Stem Cell Research Revolutionizes Cancer Treatment

Stem cell research has enabled significant advances in cancer treatment and is poised for more breakthroughs in the near future, according New Horizons Lecturer Irving L. Weissman, M.D., a foremost expert on the issue.

R. Weissman discussed the impact of hematopoietic stem cells (HSCs), which give rise to all the blood and immune cells in the body and hold promise for improving the success rate of autologous bone marrow transplants, a cancer treatment in which stem cells are removed from the patient before high-dose chemotherapy or radiation treatment.

The cells are stored in a freezer and returned to the patient after treatment to regenerate normal blood cells, said Dr. Weissman, director of the Weissman Laboratory at Stanford University in Stanford, Calif., and founder of several stem cell companies. Autologous transplants have been hampered in the past because of contamination by cancer cells, Dr. Weissman said, but recent advances like high-speed cell sorters have enabled researchers to purify the samples before transplantation.

“We isolated blood-forming stem cells from women with metastatic breast cancer and gave back the purified stem cells,” Dr. Weissman said. “At the 15-year follow up, one-third of the women were alive, compared with only 7 percent of those who got unpurified mobilized peripheral blood.”

Dr. Weissman expects to see similar results in patients with lymphoma.

Purified stem cells also improve the likelihood of success in allogeneic bone marrow transplants and in treating patients with genetically-defective blood-forming systems. The process often fails because T cells in the donor blood will attack and destroy the patient’s lymphoid organs.

“We’ve shown that purified HSCs don’t have T cells contaminating them when they remake the blood-forming system in the host,” Dr. Weissman said. “Because the hosts have a donor immune system, they cannot reject any organ, tissue or tissue stem cell transplant from the HSC donor.”

This development has the potential to eliminate the need for immunosuppressive drugs that have been used for the last 30 years to fight off rejection of transplanted organs.

“With purified HSC, we can perform organ transplants or organ stem cell transplants and never need immunosuppression,” Dr. Weissman said. “In the next decades, organ and tissue donors will not be living people, but stem cell lines that can generate HSC and organ-specific stem cells.”

Stem cells have also helped provide a better understanding of the stages of blood formation that harbor the earliest stages of pre-leukemia, Dr. Weissman said. In 1998, he discovered that leukemia had its own stem cells that were able to evade programmed cell removal. Further research implicated CD47, a protein on the cell surface that appears able to evade programmed cell removal. Further research implicated CD47, a protein on the cell surface that appears to help cancer cells trick the body’s infection-fighting macrophages.

“I in the next decades, organ and tissue donors will not be living people, but stem cell lines that can generate HSC and organ-specific stem cells.”

Irving L. Weissman, M.D.

Partnerships Promote Global Dose Reduction

Radiologists, technologists and other stakeholders are working together to successfully implement dose reduction strategies worldwide, according to presenters of a session on Monday at RSNA 2013.

In the European Union (EU), projects such as Clinical Audit Guidelines, a tool developed to facilitate the implementation of clinical audit programs in medical imaging and radiation therapy departments, and other programs that collect dose distributions and provide education and training are key to promoting a radiation safety culture, said Graciano N. Paulo, M.Sc., R.T., vice-president of the European Federation of Radiographer Societies.

“All these EU projects were made on a multi-stakeholders model, based on the contribution of organizations representing EU regulators, radiologists, radiographers, medical physicists and research centers, among others,” Paulo said.

Paulo emphasized the need for more guidelines covering the entire EU, including radiation dose information and specific advice for imaging children and pregnant women. Also needed are clearer and stronger measures by a roster of attendees from around the globe (including Bernhard Petrisch, M.D., left, and Rosa Sigrist, M.D. right). For a full report, see Page 11A.

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How Do Residents De-Stress?

In between relaxing, networking or grabbing a snack, attendees of the Residents and Fellows Lounge in the Lakeside Learning Center took time out Monday to share some secrets for dealing with stress and burnout during training. Along with exercising and napping, “Playing with my friends” were among the de-stressors mentioned by a roster of attendees from around the globe (including Bernhard Petrisch, M.D., left, and Rosa Sigrist, M.D. right). For a full report, see Page 11A.

Graciano N. Paulo, M.Sc., R.T.

to encourage the availability and the use of referral guidelines, he said.

“Radiographers, being the final point of contact for the patient, have the responsibility to guarantee the correct
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Tuesday at a Glance

7:15–8:15
Hot Topic and Controversy sessions

8:30–10:00
Refresher Courses and Workshops
Associated Sciences Refresher Course
Standards of Ethics in Practice: Evolution, Purpose, Structure, Compliance
(BOOST) Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow: Anatomy and Contouring—Gastrointestinal, Breast
Essentials of Cardiac Imaging
Quality Improvement Symposium
Safety at Work

8:30–12:00
Series Courses
Breast, Emergency, Gastrointestinal, Genitourinary, Interventional, Musculoskeletal, Neuroradiology, Nuclear Medicine, Pediatric, Radiology Informatics

10:30–12:00
Scientific Paper Sessions
Associated Sciences Refresher Course
Emerging Technology: What’s New
(BOOST) Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow: Integrated Science and Practice—Gastrointestinal, Breast
Essentials of Ultrasound
Informatics Courses

12:15–1:15
12:15–1:15
Scientific Informal (Poster), Quality Storyboard and Education Exhibit Presentations (Lakeside Learning Center and Subspecialty Campuses)

12:30–2:00
Informatics Courses
1:30–2:45
Tuesday Plenary Session (Arie Crown Theater)
Presentation of Gold Medals (See Page 15)
Special Lecture
Mobilizing Human Potential
Condoleezza Rice, Ph.D.
1:30–3:00
Associated Sciences Refresher Course
Process Engineering to Optimize Work Flow Processes in Radiology: A Case Study Approach
Essentials of Pediatric Imaging
Quality Improvement Symposium
Strategies for Improving Patient Safety: Root Cause Analysis

1:30–6:00
Interventional Oncology Series: Lung

2:30–4:00
Informatics Courses
3:00–4:00
Scientific Paper Sessions
3:00–4:15
(BOOST) Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow: Case-based Review—Gastrointestinal, Breast
3:00–6:00
Series Course
Pediatric
3:30–5:00
Associated Sciences Refresher Course
Social Media and Medical Imaging Management: What You Do Not Know Can Destroy Your Practice
Essentials of Trauma Imaging
4:30–6:00
Refresher Courses and Workshops

12:30–2:00
Medical Physics Question of the Day
Q What is the effective dose of a typical PET scan? [Answer on page 15.]

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South Building Hall A Booth #3314
DATE: Wednesday Dec. 4
TIME: 10:30 - 11:15AM
Oncologic Imaging the Focus of “France Presents”

From molecular imaging biopsy guidance to intraarterial therapy for hepatocellular carcinoma, Monday’s “France Presents” session delivered a full spectrum of cutting-edge research in oncologic imaging to a packed room.

The session, introduced in French by RSNA 2013 president Sarah S. Donaldson, M.D., demonstrated the significant contributions French radiologists bring to the world stage and emphasized the importance of international collaboration. The French Society of Radiology and the French College of Radiologists chose to focus the “Presents” session on diagnostic and interventional oncologic imaging and the role of radiologists in managing cancer patients, said presenter Valerie Vilgrain, M.D., chair of the Department of Radiology at the University Beaujon Hospital in Cligny, France.

