**Clinical: Trauma: fractures and spinal cord repair**

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**Transpedicular Lag-screwing Fixation for Unstable Hangman Fractures**

W. Jiang¹, J. Yuan¹, X. Li¹, H. Yang¹, T. Tang¹

¹The First Affiliated Hospital of Soochow University, Orthopedic Department, Suzhou, China

**Objective:** To evaluate the efficacy of transpedicular lag-screwing fixation for unstable hangman fractures.

**Methods:** Between March 2008 and April 2010, 10 cases with unstable Hangman fractures were treated using transpedicular lag-screw fixation in our Orthopedic Department, which included 8 males and 2 females. Their ages range from 31 to 62 years with an average of 43.5 years. The etiology involved 6 cases with traffic accident, and 4 cases of falling injury. There were 2 multiple-trauma cases, which included one splenic rupture case and another with multiple rib fractures and hemopneumothorax. The average interval between injury and operation was 8.8 days (range, 5 to 30 days). According to Levine-Edward's classification, there were 7 cases with type II and 3 cases with type II A. Preoperatively, we made a neurological evaluation of all cases by Frankel scale, which showed 3 cases with grade D and 7 cases of grade E. All the cases had fractures reduced by skull traction prior to surgery. The operation was performed under local anaesthesia for all cases. The middle part of C2 lateral mass was chosen as the entrance point for screw, taking a cephalic angle of 15° ~ 20° and 25° ~ 30° angle on sagittal plane. The lengths of screws as used in this study ranged from 28~34mm with a diameter of 4.0 mm. 9 cases had bilateral screws fixation and one case underwent unilateral screwing due to the comminuted fragments. All procedures were performed under monitoring of "C"-arm fluoroscopy.

**Results:** All the procedures achieved success with an average length of 100 minutes (range, 80 to 130 minutes). The average blood loss was 290 ml (range, 210 to 400 ml) during operation. Postoperatively, all patients were followed up from 3 to 14 months, with an average of 8.5 months. Based on Frankel scale, 2 cases with grade D improved to E and one case remained as grade D. The evaluation made by Mayo (McGrory) scoring showed an marked increase from 58 preoperatively to 96 after procedure. Bony fusion was achieved in all cases at an average of 3.5 months (range, 3 to 5 m). All cases showed preservation of neck motion. No spinal cord or vertebral artery injury was witnessed in the procedure. During follow-up, there were no screw loosing or breakage, no cervical malformation or instability.

**Conclusion:** The transpedicular lag screwing fixation is a less invasive, but most effective surgical method for unstable Hangman fractures. This method can provide immediate stability of cervical spine following operation. Additionally, it is able to preserve the physiological motion of upper cervical spine with little interference of adjacent segments.