

Radical Views...

from the Department of Radiology

October 2010

Mon	Tues	Wed	Thurs	Fri
3:00-4:00 ED section meeting (monthly) [ED annex, WCC] call Sheila Blalock 4-2506	1:00-2:00 MRI meeting (Weekly) [TCC-484]	Weekly Wed Section Meetings: 11:00-12:00 MSK clinical conference 12:00-1:00 Thoracic Imaging, GI Oncology/GU Oncology 3:00-4:00 Mammo [TCC-484]	Weekly Thurs Section Meetings: 12:00 - 1:30 Abd [WCC-354] 12:00-1:00 MSK	1 No Grand Rounds EVENT: <i>How to Advance in Your Career (Alexander Margulis)</i> 12 noon TCC-10 EVENT: NERRS 3:15-7pm
4 7:30 - 9:00 (Tyagi)	5 7:30-8:15 Venous Sampling (Sacks) 8:15-9:00 (Reddy)	6 7:30 - 8:15 Congenital Spine (Fisher) 8:15-9:00 Thoracic Manifestations of Collagen Vascular Disease (Boiselle)	7 7:30 - 8:15 MRI of the Knee 8:15 - 9:00 Muscular US (Yablon)	8 8:00-9:00 Grand Rounds: Changes in Resident Education: Challenges and Opportunities (Martha Mainiero) 12:00-1:00 Mammo Board Review (Mainiero) Rabkin Bd. Rm, TCC-10
11	12 7:30-8:15 Breast US & Intervention (DGS-BWH) 8:15-9:00 Cases (DGS-BWH) 10:30-11:30 Nuc Med meeting (GZ-103)	13 7:15 - 8:00 US meeting (WCC-304A Gallery) 7:30 - 8:15 Fetal Growth and BPP (Levine) 8:15 - 9:00 Bone Scans - Malignant (Kolodny)	14 7:30 - 8:15 CTT bone (Moonis) 8:15-9:00 MRT bone (Bhadelia)	15 8:00-9:00 Grand Rounds: <i>Annual Sven Paulin Lecture</i> by Roderic Pettigrew, MD, PhD (Sherman Auditorium) No Noon Neuro Conf.
18 7:30 - 9:00 Cardiac Week	19 7:30 - 9:00 Cardiac Week 8:00 - 9:00 IR meeting [West Recovery Rm]	20 7:30 - 9:00 Cardiac Week	21 7:30 - 9:00 Cardiac Week	22 8:00-9:00 Grand Rounds: Minimizing Risks: Avoiding Pitfalls in Breast Imaging Detection (Slanetz) 12:00-1:00 Neuro (Hackney)
25 8:15-9:00 (Smith)	26 7:30 - 8:15 TIPS (Collares) 8:15-9:00 (Reddy) 10:30-11:30 Nuc Med meeting (GZ-103)	27 7:30 - 8:15 ICU (Spirn) 8:15 - 9:00 Anatomy of the Mediastinum (Romero)	28 7:30 - 8:15 Metabolic Bone Disease I (Hochman) 8:15 - 9:00 Metabolic Bone Disease II (Hochman)	29 8:00-9:00 Grand Rounds: State of the Department (Kruskal) 12:00-1:00 Neuro (Bhadelia)

OCTOBER Distinguished Visiting Professors: Fridays Oct., 1, 8 and 15



Alexander R. Margulis, MD - How to Advance in Your Career
Friday, October 1st • 12:00 noon, Rabkin Board Room, TCC-10

In lieu of Grand Rounds on Friday, Oct. 1, we are pleased to announce a special presentation by **Dr. Alexander Margulis** on "How to Advance in Your Career." A graduate of Harvard Medical School, Dr. Margulis was Chairman of Radiology at the University of California at San Francisco for 26 years, transforming it into a pre-eminent radiology department in which much of the basic science and clinical research was performed in the early development of CT and MRI. A world-renowned and beloved gastrointestinal radiologist, Dr. Margulis has authored more than 250 articles in this area, MR imaging and spectroscopy, and radiological and health policy issues. He was the lead editor of *Alimentary Tract Radiology*, which became the standard text in the field and appeared in four editions, and the author of two books on leadership. Dr. Margulis was a co-author (with Dr. Ron Eisenberg) of *What to Order When*, a guide to proper ordering of imaging procedures, and the two have recently collaborated on *A Patient's Guide to Medical Imaging*, which will be published by Oxford University Press in 2011. Dr. Margulis has lectured throughout the world, been president of multiple organizations in medical imaging, and has received numerous honorary degrees and been awarded many honorary fellowships from international radiology societies. Dr. Margulis is currently Clinical Professor of Radiology at Weill Cornell Medical College in New York.