Both academic evaluation and routine functional tumor imaging are increasingly combined to provide optimal tumor staging and response, said Alain Luciani, M.D., Ph.D., a professor of radiology at the University Paris Est Creteil and a radiologist at the University Hospital CHU Henri Mondor, who presented “Whole-body Diffusion in Hematology Malignancies.”

“Current MR developments, including respiratory triggering, phased array coils and parallel imaging, bring whole-body MR imaging to clinical practice, especially for oncologic patients,” Dr. Luciani said.

Ongoing national and international protocols led by French academic imaging teams are currently underway for the assessment of multiple myeloma and lymphoma, Dr. Luciani said. In a France/Taiwan research program supported by French public funding, investigators are exploring whole-body diffusion-weighted imaging as a standalone method compared to PET-CT for lymphoma staging with novel instrumental developments dealing with diffusion in hematologic malignancies.

Radiologist Plays Key Role in Oncologic Imaging

Dr. Vilgrain’s presentation focused on the role of the radiologist on a multidisciplinary team in the treatment of colorectal liver metastases. “In recent years there has been significant growth in multidisciplinary teams, working as a result of increasing specialization, advances in medical technologies and recommendations by national agencies, especially in oncology,” she said.

The radiologist’s role on these teams is key, Dr. Vilgrain said. “In colorectal liver metastases, based on an extensive imaging workup and patient clinical status, radiologists determine whether the patient is resectable, unresectable or borderline. In unresectable or borderline patients, radiologists evaluate tumor response to choose optimal treatment.”

Radiologists also have a critical role in addressing chemotherapy-induced liver toxicity and in potentially avoiding radical hepatectomy by isolating lesions with advanced imaging, he said.

These teams are vital for optimal patient care, Dr. Vilgrain said, citing a 2012 study in the British Journal of Radiology demonstrating that patients who did not benefit from a multidisciplinary team were denied potentially curative treatments.

Established in 2003, the French National Cancer Plan was developed to reduce the number of cancer cases and deaths and improve quality of life. The plan also aimed to establish multidisciplinary team meetings for every patient.

“Radiologists have become important contributors to these teams and their presence is mandatory when discussing oncologic cases,” Dr. Vilgrain said.

The story of cancer begins with biopsy, said Eric De Kerviler, M.D., a professor of radiology at Hôpital St. Louis in Paris, whose presentation focused on molecular imaging techniques for biopsy guidance. “The standard imaging modalities used for needle guidance are often adequate to identify the lesion or determine the needle trajectory, but cannot overcome the variable expression of molecular targets within tumors.”

Molecular imaging enables the visualization of cellular function, and therefore offers better insight into a tumor’s biology, demonstrating areas of increased metabolism or necrosis, abnormal perfusion or tissue stiffness, Dr. De Kerviler explained.

Molecular imaging can create a clearer map of the optimal biopsy route, said Dr. De Kerviler. “What if we could dispose from a molecular GPS?”

Techniques for intra-arterial therapy of liver malignancies was presented by Thierry J. De Baere, M.D., director of the Department of Interventional Radiology at the Institut Gustave Roussy in Villejuif, France.

“For hepatocellular carcinoma (HCC), 3D angiography image guidance with computer image analysis improves outcomes of chemoembolization because 3D imaging allows us to better depict tumors in the liver,” Dr. De Baere said. “Tumor feeding vessels can be depicted with a sensitivity of 99 percent, with limitations in vessels below one millimeter when patients have been already treated.”

“We need research in drug and delivery platforms dedicated to intra-arterial therapy,” Dr. De Baere said. “In the future, we could have one syringe for HCC, one for liver metastases, and so on.”

Closing remarks were given by, from left: Nicolas Grenier, M.D., RSNA Board Liaison for International Affairs Richard L. Baron, M.D., and Pierre Pruvo, M.D., Ph.D., 2013 RSNA President Sarah S. Donaldson, M.D.

Survey Details Imaging Needs Across the Globe

Unmet imaging needs in countries across the world is the focus of a paper to be presented by Bhavya Rehani, M.D. Researchers surveyed radiologists across developing countries in Asia, Europe and South America to assess their imaging needs and gauge their opinions on the most effective ways to improve imaging in their respective countries. “Making Imaging around the World Better: Global Survey of Radiologists in 10 Countries,” will presented as part of Integrated Science and Practice Session SSM-03—Health Service, Policy and Research (Medicolegal and Ethics). The session is scheduled on Wednesday from 3:00 to 4:00 p.m., in Room S102D.

Valerie Vilgrain, M.D.

Pruvo, 2013 RSNA President Sarah S. Donaldson, M.D.

De Kerviler. “What if we could dispose from a molecular GPS?”

2013 Honorary Members

2013 RSNA President Sarah S. Donaldson, M.D., (far right), presented RSNA Honorary Membership to three distinguished physicians during the Monday Plenary session. Pictured, from left, are: Malgorzata Szczerbo-Trojanowska, M.D., Gabriel Krestit, M.D., Ph.D., and Anne W. Lee, M.D.
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Exhibit long-term brain differences suffered mild traumatic brain injury (MTBI) researchers have found that soldiers who

Cardiac MRI reveals energy drinks alter brain. Injuries, the results suggest the presence of two groups. Since the victims were, on average, more than four years removed from their injuries, the results suggest the presence of a long-term impact of blast injury on the brain.

Cardiac MRI Reveal Energy Drinks Alter Heart Function Healthy adults who consumed energy drinks high in caffeine and taurine had significantly increased heart contraction rates one hour later. Researchers used cardiac MRI to measure the effect of energy drink consumption on heart function in 18 healthy volunteers. Compared to the baseline images, results of cardiac MRI performed one hour after the study participants consumed the energy drink revealed significantly increased peak strain and peak systolic strain rates in the left ventricle of the heart.

PRP Therapy Improves Degenerative Tendon Disease in Athletes Ultrasound-guided delivery of platelet-rich plasma (PRP) improves functionality and reduces recovery time in athletes with degenerative tendinosis. Researchers evaluated PRP in 80 athletes who had degenerative tendinosis in the Achilles or patellar tendons. The patients underwent ultrasound-guided PRP every 21 days for a total of three treatments. Patients saw an overall improvement of 75 to 80 percent in pain and 50 to 53 percent in functionality after the PRP treatments.

MRI Technique Reveals Low Brain Iron in ADHD Patients Researchers measured brain iron in 22 children and adolescents with ADHD and 27 healthy control children and adolescents using magnetic field correlation (MFC) imaging. The results showed that ADHD patients who had never been on medication had significantly lower MFC. In contrast, no significant group differences were detected using relaxation rates or serum measures. MFC imaging’s ability to noninvasively detect the low iron levels may help improve ADHD diagnosis and guide optimal treatment.

Novel Rehabilitation Device Improves Motor Skills after Stroke Using a rehabilitation device that converts an individual’s thoughts to electrical impulses to move upper extremities, stroke patients reported improvements in their motor function and ability to perform activities of daily living. Researchers studied eight stroke patients, using a new device built by pairing a functional electrical stimulation system and a brain control interface. Each of the patients underwent nine to 15 rehabilitation sessions of two to three hours with the new device over a period of three to six weeks. While all patients showed improvement, patients who suffered a stroke of moderate severity realized the greatest improvements in motor function following the sessions.

