Case Study

Unveiling Rare Pediatric Tumors and Demyelination Disorders with SyMRI

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> Having a reference for what's normal at this age is key because there is rapid brain development and myelin changes over the early years. Baby brains are the hardest scans to read so we need all the tools we can get to help with those.

Laura Hayes, MD, FAAP
Pediatric Radiologist/Neuroradiologist, Nemours Children's Hospital - Florida, USA

Dr. Laura Hayes is board certified in Diagnostic Radiology and Pediatric Radiology, with additional fellowship training in Pediatric Neuroradiology. After working at Children's Healthcare of Atlanta for over a decade, Dr. Hayes relocated to her husband's hometown of Pensacola where she reads locally and remotely for Nemours Children's Healthcare System and serves as an assistant professor for the University of Central Florida's College of Medicine.

Dr. Hayes has authored numerous publications, regularly speaks at annual meetings, chairs the Committee that creates the American Board of Radiology's certifying examination for pediatric radiology, peer reviews for top pediatric radiology and neuroradiology journals, and is very active in the Society for Pediatric Neuroradiology.

Tushar Chandra, MD
MRI Medical Director/Pediatric Radiologist, Nemours Children's Hospital - Florida, USA

Dr. Tushar Chandra brings over two decades of invaluable experience to the field of radiology. Board-certified by the American Board of Radiology in both Diagnostic Radiology and Pediatric Radiology, Dr. Chandra's comprehensive skill set and deep understanding of pediatric neuroradiology make him an invaluable asset to his patients and the medical community. His commitment to excellence and his compassionate approach have solidified his reputation as a leading expert in the field, particularly in the diagnosis and treatment of complex pediatric neurological conditions.

About Nemours Children's Hospital

Nemours Children's Health is a leader in pediatric care as well as research and clinical trials. Their goal is to prevent and reverse childhood diseases, improve healthcare delivery and keep children safe and healthy for many generations to come.

Nemours is one of the nation's largest integrated pediatric health systems, providing hospital- and clinic-based specialty care, primary care, prevention and health information services, and research and medical education programs aimed at improving the lives of children and families throughout the Delaware Valley and in Florida.

The quality and safety of Nemours' care consistently earn accolades, with U.S. News and World Report consistently ranking it among the best in the nation. Furthermore, Nemours secures the 14th position in National Institutes of Health research funding, standing out among the 150 freestanding children's hospitals in the United States.

SyMRI NEURO

Demyelination in Pediatrics

The pediatric brain is in constant development and requires various scanner settings in order to distinguish brain features during the child's maturation. Assessing the appropriate brain maturation is an especially hard challenge.

Myelin mapping from SyMRI serves as a pivotal tool by offering age-stratified reference curves for assessing myelination, aiding in a more precise assessment of patients. In rare instances, demyelinating diseases may mimic brain tumors, presenting challenges in diagnosis. SyMRI NEURO addresses these subjective assessments in pediatric brain MRIs by providing objective decision support through precise quantitative measurements, reducing interpretative variations among radiologists. Its quantitative multi-parametric maps generate robust segmentations and volume calculations, adaptable even for neonates, and offering independent synthetic contrast images regardless of scanner settings, facilitating patient-specific contrasts.

SyMRI

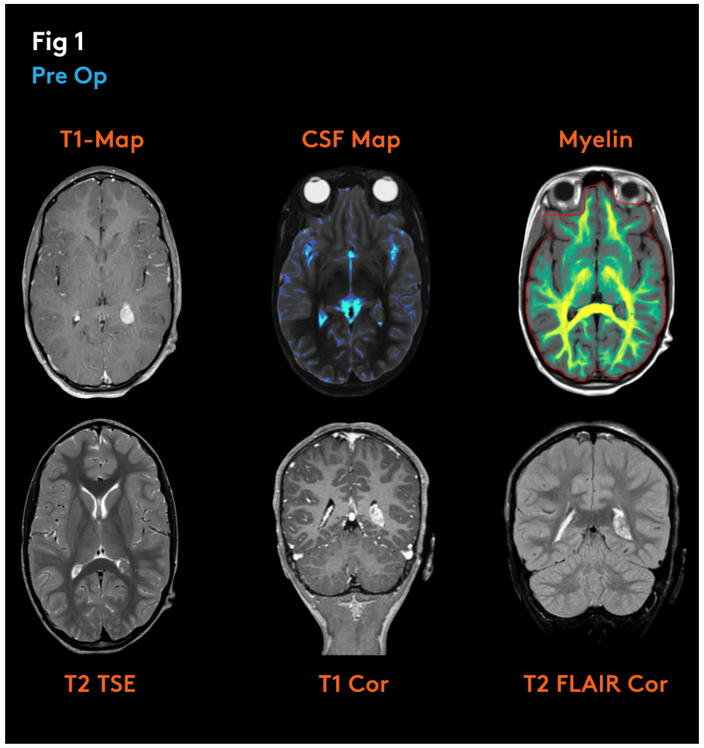
Objective decision support in a single fast scan