Both Drs. Herb Kressel and Ron Eisenberg are among the many former UCSF residents and fellows fortunate to have had Dr. Margulis as a major mentor in their academic careers.

OCTOBER Distinguished Visiting Professors



Martha B. Mainiero, MD - Changes in Resident Education: Challenges and Opportunities

Friday, October 8th • 8:00-9:00 am, Sherman Auditorium

Dr. Martha Mainiero is currently an Associate Professor of Radiology at Warren Alpert Medical School, Brown University, Providence, RI and serves as Radiology Residency Program Director and Director of the Anne C. Pappas Center for Breast Imaging at Rhode Island Hospital. Dr. Mainiero is a graduate of Tufts University School of Medicine and a *magna cum laude* graduate of Tufts University (BA in Biology and Spanish). She completed an internship in medicine and surgery at Newton-Wellesley Hospital in Newton, MA and radiology residency training at Yale-New Haven Hospital, New Haven, CT. She received the Winchester Fellowship in Breast and Chest Imaging at Yale-New Haven Hospital. In 2006, she became Associate Editor for Education for the Journal of the American College of Radiology. Most recently, she was named President-Elect of the Association of Program Directors in Radiology and she has published widely in the field of medical education and improvement in radiology resident training. Her newest paper, "Challenges and Opportunities in Restructuring Radiology Residencies: The APDR Residency Restructuring Committee Report" is in press at the Journal of the American College of Radiology 2010.

As an added bonus, Dr. mainiero will also be conducting a board review in her clinical specialty of breast imaging for residents at noon in the Rabkin Board Room (TCC-10) also on Friday, Oct. 8th.



Roderic I. Pettigrew PhD, MD - Annual Sven Paulin Lecture

Friday, October 15th • 8:00-9:00 am, Sherman Auditorium

Roderic I. Pettigrew, Ph.D., M.D., is the first Director of the National Institute of Biomedical Imaging and Bioengineering. Prior to his appointment, he was a Professor of Radiology Medicine (Cardiology) at Emory University, as well as Professor of Bioengineering at the Georgia Institute of Technology. He also served as Director of the Emory Center for Magnetic Resonance (MR) Research at Emory University School of Medicine in Atlanta, Georgia.

Dr. Pettigrew is known for his pioneering research at Emory University involving four-dimensional imaging of the heart using MR. He graduated cum laude with a B.S. in Physics from Morehouse College where he was a Merrill Scholar. He received an M.S. in Nuclear Science and Engineering from Rensselaer Polytechnic Institute, and he received a Ph.D. in Applied Radiation Physics from the Massachusetts Institute of Technology as a Whitaker Harvard-MIT Health Sciences Scholar. Subsequently, he received an M.D. from the University of Miami School of Medicine in an accelerated two-year program, served an internship and residency in Internal Medicine at Emory University, and completed his residency in Nuclear Medicine at the University of California, San Diego. Dr. Pettigrew then spent a year as a Clinical Research Scientist with Picker International, the first manufacturer of MR equipment. In 1985, he joined Emory as a Robert Wood Johnson Foundation Fellow focusing in non-invasive cardiac imaging.