Today’s Press Conferences RSNA invites members of the medical news media to attend its annual meeting each year so that, through stories in print, broadcast and Internet media, the public gains a greater understanding of radiology and its role in their healthcare. Four press conferences will be held today. They are:

- New Research Shows Promise for Possible HIV Cure
- Breast Tomosynthesis Increases Cancer Detection and Reduces Recall Rates
- International Study Finds Heart Disease Similar in Men and Women
- Breast Cancer Risk Related to Changes in Breast Density as Women Age

Margulis Awards Presented to Studies in Contrast

The 2013 Alexander R. Margulis Award for Scientific Excellence was presented today to Daniel Küetting, M.D., Daniel Thomas, M.D., and Jonas Dörner, M.D., of the University of Michigan Health System in Ann Arbor and Robert J. McDonald, M.D., Ph.D., of the Department of Radiology at the Mayo Clinic in Rochester, Minn. The two are authors of separate articles that reached different conclusions about the role of iodinated contrast agents in the diminished renal function that may be observed following CT involving intravenous contrast agents.

Dr. Davenport’s article, “Contrast Material-induced Nephrotoxicity and Intravenous Low-Osmolarity Iodinated Contrast Material” and Dr. McDonald's article, “Intravenous Contrast Material-induced Nephropathy: Causal or Coincident Phenomenon?” were both published in the April 2013 issue of Radiology.

Named for Alexander R. Margulis, M.D., a distinguished investigator and inspiring visionary in the science of radiology, this annual award was established in 2012 recognizes the best original scientific article published in a particular year in Radiology. The Margulis Award Nominating Committee and the Margulis Award Selection Committee review published manuscripts based on their novelty, quality, importance, and potential scientific and clinical impact.

Both articles chosen for the 2013 Margulis Award show the risk, if any, of kidney injury following contrast agent administration is far less than has been previously suggested. Dr. Davenport and colleagues, starting with a group of nearly 430,000 CT examinations, identified more than 20,000 patients, half of whom had undergone contrast medium-enhanced scanning and half of whom had undergone non-enhanced scanning, with exact propensity score matching. They found that patients with creatinine levels of less than 1.5 mg/dL before CT were not at risk for nephropathy. As creatinine levels before CT increased, the risk of nephropathy after CT increased for both groups. Although a number of other risk factors helped to predict the risk of nephrotoxicity, the vast majority of patients who had undergone contrast medium administration, contrast medium administration remained an independent risk factor for patients whose creatinine values before contrast medium administration were equal to or higher than 1.6 mg/dL. The risk increased as creatinine levels before contrast medium administration increased.

Dr. McDonald and colleagues performed a retrospective analysis involving more than 157,000 scans obtained from 53,000 patients. They divided contrast medium-receiving patients and non-contrast medium-receiving controls into low-, medium- and high-risk groups, performed propensity score adjustment by using several techniques to compare groups, and performed counterfactual analysis in which a subgroup of patients each of whom had contrast-enhanced and non-enhanced scans acted as their own controls. They concluded that intravenous administration of contrast medium was associated with no increased risk of nephrotoxicity, and that it may not pose any threat to renal function, even in patients with preexisting renal insufficiency.
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Tomosynthesis Superior to Mammography in Breast Cancer Detection

Tomosynthesis is significantly better than conventional mammography at detecting breast cancers and characterizing morphology, according to a session presented Monday.

There have been just a few clinical studies that have talked about the advantages of tomosynthesis over conventional mammography,” said presenter Pragya A. Dang, M.D., of Massachusetts General Hospital, Boston. These include findings that the use of tomosynthesis reduces recall rates, improves diagnostic accuracy, and increases cancer detection.

“We wanted to delve further into our own experience and use the data we’ve collected over the last couple of years since we’ve been using tomosynthesis in clinical practice in order to access the maximum performance of these two technologies,” Dr. Dang said.

Dr. Dang and colleagues retrospectively reviewed 172 biopsy-proven invasive breast cancers (142 invasive ductal carcinoma [IDC], 25 invasive lobular carcinoma [ILC] and 5 invasive mammary carcinoma) that were consecutively accrued prior to biopsy between March 2011 and October 2012. The cancers were imaged with tomosynthesis and conventional digital mammography.

Two radiologists rated the visibility and morphology of these cancers with both tomosynthesis and conventional mammography, and without the presence of prior imaging. “There was a significantly improved degree of visibility with tomosynthesis compared to digital mammography,” Dr. Dang said.

As an example she highlighted a finding in which the readers, when asked to determine whether tomosynthesis performed better, the same, or worse than mammography, rated tomosynthesis as superior to mammography in visualizing cancers in 70 percent of the cases.

Lesion visibility was rated on a five-point scale, from 1 (not visible) to 5 (obvious). Visibility scores for IDC were 3.4 for tomosynthesis and 2.8 for mammography; for ILC scores were 3.2 for tomosynthesis and 2.3 for mammography. “So for both of these readers there was basically a one point improvement with tomosynthesis on the visibility score,” Dr. Dang said. “And that is statistically significant.”

Of the 172 cancers, 28 (16 percent) were occult on mammography, whereas just 5 (3 percent) were occult on tomosynthesis. Characterization of tumor morphology also improved with tomosynthesis, Dr. Dang said.

“Along with the improved visibility a much higher percentage of the cancers were more definitively characterized as masses compared to asymmetries, which were only available on one view,” she said.

For example, she pointed out that the first reader was only able to characterize 42 percent of the cancers as masses with conventional mammography, compared to 78 percent with tomosynthesis. Results were similar with the second reader, who was able to characterize 84 percent of the cancers as masses with tomosynthesis, compared to 36 percent with conventional mammography.

But readers characterized 19 percent of the cancers as asymmetries on conventional mammography, compared to just 2 percent with tomosynthesis.

“So this better characterization of tumor morphology does help translate into improved detection of cancers,” she said.

“Results show that tomosynthesis is significantly better than conventional mammography in visualizing cancers that we believe would translate to increased cancer detectability upon screening,” Pragya A. Dang, M.D.

Results show that tomosynthesis is significantly better than conventional mammography in visualizing cancers that we believe would translate to increased cancer detectability upon screening,” Pragya A. Dang, M.D.

For more details please contact Jed Palmacci at jed@perfinhealthcare.com

Maxio is pending 510K clearance and currently not available for sale in the US
PET/MR Shows Promise in Evaluating Abdominal Malignancies

Combining PET and MR imaging could be more effective in evaluating abdominal malignancies than conventional body CT, according to the presenter of a study Monday at RSNA 2013.

Researchers in South Korea observed added value from PET/MR in more than 30 percent of the patients used in their study. “Because of low soft-tissue contrast of CT examination, there are some limitations in the evaluation of abdominal oncologic diseases,” said presenter Beomsik Kang, a resident in the radiology department at Seoul National University Hospital where the study was conducted. “In fact, in our study, a relatively large proportion of additional findings of PET/MR compared to CT were characterization of hepatic lesions, which was not determined at CT scan.”

Researchers conducted a retrospective study of 122 patients (80 men, 42 women) who underwent 18-FDG PET/MR and contrast-enhanced CT for initial staging or follow-up of abdominal malignancy. Oncological diagnoses for the patients included anal cancer, colorectal cancer, cholangiocarcinoma, hepatocellular carcinoma, gallbladder cancer, lymphoma, renal cell carcinoma, and pancreatic cancer.

