

Agent used in spinal surgery linked to higher complications rate, greater inpatient charges

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A new study indicates that bone-morphogenetic protein (BMP; a biological agent used to promote bone creation) is used in 25 percent of spinal fusion procedures and is associated with a higher rate of complications than in fusions that did not use BMP, and greater hospital charges for all categories of spinal fusions, according to a report in the July 1 issue of *JAMA*.

Back pain continues to be a leading cause of disability in the United States and is one of the most common reasons for seeking evaluation by a physician, second only to the common cold. "Nonsurgical interventions remain the first-line of therapy; however, many patients eventually progress to surgical treatments with 1 option including fusion. Spinal arthrodesis (fusion) as a treatment for back pain has rapidly evolved with the development of advanced spinal instrumentation and biologics to promote bony fusion," the authors write.

According to background information in the article, BMPs promote bone creation and remodeling and clinical use of recombinant BMP protein was approved by the U.S. [Food and Drug Administration](#) (FDA) in 2002 for surgery of the anterior lumbar spine to promote bone fusion. The current rates and patterns of BMP use since the clinical introduction more than 5 years ago are not known at the national level and no population-based data are available. Likewise, the complication rates and financial impact associated with national BMP usage have not been evaluated.

Kevin S. Cahill, M.D., Ph.D., M.P.H., of Brigham and Women's Hospital, Boston, and colleagues examined the national trends in the adaptation of BMP into clinical practice since 2002 and the association between BMP use and postoperative complications, length of stay and hospital charges. The analysis included data on 328,468 patients who underwent spinal fusion procedures from 2002-2006, identified from the Nationwide Inpatient Sample database, a 20 percent sample of U.S. community hospitals.

The researchers found that when comparing immediate postoperative, in-hospital rates of complications for the year 2006 among patients undergoing spinal fusion by BMP use status, no differences were seen for lumbar, thoracic, or posterior cervical procedures. After additional analysis, the use of BMP in anterior cervical fusion procedures was associated with a higher rate of complication occurrence (7.09 percent with BMP vs. 4.68 percent without BMP) with the primary increases seen in wound-related complications (1.22 percent with BMP vs. 0.65 percent without BMP) and dysphagia (difficulty in swallowing) or hoarseness (4.35 percent with BMP vs. 2.45 percent without BMP). BMP use was associated with greater inpatient hospital charges across all categories of fusion. Increases between 11 percent and 41 percent of total hospital charges were reported, with the greatest percentage increase seen for anterior cervical fusion.

Results from the study also indicated that nationwide usage of BMP has increased from 0.69 percent of all fusions in 2002 to 24.89 percent of all fusions in 2006. Use of BMP varied by patient sex, race, and primary payer with increased use seen in women, Medicare patients and decreased use in nonwhite patients.

"In conclusion, this report highlights the robust nationwide application of BMP in [spinal fusion](#) procedures in the first 5 years of clinical usage since FDA approval. The effects on complication occurrence in anterior

cervical fusion, as well as the increases in length of stay and hospital charges illustrate the need to continue to develop refined guidelines for usage and to further study the long-term risks and benefits of usage," the authors conclude.

More information: *JAMA*. 2009;302[1]:58-66.

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