Point/Counterpoint:

Is Interventional Oncology Ready to Stand on Its Own?

Interventional oncology sets aim on becoming the fourth pillar in the treatment of cancer.

Yes, it is!

BY MICHAEL C. SOULEN, MD, FSIR, FCIRSE

I have been practicing interventional oncology (IO) for almost 25 years (most interventional radiologists probably have to a greater or lesser extent). The treatment of cancer by interventional radiologists dates back to the 1950s, even before interventional radiology (IR) was recognized as a discipline.[1] Our "founding fathers" published extensively on minimally invasive, image-guided cancer therapy through the 1960s and '70s.[2-4] Tumor embolization has been a standard of care for 3 decades, and tumor ablation has been common practice for the past 15 years. Palliative procedures for management of cancer-related obstruction, pain management, and provision of enteral and venous access are routine IR practice.

LEADING GROWTH IN IR FOR 20 YEARS

The economic engine of IR for the past 2 decades has been IO, outstripping growth in other vascular and nonvascular IR disciplines. Furthermore, IO procedures have higher revenue per relative value unit than vascular interventions, so a full-time equivalent in IO is more valuable than one focusing on arterial diseases. IO is also a driver of growth for industry—interventional oncologists consume 10 times more product than interventional radiologists from the same group who do not have an oncologic practice (Figure 1). IO is spurring the surge of interest in IR among medical students and residents.

A Fortuitous Convergence

The evolution of IO from "something we do" into a full clinical discipline was born from the convergence of

(Continued on page 115)

No, it isn't.

BY ANDREAS ADAM, MB, BS, AND LIZBETH KENNY, MB, BS

The advent of potentially curative percutaneous image-guided techniques complemented the palliative interventional radiological methods used for the care of cancer patients and created the discipline of interventional oncology (IO). This new field of medicine aims to become the fourth pillar in the treatment of cancer, alongside the specialties of surgical, medical, and radiation oncology. As this discipline expands and becomes more sophisticated, the question that is being asked is whether IO should become an independent oncologic specialty.

The arguments in favor of such a development are not as straightforward as they would first seem. Vascular interventional radiology deals mainly with nonmalignant disease, which is closer to vascular surgery, and is based on a body of knowledge that encompasses the pathophysiology and disease mechanisms of vessel occlusion, aneurysms, and hemorrhagic conditions. Vascular intervention differs in many respects from IO. The effective use of vascular metallic stents and thrombolytic agents requires a thorough knowledge of the factors that influence blood flow and the development of atheroma, and benefits from a close working relationship with vascular surgery teams.

(Continued on page 118)

(Continued from "Yes, it is!" on page 114)
three phenomena (Figure 2). The maturation of clinical practice as an integral part of IR led to office-based clinics, consultative and admitting services, and longitudinal care. These hallmarks of successful IR practice enable interventional radiologists to take their seat at tumor boards as equal members, alongside other cancer specialists from medical, surgical, and radiation oncology. This reflects a second major phenomenon: the integration of IR into multidisciplinary care teams (be they related to cancer, dialysis access, cardiovascular, or other diseases). The majority of tumor boards now include an interventional oncologist. Market research indicates that the major decision makers regarding implementation of IO therapies within tumor boards are the interventional oncologists (Sirtex Medical, written communication, September 25, 2015). The third phenomenon establishing IO as the fourth pillar of cancer care is the explosion in minimally invasive, image-guided therapies. New platforms for embolotherapy, tumor ablation, guidance and targeting, and response assessment increase our value to the management of cancer patients.

ACCESS TO CARE

Although IO exists as a clinical discipline, recognized and valued by our oncologic colleagues, substantial barriers impede cancer patients' access to care. Market research suggests that up to 95% of patients eligible for image-guided therapy do not receive it (Sirtex Medical, Bayer, written communication, September 25, 2015). What is missing? There are three major roadblocks separating the cancer patient from the interventional oncologist. First, there is a lack of awareness of IO therapies among medical oncologists. The second is a lack of awareness of interventional oncologists among medical oncologists—47% of community medical oncologists don't know an interventional oncologist (Sirtex Medical, written communication, September 25, 2015)! The most potent strategy to overcome these two barriers is participation in tumor boards, supplemented by other outreach opportunities to the medical oncology community.