Using PET/MR, additional findings beyond the CT results were discovered in 38 patients. Lesion characterization was improved in 26 patients, while additional malignancies were identified in 12 patients. PET/MR also resulted in a change of treatment strategy for 22 patients.

Further analysis of the results shows dedicated MR improved lesion characterization in five patients. Whole-body PET/MR improved lesion characterization in six patients, and helped identify an additional malignancy in seven patients.

Lesion characterization was improved in 15 patients when PET/MR was combined with MR. The combination also resulted in detection of additional malignancies in five patients.

No statistical improvement was shown in T and N staging of CT and PET/MR when compared with histopathologic findings in 24 patients who underwent surgery after the PET/MR scan. PET/MR produced correctly staged results for 18 of the 24, compared with 15 using CT. Overstaging with PET/MR occurred in three (compared to five), and understaging also occurred in three (compared with four).

But in the N stage, CT correctly staged 16 of the patients, while PET/MR had 15. Both methods overstaged four patients, while CT understaged four and PET/MR had five.

Despite the positive results that suggest PET/MR does add clinical value, Kang cautioned against using it as a replacement for CT. He added the convenience and relative short time needed for CT scans should be emphasized. It is also more cost effective than the PET/MR combined.

“It is too early for use to make a conclusion regarding whether PET/MR can replace a conventional CT based on our study results with a small number of patients,” Kang said. “As of now, it should be regarded as being in addition to CT.”
Explore Resident, Fellow Sessions at RSNA 2013

A full spectrum of RSNA 2013 sessions spotlight issues relevant to radiology residents and fellows. Explore scientific posters and education exhibits in the Lakeside Learning Center and via the Virtual Meeting (RSNA 2013.RSNA.org/virtual).

**LL-ROS-TU4B**
Predictors of Academic Career Selection in Radiation Oncology: A National Survey of Radiation Oncology Residency Programs (Scientific [Informal] Poster)

**LL-HEP-E2019**
Navigating the Sea of Organized Radiology: A Resident, Fellow, and Junior Faculty Primer on Opportunities for 'Setting Sail' (Education Exhibit)

**LL-BRE-E2431**
Making Sense of Mammograms—A Quiz for Residents (Education Exhibit)

**RC302**
Strategies for ABR Core Exam and ACGME Resident Performance Evaluations

**RC724**
Professionalism and the Radiology Trainee

**RC402**
Resident Interviewing: Skills that Work!

**E**
Extraulmonary gas on CT is critical for identifying a range of life threatening pathologies. This session features a quiz to test residents’ ability to identify pathologic gas and distinguish it from other potential etiologies of air outside the bowel lumen. Each case is presented as an unknown, followed by key teaching points. Residents will gain an understanding of the CT appearance of air in a range of abnormal anatomic locations and the clinical significance.

Residents Relax Courtesy of RSNA and ACR

At a reception hosted by RSNA and the American College of Radiology (ACR) on Monday night, residents from around the world had a chance to network with one another and with members of radiology’s leadership. More than 7,000 radiologists in training are in attendance at RSNA 2013.
Residents From Around the World Share Secrets for Battling Stress

We asked doctors in the Residents Lounge on Monday how they handle stress during training.

“I work out…swim, bike and run,” said Bernhard Petritsch, M.D., a fifth-year resident at the University of Wurzburg, in Germany. “I do triathlons.”

“I like to sleep,” said James Zheng, M.D., a second-year resident at the Royal University Hospital in Saskatoon, Canada. “I also enjoy yoga and going to the gym.”

“That is difficult because I have two kids and I have to commute every day…I live in a city 60 kilometers from San Pao,” said Rosa Sigrist, M.D., a second-year resident at the InCor Heart Institute at the University of San Pao, Brazil. “When I have free time, I like to run a little bit. I think it helps me. Sometimes it helps with trying to eat healthy.”

“I do exercises like cycling and I like to read and also go to the beach,” said Monica Orozco, M.D., a fourth-year resident at the Son Espases Hospital in Mallorca, Spain. “We have some beautiful beaches in Mallorca, so that helps.”

“I play with my friends,” said Meeyum Park, M.D., a second-year resident at the Kangnam Sacred Hospital in Seoul, Korea.

“Sleep…I also love travel and good times with friends,” said James Collins, M.D., a second-year resident at the University of Mayor, in Santiago, Chile.

“I listen to music, whatever is on my Spotify list,” said Rudi Barua, M.D., a fourth year resident at Jacobi Medical Center in New York City. “That’s about it.”

“I like to exercise—going to the gym is part of my daily routine,” said Vlad Tchatalbachev, M.D., a third-year resident at the University of Missouri, in Columbia, Mo. “Taking a nap also.”

Resident and Fellow Symposium Explores Current, Future Job Market

This year’s RSNA Resident and Fellow Symposium, “Career 101: Planning for Success After Residency” (An Interactive Session), is designed to prepare residents and fellows for current and future workplace challenges. Coordinated in part by the RSNA Resident and Fellow Committee (RFC), all sessions are moderated by RFC chair Aparna Annam, D.O. All sessions will be held Wednesday, Dec. 4, in Room E451B.

Future of the Radiology Job Market—Progress or Panic?
1:30-2:00
Along with covering results of the 2012 and 2013 American College of Radiology (ACR) Workforce Survey, presenters will discuss the types of practices and geographic locations where jobs appear to be potentially available in 2014 and 2016 and types of radiology subspecialties and generalists where employers appear to be interested in hiring in those years.

Negotiating a Tight Job Market—The Do’s and Don’ts of Finding a Job
2:00-2:30
Presenters will assess current job opportunities, analyze important metrics and demographics for job satisfaction and identify key questions that must be answered before signing a contract.

Your First Job Isn’t Your Last Job
2:30-3:00
Presenters will focus on the impetus for job change across the career of radiologists in practice and academia, discuss nontraditional and traditional career opportunities open to radiologists, and detail the challenges, both professional and personal, of pursuing career path changes.

Panel Discussion—3:00-3:30

Stop by the Lounge
Residents attending RSNA 2013 are invited to the Residents Lounge, located in the Lakeside Learning Center. Relax and network while enjoying complimentary refreshments. Open 8:30 a.m.-6:00 p.m. through Thursday.
Also at RSNA 2013: Explore Sessions in Every Subspecialty

Here’s just a sampling of what RSNA attendees can learn in refresher courses and scientific and education presentations in every subspecialty. View scientific posters and education exhibits in the Lakeside Learning Center through Friday. Virtual meeting registrants may also view posters and exhibits by logging in from outside McCormick Place.

**Breast**

Quantitative MRI-based Phenotypes of Triple Negative Breast Cancers

Part of Scientific Paper Session SSQ02—Breast (CAD/Quantitative Imaging)

Thursday, Dec. 5 • 10:30 a.m.–Noon

Room E450A

Quantiative image analysis could become a valuable tool for identifying triple-negative breast cancers, improving prognostic assessments and allowing for the development of more effective treatment regimens for these cancers, which resist many chemotherapies. Researchers studied 168 biopsy-proven breast cancer MR imaging studies, including 40 cases that were triple-negative. (The others included a variety of molecular subtypes.) They used several quantitative techniques to classify the images based on the shape, texture, and kinetics of the lesion. Triple-negative cases exhibited increased margin variability, distinct kinetics, and increased surface area.

