MRI Equals CT for Acute Brain Hemorrhage

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Contributing Writer

Magnetic resonance imaging is superior to CT for detection of chronic brain hemorrhage and is its equal in confirming suspected acute intracerebral hemorrhage, judging from the findings of a prospective, multicenter study.

Many stroke centers currently obtain both MRI and CT in initial evaluations of suspected brain hemorrhage, a practice that is costly in both time and money. Given the new findings, MRI "may be acceptable as the sole imaging technique for acute stroke at centers with expertise," reported Chelsea S. Kidwell, M.D., of the UCLA Stroke Center, and associates.

Noncontrast CT has been the standard brain imaging study for the initial evaluation of patients with stroke, but interest in multimodal MRI—and its potential ability to distinguish hemorrhage from cerebral ischemia—has been building.

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The findings of the Hemorrhage and Early MRI Evaluation (HEME) study also suggest that gradient recalled echo (GRE) MRI—in addition to detecting hyperacute and chronic hemorrhage—may be able to detect regions of hemorrhagic transformation of an acute ischemic stroke that are not evident on CT (JAMA 2004;292:1823-30).

The study was performed between 2000 and 2003 at two stroke centers—UCLA Stroke Center in Los Angeles and Suburban Hospital in Bethesda, Md. Patients presenting with focal stroke symptoms within 6 hours of onset underwent brain GRE MRI followed by noncontrast CT. Scans were read by four blinded readers.

The findings complement another recently published study performed by the German Stroke Competence Network, which suggested that MRI is as accurate as CT for the detection of hyperacute hemorrhage (Stroke 2004;35:502-6).

In fact, when preliminary results of this other study became available, the HEME investigators performed an interim analysis of their own data and found that MRI was detecting acute hemorrhages not seen on CT. They stopped their own study early, after 200 patients were enrolled, to expedite their analysis.

The panel detected hemorrhage of any type in 71 patients with MRI and in 29 patients with CT. Acute hemorrhage specifically was diagnosed in 25 patients on both MRI and CT.

In four additional patients, however, acute hemorrhage was identified on the MRI but not on the corresponding CT. The panel interpreted each of these cases as hemorrhagic transformation of an ischemic infarct.

In three patients, regions interpreted as acute hemorrhage on CT were interpreted as chronic hemorrhage on MRI. In one patient, subarachnoid hemorrhage was diagnosed on CT but not on MRI. And in 49 patients, chronic hemorrhage, most often microbleeds, was seen on MRI but not CT.

In an accompanying editorial, Louis R. Caplan, M.D., of Beth Israel Deaconess Medical Center, Boston, said that results of this and other studies indicate that "for diagnosis of acute stroke, CT is not needed if a medical center has rapid access to modern MRI" (JAMA 2004;292:1883-5).

The investigators noted that it is unclear whether evidence of hemorrhagic transformation on MRI conveys a higher risk of symptomatic hemorrhage with thrombolytic treatment. The role of microbleeds in determining patient eligibility for thrombolytic therapy is also unknown, the investigators said.

An important caveat to the role of MRI, they noted, is that with small hemorrhages, blood that appears as acute on CT may appear as chronic on GRE MRI. "A noncontrast CT may be required to confirm the diagnosis in these cases," they said.

Patients in the study had a mean age of 75 years. The median times to MRI and to CT were approximately 2 and 3 hours after symptom onset, respectively. The MRI stroke protocol generally took 10-15 minutes—timing that should allay concerns about the length of MRI's image acquisition time, they reported. ■