

a Closer Look

Inside Medical Imaging of Baltimore

Fall 2010

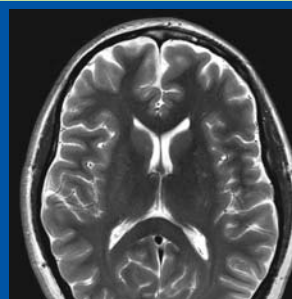
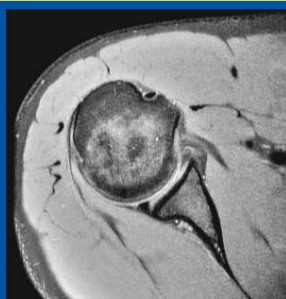
FEEL THE POWER... 3T IS COMING TO MIB!

Remember the feeling when you bought your first car? You are excited, anxious and nervous all at the same time and you can't wait to tell everyone about the exciting new addition to your family? Well, we are *that* excited to tell you about our new 3T GE scanner. We've had this in the works for a long time and now, the fruits of our labor will come to fruition by Mid December. We started to de-install our 0.7T Open scanner on October 1 and we expect our installation of our 3T to begin by mid November; our long awaited new magnet should be up and running by mid December. We're very excited to provide this innovative service to your patients.

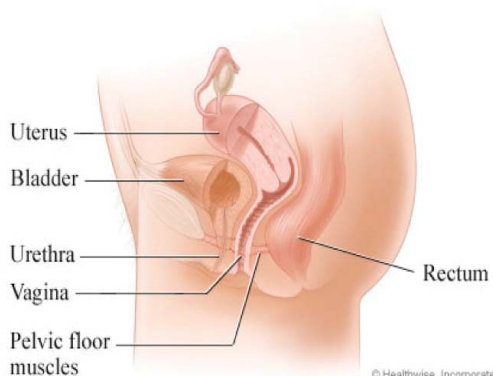
Some of the perks of 3T are higher resolution, lesion conspicuity and shorter scan times. One of the benefits of higher resolution is decreased contrast usage. This is a key element to reducing the incidence of NSF. Less contrast or no contrast needed is a big bonus for your patients. Many MRA studies can be performed without contrast on 3T.

The physics of the 3T are pretty elemental. The field strength is twice as strong as the 1.5T, so the signal from a body part is greater and the operating speed is faster too, although not quite twice as fast. The scanner can operate more efficiently. Operating a 3T is a lot different than our 0.7T or even our 1.5T scanner. There are additional

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PELVIC PROLAPSE



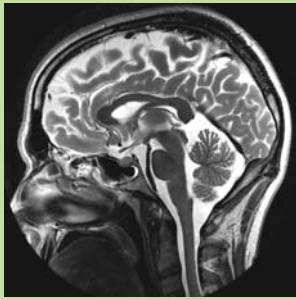
I love to see new imaging options for patients, especially when they facilitate an accurate and timely diagnosis. There are a group of pelvic floor disorders that include pelvic organ prolapse, urinary incontinence, and anal incontinence. All of these disorders can all be evaluated using MRI. I would like to share with you this new imaging option to aid in the evaluation of pelvic prolapse, Dynamic MRI of the pelvis. This imaging procedure does not use radiation or any contrast. At our facility, we have seen an increase in the number of women and men being evaluated for pelvic prolapse. Pelvic organ prolapse is a common condition affecting more women than men by a 6:1 ratio. For the purpose of this article, I will describe the female issues, although this is a condition that can affect men as well. For women, pelvic prolapse is generally caused by a relaxation or weakening of the muscles in the pelvic floor, whereby the muscles and ligaments become weak and can no longer keep the organs in place correctly. Many times, the pelvic contents descend into the vagina. Prolapse is most commonly caused by labor and childbirth, pelvic radiation or surgical intervention.

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3T IS COMING TO MIB!

