

# Osteobiologics-related complexity in spine surgery: a systematic study

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The aim of this systematic review was to determine the type and frequency of complications in patients who had BMP in spine fusion surgery, as well as whether there is a dose-response relationship between BMP and complications. Because of its efficacy in supporting arthrodesis, BMP is used on-label for ALIF with LT-CAGE and off-label for various spine fusion applications in the cervical, thoracic, and lumbar spines. In a number of clinical fusion scenarios, several reports conducted over the past few years have highlighted problems associated with BMP.

The complication profile of off-label use or physician-directed use of BMP in spinal fusion surgery is therefore not well defined and there are no systematic reviews on this subject. Some of the complications mentioned are specific to BMP, which highlights the need for this comprehensive analysis of the literature. A systematic analysis of literature in the English language was conducted. In order to recognise papers investigating the use of BMP in spine surgery, electronic databases and reference lists of key articles were scanned. Two independent reviewers used the GRADE (Grading of Recommendations Assessment, Production, and Evaluation) criterion to determine the level of evidence, and disagreements were resolved by consensus. A total of 240 studies were found in the literature that assessed outcomes after BMP use in spinal surgery; 31 of these were chosen for inclusion. After the use of rhBMP-2 in both cervical and lumbar spine fusion surgery, we determined that many complications were related.

In lumbar spine interbody fusion surgery, there is a mean incidence of 44 percent, 25 percent, and 27 percent of resorption, subsidence, and interbody cage migration recorded, while reoperation or long-term adverse effects were uncommon.

When rhBMP-2 is used for ventral cervical fusion, cervical studies show an average of 5.8 percent of postoperative soft tissue issues, including dysphagia. The current strength of evidence on the types of complications documented in peer-reviewed literature is high for the lumbar spine and low for the cervical spine, respectively, and the current strength of evidence on rates of complications with BMP is moderate and low, respectively.

BMP-2's complication profile with LT-CAGE for ALIF is well defined. The same is not true for other kinds of lumbar fusions, or for cervical or thoracic fusion applications, because of the lack of substantive evidence. A number of rare complications in the ventral cervical and lumbar spines have been associated with BMP. The published data on BMP do not adequately profile this product's use in fusion surgery; as a result, it can only be used after a detailed analysis of the relevant data. Well-designed and conducted studies are important to fully define the occurrence of different complications in relation to BMP type, fusion type and area, surgical procedure, dose and carrier, and to define the natural history and management of associated complications, in particular.

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