What if you could treat patients with serious medical problems faster and more safely than ever before, but the public and even your medical peers didn’t know about it? It’s a strange and unfortunate dilemma, but it’s exactly the situation faced by Interventional Radiologists in Canada.

In recent years, Interventional Radiology has taken giant strides. It has developed scores of procedures that result in quicker and safer treatments for patients. These procedures include:

- embolization (including fibroids and gastrointestinal bleeding)
- gastroenteral stenting (including biliary stents)
- vascular stenting (including abdominal aortic aneurysm stenting)
- vertebroplasty
- sclerotherapy
- image-guided venous line insertion
- angioplasty
- and many more.

By sending patients home sooner and keeping them out of hospital beds, Interventional Radiologists get people back to work and into the care of their families much sooner. Not only does this improve patient satisfaction, but it also reduces costs for hospitals and the healthcare system in general.

Public and professional awareness
Yet, the public isn’t taking full advantage of these services – not by a longshot. What’s more, GPs aren’t referring their patients to IRs to the extent they could, and in many cases, governments aren’t funding IR procedures that would free-up beds and shorten wait lists.

As a result, Canada is missing a big opportunity to improve the quality of care and medical outcomes, and to reduce wait times for surgical procedures.

“There are a lot of patients in Canada who could benefit from these procedures, but they just don’t know that it’s an option,” said Dr. Marie-France Giroux, Interventional Radiologist at CHUM.

Considered by many to be a revolution in patient care, Interventional Radiology has demonstrated its ability to treat patients with serious illnesses faster and more safely than ever before.

IR experts at the Centre Hospitalier de l’Université de Montréal (CHUM): Left to right, François Hamel, IR technologist; Ian Gouin, IR technologist; Michel Gouin, IR technologist; Dr. Marie-France Giroux, Interventional Radiologist; Dr. Vincent Oliva, Interventional Radiologist; Dr. Gilles Soulez, Interventional Radiologist; Catherine Bouchard, IR technologist; Dr. Alexandre Dugas, radiology resident.

IR can quickly treat patients and reduce Canada’s wait lists

By Jerry Zeidenberg

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IR can reduce Canada’s wait lists

Continued from previous page

who could use Interventional Radiology, but they’re not aware of what we can do for them, and neither are their GPs,” asserted Dr. Marie-France Giroux, president of the Canadian Interventional Radiology Association, and a vascular IR specialist at the Centre Hospitalier de l’Université de Montréal (CHUM).

A case in point is the ablation of uterine fibroids. Rather than going under the knife in an operating room, followed by several days of recovery in hospital and weeks at home, Interventional Radiologists are threading catheters through the femoral arteries to reach fibroids and embolize them – blocking their blood supply and killing them off.

Instead of open surgery, it’s a minimally invasive technique, with reduced pain, blood loss and risk of infection.

What’s more, the patient gets through the procedure much more quickly. “With embolization, I can have the patient back at home the next day and back to work within a week,” said Dr. Giroux.

However, most women don’t know this option is available to them. Oddly enough, neither do GPs. “Most GPs and gynecologists don’t know us, they’re not aware of what we do and we rarely hear from them,” commented Dr. Giroux.

Often enough, smart and Internet-savvy women have been discovering the procedure for themselves on the Web. Many have been phoning their local hospitals to ask about its availability.

“We’ve got to do a better job of making GPs and other physicians aware of what we do, not only for fibroids but for a great number of other diseases,” she said. With that in mind, CIRA and the Canadian Association of Radiologists have embarked on a campaign to inform their peers about Interventional Radiology.

New blood

As a relatively new and fast-developing medical specialty, Interventional Radiology does face an awareness hurdle. But building a profile with patients and peers isn’t the only roadblock.

Attracting a new crop of physicians into the field is also a challenge. As demand for IR escalates – and Dr. Giroux has no doubt that demand will grow. Given the choice, patients will want to avoid open surgery for faster, less invasive operations. As a result, additional highly trained professionals will be needed.

At the moment, many medical students aren’t even aware of IR as a career option – or it’s so low-profile, they don’t give it serious consideration.

“‘The students all hear about specialties like cardiology, but they just don’t hear about Interventional Radiology,’” she said.

Part of the solution will be found in educating medical students about IR as an exciting and fulfilling career option.

To that end, CIRA recently encouraged an information meeting for U of T medical students. The aim was to educate them about Interventional Radiology.

“What’s more, CIRA has organized a voluntary program for residents in Toronto to spend a day with an Interventional Radiologist, to see what the work is like.

