularization on long-term outcomes.

CORONARY ARTERY DISEASE / ORIGINAL CONTRIBUTION
E193 Rheolytic Thrombectomy for Acute Myocardial Infarction Complicated by Cardiogenic Shock
Ruben Vergara, MD; Renato Valenti, MD; Angela Migliorini, MD; Guido Parodi, MD; Letizia Giurlani, MD; Marco Marrani, MD; Giulia Cantini, MD; David Antoniucci, MD
We sought to investigate the prognostic impact of rheolytic thrombectomy in patients with acute myocardial infarction complicated by cardiogenic shock.

ELECTROPHYSIOLOGY / ORIGINAL CONTRIBUTION
E198 The Number of Recalled Leads is Highly Predictive of Lead Failure: Results From the Pacemaker and Implantable Defibrillator Leads Survival Study (“PAIDLESS”)
Daniel J. Kersten; Jinju Yi, BS; Alyssa M. Feldman, MS; Kunal Brahmbhatt, MD; Wilbur J. Asheld, DO; Joseph Germano, DO; Shahidul Islam, PStat, MPH; Todd J. Cohen, MD
The authors of “PAIDLESS” have previously reported a relationship between recalled lead status, lead failure, and patient mortality. This substudy analyzes the relationship in a smaller subset of patients who received >1 recalled lead.

CORONARY ARTERY DISEASE / ORIGINAL CONTRIBUTION
E203 Short Duration vs Standard Duration of Dual-Antiplatelet Therapy After Percutaneous Coronary Intervention With Second-Generation Drug-Eluting Stents – A Systematic Review, Meta-Analysis, and Meta-Regression Analysis of Randomized Controlled Trials
Anthony W.A. Wassef, MD; Hadi Khafaji, FRCPG; Ishba Syed; Andrew T. Yan, MD; Jacob A. Udell, MD, MPH; Shaun G. Goodman, MD, MSc; Asim N. Cheema, MD, PhD; Akshay Bagai, MD, MHS
This analysis explored the relationship between acute coronary syndrome and dual-antiplatelet therapy duration.

SCIENTIFIC ABSTRACTS
E211 AimRADIAL2016: Coronary & Vascular
5th Advanced International Masterclass • Budapest, Hungary, September 21-23, 2016

CLINICAL IMAGES
E223 Transcatheter Tricuspid Repair With MitraClip for Severe Primary Tricuspid Regurgitation
Neil P. Fam, MD, MSc; Kim A. Connelly, MD, PhD; Christoph Hammerstingl, MD; Geraldine Ong, MD; Anthony W. A. Wassef, MD; Heather J. Ross, MD, MHSc; Subodh Verma, MD, PhD
We describe the first use of MitraClip to treat severe primary tricuspid regurgitation and right heart failure in a patient with previous cardiac transplantation and high surgical risk.

E225 Iatrogenic Pneumopericardium After Pericardiocentesis
Krishna Kumar Mohanan Nair, MBBS, MD, DM; Narayanan Namboodiri, MBBS, MD, DM; Bharatraj Banavalikar, MBBS, MD, DM; Arun Gopalakrishnan, MBBS, MD, DM; Srinivasa Prasad, MBBS, MD; Ajitkumar Valaparambil, MBBS, MD, DM; Jaganmohan Tharakan, MBBS, MD, DM
A 65-year-old patient undergoing pericardiocentesis for cardiac tamponade after radiofrequency ablation for ventricular tachycardia developed pneumopericardium, which was managed successfully by pericardial aspiration.

E227 Successful Cryoablation of an Anteroseptal Accessory Pathway Guided by Electroanatomical Activation Mapping
Emre Yalcinkaya, MD; Stephan Winnik, MD, PhD; Laurent Haegeli, MD; Corinna Brunckhorst, MD; Fırat Duru, MD
Combined use of the cryoablation technology with electroanatomical mapping can further increase the precision and safety of the procedure by applying test applications at a lower energy level.