Study: Most Herniated Discs Result From Avulsion, Not Rupture

Herniated discs in the lower (lumbar) spine most often result from avulsion (separation) of the tissue connection between the disc and spinal bone, rather than rupture of the disc itself, according to a study in *Spine* [1]. The journal is published by Lippincott Williams & Wilkins [2], a part of Wolters Kluwer Health [3].

The results suggest that surgeons may need to pay more attention to failure of the vertebral end plate junction (EPJ)—the attachment between the spinal bone and discs—as the main cause of herniated lumbar discs. The study by Dr S. Rajasekaran and colleagues of Hanga Hospital, Tamil Nadu, India, was named winner of the International Society for the Study of the Lumbar Spine (ISSLS) 2013 Prize for Lumbar Spine Research.

How Do Herniated Discs Occur? Study Questions Conventional Wisdom

The study included 181 patients undergoing surgery for herniated lumbar discs. Sometimes called ruptured or "slipped" discs, herniated discs are a major cause of low back pain. They occur when the soft material inside the disc (nucleus pulposus) leaks through the tough outer covering of the disc (annulus fibrosis).

Dr S. Rajasekaran and coauthors performed an in-depth analysis of available data for each patient, including x-rays, CT and MRI scans, surgical observations, and microscopic studies. To avoid the effects of disc degeneration, the study excluded patients older than 60 and patients with disease affecting multiple discs.

The results suggested that the EPJ had become avulsed, or torn off, in 65 percent of cases, making EPH avulsion the most common mechanism of lumbar disc herniation. In these cases of EPJ avulsion, a piece of the bone and/or cartilage connecting the disc to the vertebra had actually broken off.

In contrast, true rupture of the outer disc surface, or annulus fibrosis, was seen in only eleven percent of cases overall. Sometimes an EPJ avulsion was not visible on x-rays, but was apparent at surgery. Most EPJ avulsions were visible on CT scans.

In some cases, avulsed EPJ healed in the time between initial injury and surgery to repair the herniated disc. This was sometimes accompanied by narrowing of the spinal canal—a common problem called spinal stenosis.

Implications for Prevention and Treatment of Herniated Discs?

The results may lead spinal surgeons to rethink conventional wisdom regarding how herniated lumbar discs occur. Rupture (breaking open) of the annulus fibrosus has traditionally been regarded as the main mechanism of disk herniation.

"Our study shows that the incidence of EPJ failure has been grossly underrated, probably because of the difficulty of documentation," the researchers write. They present a suggested classification system for herniated lumbar discs, based on the "anatomy of failure."

In most cases, there was no clear traumatic event before symptoms related to herniated disc appeared. This suggested that after fracture, the process of disc herniation could take several months.

"The evidence of EPJ failure opens up opportunities for prevention, repair and biological strategies that may prevent progression of lumbar disc herniation after the initial event of EPJ avulsion," the researchers write. In particular, the time after initial fracture or avulsion may provide a "window of opportunity" for some type of treatment to prevent the injury from progressing to a herniated disc.

The study by Dr Rajasekaran and colleagues was named best clinical paper in the 2013 ISSLS Prize for Lumbar Spine Research [4]. The ISSLS Prizes are sponsored by DePuy Synthes Spine in order to encourage new basic science, biomechanical, and clinical lumbar spine research.

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