IR in Canada lags other nations

As Millennium Consulting Group recently discovered, in its study entitled Non-Invasive Image-Guided Diagnosis and Therapy for Canadians 2006, there are some 1,800 radiologists in Canada, of whom 150 conduct IR procedures. But only 50 of them do Interventional Radiology on a regular basis.

On a comparative basis, we’re lagging far behind other countries, which have many more radiologists specializing in interventional procedures.

Significantly more will be needed in Canada if this country is to provide the quality of care provided by other industrialized nations.

While publicity and education will certainly be needed to bring more radiologists into the fold, there’s another factor required, as well. That’s recognition of Interventional Radiology as a sub-specialty by an official organization. Doing so will give it the cachet required to attract new practitioners. “Some students won’t take it seriously until there’s a diploma to go with it,” said Dr. Giroux.

This accreditation would also pave the way for a more uniform training program across the country.

Strangely enough, the main accreditation body in this country, the Royal College of Physicians and Surgeons of Canada, earlier this year rejected an application by CIRA for recognition as a sub-specialty – even though IR is already recognized as such in the United States and the United Kingdom.

The move has puzzled those in the IR community, to say the least. “Our colleagues in the U.S. and the U.K. think it’s insane that we’re not recognized,” said Dr. Giroux.

The Royal College cited several reasons for denying the application, but two factors were chief among them. First, it held that Interventional Radiology isn’t clinical enough – in the sense that Interventional Radiologists simply perform procedures and don’t follow up on the progress of patients.

Second, it asserted that the path to becoming an Interventional Radiologist would be restricted to Diagnostic Radiologists.

However, Dr. Giroux contested both of these assertions. In her own practice, she actually follows up with her patients, and asserts that her colleagues do, too. She stresses that Interventional Radiology has evolved over the years.

“Ten years ago, an IR would simply put a line in, to support a specialist. Now, it’s not like that. It’s more clinical – we see our patients, we follow up with them afterwards”.

“We’re working together with nephrologists, cardiologists, vascular surgeons, and many others,” she said, creating teams of specialists who are all checking on the health of the patients.

In that sense, IR is becoming much like other branches of specialized medicine. “All specialties are becoming more clinical,” she observed. “We’re all taking care of our patients, we’re not leaving the complications for others to deal with. This is at least the direction more advanced practices are heading in. We are trying to change the old non-clinical pattern with an IR sub-specialty program, but the Royal College has rejected this new way of training our future colleagues.”

On the topic of pathways into Interventional Radiology, Dr. Mark Baerlocher, a radiology resident at the University of Toronto and already a prolific author of articles in medical journals, stressed the field will be open to all physicians who are interested – but they will need to take the required training and pass the exams.

Dr. Giroux asserts that CIRA fully addressed the concerns of the Royal Co-

lege, along with answering other questions. As such, she feels the application rejection may have been sparked by a fear of ‘ turf wars ‘ – a belief that other specialties and sub-specialties fear they won’t be able to perform procedures traditionally owned by IR.

Here again, the fears appear to be unfounded. Leading groups have submitted support for the Interventional Radiologists’ application – including cardiologists, neurosurgeons, vascular surgeons, nephrologists, urologists, gynecologists, obstetricians, critical care physicians, and others.

That’s because, as Dr. Giroux explains, Interventional Radiologists are working together with these specialists as part of teams, often helping them solve problems in a new way. What’s more, as she puts it, even when IRs do perform procedures on patients who would otherwise go to a neurosurgeon or nephrologist, in Canada there are more than enough patients waiting for treatment to keep all doctors busy.

Moreover, the proposed IR sub-specialty program had even planned some specific sub-programs for other specialists to become accredited in specific procedures – for example, for vascular surgeons to become accredited in angioplasty.

Dr. Giroux said CIRA will apply again to the Royal College for recognition as a sub-specialty – unfortunately, the rules require a waiting period of three years. But if the application is again rejected, she said there are other courses of action.

“We may apply for recognition from the U.S. or the U.K., or we might establish our own credentials, with training and testing of students,” she noted.

“We don’t absolutely need the Royal College.”

Source: Millennium Research Group
The cost of IR devices, suites and staffing is significant, but investments in IR would be returned several times over in healthcare savings. Check with members of the public, and they’ll tell you that Canada has about the best healthcare system in the world. Just tweak the waiting list problem a bit, they say, and all will be well.

In truth, Canada is missing the boat on the latest revolution in medical care – Interventional Radiology. While we do have Interventional Radiologists in this country, we’ve got fewer on a per capita basis than any other industrialized nation. What’s more, we’re attracting new recruits to the field more slowly than any of these other countries.