Dr. Pettigrew's awards include membership in Phi Beta Kappa, the Bennie Award (Benjamin E. Mays) for Achievement, and he was named the Most Distinguished Alumnus of the University of Miami. In 1989, when the Radiological Society of North America met to celebrate its 75th (Diamond) Anniversary, Dr. Pettigrew was selected to give the keynote Eugene P. Pendergrass New Horizons Lecture. He has served as Chairman of the Diagnostic Radiology Study Section for the Center for Scientific Review at NIH, and has been elected to membership in the Institute of Medicine and fellowships in the American Heart Association, the American College of Cardiology, the American Institute for Medical and Biological Engineering, the International Society for Magnetic Resonance in Medicine, and the Biomedical Engineering Society.

DEPARTMENTAL NEWS, AWARDS & HONORS



FROM THE CHIEF
Jonathan B. Kruskal, MD, PhD

• **New Vice Chair of Radiology: Dr. Phillip Boiselle**

In recognition of the importance of quality and safety to our mission, I am thrilled to announce that **Phillip M. Boiselle, MD** has been promoted to Vice Chair of Radiology for Quality, Safety and Performance Improvement. In addition to leading the Thoracic Imaging Division and continuing his ergonomic improvement efforts, Dr. Boiselle will now oversee all of our department's Quality and Performance Improvement efforts. He has also set himself the goals of revitalizing the resident QI elective and Quality Grand Rounds, and will apply his recent training in Lean processes to improve overall efficiency of our services, to improve customer satisfaction, and to eliminate waste.



Dr. Boiselle is a highly respected physician, teacher, researcher, leader, role model and mentor, and I have no doubt that he will guide this program to the national and international recognition it truly deserves.

I would also like to take this opportunity to thank Dr. Vassilios Raptopoulos for agreeing to take on this arduous role during the past 2 years. I am extremely grateful for the time, effort and dedication that Vassili devoted to this program. Please join me in congratulating Dr. Boiselle and welcoming him into his new role.

DEPARTMENTAL NEWS, AWARDS & HONORS

- BIDMC at the LSO: Healing the Community Through Music**
Did you know that the Longwood Symphony Orchestra promotes community-wide dialogue among today's experts in the arts and sciences on the intersection of music and medicine? -- and members of the LSO include numerous BIDMC faculty such as Drs. Mark Gebhardt (Orthopedic Surgery/clarinet), Nick Tawa (Surgical Onc/viola), and Lisa Wong (Pediatrics/violin). On Saturday, Oct. 2, the LSO will open its 28th season at Jordan Hall with the introduction of violinist **Zina Schiff**, whom many of you also know as the wife of **Dr. Ron Eisenberg** (Thoracic Imaging/MSK). This is the first of several upcoming BIDMC related music and medicine events and I am not shy in urging you to support the LSO, particularly at this premier event.
-Jbk

- Congratulations Leo Tsai**
Please join me in congratulating 2nd year resident, Leo Tsai, on being selected to participate in the 2010-11 RSNA/AUR/ARRS Introduction to Academic Radiology Program, scheduled during the May 2011 ARRS Annual Meeting in Chicago. Leo will receive an educational grant to join several top residents throughout the country in a week-long course learning the importance of research in diagnostic radiology. I am sure this will be an enriching experience for Leo and we are proud for him to represent our department.
- Jim S Wu MD

- MRI Research 4th International Food Day**

In the spirit of good will, camaraderie and international cooperation, MRI Research held its 4th International Food Day in Ansin-2. Hosted by Dr. Robert Lenkinski, and masterfully orchestrated by Lois Gilden and her team, 23 researchers, staff, and guests from 13 countries, came together for an international potluck lunch, sharing delicacies from their home countries, including iconic musical selections and film lists for comprehensive cross-cultural immersion. Offerings varied from South African curried goat and spicy Indian cabbage to *good-enough-for-the-Queen* egg and cress sandwiches, all-American apple pie, and Swiss raclette. This is an experiment that should be reproduced more widely in the department!




