

Original Articles

The Importance of Meticulous Registration during Spinal Navigation for Pedicle Screw Placement

Feng-Wen Su¹, Tao-Chen Lee¹, Chun-Chung Lui², Yu-Ling Ting³,
Hung-Chen Wang¹, Yu-Jun Lin¹, Thung-Ming Su¹

Objectives: To evaluate correlations between registration errors and accuracy of pedicle screw placement.

Methods: Registration errors were analyzed as a relative index of accuracy in the computer imaging of surgical anatomy during spinal navigation. One hundred eighty-four computer-assisted pedicle screw installations were performed in thirty-six patients. Registration errors during spinal navigation were recorded and grouped into A (registration error <1.5mm) and B (registration error more than 1.5mm). The screw placements were evaluated by postoperative CT and were categorized as good (in the central core of the pedicle), fair (eccentricity of the screw and erosion of the pedicular cortex with perforation of less than 2mm), and poor (more than 2mm perforation).

Results: Ninety-four and ninety screw placements were examined in groups A (registration error <1.5mm) and B (registration error more than 1.5mm), respectively. In group A, seventy-five (79.8%) pedicle screw placements were categorized as good, seventeen (18.1%) were fair, and two (2.1%) were poor. In group B, fifty-seven (63.3%) were good, twenty-six (28.9%) were fair, and seven (7.8%) were poor. The difference in screw placement results between group A and B reached statistical significance ($P=0.002$, independent samples t-test).

Conclusion: Significantly more accurate pedicle screw placement can be achieved by limiting registration errors.

Key words: spinal navigation, pedicle screw placement, registration error

From the Department of Neurosurgery¹, Department of Radiology², Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Kaohsiung, Department of Nursing³, Chang Jung Christian University, Tainan, Taiwan

Received: August 20, 2007 Accepted: December 27, 2007

Address reprints request and correspondence to: Dr. Tao-Chen Lee, Department of Neurosurgery, Chang Gung Memorial Hospital, 123, Ta-Pei Rd, Niao-Sung Hsiang, Kaohsiung Hsien, Taiwan, Tel: 886-7-7317123 ext 8011,

Fax: 886-7-7318762, E-mail: leetc@adm.cgmh.org.tw