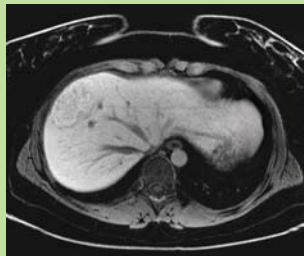
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safety issues involved with 3T. We will need to be more vigilant with our screening procedures and some patients are just not candidates for 3T because of metal implants. There are some implants that can be scanned safely on 1.5T that have not been tested at 3T. Because of the 3T safety issues, we will have a learning curve and it may take some time for us to get used to the new scanning and scheduling requirements. We will try to make this transition as seamless as possible.



BRAIN IMAGING — MRI at 3T offers a lot of Neuro advantages, especially for demyelinating disorders, head trauma, tumors and cerebrovascular disease and we can't wait to investigate all of the new bells and whistles. Some of the operating advantages are DTI (diffusion tensor imaging)/Fiber Trak, which allows you to see white matter trajectories in the brain and offer color-coded directional fractional anisotropy maps. This is a very dynamic application, designed especially for imaging MS patients. Propellor HD is an application designed to correct for motion artifacts and enhance contrast, which can produce beautiful images on patients who are unable to hold still for an MRI exam. Cube is a 3D sequence available in T2, T2 Flair or PD sequence, which can be reformatted in any plane with the same resolution as the acquisition plane. All of these enhancements make it easier for patients to complete an MRI in a shorter period of time.

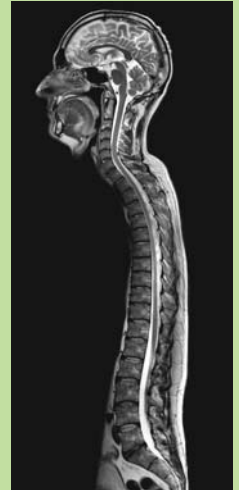
BODY IMAGING — Quicker scanning and shorter breath hold scans are a definite advantage of 3T. DWI provides high sensitivity and tissue characterization and aids the radiologist in image interpretation. DWI can be used in the abdomen, liver, breast and prostate. Spectroscopy



in the Breast and Prostate will add tissue characteristics and more confidently assess tumor spread. 3D dual echo imaging produces in-phase and out-of-phase imaging in a single breath hold which can be reformatted in orthogonal planes. For breast imaging IDEAL, BREASE and VIBRANT are imaging sequences that aid in lesion characterization. IDEAL is a fat and water separation technique. BREASE is a breast-specific, single-voxel spectroscopy sequence that allows doctors to characterize lesions confidently. VIBRANT allows for both breasts to be imaged in one scan with excellent fat saturation. All of these sequences together allow for a more accurate diagnosis in a shorter period of time.

SPINE IMAGING — The big advantage for trauma and mets is spectroscopy of the spine for lesion detection and characterization.

MUSCULOSKELETAL IMAGING — High definition coils make MSK scanning incomparable to other modalities and scanner strengths. IDEAL can be used for fat/water separation that allows for uniform and consistent fat suppression virtually every time. Cube with ARC is a 3D volume scan that utilizes state-of-the-art imaging acceleration that easily reformats into sub-millimeter slices, in any plane, with one acquisition. CartiGram is a non-invasive imaging tool that allows for in-depth visualization of articular cartilage to identify its integrity, early cartilage degeneration and monitor patient progress. You are able to see the collagen fiber network and any degradation of the articular cartilage.



MRA IMAGING — High spatial resolution and ultra quick scanning times allow for many vascular studies to be performed as non-contrast studies. This is a huge advantage, especially for patients who are in renal failure, or have contrast allergies.

Seeing is believing, and we can't wait to get our hands on the controls and drive this scanner! ■

PELVIC PROLAPSE *continued from page 1*

After the clinical exam, doctors may refer patients for Ultrasound or MRI. MRI is a quick and easy imaging study performed without contrast or radiation. The beauty of MRI is that it will include the entire pelvic floor in orthogonal planes and it allows physicians to evaluate the pelvic floor and its contents with minimal discomfort or pain and requires no contrast. These are definite advantages over CT and Ultrasound.

