

A View for Interventional Radiology in the Arab Region

At the PAIRS 2015 meeting in Dubai, I was asked by the program committee to offer my views on the future of interventional radiology (IR) in the Arab region. After some research and with no small amount of trepidation, I presented my thoughts on the challenges and opportunities facing IR in the Arab world.

Now, the editors of AJIR have requested that I summarize my perspectives on the topic for publication in this inaugural issue of their journal. I am happy and honored to contribute to AJIR's first publication, but as I review the slides from my PAIRS talk, I am reexperiencing a sense of anxiety similar to when I first addressed the topic.

Obviously, I am no expert on the practice of IR in the Arab world, and I remain very sensitive to my level of ignorance regarding the depth of what I don't know.

So, after that admission and trusting that I hold no claims of being an authority on the subject, I hope you will allow me to share my thoughts on some of the factors that will influence the future practice of IR in the region.

The Future

I have selected five general areas that I believe will prove to be keys in shaping the evolution of IR in the region. The first category destined to impact IR's future in the Arab world involves the inevitability of global trends – those inescapable realities that exist no matter where you live in the world.

Some of the factors that contribute to these global trends include evolving demographics that will swell patient populations in all geographies; increasing prevalence of chronic degenerative diseases around the world; “personalized” medicine replaces populations’ medicine – a trend emphasized in technologically advanced countries, but with real potential benefits for patients living in emerging economic areas; increasing dominance of cost-containment considerations; emergence of “consumer-driven” health care; sharper focus on prioritizing therapies that restore patient performance and function not just palliate disease; convergence of medical devices with information/communication systems; developing navigation and targeting systems to facilitate interventional procedures; and ascension of new medical sciences with the development of new polymers, nano- and microdiagnostics and therapeutics.

Some or all of these themes will play roles in the future of IR practice, irrespective of one's practice location. In terms of the extent of expanding patient demographics, the World Health Organization's Population Report estimates that there will be 2 million individuals in the world age 100 by the year 2050.^[1] This will result in a surge in a variety

of therapies to monitor, manage, and in some cases cure a wide range of chronic diseases that tend to occur with a growing incidence as individuals age. One effect of this phenomenon is that the implantation of medical devices to address these chronic conditions is estimated to rise above 5 million patients annually within the next year.

Pacing neuromodulation by either stimulation or ablation, implantable delivery pumps or reservoirs for delivery of biologics or pharma will all have a future role in the management of pain, diabetes, and cancer. In many cases, it is envisioned that they will be combined with a myriad of microchip sensors to activate electrodes or control release of active therapeutics. All of these future strategies share a vision to go beyond palliation and replace what is missing or restore what is lost. In addition, it is likely that IRs will serve as the primary specialist for image-guided delivery of these devices in a minimally invasive procedure.

Another inevitable trend that is associated with the implantation of sensors is the emergence of an important convergence between device implants and monitoring communication. Indeed, information technologies that allow connectivity and remote surveillance through device-to-device wireless communication will foster new algorithms to better monitor and manage diseases. This move to the wireless management of devices and patients will include roles for implantable and wearable sensors, distance telemetry, handheld communication devices, broadband wireless applications and networks, and new data storage and analysis including supercomputing and semantic web applications.

An obvious benefit for patients and IRs of these new capabilities will be better opportunities to manage patients who live in remote areas, far from medical centers, and specialized care. IR clinics will take advantage of the possibilities to remotely monitor a patient's clinical progress without the need to travel long distances for follow-up. This should eventually save time and money for the health-care system and the patient.

Another trend that should prove beneficial in saving time for IRs is the trend toward diversification of the health-care workforce with a variety of paramedical personnel or volunteers taking on the role of visiting clinical monitor – to check on a patient's status and alert physicians if there is a concern or need to schedule an in-person clinic appointment.

These programs can take on many forms, but the potential value of expanding the medical corps to provide in-home contact and monitoring with alerts to clinic or medical

staff regarding situations which could benefit from an early intervention at home and as a result avoid a subsequent acute presentation to the emergency department is attractive to all interested parties. As a result of the early detection and risk avoidance in vulnerable patient populations without easy access to transportation or communication networks, there are a number of cost-saving possibilities beyond the benefits to the individual patient.

In some parts of the Arab region, it is possible that the future will include geo-specific medical devices different from those used elsewhere in the world. Certain high-priced devices for vascular and nonvascular use may be reengineered to provide similar functionality and performance but at a lower price. This may apply to endovascular grafts, embolization materials (coils, plugs, liquids, etc.), interventional oncology products, and eventually, drug-eluting technologies including stents and balloons.

This trend to geo-specific sensitivity is occurring across medicine in general as the importance of growing markets is being increasingly recognized by the medical industry. The end result is that a goal of extreme affordability focused on an understanding of the needs (cultural, religious, economic, care environment, etc.) of different countries and continents is widely acknowledged and actively pursued by industry.

The second category that will impact the future of IR in the Arab world is the shared realities that exist across the Arab region – pan-Arab themes that will influence IR practice. I introduced earlier the importance of chronic diseases on health-care expenditures, but nowhere is the crescendo of the effects of chronic diseases more threatening than in the Arab region. Chronic diseases are a category comprised conditions strictly defined by the Food and Drug Administration. It includes heart disease, diabetes, obstructive lung disease, high blood pressure, kidney disease, osteoporosis, arthritis, asthma, HIV, mental illness, and dementia.

