Vertebral augmentation for spinal fractures offers greater patient survival and overall cost savings

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A study of 69,000 Medicare patient records led by Johns Hopkins researchers shows that people with spine compression fractures who undergo operations to strengthen back bones with cement survive longer and have shorter overall hospital stays than those who stick with bed rest, pain control and physical therapy.

Although so-called interventional augmentation procedures were initially more expensive than conservative medical management of the fractures, the researchers say the former were associated with lower in-hospital mortality and increased survival compared with non-operative management.

"Our results suggest that the beneficial impact of minimally invasive surgery for vertebral compression fractures reaches beyond the acute phase and improves post-discharge survival and morbidity," says Richard L. Skolasky Jr., Sc.D., associate professor at The Johns Hopkins Hospital's Department of Orthopaedic Surgery and Spine Outcomes Research Center.

Osteoporosis, which mostly affects the elderly, is responsible for more than 700,000 vertebral compression fractures and an estimated 150,000 hospitalizations annually in the United States, Skolasky notes, and can cause significant pain and disability in the elderly. Traditional medical treatment is almost always tried first, while interventional

procedures—known as vertebroplasty and kyphoplasty—consist of injecting bone cement through a small hole in the skin into a fractured vertebra. Skolasky noted that vertebral compression fractures are associated with a substantial economic burden, a medical management cost estimated at $13.8 billion in 2001.

In a report on the new study, published in the October edition of *The Journal of Bone & Joint Surgery*, the researchers said that vertebral augmentation procedures not only appear to be associated with greater patient survival than non-operative management, but also that kyphoplasty—which uses balloon inflation to create an opening for the cement—tends to have a more striking association with survival than vertebroplasty.

"Treating vertebral compression fractures with vertebral augmentation procedures is associated with acute pain relief and improved mobility, but direct comparisons are limited," said Skolasky.

For the study, Skolasky and his colleagues conducted a "post-hoc" analysis and comparison of information on some 69,000 patients sorted into three categories of fracture care: non-operative, vertebroplasty and kyphoplasty. The team examined differences in survival at six months, one year, two years and three years along with complications, length of hospital stay, charges assessed by the discharging hospital and/or the health care provider delivering services, 30-day readmission rates and repeat procedures.

Results showed that the overall survival rate for the entire study population was 77.8 percent at one year and 49.6 percent at three years. The kyphoplasty group had the highest survival rates at one and three years, at 85.2 percent and 59.9 percent, respectively. When examined by age, individuals in the kyphoplasty group consistently had higher survival rates. The study also discovered that patients treated non-operatively on

average were hospitalized approximately eight days longer. The total charges for kyphoplasty and vertebroplasty were $12,032 and $7,805 more than those treated non-operatively.

Skolasky said that the study showed that there was no statistically significant difference in postoperative infections and neurologic complications between surgical and non-operative patients. Surgically treated patients were less likely to be diagnosed with pneumonia or a decubitus ulcer, probably owing to shorter hospital stays. Those undergoing kyphoplasty were least likely to have those complications.

Skolasky also noted that other studies have examined differences in mortality associated with these three treatment methods, but that theirs is believed to be the first to examine those elements along with morbidity and costs associated with care.

Skolasky added that their findings may reflect "selection bias," and lack of racial and ethnic diversity, and such further prospective studies are needed to affirm them.

"Despite these limitations, our study did capture a large percentage of the elderly population that was acutely hospitalized for treatment and also assessed long-term complications and survival," he concluded.

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