Artificial Disc Replacement Offers Cost, Outcome Advantages Over Fusion Surgery

When physical therapy and drugs fail to relieve back or neck pain, patients often turn to spinal fusion surgery as a last resort, but two new studies show that in certain situations, especially when several discs are involved, artificial disc replacement may give better long-term results at lower cost. Hospital costs for artificial disc replacement were 49 percent lower, and four years out from surgery, artificial disc patients were four times less likely to need additional surgery than those who had fusion operations, according to two recently published studies.

"Back pain is the fifth leading cause of hospital admission and the third most common reason for surgery," said orthopaedic surgeon Rick B. Delamarter, M.D., co-director of the Cedars-Sinai Spine Center. "Estimates vary and are probably understated, but health care expenditures for back pain top $91 billion a year, not including indirect and societal costs such as time lost from work and worker's compensation.It is crucial that we develop surgical procedures that are cost-effective without sacrificing high-quality results."

Delamarter is a lead author of the two studies, which were published recently in the *SAS Journal of the International Society for the Advancement of Spine Surgery* and the *Society for Minimally Invasive Spine Surgery*. Both studies compared disc replacement surgery with the more common fusion operation to treat degenerative disc disease. One study looked at 209 patients with damaged neck discs who received either minimally invasive disc replacement or the more complex spinal fusion surgery. A separate group of 136 who received an artificial disc two years after the first group also were part of the study. All patients were assessed on their satisfaction with the results of the procedure. The other study focused on 53 patients suffering from three-level, lower back disc disease and looked at cost comparisons for length of hospital stay, resources used and other factors.

Fusion surgery seeks to relieve symptoms of the degenerative disease by removing the damaged disc and replacing it with bone. Studies show this procedure often can be effective but there can be drawbacks. In some cases, fused spinal sections can lose flexibility, impeding normal movement and stressing adjacent discs, often leading later to more fusion surgery. Artificial disc replacement, which has been performed in the United States since 2000, tends to cause less tissue injury than fusion surgery, and the discs are designed to maintain natural spine movement and reduce the need for follow-up surgery.

In their study of patients suffering neck (cervical) disc disease, Delamarter and his colleagues found both disc replacement and fusion surgery acceptable options, providing good long-term outcomes. But four years out from surgery, fusion patients were four times more likely to need additional surgery. Half of these

secondary operations were needed to treat new disc problems occurring adjacent to fused sections.

Patients in the study had imaging scans to measure before-and-after flexibility and range of motion; were evaluated for physical and neurological improvement; and completed self-assessment questionnaires on neck disabilit, as well as neck and arm pain intensity. Improvements were seen in all categories, regardless of the surgical procedure, but results tended to be at least slightly better in patients with disc replacements. An important area, according to Delamarter, was patient satisfaction with the procedure. Four years after surgery, nearly 88 percent of disc replacement patients reported that they were very to completely satisfied, compared with 76 percent of fusion patients.

"While the results of this 13-center study are preliminary, it appears that artificial disc replacement surgery compares favorably as an effective procedure, is preferred by patients and slows the rate of adjacent-level disease," Delamarter said.

Spinal fusion has been recognized as one of the more expensive surgical procedures. The second study looked at costs and is believed to be the first to compare those of three-level disc replacement with three-level fusion. It evaluated itemized billing records of 53 patients undergoing surgery for three consecutive discs of the low back (lumbar spine) at St. John's Health Center in Santa Monica, California, where Delamarter practiced before joining Cedars-Sinai.

Total hospital costs for patients undergoing disc replacement surgery averaged 49 percent lower than those for fusion patients. The number of fusions for low back pain is rising rapidly, but Delamarter urges hospitals, insurers and surgeons to consider alternatives, including total disc replacement. "After safety and effectiveness of a procedure have been documented, cost is an important consideration," he said. "Artificial disc replacement technology appears to offer a promising, cost-saving alternative to fusion, especially for patients with disease at three levels."

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