Longwood Symphony Orchestra opens its 2010-11 season October 2, 2010 and is proud to welcome American violinist Zina Schiff to the Jordan Hall stage

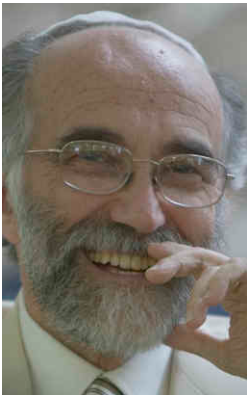


Saturday evening at 8:00 p.m., New England Conservatory's Jordan Hall

Maestro Jonathan McPhee and the musicians of the Longwood Symphony Orchestra invite you to the opening of the 28th concert season! On Saturday evening, October 2, 2010 at 8:00pm, LSO will present an evening featuring the works of Jean Sibelius and Frederick Delius. Violinist **Zina Schiff** brings to life the uninhibited romanticism of Sibelius' Violin Concerto in D minor. Ms. Schiff's playing has been described by the New York Times as "Luscious high voltage... vintage Heifetz." A protege of the legendary Jascha Heifetz, Ms. Schiff has captivated audiences and critics with her passion and communicative power. She has soloed with major orchestras and in recital on four continents.

<http://www.longwoodsymphony.org/>

BIDMC Radiology Alumni
In Memorium: Igor Laufer, MD



On Tuesday, Sept. 14, **Igor Laufer** died of complications from cancer at the Hospital of the University of Pennsylvania (HUP) where he served as Chief of Gastrointestinal Radiology from 1976 to 1997 and Residency Program Director from 1993 to 2000. Born in what is now Slovakia, he earned his medical degree at the University of Toronto in 1967, and he was a radiology resident at Beth Israel Hospital under Dr. Sven Paulin between 1970 and 1973.

According to Marc S. Levine, current Chief of Gastroenterology Radiology at HUP, Dr. Laufer's work "had a major impact on patient care, leading to earlier detection and treatment of everything from herpes esophagitis and inflammatory bowel disease to benign and malignant GI [tumors]." Specifically, Dr. Laufer "pioneered the techniques for performing double contrast GI esophagograms, double contrast upper GI examinations and double contrast barium enemas." Furthermore, Dr. Laufer's work "was embodied in the first edition of his classic text, *Double Contrast Gastrointestinal Radiology with Endoscopic Correlation*, published by W.B. Saunders in 1979.

"Igor's work generated so much excitement that it ignited a worldwide resurgence in barium studies and a new era of double contrast GI radiology. . . . This text is still considered essential reading for resident training in GI fluoroscopy and barium studies." "He was," Levine said, "a masterful teacher."

As a speaker, he had an uncanny ability to distill even the most complex subjects down to their bare essence. Dr. Laufer lectured all over the country and worldwide as an invited lecturer or visiting professor more than 400 times, including 16 named honorary lectures -- and was our own Risa and Felix Fleischner lecturer in 1994. Dr. Laufer was also president of the Society of Gastrointestinal Radiologists from 1984-86. In 1988, he was awarded the SGR's Walter B. Cannon Medal and in 2005, he received the Outstanding Educator Award from the Philadelphia Roentgen Ray Society.

Dr. Laufer is survived by his wife, Bernice; a son, Jacob; a daughter, Miriam; and a grandson. Funeral services took place Wednesday, Sept. 15.

Excerpted from the Philadelphia Enquirer (Walter F. Naedele), posted Mon, Sept. 20, 2010

Monthly Section Highlight: **Radiology in Tanzania, Aarti Sekhar, MD, Chief Fellow**



In September 2009, Aarti Sekhar, 4th year resident, left for a one-month elective at Kilimanjaro Christian Medical Center (KCMC), a 500-bed hospital in Moshi, Tanzania to work under Dr. Helmut Diefenthal who retired from the University of Minnesota to start an unprecedented residency program in rural Africa. The following is an excerpt from a manuscript to be submitted to AJR.

My first view of Tanzania was above the clouds at 17,000 ft, when the wide, flat, snow-covered peak of Mt. Kilimanjaro came into view. Once we dipped below the clouds, the peak was no longer visible, only the massive base with tree-covered slopes and



surrounding vast dusty plains. After landing, I jumped in a dolla-dolla (shared van), which was somehow carrying 25 other people. The driver weaved in and out of traffic while texting on his cell phone. I swallowed my fear and let the smell of roadside fires, sweat and dust fill my lungs. Soon I arrived at Kilimanjaro Christian Medical Center (KCMC) and heard beautiful singing coming from the chapel next to the hospital – it was Sunday morning and I was just in time for church.



