



Objective SyMRI data as a communication tool in Pediatrics

Objective decision support in a single fast scan

// SyMRI gives an appropriate scenario of the development of a disease severity as well as a prognosis, which helps in the assessment of how we're going to help the child in the future regarding different kinds of exercises, therapy and parental counselling. SyMRI's quantitative analysis helps with this //



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About DY Patil Medical College Hospital - DPU, Pune, India

The Dr. D. Y. Patil Medical College, Hospital & Research Centre, was established in 1996. It is built in an area covering 725000 square feet, and the facility includes 61 wards with 2000 beds. The Dr. D. Y. Patil Medical College, Hospital & Research Centre has the mission to provide a patient focused healthcare and aims to improve the health and quality of life for the individuals and communities by providing a compassionate, accessible, and cost-effective healthcare with high quality. It also aims to promote health and to educate professionals within healthcare to participate in appropriate clinical research.

Introduction

Subjective assessments are a common occurrence when it comes to interpretations of MR imaging, especially in pediatric cases. Qualitative measurements as hyper-intense, hypo-intense or iso-intense put a high pressure on the individual radiologist's skills and creates a situation where the tissues can be classified differently depending on the radiologist. Pediatric brains are constantly maturing which causes further challenges for the radiologists, since it requires various scanner settings in order to distinguish brain features.

While working with pediatric patients, the clinicians often come across situations where they need to communicate with anxious family members. It's understandable that the family can feel anxiety towards the child's level of severity in its condition. Particularly if they've met with different clinicians who has provided them with information which differs from each other. Subjective assessments make a poor foundation for the continuous communication with the patient's family. Being able to provide consistent information could decrease the parent's feelings of uncertainty and build trust between the parents and the clinicians. This is important since the family can provide important information about the child's symptoms and medical history.

SyMRI can provide the clinician with objective decision support through quantitative measurements and reduce unwanted variations in the assessments of a pediatric patient. In quantitative MRI, objective measurements of tissue volumes enable the radiologist to quickly assess the child's status and make comparisons with a healthy population. Reference curves can be used as a communication tool, since it compares the child with a healthy population. Effective communication regarding a child's condition has the potential to increase the trust level between the clinician and the child's family.



Objective decision
support in a single
fast scan



Rapid visualization of
reliable quantitative data

SyMRI NEURO

Accurate myelin detection with one rapid scan

SyMRI is an innovative technology that measures the brain's absolute tissue properties and generates multiple contrast-weighted images, automatic segmentation of biomarkers, and quantitative data in a single scan. SyMRI NEURO delivers quantitative measurements of brain tissue, including white matter (WM), gray matter (GM), cerebrospinal fluid (CSF), and myelin content (MyC). Quantified measurements of brain tissue volumes are valuable within pediatric cases, since abnormal volumes could indicate pathology or developmental delays. SyMRI can help improve diagnosis, monitoring and the treatment of patients and speed up the assessment process.

