SOCIETY OF INTERVENTIONAL RADIOLOGY
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Interventional Radiology Innovators: Advancing Minimally Invasive Modern Medicine

Contributions of Society of Interventional Radiology Members Through Medical Patents, Patent Applications Continue to Alter Medical Landscape to Improve Patient Care

TAMPA, Fla. (March 16, 2010)—Over the past 40 years, more than 2,400 patents and patent applications—pioneering modern medicine with the devices and drugs that advance minimally invasive treatments—have been filed by members of the Society of Interventional Radiology. These innovations—from the invention of angioplasty and the catheter-delivered stent, which were both first used to treat peripheral arterial disease in the legs, to drug-coated stents, balloon angioplasty, vena cava filters, catheter delivery systems, aortic endografts, ozone generators and radiofrequency ablation and clot-removing devices of today—continue to shape and change the medical landscape and improve patient care.

"The introduction of new devices, drugs and methods result in continuously increasing numbers of patients being treated by interventional radiologists—without the need for open invasive surgery, without the need for a scalpel. That's modern medicine," said Kieran J. Murphy, M.D., FSIR, program chair of SIR's 35th Annual Scientific Meeting being held March 13–18 at the Tampa Convention Center in Tampa, Fla. "The quality and quantity of the devices and drugs used to advance minimally invasive treatments for patients are a testament to the incredible inventiveness of interventional radiologists," noted Murphy, interventional neuroradiologist and vice chair and deputy chief of medical imaging at the University of Toronto in Ontario, Canada. In fact, SIR's meeting celebrates "IR Innovation," highlighting the tremendous interventional radiology advances in patient care and quality of life. "These unique inventions pioneered the profession, and new ones continue to benefit—and help advance—other medical specialties as well, including cardiology, urology and oncology," he added. SIR is honoring IR inventors and inventions with a special "Hall of Innovation" at its annual meeting.

A sampling of the numerous interventional radiology innovators whose inventions allow patients to be healed without having invasive operations include **Kurt Amplatz,** M.D., FSIR (the Amplatzer septal occluder, which repairs atrial septal defects, a hole in the wall between the upper chambers of the heart by percutaneous catheter placement, and the specially shaped Amplatz catheter, a mainstay for coronary angiography); **Harold G. Coons,** M.D. (covered expanding mesh stent, used as an expandable biliary, vascular, endotracheal, esophageal or prostatic device); **Andrew H. Cragg,** M.D., FSIR (infusion catheters, spinal fusion devices and a novel approach to access the lumbar spine by approaching the spine along its axis, rather than from the side, front or back); **Lindsay Machan**, M.D., FSIR (combined drug and device together with the paclitaxel stent, a revolutionary treatment for coronary artery disease that prevents scar tissue from growing into a stent and re-clogging the artery); **Robert J. Min,** M.D., FSIR (endovenous laser for treatment of venous insufficiency—when the leg's veins cannot effectively return blood to the heart—a minimally invasive technique used by thousands of physicians around the world to treat a variety of conditions, including varicose veins); and **Julio C. Palmaz**, M.D., FSIR (the first clinically successful balloon expandable vascular stent used for the first successful abdominal aortic stent grafts and transjugular intrahepatic portosystemic shunts, now common procedures throughout the world; this device has found applications beyond the arterial system, including veins [peripheral, central and pulmonary], the biliary ducts and the tracheobronchial tree).

Murphy, who noted that Machan and Palmaz are presenting sessions at the Annual Scientific Meeting, holds numerous patents related to spine/back and vertebroplasty, including methods for bone augmentation and for fostering and preserving bone growth and for strengthening vertebral bodies.

During the 1980s, the majority of patents and patent applications focused on stents and vascular work involving blood vessels. The 1990s and early 2000s shifted to spine/lumbar patents and applications, said Murphy. After 1995, there was a marked and sustained increase in patent fillings. Recently, work has centered on cancer care. "We will see huge advances in oncology, especially in improved technology for total cancer tumor kill with heat-based devices," predicted Murphy. "There will be a trend toward drug-

device combinations in bone or tumor treatments," added the co-author of "An Examination of the Inventiveness of the Society of Interventional Radiology Membership."

