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FELLOWS-IN-TRAINING & EARLY CAREER PAGE

Global Cardiovascular Health

A Role for the Interventionalist

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Cardiovascular disease (CVD) represents a major public health problem in low- and middle-income countries. Global health partnerships emphasizing training and sustainability have begun to emerge in an effort to stem the tide of CVD (1). As has been described by other fellows-in-training (FITs) (2-4) and by the American College of Cardiology's (ACC's) Leadership Council (5), such partnerships can be highly rewarding, but may be challenging to develop and require the efforts of highly motivated individuals capable of functioning outside of their comfort zone in resource-limited settings. Opportunities for interventional cardiology FITs to participate in these nascent global health efforts have not been well defined, particularly the role a fellow may have in the procedural arena. In this FIT page, I share 2 formative global medicine experiences—1 in Egypt and 1 in Tanzania—that I hope will shed light on the potential for interventional/invasive cardiologists and FITs to affect the global fight against CVD through sustainable training programs.

As a general cardiology fellow, I visited the Aswan Heart Centre (AHC) in Upper Egypt. The renowned British cardiac surgeon, Sir Magdi Yacoub, founded AHC in 2008 as an integral part of the Magdi Yacoub Foundation. The Magdi Yacoub Foundation is a nonprofit organization dedicated to developing a regional center of excellence in cardiovascular medicine, intervention, and research through partnerships with governmental and academic institutions across the globe. At the AHC, I assisted in the performance of procedures in the cardiac catheterization laboratory, and I contributed to a research project on the serial assessment of valvular function in patients with rheumatic heart disease. More recently, I visited the Jakaya Kikwete Cardiac Institute (JKCI) in Dar es Salaam, Tanzania. The JKCI was formally inaugurated in 2015, and was founded by the former president of Tanzania and the institute's namesake. Madaktari Africa is a nongovernmental organization (NGO) comprised of cardiologists from Tanzania and private and academic cardiologists from across the United States (including Virginia's Centra Health and the Medical University of South Carolina) that have partnered with the JKCI to realize their shared mission of educating and training health care workers in sub-Saharan Africa. During my visit to the JKCI as a newly minted interventional cardiologist fresh out of training, I trained local cardiologists in coronary angiography and percutaneous coronary intervention (PCI), worked with physicians and staff to develop quality improvement initiatives focused on best practices in the cardiac catheterization laboratory, and presented a lecture on cardiac catheterization at the 2nd East African Cardiology Conference.

Prior to my experiences in Aswan and Dar, the role of cardiovascular proceduralists in global medicine seemed limited to medical missions that were not primarily directed at atherosclerotic CVD. These might entail an interventional cardiology and cardiac surgical team visiting an underserved area and performing many procedures (i.e., valvular interventions), perhaps in a mobile surgical theater, before heading home within a few days or weeks. The beauty of such procedures is that follow-up can be performed locally with minimal infrastructure and/or expertise (i.e., an echocardiogram and sonographer). The primary limitation of this model is that the expertise (and often the facilities) necessary for performing these interventions are transient, and local capacity building and sustainability are not achieved. It goes without saying that these interventions have had a significant effect on the lives of countless

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individuals in these regions. However, in the absence of the appropriate medical infrastructure (cardiac catheterization laboratories, operating theaters, and so on) to perform advanced cardiovascular interventions, committing resources and time for training local health care personnel to create sustainable models of health care delivery has not been viable. A fundamental realization from my experiences in Aswan and Dar is that establishing such infrastructure entails an ethical obligation to provide the training necessary to maximize the potential of the recipient institution's new technology in a manner that can be sustained long after the visiting health care professionals have left for home. These efforts require an incredibly determined and sustained time commitment (i.e., years) by global health initiatives to avoid a scenario where newly installed/built medical equipment and facilities simply "collect dust" and local health care talent goes unrealized.