In the US, more than 25% of its citizens have two or more of these chronic diseases that require ongoing care and may limit their ability to perform activities of daily living.^[2] As the population ages, the chance of having two or more chronic conditions rises, such that two-thirds of Americans over 65 years and three-fourths over 80 have multiple chronic diseases. The number of people with chronic diseases is estimated at 157 million in the US. The cost ramifications are staggering. Nearly 69% of the government spending on Medicare (the insurance coverage program for individuals over 65 years and other patient groups) is directed to patients with five or more chronic conditions, and 85% of Medicare costs are generated by 25% of the patient population.

The growth rate of chronic conditions, most notably diabetes mellitus, in the Arab region is astounding,

and most authorities believe the statistics regarding the incidence of diabetes in many Arab countries are drastically underestimated. The change in basic diet in the Arab region over just two generations is often implicated as the cause of a diabetic “epidemic” that threatens to reach an incidence of at least 30% in most countries. It is possible that another 30% of the population is undiagnosed. The diagnosis is often only made after a patient presents for evaluation of skin lesions or a threatened limb.

The early recognition, prompt diagnosis, and diligent management of disease are increasingly important in the region, but the endovascular intervention to manage critical limb ischemia associated with diabetes is a daunting challenge for Arab interventionalists. Undoubtedly, diabetic centers focused on the care of these patients will emerge to offer specialized care, but right now, amputation rates remain high. IRs have a pivotal role to play in the multidisciplinary team charged with the management of this large patient group. The stakes are high as the social and health-care costs of diabetes management are significant and simply unaffordable long term, even in the richest Arab countries.

This connection to economics is a perfect segue way to another categorical theme, the growing importance of health care as a future opportunity to countries in the region. A shared trend among nations in the region is the desire to shift from sending citizens to the US or Europe for complex specialized care. A common goal is to create the infrastructure and confidence in their own local health-care systems. There is a wide understanding that this is important for social, political, and economic reasons.

In some Arab countries, health care is increasingly seen as a potential solution to drive employment opportunities in the 21st century. As the economy shifts away from a dominant dependence on oil production, health care is increasingly viewed as a possible alternative for domestic investment, skill development, and employment.

This should fuel opportunities in medical education and research and with it the development of training and certification programs. This is the 4th categorical element that I wish to discuss. In this area, there are numerous creative opportunities to develop and promote collaborative alliances among Arab states. One obvious and easily obtainable opportunity is to promote a network of pan-Arab IR research studies. As a consortium, IRs from Arab states could share and combine experiences to increase understanding of diseases and the outcomes of current management techniques throughout the region. Increased communication between IRs could lead to an increase in regional education opportunities for IR trainees with a resultant increase in the IR profile. Hopefully, this increase in visibility would attract more interest in IR among medical students.

Similarly, to grow IR, there is a need to enhance the network of postgraduate training courses, workshops, conferences, and exchange programs with a built-in intent of fostering multidisciplinary alliances. In addition, IRs in each Arab country must work to establish an educational consortium of regional scientists, clinical IRs, and academic IRs for the purpose of meeting with and educating government officials to broaden awareness of the benefits of IR by sharing successes with Health Ministries throughout the region. Finally, IRs must learn from examples of other specialties' successes and apply these models to IR in terms of marketing, recruitment to the specialty, and enhancement of government recognition.

In this regard, there is tremendous potential to leverage the impact of the internet in the region by providing opportunities in e-learning, computer-based case report forms for clinical trials, marketing of services and crowd sourcing solutions for difficult cases. In addition, the internet can aid in enabling collaborative research and sharing of IR experiences with government agencies and other specialty societies. It's just a matter of reprogramming current IR sites with stimulating and relevant content that will engage broad audiences. This is an especially attractive initiative for creating interest in IR among junior students and trainees.

There is a great potential for IR as there exists broad recognition that the region needs new models for education and training of its future IR physicians and technical staff. The possibilities for innovative tele-education programs and other novel approaches to support skills development, and mentoring relationships are key to developing a robust contemporary IR infrastructure to enhance the specialties' infrastructure in the region.

Finally, the last category to consider in the future is the looming need to address IR certification, specialty recognition, and practice development throughout the region. This is an important and difficult challenge. It is unlikely that one formula or recipe will work for all countries, but we can learn from models and the paths that have come before now. The SIR and CIRSE have created resource documents to guide the steps toward achieving a certification program in IR.

Communication and the facility to network with IRs around the globe are important to understand the

possible routes to follow; this is a critical time and the development of a certification program is the gateway to ensuring government recognition, potential funding for training positions, and the development of a thriving specialty and practice for individual IRs in the region. Politics is a messy endeavor, but it is increasingly important to our field, and specifically, to the future of IR in the Arab world.

I wish all my friends in the region the best of luck during this exciting and crucial time. My hopes are with you as innovational opportunities continue to grow for IR in the Arab world with technological advances that promise to impact clinical practice and transform our specialty, in terms of education, research, IR certification, specialty recognition, and practice development. Political and economic forces will have key roles in creating these changes, but we all need to prepare for these inevitable developments. Remember the encouraging words of John F. Kennedy, "If not us, who? If not now, when?"

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