Points of reference for staging prolapse are the Pubococcygeal line (PCL), a line extending from the inferior margin of the symphysis pubis to the junction between the 1st and 2nd coccygeal segments and the puborectalis muscle sling, which is a nodular density posterior to the anal canal. The puborectalis hiatus is inside the puborectalis muscle, which forms the most caudad part of the levator ani and encompasses the urethra, vagina and rectum. Organ prolapse is defined as any protrusion through the puborectalis hiatus. ■



Image #1-SSFSE in resting position

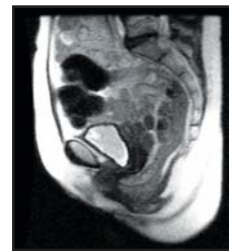
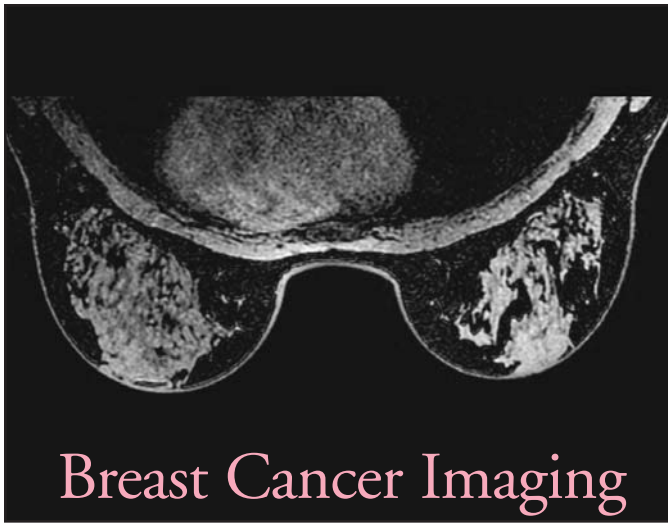


Image #2-SSFSE in partial straining



Image #3-SSFSE in full straining

Interpretation: SSFSE Images are generated in the sagittal plane in the resting position, partial straining and full straining position. In partial straining, there is abnormal descent/prolapse of the rectum and sigmoid colon. On full straining, some small bowel loops also extend posterior to the bladder, slightly between it and the coccyx, although not completely into the prolapsed sac. The sigmoid colon appears to be within the prolapsed sac, as well as the rectum.



Breast Cancer Imaging

October signals the start of Breast Cancer awareness month. Great strides have been made in the last 20 years for early detection and treatment for breast cancer patients. The ACR and the American Cancer Society have set standards and guidelines for the screening and detection of breast cancer. There is nothing strikingly new on that front. Mammography should be used as a screening tool, followed by ultrasound and MRI for lesion characterization on all positive or inconclusive exams. Biopsy should be performed on questionable lesions, based on these results. If a cancer is detected, MRI of the breast can be performed to characterize the lesion, look for satellite lesions in the same breast, or contralateral lesions in the other breast. MRI is also indicated as a screening tool for patients with the BRCA 1 or BRCA 2 gene. Many studies have shown that MRI of the breast can alter the treatment plan in roughly 30% of the patients scanned. For this reason alone, we believe that MRI'S role in diagnosing and staging of breast cancer will continue to grow in the future.

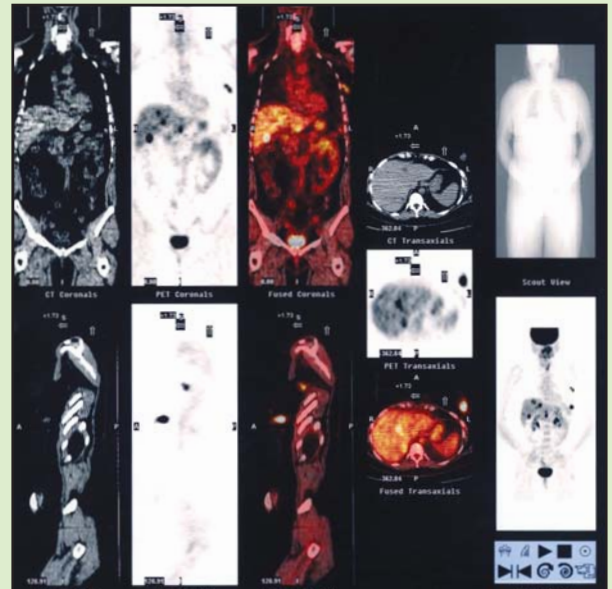
Breast imaging at 3T holds exciting promise. By adding Spectroscopy and DWI with ADC mapping to routine exams, lesion specificity increases and hopefully, decreases the number of unnecessary biopsy procedures. Spectroscopy uses choline as a biomarker of cancer. A thought process for monitoring response to therapy is checking choline volumes during therapy. By monitoring choline response mid-cycle, you can assess the response to therapy and modify treatment as needed. ADC mapping measures the water molecules moving within tissues. Studies have shown that malignant and benign tissues have different diffusion of water molecules. This allows the radiologist to more confidently characterize lesions and decrease the false positive rate.