Patients waiting for Radiology services at KCMC

providers and engineers came for 2 weeks to teach basic CPR, fix EKG machines and defibrillators, and set up code teams and carts. There was also a series of lectures on dialysis given by visiting German nephrologists, as the hospital was just starting a peritoneal dialysis service.

Like many African hospitals, KCMC is in a fragile position due to inconsistent funding, infrastructure problems, and inability to recruit and maintain personnel because of its rural location and government salaries. The hospital had just lost its only pathologist, a long-term visitor from Germany, because of funding. While the Duke-funded research lab had state-of-the-art equipment, the clinical lab was often unreliable and under-stocked (inefficient supply procurement which is organized at a national level). We were sometimes left in the dark for hours due to power outages. The brain drain is also heart-breaking – given the large discrepancy in salaries, most physicians leave government hospitals (attending radiologists at KCMC make \$1000/ month) for lucrative private centers in Dar es Salaam (where salaries are at least 4 times higher). Of the 27 Radiologists living in Tanzania (population 34 million), 21 work in Dar es Salaam (population 2 million).



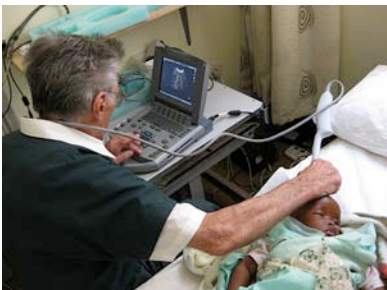
AMOs reading radiographs

To combat the dearth of health care professionals willing to work in rural areas, Tanzania has utilized task-shifting in the form of the “Assistant Medical Officer” (AMO). AMOs complete a three-year training course, and then work in district hospitals or clinical centers performing primary care and some general surgery (e.g. cesarean sections and appendectomies). After 5 years of clinical work, they can apply for a two-year course in specialties such as Radiology and Ophthalmology. Their specialty training fees are covered by their district hospital, and the AMO is obliged to go back and work at that hospital for several years.

I had the opportunity to work with ten AMO Radiology students during my month in the KCMC Radiology department, which has the only AMO Radiology program in East Africa. The program, started by Dr. Helmut Diefenthal, an American-trained Radiologist who retired and moved to Tanzania 20 years ago, has already graduated

63 AMOs who are now working at over 50% of the country’s district hospitals. There is also a four-year MD radiology program, with 2 residents per year and 11 graduates. The department at KCMC performs 80-100 radiographs, 50-60 ultrasounds (including echocardiography) and 20 CTs per day.

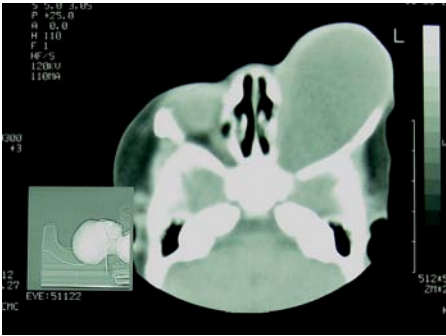
Dr. Diefenthal, or “The Professor” as everyone calls him, is now 85 years old and still works 12-hour days. Working with him in this setting is like being transported to a different era. Time is not rushed. Plain films tell entire stories. He is the teacher and we are apprentices. For better or worse, his knowledge and doctrine become ours. There are also strong relationships between the radiologists and other clinicians – in fact, the first few hours of the day are dedicated to going through every inpatient and abnormal outpatient exam from the prior day with the different teams, who visit us in 30 minute intervals from 7:30 am – 10 am. Since there are no pagers, we routinely ran to the inpatient floors to convey abnormal results.



