

Cath Lab Digest

A product, news & clinical update for the cardiac catheterization laboratory specialist



IMAGING EDUCATION

From Theory to Practice: The Value of Physician-to-Physician Education in Adopting Contemporary PCI

With Karim M. Al-Azizi, MD, FACC, FSCAI, FESC; Interventional Cardiology and Structural Heart Disease; Medical Director, Cardiac Catheterization Laboratories; Associate Program Director, Cardiology Fellowship, The Heart Hospital – Baylor Scott & White Health; Clinical Assistant Professor, Texas A&M University College of Medicine

The burden of coronary artery disease is steadily increasing in the general population, due to an aging comorbid population and increase in disease complexity at the vessel level. To address this, new technologies, techniques, and multidisciplinary collaboration are allowing percutaneous coronary intervention (PCI) to evolve into a standardized workflow approach known as “contemporary PCI.”

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HEART FAILURE CARE

Novel Device for Heart Failure With Reduced Ejection Fraction (HFrEF) Patients: Baroreflex Activation Therapy With Barostim

CLD talks with Christina H. Economides, MD, MM, FSCAI.

Interventional cardiologist Dr. Christina Economides shares her experience treating patients with Barostim™ (Baroreflex Activation Therapy). The majority of her patients who have received Barostim have improved their functional and exercise capacity.



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IMAGING SYSTEMS

Bringing the Cutting-Edge Technology of the ARTIS icono Imaging System to a Small Community Hospital

CLD talks with Vijay S. Iyer, MD, PhD, FACC, FSCAI.

Olean General Hospital is a small community hospital located in Olean, New York, but its cath lab does not think ‘small’ — according to the New York State Department of Health, Olean handles 1% of all ST-elevation myocardial infarction (STEMI) cases in the state.^{1,2} Despite its rural location, Olean General Hospital maintains equivalent outcomes to nearly all of the cath labs in New York State while treating patients of a similar acuity.¹ Staffed with outstanding team members and supported by an excellent EMS crew, the Olean General Hospital cath lab has done approximately 5000 catheterizations and 1500 percutaneous coronary interventions (PCIs) since opening in 2013, and offers implantable cardioverter-defibrillators, peripheral vascular disease intervention, and dialysis grafts. Here, Dr. Vijay Iyer discusses the value provided by the lab’s ARTIS icono imaging system (Siemens Healthineers).

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From Theory to Practice: The Value of Physician-to-Physician Education in Adopting Contemporary PCI

With Karim M. Al-Azizi, MD, FACC, FSCAI, FESC

Contemporary PCI recognizes the value of seeing beyond the angiogram, using physiology and intravascular imaging to accurately identify the severity and location of disease, define vessel size, characterize plaque morphology, and plan and execute interventions. Integrating these tools helps clinical teams standardize an elevated level of care, enhancing patient outcomes while improving efficiencies and reducing costs.

Contemporary PCI augments and replaces contrast-based angiography with more advanced imaging technologies. Obstacles to its adoption include gaps in knowledge and interpretation of data, expense of equipment, cath lab support, and guideline adoption and reimbursement. This article explores approaches to overcoming gaps in knowledge through physician-to-physician education.

Physician-to-Physician Education: A Catalyst for Professional Growth in PCI

Today's PCI workflows are not those of yesterday. Advancements such as dynamic coronary road mapping and co-registration are now considered key elements to map "vessels" rather than "lesions" to understand the degree of ischemia and, more importantly, guide treatment with minimal intervention. Physician-to-physician education in contemporary PCI allows experienced interventional cardiologists to share their updated knowledge, expertise, and procedural insights with peers, promoting professional growth and improving patient outcomes.

Physician-led teaching and mentoring, such as the contemporary PCI workshops held by Dr. Karim Al-Azizi and the team at Baylor Scott & White Health – The Heart Hospital in Plano, Texas, helps clinicians learn how to master techniques to improve overall procedural outcomes, open the door for patients once not considered candidates for PCI, and streamline PCI workflow with integrated tools. This allows for collaborative learning and facilitates the exchange of best practices, novel techniques, challenging case discussions and shared decision-making.

Focused conferences like "Dallas PCI", led by Dr. Al-Azizi and Dr. Srinivasa Potluri, have increased awareness on managing complex coronary artery disease in the cath lab.