Thus, my passion for global medicine efforts like the AHC and JKCI/Madaktari stems from their emphasis on sustainability and capacity building and the opportunities for interested interventionalists that naturally arise from the sustained commitment of these organizations. The mission statements of the AHC and JKCI are nearly identical: to provide free (AHC) and affordable (JKCI) tertiary cardiovascular care to an underserved region in a sustainable fashion, train the next generation of cardiovascular health care personnel, and develop an infrastructure for research in cardiovascular medicine. However, the similarities between the AHC and JKCI extend beyond their shared mission and vision. As a requisite for enabling advanced cardiovascular care, both institutions have invested heavily in the necessary physical infrastructure by building modern cardiovascular care health care facilities from the ground up. Critically, the AHC and JKCI have eagerly sought to educate and train local cardiovascular health care professionals by engaging international teams of physicians, nurses, and technicians from a diverse array of institutions for regular training visits, and also to sustain contact remotely to provide feedback and guidance on clinical and research operations.

At the AHC and JKCI, the visiting interventionalist (both surgeon and cardiologist) has been an instrumental tool in developing local cardiovascular procedural specialties by providing both the hands-on training and didactic instruction that are imperative in learning a new skill set. At the JKCI, visiting interventional cardiologists and nurses have worked with Tanzanian physician and nurse champions through implementation of Madaktari's "train forward" model of education that was initially applied to training catheterization laboratory physicians and staff in coronary angiography and PCI, and is now being applied to foster procedural autonomy in electrophysiology device implantation. Distinct from traditional medical volunteer missions, Madaktari's train forward methodology trains local providers to perform procedures and deliver care with the ultimate goal of having these providers teach other local health care professionals. The emphasis on local capacity building through training and education has been remarkably successful in Aswan and Dar. As examples, AHC has established a primary PCI program and performs >1,000 cardiac catheterizations annually. The JKCI has performed >500 cardiac catheterizations since performing the first such procedure in Tanzania in 2014 with physicians from Madaktari. Importantly, >75% of cardiac catheterizations have been performed independently at the JKCI. Additionally, the JKCI and Madaktari have spearheaded an electrophysiology device program that implanted the first pediatric pacemaker in the country's history during my visit.

The physical and human capital for establishing capacity building programs, such as the AHC and JKCI, are considerable. Financial support from government, industry, and philanthropic partners is a requisite component, and it is apparent from my experience at these institutions that their efforts would be improbable without the robust and targeted support of these partners. However, I believe that the critical resource to the success of such endeavors is the individual health care professionals (physicians, nurses, and technicians). Without the coordinated and selfless efforts of individuals working within and outside of the borders of Egypt and Tanzania, programs like the AHC and JKCI would not be possible. Hence, the purpose of this FIT paper is to raise awareness not only of the existence of such programs, but also of the desperate need for interested interventional cardiologists (in-training and otherwise) to seek out opportunities to leverage their procedural and clinical skills to expand programs committed to local capacity building. It is prudent to note that with any procedural short-term global medicine experience, senior physician oversight is critical to ensure that trainees are performing procedures commensurate with their level of training in their home country to ensure patient safety and trust.

At the moment, Madaktari Africa is the only NGO that is actively recruiting volunteers for interventional cardiology capacity building in sub-Saharan Africa. I would greatly appreciate hearing from readers about other such opportunities, including

programs involved in the ACC International Cardiovascular Exchange Database (6).

My experiences as a fellow and interventional cardiologist in Egypt and Tanzania, respectively, have been incredibly gratifying, have developed my appreciation for the challenges and rewards of developing sustainable global CVD partnerships, and have expanded my conception of how interventional cardiologists can contribute to these important efforts. Young cardiologists around the globe are hungry for the knowledge and training that are widely available to us as members of the ACC and trainees at tertiary cardiovascular care centers. The training models and the unique public-private-academic partnerships formed by the AHC and JKCI have created amazing opportunities for interventional FITs and early career cardiologists to reduce death and disability from CVD worldwide. Impactful and stimulating opportunities for interventional cardiologists in global CVD partnerships are continuing to evolve, and I hope that my interventional colleagues will increasingly become participants in defining our role in these important efforts to transform cardiovascular care and improve heart health across the globe.