As a result, we’re also performing fewer IR procedures than other members of the G7. That’s a shame, because of the benefits that are lost to patients.

Interventional Radiology can dramatically reduce hospital stays for patients, minimize infection, cut the rate of morbidity and mortality, and thereby improve overall outcomes and cut costs for the healthcare system in general.

Despite such advantages, the growth of this newly emerging specialty isn’t being supported by governments or medical associations to the extent that it should.

“There’s a paradigm shift going on, with everyone moving in this direction – except in Canada,” commented Dr. Mark Baerlocher, a radiology resident at the University of Toronto’s Faculty of Medicine, who is specializing in Interventional Radiology and has published several papers about the hurdles faced by IR in Canada. “There’s a lack of funding, resources and support.”

Sometimes called “bloodless surgery”, Interventional Radiology substitutes catheters for scalpels and repairs serious problems in the body via tiny incisions. Highly trained Interventional Radiologists can cut out or cauterize tumours, fix aneurysms, and repair fibroids without open surgery.

According to a 2006 study of Interventional Radiology in Canada by Toronto-based Millennium Research Group, the cost of IR devices, suites, staffing, and lab time is significant, but investments in interventional radiology would be returned several times over in healthcare cost savings.

In addition to the financial return on investment, many patients’ lives would be saved and improved, hospital beds will be used more efficiently, thereby increasing patient turnover and decreasing wait times.

The report, titled Non-invasive Image-guided Diagnosis and Therapy for Canadians, 2006, recommends that the Canadian government should develop a strategy to support IR in Canada and bring the level of treatment, at a minimum, up to par with other G7 nations. According to the MRG report, if IR treatments are adopted in this way, a total of $180 million in direct savings to the Canadian healthcare system and $92 million in indirect societal savings could be realized.

Increased adoption of IR in Canada could eliminate 98,000 days that patients are currently spending in the hospital. That’s a total of 268.5 patient years spent in hospitals that could be eliminated immediately.

Because the average length of stay in Canadian hospitals is approximately 7.2 days, this translates to 13,400 more patients who could be treated annually – something that would have a big impact on wait lists.

In order to realize these benefits, however, it’s estimated that $221 million of additional funding must be allocated directly to IR in Canada annually. In 2005, Canada spent $162.5 million on IR treatments.

While the increased funding is needed, there are several other challenges that must also be addressed:

• Patient referral patterns are limited. In many cases, GPs and specialists don’t know about the availability of Interventional Radiological procedures.
• Physician fee schedules are not supportive of IR. There are many procedures that are not funded, or the funding doesn’t encourage radiologists to dedicate the time and effort to become proficient in them.
• Human resources constraints. There are simply not enough trained Interventional Radiologists in Canada.

A recent study estimates that increased use of IR could reduce hospital stays in Canada by 98,000 days per year.
IR needs to be made a higher priority in the healthcare system

Innovator and Interventional Radiologist Dr. Lindsay Machan urges Canadian government officials and hospital administrators to adopt new practices that support and encourage more IR procedures.

Q: Dr. Machan, you are described as an innovator and entrepreneur. Can you tell us a little about your background?
Machan: I was a co-founder of Angiotech Pharmaceuticals, a Vancouver-based public company. We first developed a drug-eluting stent, the Paclitaxel-coated stent, and we licensed it to Boston Scientific and Cook (Medical). It has been used in over three million people now. Angiotech now has 1,800 employees, so you need real professionals running it. My skill set doesn’t work best in a big business structure. I still have an office there and I still consult to them.

Q: Is the Canadian Interventional Radiology Association correct— is Canada falling behind other developed nations in the use of Interventional Radiology?
Machan: Yes. There is no question that we are behind. We are really the only developed country that has public medicine only. Unfortunately, our healthcare system is run like a Soviet farming collective of the 1950s. Interventional Radiology, by its rapidly changing nature and the fact that we do so many different procedures, doesn’t lend itself well to that kind of a model.

Our healthcare system is extremely bureaucrat-heavy, and these people like to have things documented. By its very nature, Interventional Radiology is something where you are doing a lot of different procedures, and a procedure that would sound the same to an administrator might be a 10-minute procedure in one patient using $50 worth of disposables, and it might be a four-hour procedure in another patient requiring considerably more resources.