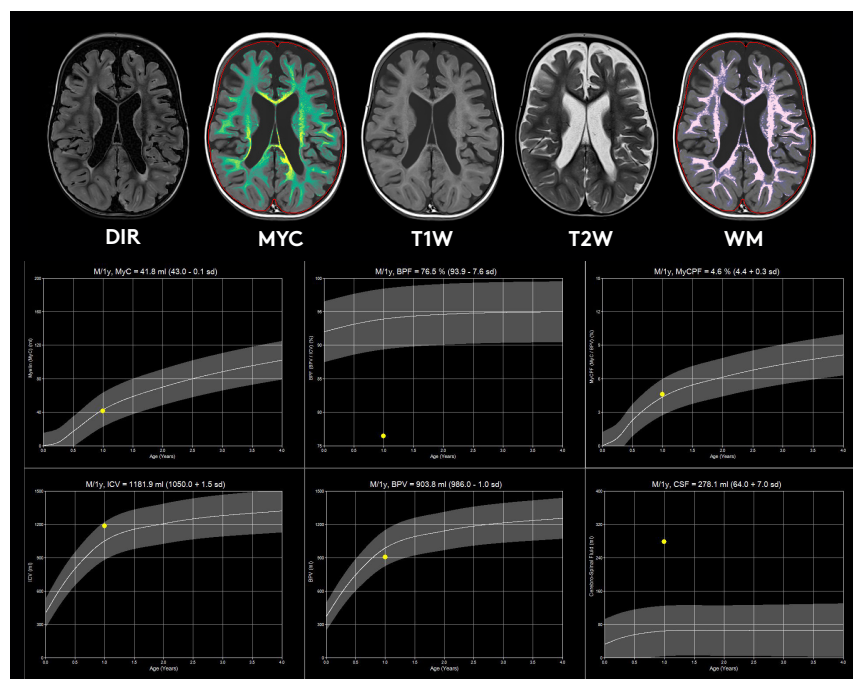
Case 1

A one-year-old male child with a clinical diagnosis of global developmental delay. The child has gross motor development delays and bilateral strabismus. He was also diagnosed with a small patent ductus arteriosus (PDA) at birth.

There is no history of seizures, ENT bleeding, vomiting, fever, blurring vision, weakness, tingling sensations, or bowel bladder dysfunction.

The diagnosis of periventricular leukomalacia due to hypoxic-ischemic injury was given based on MR imaging. Thinning of corpus callosum and prominent sulcal spaces were observed due to delayed myelination.

With the help of SyMRI, a quantitative analysis of the myelin was performed. The diagnosis correlated with the clinical findings. The quantitative analysis helped in the prognosis and the management planning. The child was placed on conservative management. Since there is a risk that the child will continue to develop thinning of the corpus callosum and due to the prominence of sulcus spaces, the child will have follow-ups for which the SyMRI analysis will be used.



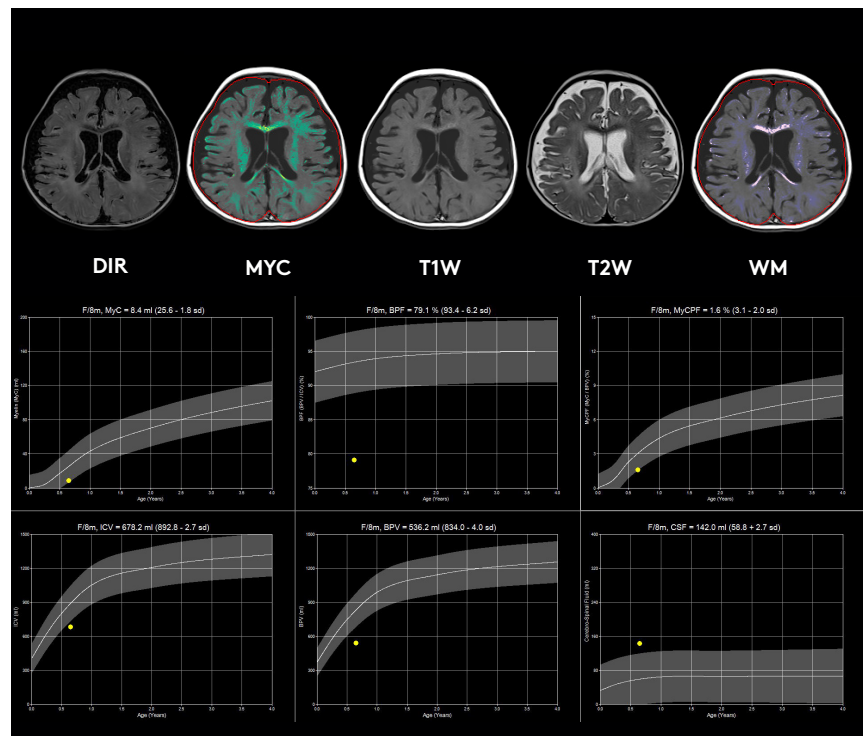
SyMRI analysis

Myelin content (MyC)	41.8 ml, [43.0-0.1 SD] below the mean	Intracranial volume (ICV):	1181.9 ml, [1050.0±1.5 SD] above the mean
Brain parenchymal fraction (BPF):	76.5 %, [93.9-7.6 SD] below the mean	Brain parenchymal volume (BPV):	903.8 ml, [986.0-1.0 SD] below the mean
Myelin parenchymal fraction (MyCPF)	4.6 %, [4.4±0.3 SD] above the mean	CSF volume	278.1 ml, [64.0±7.0 SD] above the mean

Case 2

An eight-month-old female child with a clinical diagnosis of developmental delay. The girl has microcephaly, esotropia and also an increased tone in both her upper and lower limbs with axial hypotonia. On the child's second day of life there was one episode of a neonatal seizure.

