# Subsequent Domino Osteoporotic Vertebral Fractures Adversely Affect Short-Term Health Related Quality of Life: A Prospective Multicenter Study

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INTRODUCTION: Conservative treatment is the gold standard for acute osteoporotic vertebral fractures (AOVFs). However, the treatment strategy for multiple AOVFs remains unknown. We conducted a prospective study using magnetic resonance imaging (MRI) to investigate how rapidly subsequent osteoporotic vertebral fractures (OVFs) occur as domino OVFs within 3 months. This study aimed to assess the incidence and impact of domino OVFs on quality of life (QOL) following conservative treatment for initial AOVFs.

METHODS: A prospective multicenter cohort study was conducted at eight hospitals. The included patients were those with AOVFs occurring within 3 weeks, aged 60 years or older, and diagnosed using MRI. Exclusion criteria for this study included patients who were unable to walk unaided prior to developing AOVF, previously underwent spinal fusion surgery, required surgery for AOVF, had more than three prevalent OVFs, and those with spinal metastases. Patients with a lack of data or dementia were also excluded in addition to those who had died or withdrew during the three-month follow-up period. A total of 277 patients were considered for this study, 50 of whom were excluded as a result of the criteria detailed above. Therefore, a final total of 227 patients were enrolled. The mean age was 80.1 ± 7.3 years, and 177 patients (78%) were female. All patients were treated conservatively and underwent MRI after 3 months. We defined Subsequent domino OVFs as newly occurring OVFs within 3 month. Patient characteristics, types of conservative treatment, and patient-reported outcomes, including a visual analogue scale (VAS), the Oswestry disability index (ODI), and the Japanese Orthopaedic Association back pain evaluation questionnaire (JOABPEQ), were evaluated and compared between the domino OVF and non-domino OVF groups. We analyzed continuous variables using the Student's t-test for normally distributed data. Continuous data with skewed distribution were analyzed using the Mann–Whitney U test after normality was assessed using the Shapiro–Wilk test. Fisher's exact or chi-square tests were used to assess for categorical variables. Clinical outcomes, including JOABPEQ, VAS for LBP, and ODI at baseline and 3 months, were compared using the Wilcoxon signed-rank test. Statistical analyses were performed. All tests were two-sided, and p values $< 0.05$ were considered significant.

RESULTS:

A total of 227 patients were analyzed. The mean age was 80.1 ± 7.3 years and 78% were female. Despite its high prevalence, a considerable number of patients with osteoporosis remain untreated; in this study, 84.1% of patients were not receiving any treatment. Subsequent domino OVFs were observed in 31 (13.6%) patients within 3 months. An increasing number of prevalent OVFs were significantly associated with domino OVFs ($p = 0.01$). No significant differences in age, sex, bone mineral density (BMD), body mass index (BMI), Hounsfield unit (HU), type of brace, and anti-osteoporosis medications were found between the two groups. The JOABPEQ (excluding social function), ODI, and VAS were significantly improved after 3 months. Patients with domino OVFs at 3 months had poorer JOABPEQ social life function, ODI, and VAS than those with non-domino OVFs.

DISCUSSION AND CONCLUSION:

The current study demonstrated that the incidence of subsequent domino OVFs was 13.6% within 3 months. Prevalent OVFs was the only predictor of domino OVFs in this study. Lumbar and femoral BMD, type of brace, and anti-osteoporosis medication were not found to be predictors of domino OVFs. Patients with domino OVFs had poorer social life function in the JOABPEQ, ODI, and VAS for LBP than in the non-domino OVF group. The types of anti-osteoporosis treatment and brace did not prevent domino OVFs. Domino OVFs may develop before the effects of anti-osteoporosis treatment, within a short period of time. Detection and early intervention for severe osteoporosis before initial OVF may reduce domino OVFs.

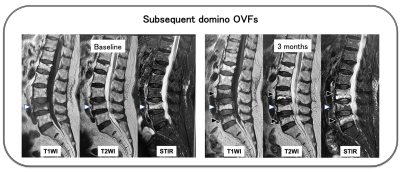
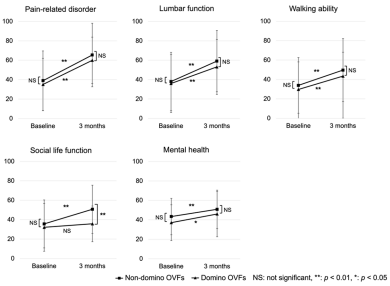
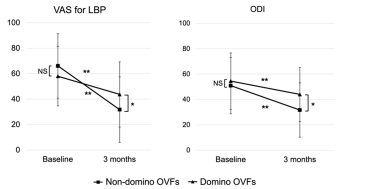



Figure 1




NS: not significant, **: $p < 0.01$, *: $p < 0.05$

Figure 2




NS: not significant, **: $p < 0.01$, *: $p < 0.05$

Figure 3