



Advanced Multimodality Image Guided Operating Suite

AMIGO is a patient-friendly environment where physicians, engineers, surgeons, radiologists and nurses all work closely together

AMIGO Update: The First 100 Patients

On Thursday, April 12th, the AMIGO staff treated the 100th patient in the suite. Considering how much preparation went into getting the multiple clinical programs up and running – from dry-runs to planning schedules and staffing – the fact that it took the teams 8½ months to reach the 100th patient milestone is quite an achievement. Since opening to patient care in August of 2011, teams have used the suite for craniotomies for biopsy and treatment of brain lesions, pituitary procedures, prostate biopsies and brachytherapy, gynecologic brachytherapy, and percutaneous tumor ablations. The most recent program to start up is the MR-guided cardiac ablation program, a cutting edge image-guided treatment for atrial fibrillation, with programs for breast-cancer lumpectomies, brain tumor laser ablations, parathyroid resections and treatment of peripheral sarcomas slated to begin in phases throughout 2012.

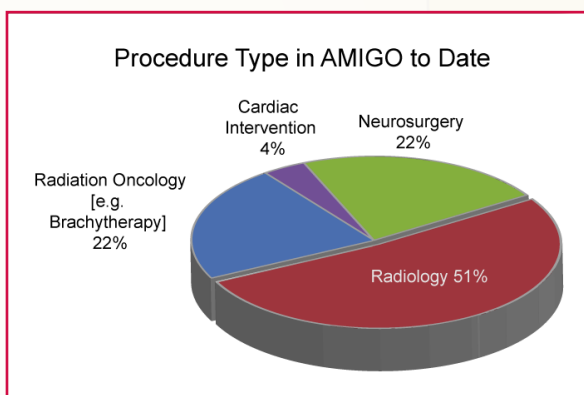
The teams starting up the newer programs were facilitated by their colleagues who were involved in establishing the first phase of AMIGO programming. The physicians, nurses, and technologists from the earlier programs, which included the tumor resection and prostate and gynecologic brachytherapy programs, have acquired valuable knowledge and experience from their 8 ½ months of working in the suite. Each specific procedure taught the

members of the AMIGO staff something new about working in the space. Physicists streamlined imaging protocols to allow for the most efficient image acquisition. Nurses and radiologic technologists coordinated the placement of portable devices, arranging the equipment so that it would be at hand at the precise moment it was needed. These small adjustments, unnoticed by patients, were vast leaps in the clinical staff’s becoming familiar with the capabilities



of the unprecedented operating theater.

Below is the breakdown of cases by procedure type since the AMIGO’s opening.



“I was impressed with the foresight with which the nursing and imaging technologist staff prepared the suite for my procedures,” said Kemal Tuncali, MD, an interventional radiologist who has performed more than a dozen kidney and liver tumor ablations in AMIGO. “Patients were imaged quickly and carefully and the images were registered to the patients’ anatomies almost instantaneously. The shifting of organs during a procedure is a significant issue during liver and kidney ablations and the real-time imaging capabilities of the AMIGO suite seem to do a great job in addressing

Michaud Introduces AMIGO Cardiac Ablation Program

The clinical programs in Phase I included procedures and techniques for which the use of image guidance is considered the standard of care. They were chosen as the first procedures in AMIGO as a way to introduce the clinical teams to the suite with procedures the staff had experience performing in existing operating theaters in the hospital. The prior experience gave the Phase I teams added confidence to explore the suite's capabilities more fully.

Cardiac surgeon Gregory Michaud, MD, didn't have the benefit of extensive experience with his procedure when prepping to work in the AMIGO suite for the first time. Dr. Michaud, who leads AMIGO's cardiac surgery program, is using the suite's capabilities to introduce a novel procedure that has the potential to advance the standard of care for patients suffering from a common heart condition: image-guided thermal ablation for the treatment of atrial fibrillation. Atrial fibrillation, which is the most common type of irregular heartbeat, is the result of progressively fibrotic tissue in the atria that interferes with the heart's normal electrical conduction system. Surgical ablation of the fibrotic tissue, via either open-heart surgery or

catheter-based surgery, is the current standard of care but many of these procedures fail because not all of the fibrotic tissue is removed. Dr. Michaud hopes to drastically reduce the failure rate for cardiac ablations through the use of AMIGO's MRI capabilities.