Rapid visualization of reliable quantitative data

Case 1

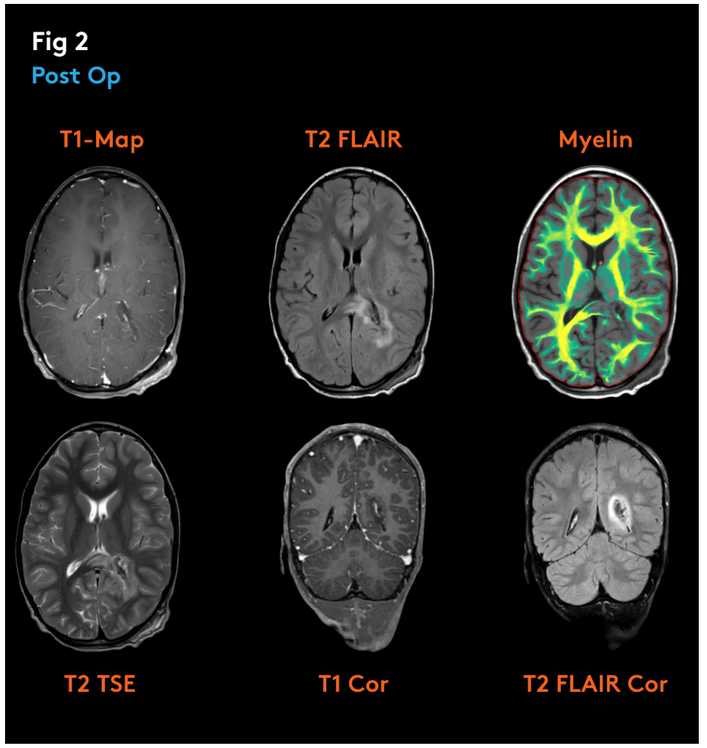
School age child with head trauma.

A mass in the left ventricle was incidentally detected on a CT scan performed for head trauma, with the rest of the head scan showing no abnormalities. Subsequently, after five months, the pediatric neurosurgeon requested an MRI to “evaluate choroid plexus papilloma” for surgical planning, suspecting a rare tumor.



The MRI revealed a contrast-enhancing mass that did not show any water content in SyMRI’s CSF map. This conflicted with the expected characteristics of a choroid plexus papilloma, typically known for their high-water content.

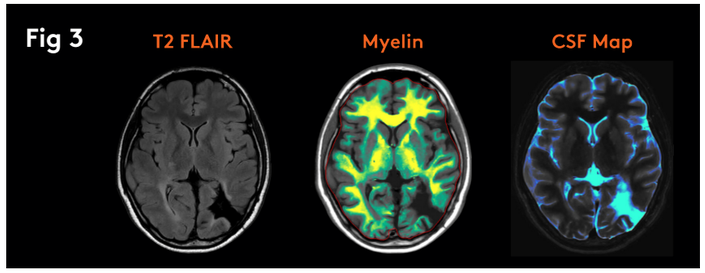
Despite its even greater rarity among children, meningioma was proposed as the leading differential diagnosis given the discrepancy in characteristics, especially the lack of water content. The tumor was resected, and the pathology was consistent with a low-grade meningioma.



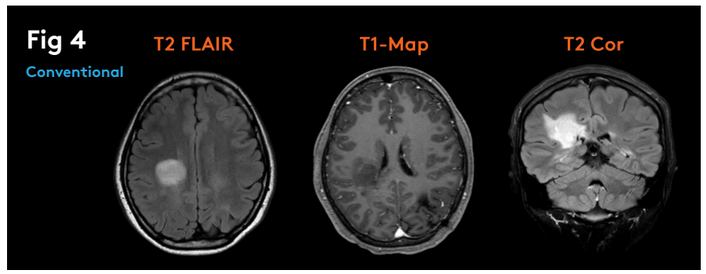
This case underscores the importance of SyMRI as an accurate diagnostic tool in guiding medical decision-making, especially if invasive procedures or risky treatments can be avoided.

Case 2

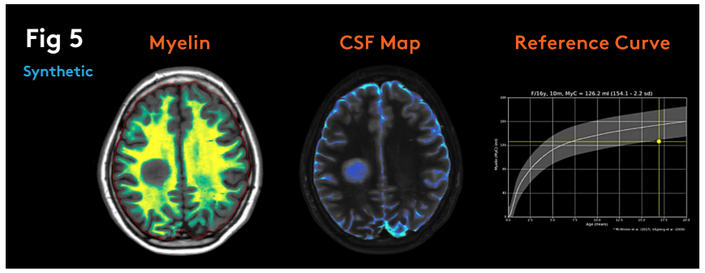
Teenage girl with history of left occipital lobe tumor resection in another country 8 years prior (Fig 3), now presents with left sided weakness. Prior studies and additional history not available.



The initial findings raised concerns about tumor recurrence. Imaging revealed a continuous region of increased T2 signal intensity in the right centrum semiovale. Post-contrast enhancement was observed at the center of this abnormal signal area (Fig 4).



SyMRI's Myelin map showed a thin, consistent, and uniform decrease in myelination surrounding the abnormal signal (Fig 5). This suggests that the issue is probably not infiltrating tumor tissue but rather an area experiencing active demyelination. Ultimately, the diagnosis was multiple sclerosis.



SyMRI proves its worth in clinical settings by offering valuable assistance in diagnosing conditions like multiple sclerosis, aiding in differentiating between tumor recurrence and demyelination disorders like MS.

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About SyMRI

SyMRI offers confident care through intelligent imaging. It combines an MR sequence with post-processing MR software, and includes multiple contrast-weighted images, fully adjustable for TE, TR, and TI values for optimal flexibility. Using only a single scan and with a post-processing time of less than 10 seconds, SyMRI enables automatic segmentations and volume measurements of tissues such as white matter, gray matter, cerebrospinal fluid, and myelin. This allows users to track disease progression or compare against control groups.

SyMRI which is FDA cleared for patients of all ages, is available both as a stand-alone solution or be fully integrated into the clinical workflow.