

Abstract Title: Use of Quick-Brain MRI as a Screening Tool for the
Detection of Subdural Collections

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Introduction: The term "quick-brain" MRI was introduced in 2002 for fast spin echo T2 weighted images which could be performed rapidly without sedation in children with hydrocephalus as an alternative to CT scanning. The goal was to reduce radiation exposure and need for sedation in shunted children who often require multiple scans during childhood. At our institution, we have used this technique for an expanding number of indications, including macrocephaly screening and rapid screens for other major anatomic abnormalities. We report our experience with detection of subdural collections using this technique.

Methods: Since February 2003 we have performed over 900 quick-brain examinations in children of all ages, including newborns. Initial indications were shunted hydrocephalus, but as our experience grew with this technique, we began to use it as the test of choice for macrocephaly screening and to rule out major mass lesions prior to lumbar puncture. Because it provides images in three planes and appears to more clearly delineate the extraaxial spaces compared to CT or ultrasound, we have been interested in whether quick-brain MRI might be better able to distinguish enlarged subarachnoid spaces ("benign external hydrocephalus") from subdural collections reliably with less risk.

Children who presented acutely with a history or obvious signs or symptoms of trauma underwent CT scans and full, sedated MRI studies. Children referred for macrocephaly or other indications and who underwent quick-brain MRI, in whom a suspicion of subdural collections was raised, subsequently underwent sedated MRI studies with blood-sensitive sequences including gradient echo and susceptibility weighted sequences.

Results: We identified three infants who underwent initial quick-brain MRI scans and who were found unexpectedly to have subdural collections. One was a 6-week old baby with myelomeningocele who was being followed for mild ventriculomegaly; prior ultrasound had failed to note the subdural collection. A 5-month old boy with vomiting had a negative CT scan; a very small subdural collection could be seen on quick-brain MRI. However, this was noted only in retrospect after a full MRI was obtained. The final 5 month-old patient presented with a new seizure and had a subdural hematoma clearly seen on quick-brain MRI. Full MRI confirmed and further characterized the subdural collections in all three patients.

Conclusions: Quick-brain MRI can detect some unexpected subdural collections without radiation or sedation which may be missed by ultrasound and CT scan. Prospective comparison of quick-brain MRI to CT scans as a screening test for specific clinical indications has not been performed, so the relative numbers of false negatives and positives using these two techniques is not yet known. At present, animal studies are ongoing for this purpose at our institution.