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REFERENCES

1. Binanay CA, Akwanalo CO, Aruasa W, et al. Building sustainable capacity for cardiovascular care at a public hospital in western Kenya. J Am Coll Cardiol 2015;66:2550–60.

2. Patel A. Organizing a career in global cardiovascular health. J Am Coll Cardiol 2015;65:2144–6.

3. Kalra A. Organizing an international elective: a unique opportunity for cardiovascular fellows. J Am Coll Cardiol 2014;64:2429–31; discussion 2431.

4. Krishnan S. 20 days in the Himalayas: a doctor's journey. ACC Cardiology Magazine August 25, 2016. Available at: https://www.acc.org/latest-in-cardiology/articles/2016/08/22/09/23/20-days-in-the-himalayas-a-doctors-journey. Accessed April 4, 2017.

5. Abdalla M, Kovach N, Liu C, et al. The importance of global health experiences in the development of new cardiologists. J Am Coll Cardiol 2016;67:2789–97.

6. American College of Cardiology. ACC International Cardiovascular Exchange Database. Available at: http://www.acc.org/internationalexchange. Accessed February 26, 2017.

RESPONSE: Trainees in Regional Centers of Excellence in the Developing World

A Win-Win for Global Cardiology

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Global cardiology has reached the stage of maturity where it is positioned to deliver on its objectives (1). One of the main pillars of global cardiology is the establishment of Centers of Excellence in the developing world (2,3). The success of these centers depends on concerted, unified efforts and partnerships involving all members of the specialty—young and old, including those still training or in established careers—both in the developed and developing world.

It has been amply demonstrated in the business world that for a project or a partnership to succeed, it should be of benefit to all parties involved (4). In 2016, the Nobel Prize in Economic Sciences was awarded to Oliver Hart, a British economist working at Harvard University, and Bengt Holmström, a Finnish economist at Massachusetts Institute of Technology, for "improving our understanding of why partnership and contracts work and how they can work better, through aligning benefit of all parties concerned, or put simply, the win-win partnership" (4). The same principles apply to medicine in general, and in particular, global cardiology.

The paper by Dr. Albaghdadi is a welcome addition to the published data, as it eloquently describes his personal experience in the Aswan Heart Centre in Aswan, Egypt, as well as the Jakaya Kikwete Cardiac Institute in Dar es Salaam, Tanzania. These experiences clearly illustrate the role of trainees in the evolving Centers of Excellence in the developing world and the win-win principle that delivers:

1. Benefit to the trainees at a personal level through witnessing firsthand the need for these programs,

and sharing in the joy and satisfaction of being active participants in solving a major problem. In addition, interacting with a host of new patients and colleagues who will enrich and strengthen their personality and future practice. At a professional level, these experiences and interactions can widen the trainees' horizons and enhance their experience as physicians by participating in the active clinical programs dealing with various disease states that are different both in quantity and type from what they normally see in their home country. Such knowledge can be of great value in their future practice. In addition, participating in existing or initiating new research projects contributes to their training, regardless to whether they will pursue an academic career or not.

2. Benefit to the center includes increasing the workforce, quality assurances, and cost effectiveness—all of which are badly needed both in the short and long term.
3. Benefit to patients and science, which is the ultimate goal of all concerned and is significantly enhanced by such exchanges.

I hope that Dr. Albaghdadi's paper stimulates trainees to participate in this win-win opportunity in global cardiology.

REFERENCES

1. Fuster V, Kelly BB, editors. Promoting Cardiovascular Health in the Developing World: A Critical Challenge to Achieve Global Health. Institute of Medicine (US) Committee on Preventing the Global Epidemic of Cardiovascular Disease: Meeting the Challenges in Developing Countries. Washington, DC: National Academies Press, 2010.

2. Yacoub MH. Establishing pediatric cardiovascular services in the developing world: a wake-up call. Circulation 2007;116:1876–8.

3. Remenyi B, ElGuindy A, Smith SC, et al. Valvular aspects of rheumatic heart disease. Lancet 2016;387:1335–46.

4. Nobel Media. Press release: the prize in economic sciences 2016. Available at: https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2016/press.html. Accessed April 4, 2017.