**Computed Tomography**

Novel Applications of Dual Energy CT

Refresher Course 517

Wednesday, Dec. 4 • 8:30–10:00 a.m.

Room S304CD

Dual energy CT (DECT) is an innovative imaging technique that can provide information about tissue composition beyond that obtainable with single energy techniques. In thoracic medicine, low kilovoltage DECT imaging with increased iodine conspicuity is useful for evaluation of vascular structures. Material-specific post-processing can be tailored for particular clinical indications, like contrast enhancement in pulmonary nodules. Other potential thoracic applications for DECT include evaluation of pleural masses and airways disease. The ability of DECT to separate distinct materials and assess the presence and amount of iodine within a target lesion makes it a valuable tool in oncology, with advantages in lesion detection, characterization and evaluation of response to therapy. DECT also has numerous applications in musculoskeletal imaging. In patients with gout, DECT can delineate the anatomy of crystal deposition disease and monitor disease progression and treatment of the monosodium urate crystals. Additional musculoskeletal applications include characterization of acute bone marrow edema, identification of injuries to tendons and ligaments and reduction of metal artifacts.

**Informatics**

Leveraging ‘The Wisdom of Crowds’ in Collaborative Image Diagnosis

Education Exhibit

An experiment sought to discover if radiologists could perform better working independently or within a group when diagnosing images, based on “the wisdom of the crowds” phenomenon. Using the results of 12 musculoskeletal radiologists examining 74 images individually, a consensus diagnosis was calculated by a computer algorithm. The sensitivity of the consensus was greater than the sensitivity of all 12 of the individual diagnoses, and the specificity of the consensus was greater than 10 individuals, with two others being equal, the study showed.

**Neuroradiology**

Mapping functional reorganization of the motor network connectivity after training with a novel MR compatible hand induced robotic device

Part of Scientific Paper Session SSM16—Neuroradiology (Resting State Functional Brain Imaging)

Wednesday, Dec. 4 • 3:30–4:00 p.m.

Room N229

Functional MR imaging can be used to fine-tune rehabilitation for stroke victims by mapping brain activity during therapy and tracking changes in that activity as therapy progresses. Researchers used a MR-compatible hand-induced robotic device that patients squeezed and released while their brain activity was monitored with fMRI. Using dynamic causal modeling, the researchers were able to model the task-dependent influences that one area of the brain exerted over another. Twelve healthy volunteers and five chronic stroke patients who were at least six months post-stroke were studied.

**Pediatric Radiology**

Structural Anomalies of the Lung in Children Born Extremely Preterm during the Surfactant Era

Part of Scientific Paper Session SSMM1—Pediatrics (Chest)

Wednesday, Dec. 4 • 3:00–4:00 p.m.

Room S102AB

Researchers sought to show structural anomalies existed in lungs of preterm children regardless of their bronchopulmonary dysplasia (BPD) status, and that children of the BPD cohort would have increased frequency and severity of the abnormalities. Looking at a cohort of 100 preterm children born at 32 weeks, the study revealed 94 percent presented with structural lung abnormalities regardless of BPD status. The abnormalities remained evident at ages 9 through 11.

**Vascular**

Whole Body Cardiovascular Magnetic Resonance Imaging in the Detection of Occult Disease in Diabetes Mellitus

Part of Vascular Imaging Series VSVA61—MR Angiography: Principles and Technique Optimization

Friday, Dec. 6, 8:30 a.m.–Noon

Room E352

Whole body cardiovascular MR imaging can detect hidden arterial disease and silent myocardial scarring even in apparently healthy Type-2 diabetics. A study by IMI-SUMMIT, a pan-European research consortium, divided 156 patients into four groups: diabetics with and without cardiovascular disease and non-diabetics with and without CVD. Whole-body cardiovascular MR imaging was performed from skull vertex to feet following intravenous gadodoterate meglumine. The study detected occult CVD in asymptomatic diabetics, with evidence of silent myocardial scarring in 6 percent of that group. The researchers recommend using WBCVMR as a screening tool to identify diabetic patients at risk for future CV events.
Partnerships Promote Global Dose Reduction

In his study of a research sample representing an estimated 8 percent of radiologists nationwide, Richard Duszak, Jr., M.D., found radiologists received no compensation at all for 28.4 percent of radiological services rendered to emergency department (ED) patients.

"Given the ‘safety net’ role of EDs for uninsured patients, uncompensated services are increasingly a challenge to all specialists and appear to be a particularly common problem for radiologists," said Dr. Duszak, chief medical officer of the Harvard L. Neuman Health Policy Institute (HPI) of the American College of Radiology.

The shortfall represents a mean $2,584 per month per physician in Medicare dollars for professional services alone, said Dr. Duszak, incoming vice-chair for Health Policy and Practice in the Department of Radiology and Imaging Services at the Emory University School of Medicine in Atlanta. "As a physician reimbursement declines, this volume of uncompensated care could threaten patient access," he said.

Data from 2009 to 2012 were captured by Zotec Partners, a large nationwide radiology billing company. Most commonly rendered services were: one-view and two-view chest radiography (20.8 and 28.3 percent uncompensated, respectively); non-contrast brain CT (26.5 percent uncompensated); and contrast and non-contrast abdomen/pelvis CT (28.9 and 27.6 percent uncompensated, respectively).

Most frequent modalities were radiography (27.4 percent uncompensated); CT (29.1 percent uncompensated); and ultrasound (33.5 percent uncompensated). Although CT represented just a third of ED services, it accounted for nearly two-thirds of uncompensated dollars. Of all uncompensated services, 52.3 percent were rendered to uninsured patients.

"Our findings help to increase the awareness of policymakers and regulators, so that ED patient access to needed radiological services is ensured," Dr. Duszak said.

Order Entry System for Trauma CT Increases Rate of Patient’s Clinical History

In another RSNA 2013 study, researchers measured the impact of a structured physician order entry system for trauma CT imaging on the clinical information provided to the radiologist and on associated coding practices and reimbursement success.

The study was conducted between at a quaternary care institution with a Level 1 Trauma Center and 58,000 ED visits annually and comprised 457 patients who received CT pan-scans, including 2,734 distinct exam acquisitions. After the intervention, there was a 62 percent increase in requisitions containing clinical signs, symptoms, or physical examination findings and a 99 percent increase in provided mechanism of injury.

There was a 19 percent increase in primary ICD-9-CM codes representing clinical signs or symptoms (from 3 percent to 22 percent, p < .0001), and a modest 4 percent increase in reimbursement success for examinations submitted to insurance carriers (from 91 percent to 95 percent, p = .003). Rate of initial reimbursement denials dropped 7 percent (from 24 percent to 17 percent, p = .04).

Results showed that implementation of structured physician order entry for trauma CT imaging was associated with a large increase in rate of clinical history provided to the radiologist and was associated with a decrease in initial reimbursement denials and a modest increase in reimbursement success.

Coming Tomorrow: Imaging in a New Dimension

See the Wednesday issue of the Daily Bulletin for coverage of Monday’s special interest session, “Imaging in a New Dimension: Radiologists Add Value,” where presenters discussed how RSNA and the American College of Radiology are working to make radiology more patient-centered.