Interventional Radiology is the absolute sine qua non of what our administrators and politicians say they want, which is care closer to home, keeping patients out of hospital, shortening hospital stays. Interventional Radiology does all that incredibly well. But the missing piece is that the bureaucrat who administers your disposables budget, what it costs to use all those catheters, etc., doesn’t realize the gain by having the patient go home more quickly. That comes out of someone else’s budget. If you do in fact, the benefit may only be in how the patient feels. So there is absolutely no motivation for that person who doesn’t typically get rewarded for innovation, but gets seriously punished for not staying within the budget they administrate. That is a real stopper in the system.

The way we fund our radiology departments also doesn’t lend itself very well to the practice of Interventional Radiology. The usual approach is to give a lump sum to the radiology department and say, ‘Deliver all these services for this amount of money and do not go over this.’

Q: Of course there is an ever-increasing demand for interventional procedures, for all the obvious reasons: procedures applicable to a broader range of illness, our aging population, and better educated patients who want minimally invasive therapies. And yet, you have these fixed numbers to deliver these services. Not only is the money not there, it is incredibly hard for any radiologist to make these things happen. You have to be willing to deal with conflict to make this happen, and the radiologist already has a full day.
Machan: There is very few pure Interventional Radiologists in Canada. Most people who practice Interventional Radiology also do general radiology. This is an issue because they want to provide these services but it is not necessarily how they earn the bulk of their income. If they were pure Interventional Radiologists and they had to survive only by doing interventional procedures to earn their keep, they might be more aggressive about pursuing these procedures.

Another part of it is that Interventional Radiology is very open-ended. Those procedures really can take either 15 minutes or four hours, and then there is all the patient care that comes with it; talking to people on the phone, seeing patients up on the ward. That doesn’t mix well with a diagnostic radiology practice, where the length of time to read an exam is less variable and the hours of work are relatively constant (and often more humane). As well, after capital equipment, interventional disposables are the largest drain on the budget. And on an hourly basis, physician remuneration has been relatively poor compared with diagnostic radiology. So you have a situation where a physician has to expend considerable energy to fight for a budget for procedures that pay less than the diagnostic component and result in longer and less predictable hours.

Q: You used to be on the faculty of a yearly IR conference in Prague shortly after the fall of the Berlin wall. I understand you don’t do that anymore, because the former East Bloc countries are now doing more advanced procedures than we are in Canada.
Machan: Yes, they passed us with breathtaking quickness, certainly within five years. I found myself talking about procedures that were being offered in only a few centres in Canada, but which were more broadly offered in Romania.

Q: Can we catch up?
Machan: Of course. It would require some pretty significant changes in the way we fund Interventional Radiology. CIRA (Canadian Interventional Radiology Association) and CAR (Canadian Association of Radiologists) have to continue their efforts to educate both the public and particularly the health ministers and the people who work for them, about the power of Interventional Radiology.

Q: If there was one thing you could have changed right away, what would it be?
Machan: Interventional Radiology has to be a higher priority for most radiology departments across the board, and for the various bureaucracies that govern our healthcare system across the country. They need to really understand the power of Interventional Radiology, that it is good medicine.

Q: Is there innovation going on in the field in Canada?
Machan: There is, but it is getting progressively more difficult to do it. Particularly, the group in Montreal, Gilles Soulez and Vincent Oliva, are doing some very innovative basic science work. They are developing some interesting new ways to combine biomaterials with biologically active substances.
The kinds of innovations that they are working on in Montreal, if they do come to fruition could make a profound difference in patient care. You take the paclitaxel-eluting stent. It was the most successful first year of a medical device ever. In the first year of any medical product, even out-selling the first year of Viagra. So new medical devices can really change the way patients are handled.

Q: What sort of developments do you see in IR in the next five to 10 years?
Machan: We are starting to see the local administration of drugs and different types of energy such as using combinations of ultrasound for targeted release of drugs to enhance their effectiveness or using local drug delivery and various types of energy for tumor ablation. For this type of treatment, you need to have improved imaging guidance. Fluoroscopy, just plain X-ray, that is not enough anymore. Fusion imaging, which is the superimposition of cross-sectional imaging plus fluorescence or endoscopic techniques, or the combination of ultrasound plus CT or MR, those will allow improved real-time for minimally invasive treatments. That’s some of what we are going to be seeing.

Former East Bloc countries are now doing more advanced IR procedures than we are in Canada.
RFA proves its worth against liver cancer

Study shows that IR patient survival rates equal those undergoing surgical resections, but RFA offers a less invasive and safer technique.

By Jerry Zeidenberg

Sometimes, Interventional Radiology isn’t just an alternative to conventional surgery. On occasion, it’s the only viable option. When cancer patients are too old or weak to sustain a traditional operation, or the nature of the tumours prohibits an open surgical procedure, a minimally invasive IR procedure may still be possible.

