

Myelopathy in Pediatric Spine Trauma Needs MRI

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MADRID — Every child admitted with trauma-related myelopathy should have magnetic resonance imaging of the spine, because x-rays may not show even serious spinal cord injuries.

The juvenile spinal cord is less resilient than the malleable youthful vertebrae and ligaments to withstand the forces of an injury, Dr. Michael Vassilyadi said at the annual congress of the European Federation of Neurological Societies.

The incidence of spinal cord injury without radiographic abnormality (SCIWORA) is low in children, but the consequences of missing such an injury can be devastating.

Dr. Vassilyadi conducted a retrospective review to determine the incidence of SCIWORA at the facility over a 15-year period. Because there is no universally accepted criteria for the SCIWORA, he

defined it as traumatic myelopathy (objective sensorimotor or motor deficits) that is either transient (but of at least 24 hours' duration) or permanent without radiologic evidence of spinal injury (no vertebral fracture or ligament instability, with normal flexion and extension cervical spine x-rays).

From 1990 to 2005, 22 children presented at the hospital with traumatic myelopathy.

Of these, eight had both a spinal cord and head injury; four had spine fracture and four

did not. Of those with fractures, only two had abnormal x-rays.

Fourteen additional children had spinal cord injuries without head injury. Of these, 12 had spine fractures and 2 did not; both of these 2 had abnormal x-rays.

"That left us with just two patients who had SCIWORA," said Dr. Vassilyadi, a neurosurgeon at the Children's Hospital of Eastern Ontario. The first patient had been tackled while playing football and sustained the hit on the left side of his

head and neck. He presented with partial anterior cord syndrome, complaining of a left extremity paresthesia that lasted about 45 minutes and left extremity weakness that persisted for 2 or 3 days. Both his cervical-spine and thoracic-spine x-rays were normal, although he complained of pain to palpation in the area of the lower cervical spine.

An MRI showed a small central disc herniation between C5 and C6. This patient recovered with no neurologic deficits.

The second patient was a 12-year-old boy who was involved in a motor vehicle accident.

He was admitted with paraplegia and no sensation below T3, although all of his spine x-rays were negative.

An MRI showed increased signal intensity on T2-weighted images between T1 and T3.

Five years later, the boy was still paraplegic. An MRI at that time showed the cord in the upper thoracic area had developed multiple syrinxes that tracked the original injury.

Although this patient has not experienced significant improvement in his neurologic status, children do have remarkable recovery ability, and families should



A normal spine x-ray (top) after a car accident: Serious damage became apparent only with an MRI (bottom).

be counseled to keep an eye out for improvement, Dr. Vassilyadi commented.

"We give the kids at least 2 years [before determining an injury as permanent]," he said.

Cine MRI Offers Insights Into Kids' Obstructive Sleep Apnea

BY AMY ROTHMAN SCHONFELD
Contributing Writer

NEW ORLEANS — With visualization of dynamic airway motion in children with severe obstructive sleep apnea, cine MRI supplies unique information that enhances diagnosis, targets treatment and, in some cases, prevents unnecessary surgeries, according to findings presented at annual meeting of the American Society of Neuroradiology.

Likely candidates for cine MRI evaluation are children who have obstructive sleep apnea (OSA) and have undergone adenoidectomy or tonsillectomy and have failed using continuous positive airway pressure (CPAP). Many have congenital disorders such as Beckwith Weidemann syndrome, trisomy 21, midfacial hypoplasia, and cleft palate. "We do not use cine MRI for the typical patient who has sleep apnea and enlarged tonsils and would respond to conservative management," said Dr. H. Coleman Herrod, of the University of Utah, Salt Lake City.

For the cine MRI, the patient is deeply sedated using propofol and then monitored for airway obstruction. During imaging, the airway is not secured, in order to elicit the obstructive pathophysiology. This requires close monitoring by the anesthesiologist to foster physiologic sleep respiratory patterns, and technologists who know exactly what they are doing to ensure the child's safety, Dr. Herrod said. Patients are imaged on a 1.5-T magnet through several different sequences.

In 29 cases, sleep was successfully in-

duced with no adverse events. Airway obstruction was visualized in most patients. The remaining patients were found to have patent airways throughout the exam with no clinical evidence of apnea.

Cause of obstruction visible on cine imaging included macroglossia, glossop-tosis, micrognathia, palatine elongation or coaptation with posterior pharynx, tonsillar hypertrophy, and dynamic multilevel airway collapse. In several cases, more than one site appeared obstructed.

The findings directed the need for surgery and the type of procedure in several cases. For example, in one case, an enlarged tongue was shown to be obstructing the airway. Subsequently, tongue reduction surgery led to a decline in the OSA score from 50.1 to 4.4. In a second case, the patient underwent Le Fort maxillary retrusion—an operation for reconstruction of the midface in which the teeth-bearing part of the maxilla is separated from its bony attachments and repositioned—to correct the problem. In at least two cases, physicians decided against surgery after reviewing the results of the cine MRI.

Traditional imaging for the evaluation of OSA in children includes radiographic, CT, and fluoroscopic imaging. Static imaging may show anatomic details but yields no information regarding dynamic airway motion. Fluoroscopy can show dynamic changes but at the risk of ionizing radiation exposure. Cine MRI adds to the traditional work-up of OSA for those patients with more severe disease, said Dr. Herrod, who added that he is getting positive feedback from referring clinicians.

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Online Program Overview

Parkinson's disease (PD) is a chronic, progressive, neurologic disorder with an estimated prevalence of 4.1 million worldwide and 340,000 in the United States in individuals >50 years of age. Early diagnosis of PD and treatment with disease-modifying therapies may provide improved long-term patient outcomes by potentially slowing the progression of PD. Overall, effective management of the motor and nonmotor symptoms of PD through an individualized, patient-focused perspective is crucial to minimize disability, improve health-related quality of life, and achieve therapeutic success. The objective of this program is to present healthcare providers with information necessary to develop and implement a routine comprehensive assessment of patient needs and to facilitate the development of an appropriate individualized treatment strategy for patients with PD.

Faculty

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