"It’s not just about giving test results to patients—it’s about considering and optimizing the entire patient experience," said presenter Mary C. Mahoney, M.D., chair of RSNA’s Patient-centered Radiology Steering Committee. "The radiologist can’t just be a name on a bill."

Observed Bibb Allen Jr., M.D., vice-chair of the ACR Board of Chancellors: “How we’re going get there is by undergoing a cultural transformation. Radiologists need to own all aspects of medical imaging, providing all care that is necessary and safe and beneficial, and no care that is not.”

Implementing a computerized provider order entry system for trauma CT imaging led to increased clinical history and mechanism of injury data and increased reimbursement success.

"He said that this opportunity allowed him to put himself in a bigger world," Newman recalled.

The ISRRT also offers the Dose-wise Competition, a contest in which radiographers across the world send in examples of their best practices to protect patients from excess radiation. The winner gets a trip to the ISRRT international conference or the RSNA annual meeting.

Other ISRRT workshops send instructors to developing countries to provide education and training to colleagues who can’t go to the conferences. Session moderator Michael D. Ward, Ph.D., FASRT, vice-dean of the Goldfarb School of Nursing at Barnes-Jewish College in St. Louis, echoed the theme of this year’s meeting—the Power of Partnership—when he discussed the importance of disseminating the latest information on dose optimization.

“These events bring together physicists, radiographers, physicians and other staff members and regulators to share best practices,” he said. “Then we go back and spread the word through our organizations.”

More Than a Quarter of Emergency Radiological Services Uncompensated

Utilization of medical imaging nationwide may be in decline, but its use in the emergency department setting continues to grow—and much of that use is uncompensated, according to a study presented Monday at RSNA 2013.

Presenters

Partnerships Promote Global dose reduction

More Than a Quarter of Emergency Radiological Services Uncompensated

Graciano N. Paulo, M.Sc., R.T.

continued from cover

Richard Duszak, Jr., M.D., FASRT, Graciano N. Paulo, M.Sc., R.T.

Continued From Cover

procedure to the right patient, while ensuring maximum optimization and effective use of equipment," Paulo said.

Partnerships have also helped another major organization, the International Society of Radiographers and Radiologic Technologists (ISRRT), make great strides in bringing radiation safety to developing countries, according to Donna E. Newman, B.A., R.T., director of professional practice at the organization’s World Congress.

The ISRRT works with the World Health Organization (WHO) and others to promote best radiography practices, education and standards throughout the world. Society programs like the donor-sponsored Travel Support Fund help bring technologists from developing countries to the organization’s World Congress.

As an example, Newman cited Boniface Yao, a technologist from Ivory Coast who won the organization’s first Best Practice Competition in 2009. Yao returned home after the congress and presented several workshops in his native country and at a national conference in Cameroon.

"We sent him to needed radiological services is ensured,” Dr. Duszak said.
Utilization Management Reduces Radiation Exposure from CT

**Even Million Chest X-Rays.** That’s the equivalent radiation exposure avoided by one health plan’s nearly 5 million subscribers across the U.S., as the result of a utilization management program administered by the plan’s radiology benefit management (RBM) company.

Mark D. Hiatt, M.D., M.B.A., M.S., executive medical director for Regence BlueCross BlueShield of Utah in Salt Lake City, described the program in a scientific poster presentation on Monday. “The RBM contracted with radiologists to consult collaboratively with ordering clinicians, to persuade them to reduce their use of unnecessary CT and consider alternative means of imaging when appropriate,” Dr. Hiatt said. “Radiologists can make a difference in limiting unnecessary exposure to radiation by advising their physician peers about the best imaging tests for their patients.”

Records of the 5 million subscribers were examined for the two years spanning 2009 to 2010. In 2009, more than 8,600 CTs were cancelled and about 2,400 were changed to other modalities including MR and ultrasound, sparing approximately 3.3 million posteroanterior chest X-ray equivalents (CXREs). In 2010, more than 10,000 CTs were cancelled and 2,600 were changed to a different modality, sparing approximately four million CXREs.

“The radiation averted by avoiding inappropriate or unnecessary CT was expressed in terms of posteroanterior chest X-ray equivalents (CXREs), using a consistent conversion factor relating the radiation from CTs to CXREs,” Dr. Hiatt said. “Our study finding is significant, because it shows that radiologists consulting for RBMs can make a difference in reducing unnecessary radiation exposure by providing their expert guidance to other clinicians,” Dr. Hiatt said.

**ARR Recognizes Distinguished Investigators**

The Academy of Radiology Research (ARR) held an induction ceremony for members of its Council of Distinguished Investigators on Monday at RSNA 2013. The Distinguished Investigator Award recognizes individuals for their accomplishments in the field of imaging research and significant contributions to the record of scientific progress and innovation. Forty researchers received the Distinguished Investigator Award in 2013.

**Explore Elastography Sessions at RSNA 2013**

RSNA 2013 offers a full roster of sessions involving elastography, which continues to be a hot topic in radiology. Sessions include:

- **“Scientific Paper Session SSM08—Gastrointestinal (Liver Imaging)** Wednesday, Dec. 4, 3:00–4:00 p.m., Room E353C

- **Scientific Paper Session SSK16—Neuroradiology (Advanced Neuroimaging of Alzheimer’s Disease)** Wednesday, Dec. 4, 10:30–Noon, Room N230 Several MR imaging biomarkers exist to measure various disease processes associated with Alzheimer’s disease (AD) and frontotemporal dementia (FTD). Researchers investigated the effect of AD and FTD on brain stiffness.

- **“The Activity Grade of Hepatitis Affects Liver Stiffness Measured Using MR Elastography” (LL-NRS-TH6B)** As reported in this scientific poster, researchers evaluated diagnostic performance of ultrasound elastography in differentiating benign and malignant thyroid nodules in the background of chronic thyroiditis and compared it with grey scale ultrasound and Doppler findings.
RSNA 2013 Gold Medalists

RSNA’s highest honor—the Gold Medal—will be awarded to three individuals during today’s plenary session.

A WORLD-RENOWNED THORACIC radiologist, 2008 RSNA President Theresa C. McLoud, M.D., of Boston, and one of the foremost educators in her field as well a passionate promoter of the globalization of radiology. Dr. McLoud has forged new territory for women, serving as the first woman to lead the residency training in teratology of radiology at the Massachusetts General Hospital (MGH) in Boston to hold the rank of professor at Harvard.

A Boston native, Dr. McLoud earned her medical degree from the McGill University Faculty of Medicine in Montreal, Quebec, Canada, where she also completed her residency training in radiology. She completed a thoracic imaging fellowship at the Yale University School of Medicine. In 1976, she returned to Boston and joined Harvard Medical School where she has been a professor of radiology since 1991. Dr. McLoud served as chief of Thoracic Radiology from 1982 to 1996, chief of Thoracic and Cardiac Radiology from 1996 to 2001 and is currently vice-chair of education in the Department of Radiology at MGH. Dr. McLoud’s research in interstitial lung disease, CT of the thorax, lung cancer imaging and occupational lung disease has taken her around the world to conduct postgraduate teaching and visiting lectures.

She began her term on the RSNA Board of Directors in 2001, was board chair in 2006 and served as president in 2008. Dr. McLoud has received the gold medals of the American Roentgen Ray Society, Society of Thoracic Radiology and International Cancer Imaging Society. In 2003 she received the Marie Curie Award, the highest honor bestowed by the American Association for Women Radiologists.