The Professor performing neonatal brain ultrasound using a trans-vaginal probe

The diseases I saw were both familiar and new to me. We diagnosed TB on radiographs because it takes too long to get the cultures back. I learned the chest radiograph findings of AIDS-related Kaposi's sarcoma, rarely seen in the U.S. today because of HAART therapy. We diagnosed altitude-related pulmonary edema in hikers who had tried to ascend Mt. Kilimanjaro too quickly. There was also the endless sequelae of trauma – fractures in traction (surgery is often too expensive for patients), chronic osteomyelitis, urethral strictures. I learned echocardiography to diagnose rheumatic heart disease, a completely preventable disease if patients receive a dose of penicillin during a bout of strep throat. However, once their valves are damaged, there is no hope for cure unless they go to India for a \$10,000 valve repair. Oncology is a particularly tough issue, as there is little treatment. Hepatoma is the most common malignancy due to lack of Hepatitis B vaccinations, which are only now being introduced. Smoking and lung cancer are on the rise, with tobacco companies targeting the developing world. Cervical and breast cancer are rarely detected until it is too late, as there are no screening programs.

Radiology plays an extremely important role in diagnosis. Tanzanian radiologists have to hone their radiographic and sonographic skills, since they do not have multi-phasic CT or MRI. They have to be more definitive with their reads, since they don't have the luxury of recommending biopsies or following questionable findings. Patients pay for their own exams and often save up for months for an x-ray or ultrasound.



Dr. Zoheir reading CTs at the 1-slice scanner. Sample case of a child with a cystic orbital mass. CT confirmed the cystic nature, thought to be micro-ophthalmos with cyst. No calcifications or soft tissue to suggest retinoblastoma.

I learned wonderful life lessons from the residents and AMOs with whom I worked. Many had struggled immensely just to get an education. Many left their families behind and traveled great distances to train at KCMC. One resident was a member of the Zambian army and had spent years serving as a physician in some of the worst civil wars in Africa. When he was finally granted permission to train in Radiology, he was 48 years old and the only position available was a 30-hour bus-ride away, at KCMC. Even though he is now only able to see his wife and two children once a year, he feels lucky to be able to finally pursue his dream.



Dr. Makosi washing clothes - weekend duties for the AMOs since their wives were far away.

The Professor loved to say “There are three things you need for any enterprise: capital, personnel and maintenance. The easiest thing to come by is capital.” By the end of my month, I understood exactly what he meant. KCMC is struggling to find radiologists because of the rural location and non-competitive salary. Equipment, such as state-of-the-art ultrasound machines, routinely become unusable due to lack of maintenance. If we are to meaningfully participate in increasing access to radiology world-wide, these critical issues will need to be addressed. Task-shifting is one solution to the human resource problem – the AMO program in Tanzania is one outstanding model. Training midwives and community health workers to use portable ultrasound machines in rural areas has also shown promising results. Supplementing salaries for higher-level personnel will allow the public sector to compete with the private. Encouraging the development of cheaper and more portable technologies, which can be shipped off for repairs, can increase access and combat the maintenance issue. Finally, improving infrastructure to support digital imaging will allow tele-radiology interpretation, at least until rigorous local training programs are established.

In his short story “The Snows of Kilimanjaro”, Ernest Hemingway writes about a dying man who realizes that in enjoying his privileged life, he did nothing to stop the suffering of those less fortunate. The snows of Kilimanjaro will soon be gone, possibly by 2020, due to climate change. The world changes, in both good and bad ways, by many individuals doing many small things. We may not, at this point, be able to reverse the melting of an iconic glacier. We can, however, use our incredible resources, talent, and privilege to help those in need, wherever they are.



Moshi Town



Dr. Sekhar delivered books, as well as supplies and equipment, donated by BIDMC



Masai tribesmen

Do you know... about the 2010 Silverman Symposium?

Presented here is the 2010 Silverman Symposium Improvement Project Posters. Sponsored annually by the Silverman Institute for Health Care Quality and Safety, it celebrates BIDMC's on-efforts to improve quality and safety throughout the medical center every day. This year, approx. 95 Project Teams participated and 13 were from Radiology which will be presented here over the following months.

Quality Assurance Assessment of Breast MRI

The Problem

The Mammography Quality Standards Act (MQSA) of 1992 established a precedent in the practice of mammography by creating federal quality standards for all parts of the mammography system. However, MQSA has not been formally mandated for breast MRI examinations as the technology developed well after the act was passed. MQSA can be used to compare programs and analyze whether a specific program meets certain industry standards. To date, there is no such program in breast MRI and no such known standards.