Liver cancer is a case in point. The relatively new technique of radio frequency ablation (RFA) has scored documented successes in the treatment of primary liver tumours, or hepatocellular carcinoma (HCC).

“Only about 15 percent of patients first presenting with HCC or liver metastases from colorectal carcinoma are candidates for surgical resection,” commented Dr. John Kachura, an Interventional Radiologist at the University Health Network, in Toronto, where he and a group of colleagues have been performing RFA of liver tumours since 1999.

“RFA now gives many more patients a possible curative treatment,” says Dr. Kachura. “I would estimate that 50 percent of patients presenting with HCC could be considered for RFA. Certainly most patients with one-to-three HCC tumours, each 4cm in size or smaller, could be considered for RFA.”

What’s more, Dr. Kachura and his colleagues have collected statistics and performed studies showing the value of RFA for liver cancer. “Another exciting aspect for our group of Interventional Radiologists at the UHN and Mount Sinai Hospital is that our results of treating patients with RFA are on par with some of the strongest studies in medical literature. Our five-year patient survival of 50 percent is the same as that seen with surgical resection, yet RFA offers a less invasive and safer method.”

The results are so impressive that an Ontario government review of the technique, in 2004, concluded that RFA of unresectable liver cancer should be supported at several hospitals in the province.

At the same time, the report noted that practitioners who treat and coordinate liver cancer patients, or the patients themselves, may not yet be aware of RFA or other ablative treatments for unresectable HCC! That’s still likely to be the case today, moreover, as awareness of the efficacy of a variety of Interventional Radiology treatments is still quite low.

Radio-frequency ablation is performed by inserting a needle electrode, at the tip of a catheter, into a tumour and applying electrical current. The heat leads to thermal coagulation that kills the tumour and also closes up small blood vessels, thereby minimizing the risk of bleeding.
Rads at regional hospital offer expertise in many IR techniques

A team of four Interventional Radiologists, along with technologists and support staff, are handling about 2,200 IR cases a year using 35 different procedures, at Windsor’s Hôtel-Dieu Grace Hospital.

By Paul Brent

W hile many Canadians, medical professionals included, feel the pull of western migration, Dr. Jack Speirs chose to go the opposite way. A British Columbia native who received his medical training at UBC, he moved east to do his radiology training at Detroit’s Henry Ford Hospital and followed that with his interventional fellowship there as well.

All the time he was working in Detroit, Dr. Speirs was living on the other side of the border, in Canada’s version of Motor City. “I ended up liking Windsor so much I stayed,” he said.

For the past decade, the Interventional Radiologist has worked at Windsor’s Hôtel-Dieu Grace Hospital (HDGH), the region’s premier tertiary acute care hospital. During that span he has witnessed the rapid evolution of IR from a primarily diagnostic discipline to therapeutic one at the 312-bed facility.

“When I joined Hôtel-Dieu, the interventional realm was primarily diagnostic, with a small amount of angioplasty,” said Dr. Speirs. “Over the past six or seven years, we have experienced very significant growth in terms of what we do and the number of cases that we do as well.”

Part of that increase has been fueled by simple demographics. The overall population is aging and people are coming to the facility with more conditions that are suitable for IR procedures. As well, the greater Windsor area has one of the highest rates of atherosclerosis in the country. That in turn has prompted HDGH to develop expertise in angioplasty and stent-graph techniques.

“Hôtel-Dieu is pretty unique in that we offer pretty much the entire breadth of services,” said Dr. Speirs. “You have to be a master of a lot of different techniques.”

As the nexus of medical care for the Windsor area, Hôtel-Dieu’s staff of 1,859 has a heavy load of work. The hospital cares for nearly 139,000 patients every year, performing 23,275 day surgeries annually, 1,700 cardiac catheterizations and 30,537 dialysis procedures.

“We are pretty much the only centre in the [local health integrated network] that does a substantial volume of intervention,” said Speirs. “What that means is we have to take care of the dialysis patients, we do a lot of work for oncology, like vascular work for oncology, embolizations for oncology, we do lots of radio-frequency ablation for oncology.

“We also have the vascular surgery and neurosurgery units at the hospital, so we do a large amount of work to support those, as well. And we do a fair amount of palliative stenting, like esophageal stenting, for our oncology and palliative care group.”