THROUGHOUT HIS CAREER, Harvey L. Neiman, M.D., of Reston, Va., has combined skill in patient care, radiologic research, and education with business savvy and knowledge of health policy and economic issues to benefit patients, his fellow radiologists and all of medicine. Dr. Neiman has served as chief executive officer of the American College of Radiology since 2003 and will retire in spring 2014.

Dr. Neiman is accomplished as an educator and administrator. He began his career in Washington, D.C., as an instructor at the Armed Forces Institute of Pathology and chief of cardiovascular radiology at Walter Reed Army Medical Center and spent the next 10 years as a professor at Northwestern University in Chicago, where he also served as director of angiography and sectional imaging. He also was director of angiography at Children’s Memorial Hospital in Chicago. Dr. Neiman was a clinical professor of radiology at the University of Pittsburgh from 1985 to 2002 and a professor of radiology at Temple University in Philadelphia from 2000 to 2003; during that time he also served as chair of the Department of Radiology at the Western Pennsylvania Hospital in Pittsburgh.

Dr. Neiman has served as a刷新 course faculty member and plenary session moderator for numerous RSNA annual meetings. For the ACR he has chaired commissions on ultrasound and economics, served as a member of the Board of Directors, and as chair of the ACR Board of Chancellors and as chair of the board. During his tenure as ACR CEO, Dr. Neiman has helped establish the ACR Education Center, Radiology Leadership Institute, Harvey Neiman Health Policy Institute, and the American Institute for Radiologic Pathology.

RENOVED FOR HIS LEADERSHIP and commitment to radiation oncology, J. Frank Wilson, M.D., of Milwaukee was an early advocate for breast conservation therapy and is internationally regarded as an authority on breast cancer. He has been consistently recognized as one of the top physicians in America.

Dr. Wilson has lent his considerable expertise to teaching his colleagues the most cutting-edge radiation therapy techniques—including brachytherapy—and mentoring countless radiation oncology students, residents and junior faculty who rank among the specialty’s finest leaders today.

Dr. Wilson joined the Medical College of Wisconsin (MCW) in 1974 as an assistant professor of radiology, rising to the position of professor of radiation oncology in 1985 and department chair in 1986. He served as director of the MCW Cancer Center from 1994 to 2000.

Today, Dr. Wilson serves as the chair and Bernard & Miriam Peck Family Professor of Radiation Oncology and director emeritus of the MCW Cancer Center. He has served as chair and principal investigator of the National Cancer Institute-funded American College of Radiology (ACR) Quality Research in Radiation Oncology project (Q-RRQ).

Dr. Wilson has served as editor of the International Journal of Radiation Oncology Biology Physics (IJROBP) and on the editorial board of the American College of Radiology. Dr. Wilson delivered the Annual Oration in Radiation Oncology in 1998 and has held numerous positions within the RSNA, serving as second vice-president in 1999. He served on the ACR Board of Chancellors and as ACR vice-president, and is past-president of the American Society for Radiation Oncology and of the American Radium Society.

MR Imaging Part of “Genomic Revolution” in Brain Cancer Treatment

An imaging genomic map that links MR imaging traits with gene and microRNA (miRNA) expression profiles in patients with glioblastoma multiforme (GBM) was presented Monday at RSNA 2013.

Researchers sought to identify genomic correlates of an MR perfusion radiophenotype in order to find new genomic targets for treatment of GBM, the most common malignant brain tumor. GBM accounts for 52 percent of all primary central nervous tumors with 20 percent of all intracranial tumors. Between 12,000 and 14,000 new GBM cases are diagnosed annually, and the five-year survival rate for GBM is among the worst for human cancers.

“It’s a quite terrible diagnosis,” said Rivka Colen, M.D., of The MD Anderson Cancer Center in Houston. She noted that despite ongoing efforts, there has been little significant progress in GBM therapy over the years.

But the relatively new field of imaging genomics, which links specific imaging traits (radiophenotypes) to genomic profiles, has the potential to effect changes in the way GBM is diagnosed and treated, Dr. Colen said. Her question has been, “Can MR imaging help in the so-called genomic revolution?”

Dr. Colen and colleagues identified 30 patients from the Cancer Genome Atlas (a publicly available genomic data site) who had both a genomic-expression profile and an MR imaging. Morphological image analysis was performed using Slicer 3.6, a free, open-source package for visualization and image analysis, while the perfusion maps were created using his NordicICE, an image processing and software application software.

“We included patients with high versus low perfusion and we looked at—and were able to obtain—the microRNAs and genes that were intimately and closely associated with high versus low perfusion,” Dr. Colen said. “Given that patients with high perfusion are said to have a more aggressive phenotype—to have increased angiogenesis, and usually have a greater propensity to recur and even have an increased amount of invasion and decreased survival rates—we identified the top gene hits that were associated with these glioblastoma and glioblastoma patients.”

The overall purpose is using MR—specifically MR perfusion—to screen for genomic targets that would be novel, clinically relevant and clinically meaningful, which can go on to commercialization to develop a genomic-based therapeutic,” Dr. Colen added.

Currently genomic targets are identified for commercialization through computer algorithms, but these algorithms do not necessarily provide biological information, Dr. Colen said. “MR imaging reflects the underlying composition of the tumor, as well as the tumor environment,” she said. “The changes on MR imaging reflect the underlying histological, physiological, functional, metabolic and genomic composition of the tumor, and of the tumor microenvironment.”

Studies like the 2011 PLoS One article, “Radiogenomic Mapping of Edema/Cellular Invasion MRI-Phenotypes in Glioblastoma Multiforme,” authored by Dr. Colen and colleagues, have validated the use of MR as a tool to discover novel and new genomic targets, she said. Now, instead of using conventional MR imaging characteristics, Dr. Colen and colleagues are using perfusion—a more advanced imaging modality.

Next, researchers need to determine how MR can play a role in genomic-based drug development, Dr. Colen said. “How can we play a role in imaging genomic biomarkers so that we can begin stratifying patients using MR, or stratify patients into clinical trials, and develop imaging-based endpoints in clinical trials that are reflective of the histological and genomic composition of the tumor?” Dr. Colen added. “Those are the next questions.”
High Endurance Training Prompts Cardiac Changes Not Linked to Sudden Death

Even a small amount of endurance training provides significant changes in cardiac morphology and function in previously untrained men, and those changes are not associated with pathological features predisposing for sudden cardiac death, according to an RSNA 2013 presenter.

HIGH-INTENSITY TRAINING (HIT) is more effective than low-intensity training (LIT), said Michael Scharf, M.D., a resident in the radiology department at University Hospital of Erlangen, Germany.

“High-intensity endurance training is sometimes associated with sudden cardiac death, as it’s often seen in the media,” Dr. Scharf said. “I wanted to show that there is a physiological adaption of their heart that is associated with high-intensity training.”

For the study, 84 untrained volunteers were randomly split into two equal cohorts—an HIT group and an inactive control. Members of the control group were subsequently trained in a LIT group.

HIT subjects, who ranged in age from 33 to 51, underwent cardiac MR imaging before and after four months of training to assess myocardial morphology ventricular function. The training included a step-wise treadmill test with increasing intensity. A blood sample was taken at the end of every three-minute stage to determine heart rate at the anaerobic threshold. To be included in the results, subjects participated in a pre-determined training program twice a week for the first month of the study, and three to four times a week during the last month.