"Attending the workshop provided a valuable platform to refine the latest techniques in PCI, and exchanging ideas with fellow experts reinforced the importance of staying at the forefront of technological advancements. Immediately following the workshop, my team successfully implemented the contemporary PCI workflow in our hospital," commented general and interventional cardiologist Saji Jacob, MD, Brookwood Baptist Medical Center, Birmingham, Alabama.

Coronary artery disease (CAD) complexity is increasing due to comorbidities such as diabetes mellitus and chronic kidney disease (CKD), which can limit receiving appropriately indicated and optimal PCI. To manage the risk for these patients, interventionalists can embrace techniques and technologies aimed at reducing contrast use while performing optimal PCI. With dynamic coronary roadmapping, initial angiograms are co-registered in real time with live fluoroscopy to help guide coronary wire introductions. This is proven to minimize contrast use, as shown by data from late-breaking trials presented at EuroPCR and the Society for Cardiovascular Angiography and Interventions (SCAI) 2023 Annual Scientific Sessions.¹⁻³ The era of multiple fluoroscopic views has evolved to rely less on the angiogram and more on adjunctive physiology and imaging tools. With advanced technologies such as

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co-registration, patients can be treated using less contrast, with fewer angiograms. Angiograms are used for roadmap development, while physiology and imaging are used to diagnose and assess CAD, and, if appropriate, perform and optimize PCI. An instantaneous wave-free ratio (iFR) pullback, co-registered with fluoroscopy, provides physiological evidence of diffuse versus focal disease, and clearly indicates points of greatest pressure drops so that PCI, if indicated, can be planned accordingly. Intravascular ultrasound (IVUS) imaging can also be co-registered, correlating anatomical morphology data with physiologically significant segments to enrich the PCI plan. A virtual stent may be drawn on the system, with identification of an estimated delta change of iFR post-stenting and anatomical proximal and distal landing zones. This process, when mastered and individualized to each lab and operator, can improve efficiencies, and reduce waste because precise balloon sizes, plaque modifiers, and stent sizes can be identified during PCI planning.



Figure 1. Drs. and course directors Karim Al-Azizi (center) and Srinivasa Potluri (2nd from left) with physician attendees at Baylor Scott & White Health – The Heart Hospital.



Figure 2. Dr. Al-Azizi explains the benefits of IVUS and SyncVision Co-registration.

Industry Partnerships: Driving Innovation and Education in PCI

Industry plays a vital role in advancing PCI workflows for better patient outcomes by supporting the development of innovative technologies, tools, and devices that enhance PCI procedures. Investments by industry offer collaborative initiatives with interventional cardiologists for educational advancement. A range of industry-sponsored training programs, product demonstrations, and research collaborations focus on improving PCI techniques and patient safety. Partnership with a health technology company such as Philips assures that physicians are not alone when implementing a contemporary PCI program, but instead have access to the support, training, and ongoing assistance for the greatest opportunity for success.

Empowering Interventional Cardiologists of the Future Today: Enhancing PCI Education in Novel Ways

The traditional PCI educational curriculum can be slow to adopt advancing techniques, falling short in preparing today's interventional cardiologists for the evolving PCI landscape. Without exposure to novel techniques, emerging technologies and evolving guidelines, education and practice can lag. In addition, clinical teams may be initially resistant to adopting new ways of working.

“In the beginning stages of implementing a contemporary PCI program, be ready to see eye rolls, sighs, and frustration among staff. Once they see

the benefit, they will be pushing other operators to do the same and more. Investing in staff education and knowledge is key to quality outcomes, lab efficiency, and multidisciplinary team satisfaction,” says Dr. Al-Azizi.

Achieving Best Practices: Examples of Effective Collaboration in Contemporary PCI Education

Physicians can see this approach in action at the contemporary PCI workshops at Baylor Scott & White

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Contemporary PCI workshop: example of workflow

- 1 Engage guide.
- 2 Use Philips Azurion Image Guided Therapy System and Dynamic Coronary Roadmap for real-time automatic coronary imaging.
- 3 Perform angiogram.
- 4 Engage catheter with good pacification in coronary artery.
- 5 Acquire three heartbeats where the vessels are filled with contrast medium.
- 6 Use low (8-inch) magnification, DO NOT pan table or change the camera angle for the entire case.
- 7 Assess region of interest (ROI) with Azurion.
- 8 Evaluate pre-PCI physiology with pullback to confirm, localize ischemia and plan intervention.
- 9 Perform Philips Co-registration using a previous angiogram.
- 10 Use pre-IVUS to assess plaque morphology and vessel size.
- 11 Guide plaque modification and stent sizing with Philips tri-registration data.
- 12 Use Philips StentBoost Live and/or device detection to confirm adequate plaque modification (i.e., balloon and stent expansion, laser). Perform post-stent IVUS. ChromaFlo ON as you advance EEP distally; ChromaFlo OFF and pullback in grayscale.
- 13 Confirm absence of geographic miss/edge dissection, confirm stent expansion.
- 14 Assess post-PCI physiology.