Aim/Goal

- To design a method to analyze a large volume of examinations and begin development of a quality assurance assessment method.
- Factors analyzed included, but not limited to, (1) MR exam characterization in terms of study indication, diagnostic quality and BIRADS assignment and (2) Assessment of biopsy results of abnormal MR exam to calculate cancer detection rate.

The Team

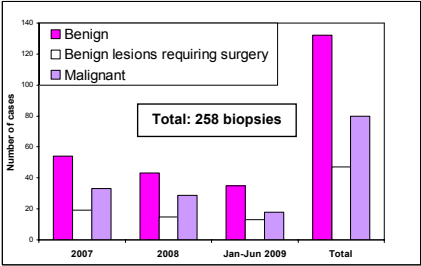
Diana M. Ferris, M.D., Ph.D., PGY5, 4th year radiology resident
Valerie Fein-Zachary, M.D., Radiology, Breast imaging staff
Priscilla Slanetz M.D., M.Ph., Radiology, Breast imaging staff
Tejas Mehta, M.D., M.Ph., Radiology, Breast imaging staff
Shambhavi Venkatarman, M.D., Radiology, Breast imaging staff

The Interventions

- 2057 MRI examinations were reviewed from 1/2007 through 6/2009.
- Data were collected in Excel and data analysis performed to meet the aims and goals of the project.
- Problems regarding a breast MR biopsy device were identified and a new device was purchased for breast biopsies in late 2008.

The Results/Progress to Date

Breast biopsies were categorized as benign, malignant, or benign lesions requiring surgery as per pathologic established standards.



- The positive predictive value of radiology biopsies averaged 31% over 2.5 years, corresponding to a detection rate of 49.5 cancers per 1000 patients with the inclusion of surgical excision data.
- Over the 2.5 yrs, there were 10 cases upgraded to malignancy at surgery.
- Half of these may have been secondary to lesions missed at biopsy.
- Four, or 80% of cases occurred before our device change from a repeated insertion device with internal vacuum to a stationary biopsy device with external vacuum, versus a single missed case after the device change.

Lessons Learned

- Our cancer detection rate of 49.5 per 1000 patients is substantially higher compared to our screening (4 per 1000) and diagnostic (25 per 1000) programs.
- A simple change in clinical practice, such as changing to a biopsy device with a different design substantially improved the missed lesion rate.

Next Steps/What Should Happen Next

- This work forms the basis of a method to assess quality measures in a breast MRI program and could be applied at other academic centers, community hospitals and private practices.
- Further work could be done to assess malignancy rates per initial BIRADS study designation, for example.
- The main challenge in this work remains the significant time required to collect the data to perform this type of analysis. A database system that could be automatically populated from issued radiology reports based on key words would aid substantially in overall data efficiency.



Beth Israel Deaconess Medical Center



A teaching hospital of Harvard Medical School

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Radiation Reduction in Abdominal/Pelvic CT Exams

The Problem

There has been a tremendous amount of recent press in the mainstream media and in the scientific literature regarding potentially excessive exposure to radiation during CT examinations. Radiologists and technologists must be aware of this problem and strive to reduce radiation dose whenever possible.

- Patients are scanned on many different machines across the department and we sought to evaluate whether there was uniformity across the department.
- Within the IOM Dimensions of Quality Care, this project addressed safety.

Aim/Goal

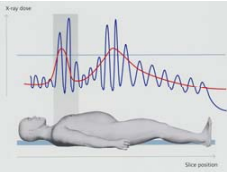
From July – September 2009, we quantified radiation dose delivered for two common and similar abdominal/pelvic CT examinations (CTE and Gen AP) performed on 5 GE 64 slice scanners throughout BIDMC. We discovered one outlier delivering 50 to 65% higher radiation. We implemented changes to the scan parameters to reduce dose. While doses on this outlier were elevated compared to other BIDMC scanners, the delivered doses were still within reported national standards.