> Many interventional radiologists are not fluent enough in oncology to engage effectively with other cancer specialists.

Talk the Talk Before You Walk the Walk

The third major barrier to patient access is the lack of adequately educated interventional oncologists. Many interventional radiologists are not fluent enough in oncology to engage effectively with other cancer specialists. You need to know staging and standard treatment guidelines, the drug regimens used first-line and subsequently, and where surgery and radiation oncology fit into the treatment algorithm. General IR

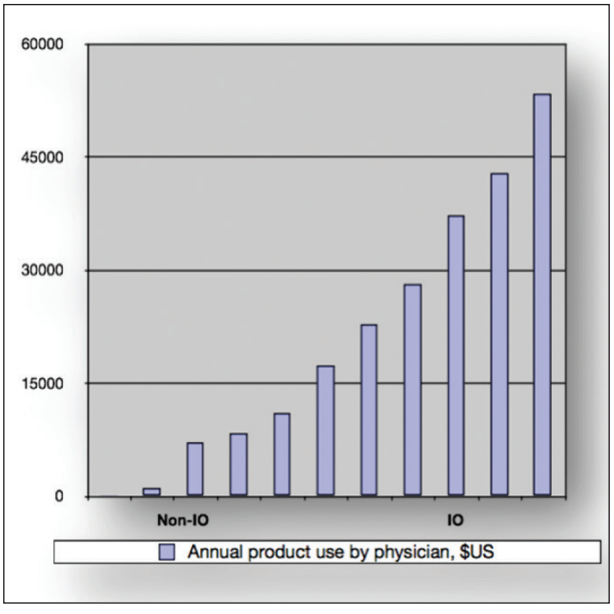

Figure 1. Inventory use by University of Pennsylvania IR staff.

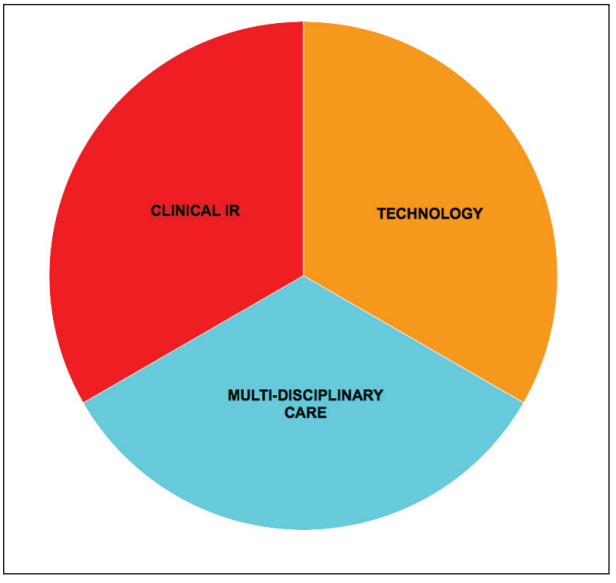

Figure 2. Convergent phenomena leading to the birth of IO as the fourth pillar of cancer care.

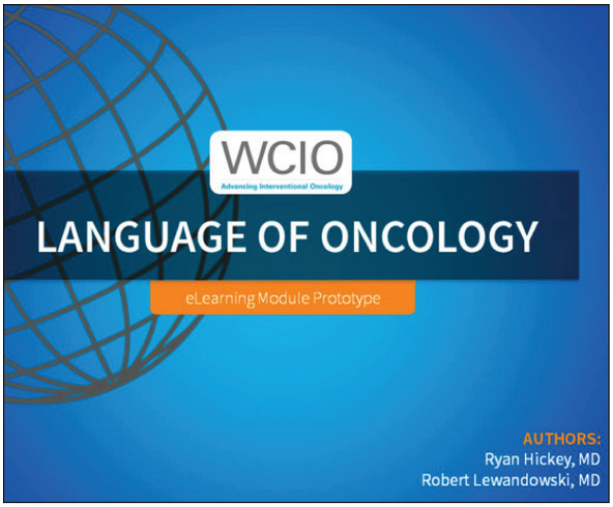

Figure 3. IO University (http://www.io-central.org/).

