Susceptibility Weighted Imaging (SWI)

A Real Game Changer!

Previously Invisible Brain Injuries can Now be Identified

High Field and Open MRI has recently added the ground breaking pulse sequence called, “Susceptibility Weighted Imaging” or SWI. This revolutionary software provides a new method that maximizes MRI sensitivity to magnetic susceptibility from microscopic areas of trauma. Therefore, areas of brain injury that could not previously be visualized and interpreted as normal on conventional MRI exams, can now be diagnosed accurately and confidently.

As part of High Field and Open MRI’s commitment to patients that are claustrophobic and/or large in stature, SWI is available on our new Open Siemens Espree 1.5T magnet at our convenient Shelbyville Road location across from Oxmoor Center.

MRI of Brain without (left) then with (right) SWI

Routine brain sequences
Normal

Same patient performed using SWI
Abnormal

The standard sequence used to identify brain trauma is normal (image on the left). The susceptibility weighted image (on the right) demonstrates an area of magnetic susceptibility indicating an underlying shear type brain injury.
SWI incorporates high resolution 3D modified T2 STAR sequences combined with advanced thin-sliced scanning to maximize the magnetic susceptibility of paramagnetic substances such as iron, present even in the smallest area of hemorrhage. This magnetic susceptibility gives physicians the ability to visualize subtle brain injuries which contain microscopic areas of blood. How can injuries that are microscopic in size be seen? We can see them because of the microscopic area of hemorrhage that occur with shear and diffuse axonal injuries. This area of hemorrhage is too small to see with MRI’s. However, SWI detects not the hemorrhage, but the magnetic susceptibility of the blood breakdown products resulting from the hemorrhage. These blood breakdown products are paramagnetic and result in areas of low signal intensity many thousands of times larger than the microscopic area of hemorrhage. This is how SWI can detect lesions of such a small size. Research has shown that SWI sequences can detect areas of blood as small as 50 microns, which is 5/100 of a millimeter. These small brain injuries occur more often than previously thought and can result in profound neurological and psychological symptoms even with what was considered to be minor trauma.

“How Susceptibility Weighted Imaging Works

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“I like to think of this paramagnetic effect as a person with a powerful searchlight lost at sea. A search plane cannot see something as small as a person floating in a huge, dark ocean. However, the rescuers can easily see the bright searchlight. Therefore, the rescuers know by seeing the light that there is a person there. This is an analogy for how we look for microscopic areas of blood using the paramagnetic effect of SWI imaging.”

-Peter Rothschild, M.D., Radiology Director, High Field & Open MRI

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Brain Trauma

The diagnosis of brain injuries is critical, not just to explain the patient’s deficits, but also for establishing prognosis, and planning intervention and rehabilitation. There are two types of subtle neurological trauma that have traditionally been difficult to diagnose with imaging, diffuse axonal injuries (DAI) and shear injuries. Either is indicative of significant trauma and can be easily missed because they are often microscopic in nature. SWI can be used for more than just the diagnosis of brain injuries. With the use of SWI, radiologists can also evaluate the size and number of lesions. This information is invaluable for planning the course of treatment which is critical for patients and caregivers. Additionally, SWI can be used to predict a patient’s prognosis.

Venous Abnormalities

SWI can be used for imaging venous structures and is an excellent tool to identify possible tears in small cortical or septal veins. Visualization is possible because venous blood also has a paramagnetic effect due to deoxyhemoglobin. This allows for the detection of very small venous angiomas and other vascular abnormalities, without the use of intravenous contrast media. These small lesions can often be missed on standard MRI sequences even with contrast.

Amyloid Angiopathy

The imaging diagnosis of amyloid angiopathy before SWI was difficult if not impossible. Cerebral amyloid angiopathy is a disease process where amyloid proteins are deposited in the walls of small arterioles. These walls lose their elasticity and become fragile. Subsequently there are numerous microscopic areas of hemorrhage in and around the arteriole vessel wall. These small areas of hemorrhage, having a paramagnetic signature, act as a marker for amyloid angiopathy. The early diagnosis of amyloid angiopathy is critical so these patients can be taken off aspirin or other anticoagulants and placed under strict blood pressure control. If patients with amyloid angiopathy have a bleed while on anticoagulants, the results can be devastating.

Why is SWI so important for your patient?

Studies have shown that up to 50% of neurological trauma (brain injuries) can be missed on conventional MRI. This is not acceptable and is why High Field & Open MRI has incorporated the new Susceptibility Weighted Imaging pulse sequence into our protocols.

High Field and Open MRI is one the few outpatient imaging centers in the country offering this advanced Susceptibility Weighted Imaging sequence. If you have a patient that has clinical signs of a brain injury and has had a brain MRI read as normal, we encourage you to have that patient scanned using SWI pulse sequence.

For a limited time, High Field & Open MRI:

- is offering special pricing for SWI in symptomatic patients who have had a brain injury and an MRI at another facility that was read as normal
- will schedule at no charge a SWI MRI on any previous High Field & Open MRI patient that had a negative brain MRI for neurological trauma and is still exhibiting symptoms

Call 502 429 6500 to speak with one of our marketing professionals about the new SWI pulse sequence.
Now Open 7 Days a Week

Our Siemens Espree 1.5T Open Bore MRI is now available!

High Field & Open MRI • 7807 Shelbyville Rd.
Louisville, KY 40222 • 502 429 6500

“I can’t believe what we were missing before SWI. No MRI should be done on a patient with brain trauma without SWI.” - Beth Dubose, M.D.
Staff Radiologist, High Field & Open MRI

“SWI sequences are the next step in diagnosing brain injuries. The difference between SWI and a standard MRI is like the difference between a CT and an MRI; it’s amazing!” - William Zinn, M.D.
Staff Radiologist, High Field & Open MRI

Exciting News: Here We Grow Again!

NEW in January 2011!

16 Slice GE CT at our Dixie Highway location.

Fast Track CT
“Just Walk In” at either of our convenient locations.

No Appointment Necessary!

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