The Team

Dr. Jean-Marc Gauguet, MD/PhD, Resident, Department of Radiology
Dr. Vassilios Raptopoulos, MD, Director of CT, Department of Radiology
Jae Kim, Senior CT Technologist, Department of Radiology

The Interventions

- CT radiation dose was examined for two common abdominal/pelvic CT scans performed throughout BIDMC.
- We identified an outlier delivering higher radiation doses. The reasons behind the higher doses were identified.
 - Dose modulation, a means of adjusting radiation dose at different regions of the body and reducing radiation dose, was not being utilized.
 - Higher tube currents, a scan parameter directly affecting radiation dose, were being used.
- Dose modulation was implemented and lower tube current settings were used. Radiation doses were measured after the change over from October – December 2009 and quantified.



The Results/Progress to Date

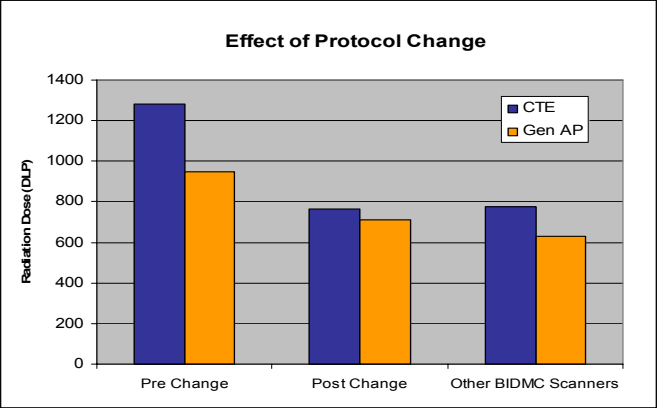


Figure 1: Radiation doses for the outlier were 50 to 65% higher (Gen AP and CTE, respectively) compared to other BIDMC scanners, but were comparable after the scan parameters were changed.

Lessons Learned

- CT technologists and radiologists need to be more aware of the radiation doses delivered during CT examinations.
- Accepted standards for CT dose across BIDMC must exist.

Next Steps/What Should Happen Next

- Perform an extensive review of CT radiation doses to ensure uniformity and acceptable levels across the department.
- Explore new technologies to further reduce radiation dose, while maintaining image quality.
- Report DLP and develop a mechanism to register cumulative radiation dose.
- Diagnostic accuracy depends upon image quality, which varies with radiation dose, so image quality must be preserved while reducing radiation dose.



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2010 Publications from our Faculty Members [\[New citations in Blue\]](#). *We do a monthly PubMed search for new BIDMC publications and may miss those in which your affiliation is not noted. If we miss your paper, please send the reference to dwolfe@bidmc.harvard.edu to be included in next month's issue. Please note that publications do not always appear in Pubmed in the same month they are acutally published.*

Alazemi S, Majid A, Ruiz AI, **Litmanovich D**, Feller-Kopman D, Ernst A. An elderly woman with chronic dyspnea and endobronchial lesion. Chest. 2010 Feb;137(2):460-6.

Alsop DC, Dai W, Grossman M, Detre JA. Arterial Spin Labeling Blood Flow MRI: Its Role in the Early Characterization of Alzheimer's Disease. J Alzheimers Dis. 2010 Apr 22. [Epub ahead of print]

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Radiology Media Lab & Medical Editor Services

The **Radiology Media Lab** is located on the West Campus (WCC), Rm. 305. **Michael Larson** is responsible for operating and maintaining the media lab equipment: 2 wide-format poster printers, 2 flatbed scanners, a 35mm-slide scanner, a VCR/DVD player, and two loaner laptop PCs. Radiology faculty, staff and administrative assistants can request appointments for using (or learning to use) the equipment with a week's advance notice. (Note: loaner laptops require at least 2 weeks notice.) For major Radiology conferences such as RSNA, ISMRM, etc., users are expected to prepare their presentation materials as early as possible prior to making requests to use the media lab equipment.

Michael also provides, by appointment, general photography and digital image editing support, and training in the basic use of media materials in Microsoft Office, e.g., using and manipulating media files in Word documents and PowerPoint presentations.

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