training does not provide the cancer education needed to practice oncology. Current practitioners and trainees need a resource to learn the language of oncology and the essentials of cancer treatment. The WCIO's IO University will address this need with a Continuing Medical Education-accredited, comprehensive, online curriculum of approximately 200 hours that is designed to fill the training and education gap. In development since 2010, this ambitious > $1 million project is already 50% funded by corporate partners BTG International Inc. and Guerbet LLC. The WCIO curriculum committee has rolled out the initial modules on IO-Central.org (Figure 3).

The Elephant in Your Mailbox

Although IO University provides a short-term solution to the education gap, in the long term, the Achilles' heel of IO is our research. The vast majority of IO publications in IR journals are single-institution, retrospective studies that are neither designed nor powered to change practice. Real oncology journals won't even review such manuscripts. Interventional radiologists need to get over the "me first," single-center publication mentality. All IO studies should be prospective, and anything beyond phase 1 should be adequately powered and multicenter—it's what the oncologists do. We need to learn to play together (a big culture change for IR) if we are going to change practice and impact treatment guidelines. The Radiological Society of North America offers outstanding training through its annual Clinical Trials Methodology Workshop, a week-long boot camp in which each student leaves with a polished clinical protocol ready to submit.[5] Young IO faculty should be encouraged to attend. The "Holy Grail" would be our own dedicated IO clinical trials cooperative group (the second item on my professional bucket list).

Figure 4. One day of IO therapy did what 3 years of chemotherapy could not.

CONCLUSION

IO is real. It's here. It's now. It has been part of IR for decades. It's challenging, it's fun, and it's constantly growing. You learn constantly, play an important role in a multidisciplinary team, and help many grateful people. At the end of the day, you do what no one else can, and you get cards like this (Figure 4).

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(Continued from "No, it isn't." on page 114)

INTERVENTIONAL ONCOLOGY'S IDENTITY AND CHALLENGES

In order to function effectively as a cancer doctor, an interventional oncologist has to acquire additional knowledge and training, and work within multidisciplinary cancer teams. Interventional oncologists must have contemporary knowledge of oncology and be able to speak its language if they are to communicate effectively with other specialists engaged in the care of patients with malignant conditions. In addition, they need to establish a long-term relationship with their patients, and be actively involved in follow-up assessment and care.

Curricula in IO are already under development in the United States and Europe, and aim to ensure that future interventional oncologists understand the natural history and biology of cancers; how they are treated by surgical, medical, and radiation oncologists; and how IO can collaborate effectively with other oncologic specialties.

The need for interventional oncologists to follow up with their own patients is even stronger than for vascular interventional radiologists managing peripheral vascular disease. Some of the latter may choose to collaborate closely with vascular surgeons, as they deal with the same conditions using closely related skills. This is a wholly different situation than that of following up with a patient with a hepatic metastasis from breast cancer who has been referred to an interventional oncologist by a medical oncologist, whose main expertise is in the pathology and pharmacology of cancer care. Such a physician is unlikely to have a detailed understanding of postablation imaging. An equivocal report by a local radiologist unfamiliar with tumor ablation may be difficult to interpret, and by the time this physician has communicated with the interventional oncologist and ensured that the images have been interpreted appropriately, a potentially treatable recurrence may have become untreatable.

In the future, it is essential that interventional oncologists have a reasonable understanding of chemotherapy, of the main surgical operations employed in the treatment of malignant conditions, and of the essentials of radiation oncology. This knowledge will be important, not only in its own right, but also because there will be an increasing need for combined treatments.