Results showed significant increase of the indexed left (LV) and right ventricular (RV) myocardial mass (MM), end-diastolic volume (EDV), end-systolic volume (ESV) and stroke volume (SV) by 7 to 10 percent from baseline in the HIT group. Values in the control group, whose ages ranged from 31 to 51, remained unchanged. However, the LIT group experienced significant increase of indexed LV and RV, MM, EDV, ESV, and SV by 5 to 6 percent from baseline. “Comparing HIT to LIT, there was a statistically greater increase for the HIT group,” Dr. Scharf said.

Results showed a peak systolic strain rate range before and after training of -10 to -25 percent in the HIT, LIT and control groups. Intergroup differences before and after training were not significant. But within the HIT group, a statistically significant post-interventional decrease of peak systolic strain occurred in the anteroseptal and anterolateral segment.

The research also showed significant correlation between cardiac morphologic changes in EDV and MM, and cardiac function (maximal aerobic capacity) in the HIT group. That correlation was not found in the LIT group.

Late enhancement imaging showed no contrast medium accumulation, indicative of structural myocardial damage, in any of the participants. The HIT group also displayed similar LV and RV remodeling indexes before and after the training period.

“In addition, there is a physiological cardiac adaption on the macro-morphologic level,” Dr. Scharf said. “There might be some negative changes in the microstructure of cardiac morphology associated with endurance HIT.”
Rice Discusses “Mobilizing Human Potential” Today
Former U.S. Secretary of State Condoleezza Rice, Ph.D., will address RSNA 2013 attendees today to talk about identifying, attracting and mobilizing resources to solve problems worldwide.

Dr. Rice’s comments are relevant to radiology, as the specialty looks to address the healthcare challenges of the 21st century, including educating the students of tomorrow and fostering leadership present among current and future practitioners.

From 2005 to 2009, Dr. Rice served as the 66th Secretary of State of the United States, the second woman and first African American woman to hold the post. She also served as national security advisor for President George W. Bush from 2001 to 2005, the first woman to hold the position.

Dr. Rice is currently the Denning Professor in Global Business and the Economy at the Graduate School of Business; the Thomas and Barbara Stephenson Senior Fellow on Public Policy at the Hoover Institution; and a professor of Political Science at Stanford University. She is also a founding partner of RiceHadley-Gates LLC.

Tickets are required for the lecture to be delivered by Dr. Rice. Check the Help Centers in the Grand Concours or the Lakeside Center Ballroom for availability.

Today in Mobile Connect
In the presentation theaters in Mobile Connect, RSNA staff will discuss how to get the most out of RSNA and other mobile apps, and some authors of RSNA presentations with mobile technology topics will also demonstrate their work:

8:30 a.m.
- Challenges to Testing and Upgrading PACS, RIS and Voice Recognition Systems: Daily Issues and Practical Solutions
  Perry S. Gerard, M.D., Valhalla, N.Y.
- From the Back of a Napkin to the App Store: How to Create and Submit an Educational iPad Application to the Apple App Store
  John D. Bisges, M.D., Jackson, Miss.
9:00 a.m.
- Health Apps
  RSNA Staff
9:30 a.m.
- Interactive Radiology Textbooks Made for iPad: Moving Beyond PDFs
  Henry Baskin, M.D., Salt Lake City
- Medical Graphic Viewer Interface: Our Trial on Game Controller, Eye-tracking and Touch-less Gesture Motion Capture
  Dai Miyazaka, Kitami, Japan
10:00 a.m.
- Travel Apps
  RSNA Staff
10:30 a.m.
- m-SARCC (Mobile Stroke Acute Radiology Command Center): Image Review and Neurological Care Team Coordination Linking PACS and Mobile Smart Devices
  Guo Liang Yang, Ph.D., Singapore
- Incorporating the iPad in Resident Education: Using Mobile Technology to Improve the Way We Teach
  Harprit S. Bedi, M.D., Boston
11:00 a.m.
- RSNA Mobile
  RSNA Staff
11:30 a.m.
- AtlaVasc: An Interactive Online Vascular Atlas and Interventional Radiology Review
  Donald J. Perry, M.D., Seattle
- Incorporating the iPad in Resident Education: Using Mobile Technology to Improve the Way We Teach
  Harprit S. Bedi, M.D., Boston
2:00 p.m.
- Productivity Apps
  RSNA Staff
2:30 p.m.
- University of Colorado Hospital Adult Contrast Reaction Guide Smartphone App: Design and Implementation
  Theodore B. Jennermann, M.D., Aurora, Colo.
- Image Quality Characterization of Handheld Devices for Medical Image Display
  Alok Badano, Ph.D., Silver Spring, Md.
3:00 p.m.
- iOS 7 Overview
  RSNA Staff
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Diffusion-tensor Imaging Aids in ADHD Diagnosis, Treatment

Diffusion-tensor imaging (DTI) can be useful in both diagnosing attention deficit hyperactivity disorder (ADHD) and following up with patients during treatment, according to research presented Monday.

Researchers found that the frontocerebellar tract responds better to behavioral therapy, Omega 3, and atomoxetine therapies, Dr. Dies Suarez said. Currently multidisciplinary therapy and pharmaceutical approaches are used to treat ADHD, she said.

“Along with methodology, I would add that a collaborative parent-medical psychologist relationship is important,” Dr. Dies Suarez said. Currently multidisciplinary therapy and pharmaceutical approaches are used to treat ADHD, she said.

“They studied that the frontocerebellar circuit is present, and altered in ADHD patients; generalized fractional anisotropy is increased (p=0.08), in the ADHD group; there are significant differences in the number of tracts between ADHD patients and control subjects,” Dr. Dies Suarez said. The ADHD patients have fewer tracts and primarily left tracts.

Researchers found that the frontocerebellar tract responds better to behavioral therapy, Omega 3, and atomoxetine therapies, Dr. Dies Suarez said. Currently multidisciplinary therapy and pharmaceutical approaches are used to treat ADHD, she said. "We propose diffusion tensor imaging as a quantitative tool for the diagnosis of ADHD," said Dr. Dies Suarez. “In the future, MR may be useful for follow-up patients with ADHD during their treatment. “We hope to present the follow-up results next year,” she concluded. “We think that maybe with treatment, the tracts can change and have better diffusion and connectivity.”

The presentation is available at https://www. radiosurgery.org/2013/abstracts/abstracts. html/151.html.

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- **Module 1: Strategic Planning**
  Learn essential principles of strategy, competitive analysis and strategic alignment that can be applied to everyday practice.

- **Module 2: Managing Change**
  Develop tools and techniques for successfully managing change.

- **Module 3: Difficult Interactions**
  Discover how to manage challenging situations for mutually beneficial outcomes.

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Feb. 21–23, 2014 | Dallas, TX

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- **360 Evaluation**
  This robust survey provides real-world feedback on how your colleagues view your leadership style, strengths and weaknesses and will provide you with invaluable lessons on how to improve your leadership skills.

- **Radiology Specific Scenarios**
  The RLI Expedition provides you a radiology-specific and scenario-based learning experience for putting newly acquired skills into practice.

- **Peer Consulting**
  The small group dynamic encourages growth from the very beginning. You will benefit from shared colleague experiences and receive real feedback on real problems.
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