"The intraoperative use of MRI will enable me and my team to better assess the extent to which we were able to remove the fibrous tissue from the atrium in real-time," said Dr. Michaud. "By getting the images quickly, we will be able to see if more unhealthy tissue remains and remove it while the patient is situated on the operating table."

With the addition of cardiac care, the AMIGO suite has another innovative clinical program on its roster; other programs are scheduled to be added in the months ahead. As these programs mature and the data on patient outcomes grow, the true impact of the AMIGO suite will begin to be felt. But until then, the AMIGO clinical teams and individuals like Dr. Michaud will continue using the suite to push for new standards in image-guided surgical care.

Rachel Rosenblum, AMIGO Administrative Director, Departs for New England Baptist Hospital

We focus a lot of attention in the pages of this newsletter on the physicians, nurses, technologists and physicists who devote their specialized skills to providing the cutting edge made possible by the AMIGO suite. But there's a small but highly effective team of administrators that has been involved with AMIGO planning, development and implementation from Day 1, working behind the scenes to make the AMIGO suite a viable, efficient enterprise. This team supported the technology review that preceded decisions regarding the specific devices to include in the suite and negotiated project terms with scores of companies and firms that were involved in aspects of the AMIGO project ranging from architectural design and construction to rigging up the A/V system. When construction was underway, the administrative team presented updates, determined and assigned task lists and kept everyone motivated to meet project deadlines. Members of the team took point on troubleshooting any issues with vendors and displayed a diplomatic touch to developing the phased approach by which clinical programs were to be added to the suite. All of this varied and difficult work was done with little fanfare, yet was integral to the first months of the suite's existence being as remarkably smooth as they have been.

So it is with a little bit of disappointment that an introduction to the talented and tireless leader of AMIGO's administrative group, Rachel Rosenblum, MHA is occasioned by her departure to become the Director of Surgical Services at New England Baptist Hospital.

Rachel has been at Brigham and Women's Hospital since 2008, when she became an Administrator for Endoscopy and Surgical Services. Two years after that, she was promoted to Director of Surgical Services Operations and Program Development. With this new role came the responsibility for oversight of all administrative aspects related to AMIGO.

Rachel got up to speed on the AMIGO project remarkably quickly. She was closely involved in the prep and planning work, ensuring that licensing submissions to the Department of Health met the deadlines. She also helped work through scheduling the introduction of the various programs and the billing and coding issues related to AMIGO-based clinical work.

These administrative tasks, in the context of a standard operating room, loom large. In the context of the AMIGO suite, where so much of the clinical work was unprecedented, the suite's administrators had to come up with creative solutions to issues that were intensified by the unprecedented nature of the clinical work going on in the suite. Rachel has led her team through the uncharted waters, mapping a course that AMIGO administrators can follow for years to come.

"Rachel has been a boon for the AMIGO program," said co-Medical Director Clare Tempany, MD. "Her professionalism, attention to detail, and communication skills were absolutely central to getting us through the transition from the construction phase to the clinical programming phase. I am truly thankful for the countless hours of work Rachel put into the AMIGO project and wish her all the best!"

AMIGO Profile

Akila Viswanathan, MD, MPH Leads Clinical Advances in Gynecologic Radiation Oncology



Attesting to the multidimensional nature of AMIGO, since Sept, 2011, innovative procedures to treat gynecologic cancers have met with great success. BWH and Dana-Farber Cancer Institute radiation oncologist Akila Viswanathan, MD, MPH, Director of the Gynecologic Radiation Oncology service, has been treating patients who present with cervical, vulvar, uterine, or vaginal cancer using image-guided brachytherapy since September, 2011. She uses the

AMIGO's various imaging capabilities to guide the insertion of the brachytherapy applicator.

In brachytherapy, radioactive seeds are placed in or near the tumor itself, giving a high radiation dose to the tumor while reducing the radiation exposure of the surrounding healthy tissues. In gynecologic brachytherapy, needles or narrow tubes are used as applicators for the insertion of the radiation sources, so the accurate placement in and around the tumor is critically important. Overall, at the BWH, the Gynecologic Radiation Oncology service treats more than 200 patients each year.