As Hôtel-Dieu has grown into the regional hub for medical care in Windsor, the centre’s Interventional Radiology practice has grown along with it. The evolution of IR from a diagnostic specialty to a viable treatment option has increased the number of patients that the hospital can serve each year and has generally improved the quality of life for patients.

Many medical procedures that used to tie up surgical theatres and ICU beds for recovery have now been replaced with non-invasive techniques that have patients out the same day or with dramatically shorter recovery stays.

“Having shifted procedures from the OR to the interventional suite has been a huge benefit, not only for the quality of life for the patient but providing additional capacity for the hospital itself,” said Claudia denBoer Grima, Hôtel-Dieu’s integrated vice-president of clinical support services.

Thanks to the Internet, patients (or in the case of the elderly, their children) can come armed with an impressive layman’s knowledge of medical conditions and newer treatment options. “We have a more savvy consumer, so they come with a set of expectations,” she said. “As the demand increases, from the consumer and with our increased ability to do these procedures successfully in a minimally invasive way, we actually have less funding to do it with.”

Treating a blockage in a patient’s carotid artery, for example, used to require conventional surgery and a three-to-five-day stay in the intensive care unit. Today, that same condition can be dealt with by angioplasty and stenting, and patients are typically released the next morning.

Unfortunately, the way that governments fund centres and procedures has failed to keep up with the rapid advancements in the Interventional Radiology field. While IR techniques are allowing more work to be done, and are saving hospital resources by getting patients home faster, they currently don’t appear as budgetary saviors.

“When we do the angioplasty stenting, that is not really counted in the stats,” observed Dr. Speirs. “If we could count it as carotid surgery, we actually get a benefit because patients go home in one day instead of three days. But there is no way to account for that, so it looks like we are either doing fewer surgeries or there is no change in the length of stay. In fact, we are doing more cases and people are staying a shorter time.”

The benefits are obvious: local, rather than general anesthetic is used, so the risks associated with putting patients under are decreased; no big incisions are made, so risks of infection are reduced and recovery time is far shorter; and patients are spending less time in hospital, thereby freeing up resources for other patients.

“From the hospital’s point of view, there are some significant costs associated with the devices or gizmos. How that actually shakes out is often a bit of an issue at the hospital level,” said Dr. Speirs. “From a patient’s perspective, it is pretty clear what is preferred, but when it actually comes down to the dollars and cents, that is a bit more difficult for the system to sort out.”

Part of the problem is the diverse range of IR procedures that a centre can typically provide. In HDGH’s case, the 30-odd procedures it carries out cost between $100 and $10,000, Speirs noted. “It’s tough to come up with $10,000. For example, kyphoplasty costs $4,000, but you keep your patient out of hospital, they are at home, they are independent. Treating an aneurysm is a very expensive procedure, but the outcomes are stellar. Those patients, often in their Fifties, who if they do end with a stroke or morbidity from conventional surgical procedures, it’s a big deal, and it costs a lot of money.”

HDGH is now wrestling with how to fund the new Interventional Radiology technique to treat abdominal aortic aneurysms, dubbed EVAR (EndoVascular Aneurysm Repair). “It is certainly a sound approach and a procedure that we really should be providing here, but they certainly are a pricey procedure, probably about $12,000 [apiece], so we have to determine how we implement that and not add to our funding crunch,” said denBoer Grima.

HDGH considers itself a fast-follower when it comes to new Interventional Radiology techniques, rather than a pioneer, and prefers to ride “the backside of the wave of new technologies,” rather than its crest, as Dr. Speirs describes it. “We try not to adopt all of those (emerging) technologies, we choose the ones that seem like they are going to be durable,” he said.

While the IR staff at Hôtel-Dieu follows research and innovation at the bigger Canadian universities, they have found that many of the advancements originate from Europe. Dr. Speirs and his colleagues follow the European literature closely, not just because of the innovation there, but because professionals there are forthcoming about what works and what doesn’t.

“One of problems, if you are in a field that is very technology intensive, is that there are going to be some missteps, so the latest and greatest isn’t always the best,” he said. “We can’t embrace all of those technologies, but we need to take the lead from centres that are on the cutting edge.”
Physicians destroy tumours using ultrasound

A leading-edge therapy, pioneered by Interventional Radiologists in Toronto, automates much of the ablative procedure.

By Jerry Zeidenberg

Imagine, cancer surgery that’s conducted without making any incisions. Imagine, furthermore, that a doctor isn’t needed to physically conduct the operation. Instead, the procedure is performed with accuracy by a computer system.

It’s happening right now, and radiologists and researchers at the University Health Network, in Toronto, are world leaders in testing and developing the technology.