Health. A multidisciplinary heart team collaboration among interventional cardiologists, cardiac surgeons, imaging specialists, and other healthcare professionals allows these teams to work together to plan and execute complex PCI procedures, leveraging their collective expertise and improving patient outcomes. Attendees take part in procedural case discussions and hands-on workshops. Interventional cardiologists present and analyze challenging PCI cases, share their decision-making process, and seek input from peers. Didactic discussions followed by hands-on workshops in the lab allow experienced interventional cardiologists to perform procedures while educating and engaging other physicians in real time.

“Attending this workshop was truly insightful and educational. The information given, and then implemented the following day in the host hospital, shows the true potential of an improved PCI. The use of IVUS/iFR in conjunction with Co-Registration shows a path to understand the morphology of the vessel prior to treatment. It is important, as a team

How the Adoption of Physiology and Imaging Continues to Change the Course of PCI

From the first angioplasty and publication by Andreas Gruentzig in 1970 in the *New England Journal of Medicine*, the value of coronary physiology has been shown in treating stenosis on translesion gradients. The emergence of coronary physiology as a diagnostic tool rose with clinical trials with fractional flow reserve, setting a new benchmark in the decision to intervene in moderate disease. Trials such as DEFINE FLAIR and iFR SWEDEHEART validated a non-hyperemic index in assessing intermediate stenoses.^{1,2} This has become widely adopted, with room to improve. These trials led to the adoption of physiologic assessment of coronary artery disease (CAD) in the guidelines as a class I indication for fractional flow reserve (FFR) or instantaneous wave-free ratio (iFR) in assessment of stenoses.³ The need for physiologic assessment for moderate stenoses has been highlighted in the appropriate use criteria in the assessment for revascularization. The mean adoption rate of coronary physiology for all percutaneous coronary interventions is 26.9%.⁴

Data from important trials such as ADAPT DES, ULTIMATE, and RENOVATE highlight the clinical superiority of an image-guided PCI approach over angiography alone.⁶⁻⁸

A growing body of evidence about post-percutaneous coronary intervention (PCI) physiology suggests that lower values are associated with poorer clinical outcomes. With 1 in 4 patients left with an abnormal iFR after PCI per the DEFINE PCI study,⁵ the DEFINE GPS ongoing prospective, randomized, controlled trial is assessing the use of the SyncVision precision guidance system (Philips) in post-PCI physiology.

Intravascular imaging was initially used to study plaque composition, morphology, and vessel response to PCI. However, data from important trials such as ADAPT DES, ULTIMATE, and RENOVATE highlight the clinical superiority of an image-guided PCI approach over angiography alone.⁶⁻⁸ More data is expected to emerge from the IMPROVE and ILUMIEN IV trials supporting image-guided interventions. Adoption, although rising, remains low at less than 30%, likely hindered by its lower classification in the guidelines, lack of reimbursement, and time consumption. ■

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performing cath procedures, that we work together as a whole to understand what we are doing. This is for the benefit of our patients and to further support our physicians. Many hands make light work,” says Tyler Durbin, CLT/Lead Structural Tech.

Making Contemporary PCI a Reality for Today's Practices

Broader adoption of physician-to-physician education and industry partnerships plays an important part in educating future interventional cardiologists and optimizing workflows for contemporary PCI, helping to advance treatment and improve patient care. Collaboration among interventional cardiologists, cardiac surgeons, imaging specialists and other professionals is essential in realizing a contemporary PCI program that continues to incorporate state-of-the-art tools and ways of working.

CAD is becoming more complex, beyond a “balloon and stent.” Patients are becoming sicker, beyond hypertension and dyslipidemia, and now can present with CKD and heart failure. The demands are real, and physician-to-physician education on contemporary PCI is an opportunity to make a clinical difference for these complex patients in a practical fashion. ■

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Join Dr. Al-Azizi at TCT for a panel discussion on this topic. Learn more:



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