With its multi-imaging options and sophisticated audiovisual and navigation technologies, the AMIGO suite is an ideal setting for gynecologic brachytherapy. Dr. Viswanathan is one of a select few radiation oncologists nationwide to offer brachytherapy using real-time, 3D image guidance as an alternative to surgery or non-image-guided radiation. MR images are taken prior to, during, and after the procedure with "the main goal of accurate targeting of the tumor," she explained. The MR imaging complemented by ultrasound and computed tomography also reveals tumor margins so that less of the bowel and bladder are exposed to the radiation.

According to Dr. Viswanathan, brachytherapy with real-time imaging can offer many patient benefits, including additional preservation of normal tissue compared with traditional radiation planning alone, a reduction in the risks of rectal bleeding and bladder ulceration, and an improvement in local cancer control and survival. Compared to other brachytherapy techniques, says Viswanathan, "International series have shown at least a 5-10 percent improvement in local tumor control and survival, particularly in patients with larger tumors, using 3D image-guided brachytherapy."

Active and Always Learning

Dr. Viswanathan grew up in Pittsburgh, PA. She graduated with honors from Harvard University, where she majored in biological anthropology. She received her medical degree from the University of Pittsburgh School of Medicine in 1987 and subsequently returned to Cambridge, MA to enter the residency program at the Harvard Joint Center for Radiation Therapy in Radiation Oncology. Dr. Viswanathan served as the program's chief resident in 2001-2002.

During her residency, Dr. Viswanathan completed a Masters in Public Health in 2001, and also completed a Masters degree in Epidemiology at the Harvard School of Public Health. She was board certified in Radiology Oncology in 2002, and has since served as the Chair of both the written and the oral gynecologic board certification examinations. She recently was elected President of the American Brachytherapy Society (ABS), and will begin her term as President-elect in May, 2012.

A Leader in Image-Guided Brachytherapy

Dr. Viswanathan's considerable clinical experience and robust compilation of published work have made her an internationally respected leader in 3D image-guided gynecologic brachytherapy. She published the first substantial book on the topic, titled "Gynecologic Radiation: Novel Approaches to Image Guidance and Management", in January 2011. She also led the first prospective clinical trial using real-time MRI image-guided brachytherapy in the U.S. Then, as a way to assess current trends in image-guided brachytherapy in the United States, she led the design and analysis of a survey of 141 American Brachytherapy Society physician members who were not in training (*Viswanathan AN, Erickson BA. Three-dimensional imaging in gynecologic brachytherapy: a survey of the American Brachytherapy Society. Int J Radiat Oncol Biol Phys. 2010 Jan 1;76(1):104-9.*)

Dr. Viswanathan and her colleagues found that more 3D imaging is needed in brachytherapy as it can enable more complete radiation coverage than standard radiation planning methods alone. Only one other center in the United States reported using MRI for gynecologic brachytherapy treatment planning, and no center reported real-time PET capability. "While 70 percent of ABS survey respondents use CT imaging after insertion, the available images are not necessarily optimally used for patient care," said Dr. Viswanathan. "With additional training and awareness regarding the patient benefits of 3D images, the utilization of available imaging technology should significantly increase in the near future, resulting in substantially improved outcomes for patients."

Her ongoing research aims are numerous and include determining the best MR sequences to use with patients to obtain the most accurate understanding of their anatomy and cancer and correlating imaging with pathologic analysis.

In AMIGO, she is the principal investigator of a trial that is recruiting patients to evaluate image-guided gynecologic brachytherapy, for which the primary outcome measure is to determine doses to the rectum, sigmoid and bladder obtained after AMIGO-guided placement compared to standard CT-guided treatment. The hypothesis is that AMIGO-guided placement will result in lower doses to the organs at risk than standard CT-based imaging.

Note: For more information on these procedures, see Dr. Viswanathan speak on interstitial brachytherapy here: <http://www.dana-farber.org/Health-Library/Interstitial-Brachytherapy-Video.aspx> and intracavitary brachytherapy here: <http://www.dana-farber.org/Health-Library/Tandem-and-ovoid-brachytherapy-video.aspx>. More on brachytherapy can be found at the American Brachytherapy Society (<http://americanbrachytherapy.org>) where Dr. Viswanathan is involved in leading the task group that establishes guidelines on the treatment of cervical cancer: http://americanbrachytherapy.org/guidelines/cervical_cancer_taskgroup.pdf.

