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EDITORIAL COMMENT

Hybrid Training for Interventional Critical Care, Complex Coronary Interventions, and Interventional Heart Failure

Is it the Right Time?

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Contemporary interventional cardiologists (ICs) have maintained a primary focus on percutaneous coronary interventions (PCIs), despite ongoing challenges including an aging patient population, rising comorbidities, and declining PCI volumes.[1] With a stable workforce of ICs, decreasing reimbursement rates, and more demands from health system employers, it has become increasingly difficult to practice exclusively on PCIs and patients with coronary artery disease. Given some of these external pressures, Vallabhajosyla et al,[2] in this issue of *JACC: Advances*, propose 3 novel dual-training pathways for ICs in tertiary and quaternary centers to pursue hybrid training: interventional critical care cardiology, complex and high-risk coronary interventions, and interventional heart failure (HF).

In this state-of-the-art review, the authors nicely summarize how ICs can leverage their procedural skills to provide specialized care for high-risk patients, including those needing mechanical circulatory support. Additionally, an IC's skill and comfort level with vascular access, management of critically ill patients, and navigation of a complex health care environment provide a distinct advantage in procedural performance and decision-making in the cardiac intensive care unit (CICU).[3] Similarly, the rapid expansion of percutaneous and surgical therapies for HF has created a growing demand for advanced procedural skills to perform both diagnostic and therapeutic procedures.[4] Dual-trained interventional HF physicians are uniquely equipped to bridge the gap between the procedural expertise required for placing acute percutaneous mechanical circulatory support devices and the clinical decision-making involved in advanced HF therapies.[5]

As the authors highlight, despite the rising demand and growing interest in hybrid interventional training, current pathways for trainees typically involve at least 3 years of general cardiology fellowship followed by 1 year of IC (coronary) training and an additional year of critical care cardiology, complex high-risk and indicated PCI (CHIP), and/or HF. While they mention peripheral vascular and structural training, there is no clarity on how IC fellowships would incorporate peripheral/structural training within the currently proposed hybrid interventional training. The authors acknowledge that the additional training burden may contribute to increased debt accumulation, heightened burnout, and the challenge of achieving and maintaining dual board certifications.[2]

In their conclusion, the authors state that the interventional cardiology community should explore ways to rethink and redesign hybrid training with a goal to enable ICs to expand their practice scope and address the needs of complex patients without compromising their mental and physical well-being. The authors further suggest that creating hybrid training pathways could be beneficial, especially with a focus on abbreviating the foundational training phase.[2]

This article presents a strong case for the need for dual-trained ICs, yet for the casual reader, it needs to

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be stated that the lion's share of graduating ICs in the United States will still pursue early career paths that primarily involve care delivery in the cath lab, cardiology ward/consult service, and outpatient practice—which includes coronary, structural, and/or peripheral vascular care and interventions. As the authors know well, there are burgeoning training pathways for both critical care cardiology and advanced HF, and there has been considerable interest in these foundational training programs among general cardiology fellows.

As the authors noted, there is exceptional pressure on all cardiologists to meet the demands of busy health systems during their early careers, but the main question will be whether fellows *need or want* to do additional training in these "super" specialties. Most of the issue revolves around the core competencies of the particular hybrid training pathway, and whether IC faculty members will be able to dedicate enough time to accrue the knowledge and master all the skills necessary to do both jobs. An additional concern remains that the median coronary volume for U.S. operators is approximately 50 PCIs/year, so less time devoted to PCI and coronary care will likely lead to an even lower median operator volume, a variable that is known to be associated with poorer clinical outcomes. When the dual training pathways are examined individually, CHIP and chronic total occlusion (CTO) PCI, like peripheral and structural training, complement the skills, decision-making, and device knowledge that are taught during general IC training. While this editorial is not fit to determine what a "complex high-risk and indicated PCI" fellowship entails, it is quite clear that if IC fellows want to dedicate a substantial amount of time and effort to master CTO PCI, they should do a dedicated training year in CTO PCI. It is less clear if ICs should spend a dedicated additional training year to develop some of the competencies of critical care cardiology (eg, chest tube placement, bronchoscopy, intubation) and advanced HF (eg, left ventricular assist device management, decisions about transplant eligibility, transplant medication titration). Additionally, while hybrid interventionalists are often attracted to tertiary centers, these facilities are often already staffed with on-call, cardiothoracic surgeons, intensivists, and advanced HF specialists with great procedural and clinical expertise, thus bringing into question whether tertiary care centers need to hire additional dual-trained proceduralists.

There is no question that a group of people (ie the authors and others) have a zealous desire to master multiple aspects of cardiology, but it is less clear whether hybrid training programs will attract the level of appeal from prospective IC fellows as structural or peripheral training has done. Ultimately, future health system needs will dictate whether they can accommodate superspecialized individuals, especially since fellowship programs will continue to produce critical care cardiologists and advanced HF cardiologists (who are not IC trained) at increasing rates. There is no question that health systems want sharp ICs who can navigate multiple spaces, including the cath lab, CICU, and advanced HF wards, but a bigger concern is whether dual-trained physicians can perform an adequate number of procedures to achieve and maintain proficiency, both in the cath lab and in the other areas.[6,7] If dual-certification becomes more widespread, thoughtful discussions about the strategic allocation of these highly skilled physicians in certain communities (eg, rural areas, community hospitals) will also be necessary.

FUTURE DIRECTIONS

Despite the challenges discussed, Vallabhajosula and colleagues stress the importance of integrating hybrid training for ICs to manage complex patients comprehensively. In many settings including academic institutions, ICs currently manage critically ill patients in the emergency department, cath lab, and CICU. The question remains whether future ICs will want to spend additional time learning to manage critically ill patients during their general cardiology fellowship or in a dedicated hybrid training program. Until there are decisions made about certifications needed to round in the CICU, it seems highly likely that ICs who want to pursue critical care cardiology (and advanced HF) will need to be trained separately and certified separately. If we get to an era when all physicians who round in a CICU are trained and boarded in critical care cardiology, then a hybrid certification system will make more sense.

In conclusion, as PCI volumes decline, patient complexity grows, and the demand for percutaneous therapies increase for critically ill cardiac patients, ICs may elect to pursue dual-training to provide specialized CICU, CHIP, and advanced HF care. While dual-trained ICs may offer significant advantages, the real challenge is determining whether fellows and faculty can commit the necessary time and resources to master both skill sets and whether health systems will value and desire these dually trained physicians en masse.

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