Prophylactic of stress fractures of vertebrae adjacent to transpedicular screw fixation for Osteoporosis

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Objective: To assess the efficacy of vertebroplasty as a prophylactic measure to prevent stress fractures of vertebrae adjacent to transpedicular screw fixation with cement augmentation in case of osteoporosis.

Methods: An experimental cadaveric study was performed to assess the overall strength of 10 cadaveric blocks of T10-L4 vertebral segments with simulation of L1 fracture and T12-L2 transpedicular 4-screws system with cement augmentation. Next all the blocks were divided in 2 groups of 5 blocks each. Group 1 - the control group included the blocks with simulated L1 fracture and T12-L2 4-screws PSF with cement augmentation.

Group 2 - the main group included the same blocks but with cement vertebroplasty of T11 and L3. Stress testing of the blocks was performed by placing them under a vertically directed load until fracture (type A according to the AO/Magerl classification).

Results: Vertically directed load on the blocks in the control group (0.84 ± 0.39831 kN) resulted in T11 vertebrae fractures. Vertebrae with augmentation were resistant to the load in the main group. T10 vertebrae fractures in the blocks of the main group occurred at a load of 1.91 ± 0.40566 kN.

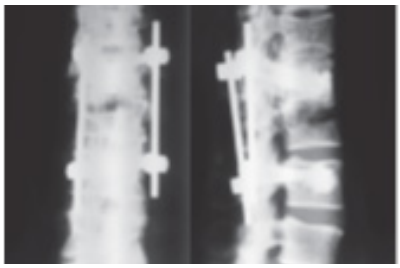
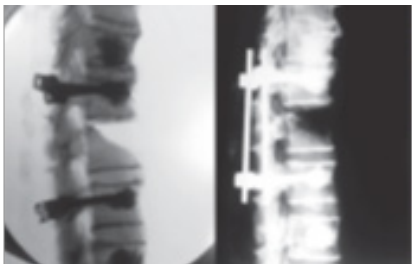
Conclusion:

1. The adjacent T11 vertebra is the weakest vertebra in the anatomical blocks of T10-L4 vertebral segments with simulation of L1 fracture and the T12-L2 4-screws transpedicular system with cement augmentation

2. Bone cement injection into the T11 cranial vertebra adjacent to the level of fixation increases the overall strength of the blocks

3. Vertebroplasty of the overlying vertebra is an effective way to prevent its fracture in case of osteoporosis.

4. Prophylactic vertebroplasty of the vertebra caudal to the level of fixation is unnecessary due to the insignificant risk of fracture.

Biography

Igor Basankin has been treating diseases of the Spine more than 25 years. Since 2009 he has been the head of the Spinal Surgery Department in Krasnodar, Russia. More than 2,400 operations are performed in the department annually. The doctor has areas of interest in the treatment of Osteoporosis, Spinal Deformities, Spinal Trauma, Degenerative Disorders, and Spinal Tumors.

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