It is already difficult for interventional radiologists to learn everything that they will need to know to function effectively as vascular interventionists and to also gain a thorough understanding of oncology. This difficulty will become greater as scientific advances produce more data relating to the effects of ablative techniques on malignant tumors and adjacent benign tissue, and on how these are influenced by concurrent chemotherapy or radiotherapy.

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An additional consideration is the likely convergence of IO with radiation oncology.[1,2] Both of these disciplines are guided by imaging and focus on local tumor treatment. It is very likely that many patients will benefit from both of these modalities of treatment. When surgery is not a realistic option, some conditions (such as lung tumors) require careful discussion by experts in both disciplines before an appropriate, evidence-based choice can be made between ablation and stereotactic ablative body radiation therapy.

Society Relationships

The aforementioned necessary developments will become easier if IO gradually develops a distinct identity within interventional radiology as a whole, and if organizations such as the Society of Interventional Radiology (SIR) and the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) take the necessary steps to facilitate the acquisition of such an identity. Such steps would make it easier to establish a close relationship with cancer-specific societies, such as the American Association of Clinical Oncology (ASCO), or the American Society for Radiation Oncology (ASTRO). Such connections are very helpful in the furthering of research and in improving training in all oncologic disciplines.

At a local level, an interventional oncologist who spends all their time treating cancer patients would find it easier to be accepted by surgical, medical, and radiation oncologists as a full-fledged cancer doctor than would a colleague who devotes a substantial proportion of their professional time to treating peripheral vascular disease. Furthermore, such a physician would be more likely to run outpatient clinics for cancer patients than someone who has to spend a lot of time engaged in vascular intervention. Also, full-time interventional oncologists would be more likely to attend hospital meetings focusing on patients with cancer, and

to go to national and international congresses centering on oncology.

There is much to do in the field of IO if this discipline is to attain full credibility and to be accepted as an equal partner by medical, surgical, and radiation oncologists. Improving training, especially in relation to clinical knowledge, establishing a robust quality assurance system similar to that currently operating in surgical and radiation oncology, and carrying out high-quality research on clinical outcomes (rather than on technology), would all be much easier if interventional oncologists spent all their time caring for cancer patients.

Interventional radiology has fought and won the battle for recognition as a full-fledged, independent clinical specialty. This development was resisted by specialties that had reservations about a discipline that emerged from within a service specialty that lacked the infrastructure for clinical practice. Interventional radiologists achieved specialty recognition because of their dedication to their patients, and their enthusiasm for their discipline, which has revolutionized modern medicine. No modern hospital can claim to be providing first-class care for its patients if it cannot offer a comprehensive interventional radiology service. It is no longer acceptable to allow patients with catastrophic hemorrhage to be managed without arterial embolization being available, or for patients with obstructive jaundice and no endoscopic access to be treated without being offered percutaneously inserted, self-expanding metallic endoprostheses. There are excellent training programs in interventional radiology and dedicated posts in this discipline. It is generally accepted that interventional radiology procedures are best performed by physicians who have received training in image interpretation and interventional techniques. It has taken many years of dedicated work by leaders on both sides of the Atlantic to get to this point. However, these developments are relatively recent. Although a substantial number of interventional radiologists function as full clinicians, and are accepted as experts in the minimally invasive treatment of patients, it will take a few years of consolidation before all of their colleagues get to the same point.

REQUIREMENTS FOR INTERVENTIONAL ONCOLOGY TO FUNCTION AS A DISTINCT ONCOLOGIC DISCIPLINE

IO must become an identifiable entity within interventional radiology, for all the reasons described previously. However, it should not be detached from mainstream interventional radiology, as its achievements would be put at risk, to the detriment of interventional radiology as a whole and IO itself. Furthermore, it is important that IO prepares itself appropriately before it becomes a distinct entity within interventional radiology and within oncology. The appropriate preparation should include the following three criteria.