While times have changed and more options are available, insurance companies are still dragging their feet with reimbursements. It is important for patients to check with their insurance carriers and meet their eligibility requirements. ■

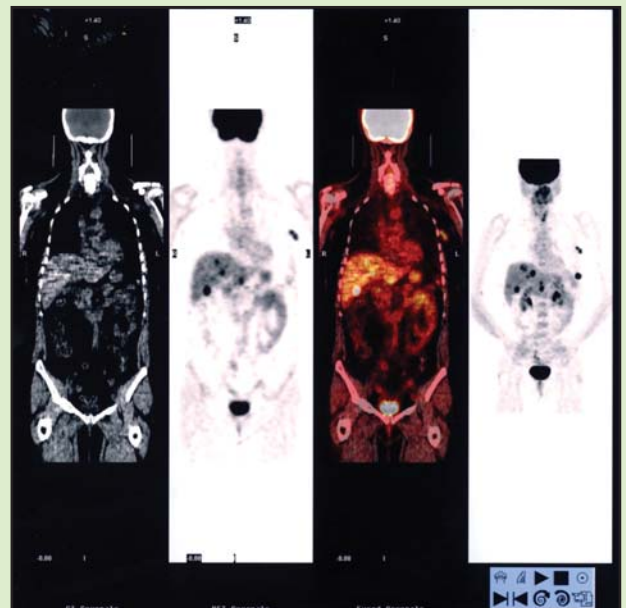
Case of the Month

By Dr. Loralie Ma

PET PRE-SCAN PROTOCOL



HISTORY: Patient is a 57 year old female with a newly diagnosed left breast cancer. This exam was performed for staging purposes prior to treatment and or surgery. Coronal and Axial PET/CT images show numerous hypermetabolic lesions in both lobes of the liver in addition to her primary left breast cancer and axillary lymph node metastases.



DISCUSSION: This case shows a patient with breast cancer and known axillary lymph node metastasis for staging. PET/CT shows multiple liver metastases in addition to her known breast primary malignancy and known axillary metastasis. PET/CT is useful in evaluation patients with locally advanced disease as correctly staging these patients optimizes treatment strategy.



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Noreen Pfeiffer

Noreen's Corner

A lot of new news in this edition! Thanks for taking the time to read the newsletter. The big advantages of the 3T will be in Neuro imaging, Breast & Prostate imaging and Musculoskeletal imaging.

While we are sad to see our Open scanner leave, we are equally as excited to see our new

addition, the 3T scanner and take it for a test drive. We can't wait to see some of our own images on the new 3T scanner. Look for upcoming news about the progress of the scanner. We are hoping to have an Open House in the early part of 2011 and you can see some of these spectacular images for yourself!

HIGHLIGHTS

3T High Quality Imaging

High field MRI Scanners

PET/CT Scanner

State of the art scanners for improved speed and image quality

Non-invasive angiography

MR Breast imaging

MRI Guided breast biopsies

Board-certified physicians

Licensed, certified technologists

Staff receives ongoing continuing education

24-hour report turnaround

Extended hours of operation

Complimentary parking

Partnered with GBMC

Participation with numerous insurance plans

Oral sedation available upon request (for patients with claustrophobia)

