

Polymethylmethacrylate augmentation of pedicle screw for osteoporotic spinal surgery: a novel technique.

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STUDY DESIGN: A retrospective study to evaluate the clinical results of patients with osteoporosis and various spinal diseases treated surgically with polymethylmethacrylate (PMMA) augmented pedicle screw. **OBJECTIVE:** To report a novel technique using PMMA for pedicle screw augmentation in osteoporotic spinal surgery. **SUMMARY OF BACKGROUND DATA:** Many studies have proved that the stiffness and strength of pedicle screw fixation can be significantly increased when the pedicle screw is augmented with various cements. However, most of those studies were experimental. Clinical reports using those materials for pedicle screw augmentation are rare and a practical and reliable technique for primary pedicle screw augmentation with cement has not yet been established. **METHODS:** Forty-one patients [23 female, 18 male, mean age 75.1 (50-90) years] with osteoporosis and various spinal diseases underwent spinal decompression and instrumentation with PMMA augmentation of pedicle screw. Pre- and postoperative scores for visual analogue scale for pain and Oswestry disability index questionnaire were analyzed. The screw migration, which is the distance from the screw tip to the anterior cortex and upper endplate of vertebra, was also evaluated immediately after the operation and at the mean 22.3 months final follow-up. **RESULTS.:** Totally 291 of 300 screws were augmented with PMMA. There was neither neurologic deterioration nor symptomatic cement leakage after surgery. The mean visual analogue scale pain score of these patients improved from 9.2 to 1.5 ($P < 0.01$) and the functional Oswestry disability index score improved from 77.5% to 44.2% ($P < 0.01$). Kyphotic deformity was improved from average 23.2 degrees to 11.9 degrees after surgery, and to 14.9 degrees at final follow-up ($P < 0.01$). The average loss of kyphosis correction was 3 degrees. There was no significant screw migration when the screws distances just after operation and at the final follow-up were compared ($P > 0.01$).

CONCLUSION: The presented technique of PMMA for augmentation of pedicle screw is a safe, reliable, and practical technique for osteoporotic patients who also had various spinal diseases and need spinal instrumentation.

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