

Title: Spinal cord MRI signal change at 1 year after cervical decompression surgery is useful for predicting mid-term clinical outcome: an observational study using propensity scores.

Background: There is little evidence concerning the relationship between magnetic resonance imaging (MRI) T2WI high signal change (T2HSC) at the spinal cord and surgical outcomes for cervical compression myelopathy (CCM).

Research question: We examined whether T2HSC regression at one year post-surgery impacts the subsequent prognosis.

Design: Retrospective observational study

Methods: The subjects were 150 CCM patients who underwent surgery. The median age was 68 years (39–87 years) at surgery. Based on spinal MRI at 1 year post-surgery, patients were divided into the following two groups: MRI regression group (Reg. group, with a fading of T2HSC) or no regression group (No-reg. group, with no change in or enlargement of T2HSC). Recovery rates of Japanese Orthopedic Association (JOA) scores at 1, 2, 3 and 5 years post-surgery were compared between groups using a t-test. We adjusted outcome scores for age, sex, diagnosis, and symptom duration by the inverse-probability

weighting method using the propensity score. $P < 0.05$ was considered significant.

Results: The recovery rates (mean $\pm$ standard error) were as follows: 1 year post-surgery, Reg. group, 44 cases, $49 \pm 6\%$; No-reg. group, 102 cases, $36 \pm 4\%$ ($P = 0.087$); at 2 years post-surgery, Reg., 42 cases, $50 \pm 6\%$; No-reg., 91 cases, $37 \pm 4\%$ ($P = 0.103$); at 3 years post-surgery, Reg., 33 cases, $51 \pm 6\%$; No-reg., 79 cases, $31 \pm 6\%$ ($P = 0.020$); and at 5 years post-surgery, Reg., 21 cases, $62 \pm 8\%$, No-reg., 48 cases, $33 \pm 6\%$ ($P = 0.012$).

Discussion: Spinal T2HSC improvements at 1 year post-surgery positively impacted recovery rates starting at 3 years. We recommend confirming spinal MRI at 1 year post-surgery to predict the mid-term outcome for CCM patients.