The diagnosis of periventricular leukomalacia due to perinatal hypoxia was given based on the MRI findings and with help of the SyMRI analysis. The diagnosis correlated clinically. SyMRI was used to show the level of severity of the condition.



SyMRI analysis

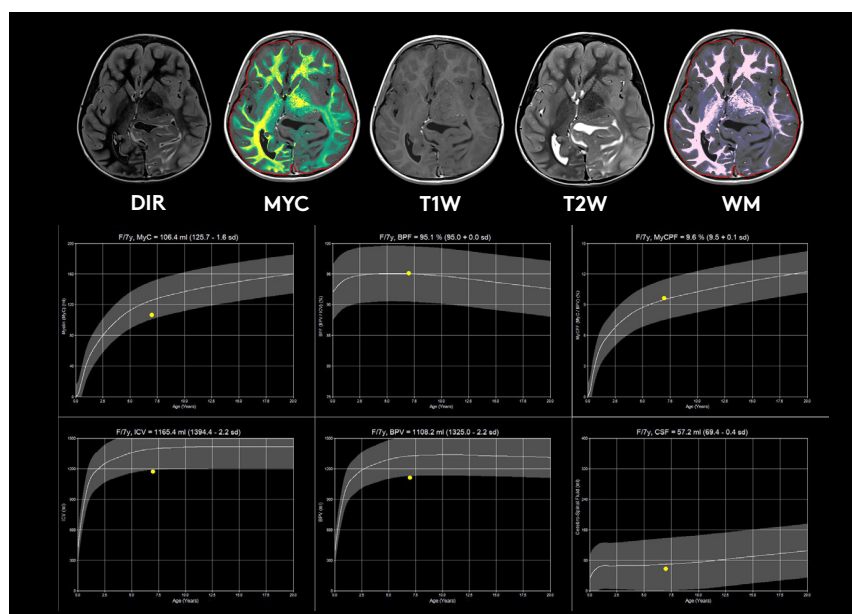
Myelin content (MyC)	8.4 ml, [25.6-1.8 SD] below the mean	Intracranial volume (ICV):	678.2 ml, [892.8-2.7 SD] below the mean
Brain parenchymal fraction (BPF):	79.1 %, [93.4-6.2 SD] below the mean	Brain parenchymal volume (BPV):	536.2 ml, [834.0-4.0 SD] below the mean
Myelin parenchymal fraction (MyCPF)	1.6 %, [3.1-2.0 SD] below the mean	CSF volume	142.0 ml, [58.8+2.7 SD] above the mean

Case 3

A seven-year-old female child with a seizure disorder with involuntary movements of limbs, associated with up-rolling of the eyes and frothing from the mouth. Experiences vomiting and headaches after the seizure episodes. The child had a road traffic accident one year ago and since then the patient has experienced six to seven episodes of seizures, lasting for a duration of 10 to 15 minutes.

An ill-defined altered signal intensity lesion in the left parieto-occipital region, which extends to the adjoining corpus callosum, revealed restriction on DWI and post-contrast enhancement. The possibility of a glial tumor needs further consideration. On the basis of the MRI findings, focal cortical dysplasia needs consideration.

SyMRI analysis will be used in the continued follow-up with this patient to observe any progression of demyelination or the gray and white matter involvement in the particular focal area. The information about the road traffic accident came from the family of the child when they were asked about her medical history. In this case, the accident was only a coincidence and was not correlated with her seizure episodes. It needed to be ruled out as a cause since a head injury as a cause of symptoms can sometimes be missed, especially in children.