"An exhaustive patent search of SIR current and former members conducted by searching the United States Patent and Trademark Office database—as well as international patents—shows interventional radiologists created the minimally invasive medical profession," said Murphy. "The study's aim was to find a metric of the inventiveness of SIR members and gain a sense of the contribution they have made to the creation of the field of image-guided therapy," said Murphy, who cross referenced SIR membership with patent filings and applications at the U.S. Patent and Trademark Office and the international patent filling body, the PCT (Patent Cooperation Treaty). "Interventional radiologists created the tools that we all use today. The inventiveness and creativity of the SIR membership far surpassed our expectations. The contribution of the members to the field is striking, with the demographics indicating that clinical challenges and daily work with patients are the greatest sources of innovation," he noted.

Angioplasty and stenting revolutionized medicine and led the way for the more widely known applications of coronary artery angioplasty and stenting that advanced the practice of cardiology. Today, many conditions that once required surgery can be treated nonsurgically by interventional radiologists. Through a small knick in the skin, IRs use tiny catheters and miniature instruments so small they can be run through a person's network of arteries to treat at the site of illness internally, saving the patient from open invasive surgery. The risks of interventional procedures are far lower than the risks of open surgery and are a major advance in medicine for patients.

Some of the more recent advances in interventional radiology include nonsurgical ablation of tumors to kill cancer without harming the surrounding tissue; embolization therapy to stop hemorrhaging or to block the blood supply to a tumor; catheter-directed thrombolysis to clear blood clots, preventing disability from deep vein thrombosis and stroke; and carotid artery angioplasty and stenting to prevent stroke.

Of the 2,429 patents and applications studied, 622 were issued patents and 938 were applications with USPTO; there were 629 issued patents and 303 patent applications at the PCT. According to Murphy, the file patent breakdown was as follows: 1 patent (211 members); 2–10 patents (175 members); 10–20 patents (29 members); 20–30 patents (10 members); 30–170 patents (14 members). Murphy indicated that the percentage breakdown by nationality for patents and applications was as follows: United States, (67 percent), Europe (26 percent), Japan (4 percent), Korea and the Czech Republic (about 1 percent) and Australia and Canada (both under 1 percent).

More information about the Society of Interventional Radiology, interventional radiology and minimally invasive treatments for disease can be found online at www.SIRweb.org.

Abstract 75: "An Examination of the Inventiveness of the Society of Interventional Radiology Membership," K.J. Murphy and R. Mandani, both at the University of Toronto, Toronto, Ontario, Canada, SIR 35th Annual Scientific Meeting March 13–18, 2010, Tampa, Fla. This abstract can be found at www.SIRmeeting.org.

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About the Society of Interventional Radiology

Interventional radiologists are physicians who specialize in minimally invasive, targeted treatments. They offer the most in-depth knowledge of the least invasive treatments available coupled with diagnostic and clinical experience across all specialties. They use X-ray, MRI and other imaging to advance a catheter in the body, such as in an artery, to treat at the source of the disease internally. As the inventors of angioplasty and the catheter-delivered stent, which were first used in the legs to treat peripheral arterial disease, interventional radiologists pioneered minimally invasive modern medicine. Today, interventional oncology is a growing specialty area of interventional radiology. Interventional radiologists can deliver treatments for cancer directly to the tumor without significant side effects or damage to nearby normal tissue.

Many conditions that once required surgery can be treated less invasively by interventional radiologists. Interventional radiology treatments offer less risk, less pain and less recovery time compared to open surgery. Visit www.SIRweb.org.

The Society of Interventional Radiology is holding its 35th Annual Scientific Meeting March 13–18 in Tampa, Fla. The theme of the meeting is "IR Innovation," celebrating the remarkable inventiveness of SIR members and highlighting the contributions made to both the creation of the field of interventional radiology and to improving patient care.

Local interviews are available by contacting SIR's communications department via e-mail at mverrillo@SIRweb.org or by phone at (703) 460-5572.