“In radiology, there’s been nothing like this,” said Dr. David Gianfelice, director of image-guided therapy at the UHN. “This may offer an alternative to some surgical procedures as it is reproducible, has few side effects and significantly decreases human error.”

Dr. Gianfelice leads what’s known as the GTx program in Toronto, which is marrying medical imaging techniques to surgery and other procedures to produce innovative new therapeutic solutions.

GTx is seeding teams of physicians and researchers with funds and resources, putting together experts with different skills to encourage the creative ferment that often results in new techniques for solving problems.

Dr. Gianfelice’s own team is using a technique called MR-guided focused ultrasound (MRgFUS), which employs MR to map the size and location of a tumour, coupled with high energy ultrasound waves to destroy the tumor.

Completely computer controlled, without a surgeon or radiologist intervening directly on the patient, the system focuses high-frequency ultrasound waves on the tumour, heating the cells to 60°C or more and thereby killing them, while leaving surrounding tissue untouched.

Next, the MR, which develops the patient like a huge vanilla donut, checks to see if the unwanted cells have been killed – a real-time quality control check. MR systems are highly sensitive to heat, and can readily tell if a particular spot in the body has hit a certain temperature.

If the targeted cells haven’t been ‘cooked’, they’re zapped again, so that when the procedure is finished, the tumour has been decimated.

Once on the table, the patient slides right into the MR tunnel. The ultrasound and MR are working in lockstep, and once the procedure is set up, there is no human intervention required. (A radiologist is needed to supervise, and technologists also help prepare the patient and the equipment.)

Dr. Gianfelice explains that the computer-guided ultrasound ablation system can be more accurate than a human eye and hand. That’s because a surgeon relies on his sense of sight, and the limits imposed by the size of his hands and instruments, while working in a small area of the body.

By contrast, the focused ultrasound beam is accurate to less than a millimeter. And assisted by the MR imaging, it can accurately determine whether any cancerous tissue has been left behind.

What’s more, unlike the surgeon’s hands, the ultrasound beam never shakes.

It’s not the solution for every surgical procedure, but for some cancer masses, it has already demonstrated promising results.

In the last six months, since the project began, Dr. Gianfelice and his team have concentrated on patients with metastatic bone cancers, in a bid to reduce pain, and on women with uterine fibroids — benign tumours in the uterus that can bleed and cause pain.

The results so far? “Very good, and very promising,” said Dr. Gianfelice.

The treatment has reduced pain in all of the bone cancer patients treated so far, and participants who had the procedure done three months ago have stopped taking pain medication.

Women with uterine fibroids have also obtained good results. At the time of writing, five women had been treated for uterine fibroids using MRgFUS at the UHN.

Dr. Gianfelice explained that each of the women had a four-hour procedure, and then were able to go home. “They could carry on with their lives the next day, and even go to work,” he said.
Interventional Radiologists repair spines using new techniques

With an aging population, Canada will experience increasing numbers of patients with osteoporosis and spinal fractures. Luckily, new and effective therapies are at hand.

By Paul Brent

Patients suffering from collapsed or fractured bones of the spine likely don't know it, or care, but there is a lively debate in the medical community about the best treatment for the crippling condition.

Since its development in the mid-1980s in France, vertebroplasty has since become the standard minimally invasive spinal surgery procedure. Its popularity is easy to understand. It's simple, fast, effective and cheap.

Vertebroplasty, which literally means fixing the vertical body, is a relatively simple procedure designed to alleviate the pain of spinal fractures by injecting orthopedic cement into spinal breaks. In most cases, the procedure can be conducted under local anesthetic and intravenous sedation, and patients can be mobile within hours.

The “next generation” procedure, kyphoplasty, promises similar pain relief and superior results in terms of restored height for conditions that can be treated by vertebroplasty. A high-tech riff on the earlier procedure, kyphoplasty uses a special balloon, or balloon tamp, in an effort to better position the cement. The result, say its proponents, is similar pain relief, less risk of complications due to possible leakage of the cement, as well as better height restoration.

“Kyphoplasty is standing on the shoulders of vertebroplasty,” said Dr. Ramesh Sahjpaul, a neurosurgeon with the University of British Columbia who does vertebroplasty operations, “By my observation and the clinical outcomes, I do the kyphoplasty or skyphoplasty, only very select cases.”

Sahjpaul contends that kyphoplasty is most effective in the worst cases and has all but abandoned vertebroplasty. The newer procedure is more useful “for patients who have significant collapse of the vertebral body or significant angulation, and it’s also useful in the field of tumor treatment,” he said.