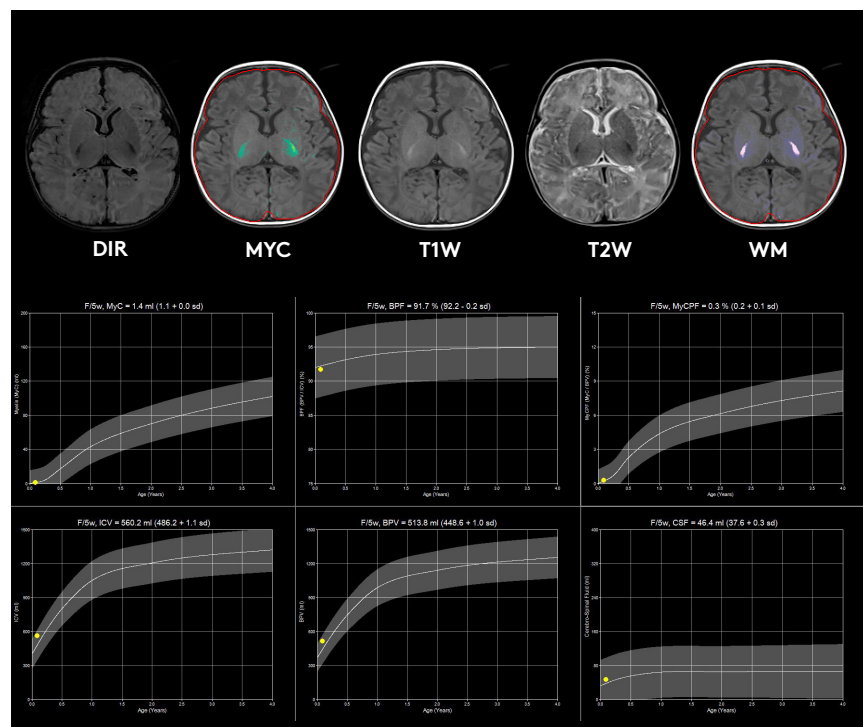
SyMRI analysis

Myelin content (MyC)	106.4 ml, [125.7-1.6 SD] below the mean	Intracranial volume (ICV):	1165.4 ml, [1394.0-2.2 SD] below the mean
Brain parenchymal fraction (BPF):	95.1 %, [95.0-0.0 SD] on the mean	Brain parenchymal volume (BPV):	1108.2 ml, [1325.0-2.2 SD] below the mean
Myelin parenchymal fraction (MyCPF)	19.6 %, [9.5+0.1 SD] on the mean	CSF volume	157.2 ml, [69.4-0.4 SD] below the mean

Case 4

A one-month-old female child with findings of spina bifida. Since children with spina bifida often have hydrocephalus or Chiari malformation (CMS), an MRI investigation of the brain and spine was advised.

The SyMRI analysis did not show any significant findings. The quantitative measurements were used in the communication with the parents of the child to lower their anxiety regarding further abnormalities.



SyMRI analysis

Myelin content (MyC)	1.4 ml, [1.1+0.0 SD] on the mean	Intracranial volume (ICV):	560.2 ml, [486.2+1.1 SD] above the mean
Brain parenchymal fraction (BPF):	91.7 %, [92.2-0.2 SD] below the mean	Brain parenchymal volume (BPV):	513.8 ml, [448.6+1.0 SD] above the mean
Myelin parenchymal fraction (MyCPF)	0.3 %, [0.2+0.1 SD] on the mean	CSF volume	46.4 ml, [37.6+0.3 SD] above the mean

About SyMRI

SyMRI is FDA-cleared for patients of all ages. 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. This enables automatic segmentations and volume measurements of tissue such as white matter, gray matter, cerebrospinal fluid and myelin. The SyMRI technology allows the users to track disease progression or compare against control groups. In the healthcare workflow it can be used with a single scan and has a short post-processing time. SyMRI is available as a stand-alone solution or it can be fully integrated into the clinical workflow.

SyMRI is a registered trademark in Europe and USA. SyMRI is CE marked and FDA 510(k) cleared. This leaflet details SyMRI version 12.1. The products/features in this text may not be available for clinical use on your market. Please contact us for further information. FRM-63 Case Study DY Patil Version 1.0