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A Full Curriculum in Interventional Oncology

An IO curriculum needs to cover not only procedural technique, but also the necessary clinical knowledge. This will require substantial help from experts in chemotherapy, radiation oncology, and cancer surgery. Efforts are being made both in Europe and the United States to create such a curriculum. However, it will take several years to complete this task and to test whether what emerges is fit for its intended purpose. If organizations that represent IO start certifying expertise in this field without ensuring that the knowledge certified is sufficient to cover the needs of its practitioners, the result would be a loss of credibility.

A Robust and Extensive Quality Assurance System

The safe practice of IO is dependent upon a system that provides significant quality assurance. Radiation oncologists demonstrated many years ago how important such a system is to the ensuring of optimal clinical outcomes. Surgical oncologists also have similar systems. If IO continues to be practiced without regard to essential safety requirements, it will find difficulty in being accepted as an equal partner in the field of oncology. CIRSE is in the process of preparing an excellent quality assurance system in IO, which will be available in 2016. However, it will take a few years before appropriate methods of credentialing are put in place and used widely.

Increasing the Number of Interventional Oncologists to Allow Organ-Specific Subspecialization

Although the most difficult, the initial step of adding more interventional oncologists to the ranks is also the most important. In general, the degree of specialist

knowledge required of a vascular interventionist is broadly similar to that of a vascular surgeon (who operates in almost every vascular territory). Embolization and stenting are governed by similar considerations wherever they are performed. Although some procedures require special protective or other measures, these are matters based on considerations that apply only to the vascular tree. Oncology is very different. A small renal cell carcinoma differs fundamentally from a small tumor in the lung in terms of prognosis, burden of disease, and options for treatment. Understanding the natural history of cancers, the contribution that other members of the cancer team bring to patients, and how to best integrate the whole care pathway takes years of team learning. Developing the team's confidence in interventional oncologists and what they can offer takes some time. Among the specialized teams that interact with interventional oncologists, the medical, surgical, and radiation oncologists are likely to have subspecialized to a considerable degree. Detailed knowledge of an organ system, and of the malignancies that affect it, are essential if an interventional oncologist wishes to make a substantial contribution to the decision-making process, and to follow up with treated patients effectively.

Some will argue that the listed preparatory steps would be easier to make if IO were responsible for its own affairs because its practitioners are more likely to see the need for them. For example, interventional radiology organizations (which have many members who do not practice IO) may not always perceive the urgency of issues such as developing a curriculum in IO. However, those who advocate detachment of IO from such organizations may be assuming that the detached interventional oncologists will all be interventional radiologists. Initially, this is likely to be the case. However, intentionally or unintentionally, the fact of separation would send the signal that IO is different from interventional radiology. It is likely that oncologists currently training or working in other disciplines would seek to join the ranks of IO, and that some of them would reach positions of influence. It would be natural for such physicians to consider that their own skills, such as in-depth clinical understanding of malignant disease, the genetics of cancer, chemotherapy, and other relevant knowledge, are just as important for the effective practice of IO as the ability to interpret cross-sectional imaging, or to perform an embolization to deal with hemorrhage resulting from ablation. Such points of view could distort or delay the very reforms that the creation of an independent discipline of IO might seek to put in place. Furthermore, if interventional oncologists started practicing as full-fledged cancer doctors without appropriate training, and without the necessary supporting developments (such as a robust quality assurance system), the consequent lack of credibility would set back the acceptance of their discipline as the fourth pillar of cancer care for several years.

> A gradually increasing focus on IO, and taking the preparatory steps described [herein], will likely result in a robust distinct discipline in a few years.

CONCLUSION

IO has a brilliant future. As vascular work is gradually distributed among several specialties, it is likely that organizations such as CIRSE and SIR will focus more intently on IO, and that the necessary actions will be taken to equip its practitioners appropriately. A gradually increasing focus on IO, and taking the preparatory steps described earlier, will likely result in a robust distinct discipline in a few years (always within the fold of interventional radiology). The practitioners of that distinct discipline will be true oncologists, and will be seen as worthy and credible peers by other physicians engaged in the care of cancer patients. Interventional oncologists in too much of a hurry should study the fate of those that tried to conquer Russia quickly, without making provision for winter clothes. ■

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