MRI Reveals the Structural Abnormalities of Whiplash Injury

BY DOUG BRUNK
San Diego Bureau

SAN DIEGO — High-resolution MRI is a useful tool to assess ligaments and membranes in the upper cervical spine and classify structural abnormalities in grades of severity, results from a controlled study of 92 whiplash-injury patients have demonstrated. The finding is important because the structural basis of whiplash injury is unknown, Jostein Krakenes, Ph.D., said at the annual meeting of the Cervical Spine Research Society.

"Structural changes can be graded with reasonable reliability (using MRI)," he said.

For the prospective study, 92 patients with whiplash injuries sustained after frontal or rear-end automobile collisions 2-9 years previously and 30 uninjured controls underwent high-resolution MRI of the craniovertebral junction in three orthogonal planes. Dr. Krakenes of Haukeland University Hospital, Bergen, Norway. The investigators included only patients with persistent neck pain, tenderness in neck muscles and other soft tissues by palpation, and decreased range of neck motion 3 months after the whiplash injury.

Three radiologists blinded to the clinical information interpreted the images twice at 3-month intervals.

He explained that on MRI normal alar ligaments and membranes show low signal intensity and appear dark. Increased signal intensity within ligaments, meanwhile, is regarded as injury.

A high signal in one-third or less of the cross-section was defined as grade 1, a high signal in one-third to two-thirds of the cross-section was grade 2, and a high signal in two-thirds or more of the cross-section was grade 3.

Of the 394 ligaments and membranes evaluated, 117 (30%) were grade 2 or 3 lesions in the whiplash group. Among the 140 ligaments and membranes evaluated in the control group, only 7 (5%) had grade 2 lesions and none had grade 3 lesions.

Most of the damage in the whiplash group patients with grade 2 or 3 lesions was localized to the alar ligaments, said Dr. Krakenes. Most of the high grade changes seen in controls were localized to the transverse ligaments.

When the investigators assessed inter- and intraobserver agreement, highest reliability was found for the atlanto-occipital membrane and lowest for the transverse ligament.

He concluded that increasing neck disability index with increased MRI grading "indicates that craniovertebral ligament lesions may explain some of the impairment of the whiplash-associated disorder."