The major drawback to kyphoplasty, both proponents and critics agree, is its cost. The procedure typically costs between eight to 10 times what a vertebroplasty procedure will cost. In Canada, the cost for a kyphoplasty kit runs between $3,500 and $4,000, practitioners said, versus $500 to $600 for a vertebroplasty kit.

With an aging population and the demographic bulge of the Baby Boomer now starting to hit retirement age, the demand for these non-invasive procedures to alleviate spinal fractures will only grow. The main driver is the bone disease osteoporosis, which strikes older people in the form of fractures of the hip, wrist and spine.

Approximately 1.4 million Canadians suffer from osteoporosis, according to Osteoporosis Canada. One in four women over the age of 50 and one in eight men over 50 suffer from the condition. The cost of treating osteoporosis and associated fractures is estimated to be $1.9 billion each year in Canada, with the majority of the costs coming from long-term, hospital and chronic care.

Physically not very far away from Sahjpaul, but philosophically far apart in his opinion of the relative merits of the two main spinal fracture procedures, is Dr. Peter Munk, head of musculoskeletal imaging at the Vancouver General Hospital and a professor at UBC. “A lot of this is marketing hype in my opinion,” he states.

Dr. Munk gives credit to kyphoplasty developer Kyphon Inc., of the U.S., for the rising popularity of the new procedure. “In my opinion, kyphoplasty and vertebroplasty have very little difference in terms of the clinical outcomes. I do mainly vertebroplasty, I do very little in the kyphoplasty or skyphoplasty, only very select cases.”

A similar, lesser known procedure to kyphoplasty that was developed in Israel, skyphoplasty utilizes a special polymer device that can be positioned within a vertebra and expanded, creating a void which can be filled with bone cement. Israel’s Disc Orthopedic Technology (Disc-O-Tech), which developed the Sky Bone Expander skyphoplasty device has agreed to sell the product to Kyphon. The deal now awaits regulatory approval.

Skyphoplasty’s widespread use has been hampered, Dr. Munk said, by legal battles between Kyphon and the Israeli company, which saw Disc-O-Tech lose the right to market its product in the United States. “We may be the only centre currently in North America doing any at all.”

The vertebroplasty-kyphoplasty divide which has developed in the medical profession owes its existence in part to the history of the two procedures. Vertebroplasty was enthusiastically adopted by the Interventional Radiology discipline while kyphoplasty was developed by an orthopedic surgeon.

“The kyphoplasty was taken up more by the surgeons and the vertebroplasty was taken up more by the radiologists, and there is kind of this schism in the field where you sort of do one or the other,” said Dr. Jack Speirs, an Interventional Radiologist with Windsor’s Hôtel-Dieu Grace Hospital.

Because the procedures are covered by most provincial health plans, cost is not really a factor in which procedure is used. “At least in Ontario, you’ll find that most of the kyphoplasty is done by surgeons and most of the vertebroplasty is done by radiologists,” said Dr. Speirs. “It’s hard to sort out the turf battle between the two versus the reality of which is the better procedure.”

While Dr. Speirs began treating spinal fractures with vertebroplasty, he has since relied more on kyphoplasty to treat his hospital’s younger patients. “We tend to use vertebroplasty in patients who are older and frailester because it is faster and safer or may reduce pain more effectively, and acknowledges that “kyphoplasty is a lot more work.” He said a vertebroplasty procedure typically takes about 20 minutes, while kyphoplasty will take about 40 minutes. “But I think that there is some benefit to it.”

Dr. Speirs tells the story of a 96-year-old patient who already had two kyphoplasty procedures carried out in the U.S., and then suffered another fracture. “She showed up at our door in a fetal position in a diaper. With some reluctance, we did the [kyphoplasty] procedure and her daughter recently sent me a picture from her 97th birthday. She was back in her condo and having a birthday party with all of her relatives. There’s a lady who otherwise would have been in a nursing home somewhere, who is now living independently.”

While the practitioners have for now formed their own opinions on the merits of kyphoplasty, vertebroplasty and to a lesser extent skyphoplasty, time and clinical evidence—which is to date lacking—will determine the relative worth of the three procedures.

“Right now there is almost a battle being fought to see whether vertebroplasty or kyphoplasty is going to surface to be the dominant preferred procedure,” said Vancouver General’s Dr. Munk. “All three procedures will probably have certain occasions for which they are better, but that has to be worked out and sorted out in a scientific fashion, which hasn’t happened yet.”

Vertebroplasty, kyphoplasty and skyphoplasty have all emerged as viable therapies.