

## Reply to the Editor: Surgical Treatment of Osteoporotic Vertebral Fracture with Neurological Deficit—A Nationwide Multicenter Study in Japan

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First of all, we would like to appreciate your interest and your Letter to the Editor regarding our recently published article entitled “Surgical Treatment of Osteoporotic Vertebral Fracture with Neurological Deficit—A Nationwide Multicenter Study in Japan”<sup>1)</sup>. The authors of the letter pointed out the importance of nonsurgical treatment or minimally in-

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vasive methods, such as balloon kyphoplasty (BKP), in the initial management of osteoporotic vertebral fractures (OVFs).

As OVFs predominantly occur in elderly patients, we totally agree with the authors of the letter that we should choose less invasive methods for initial treatments and that most patients can be managed without the need for surgical intervention. Many studies have been published in our country reporting the efficacy of conservative treatment. Abe et al. showed that initial hospitalization with rigorous bed rest followed by a rehabilitation program for 154 patients with OVFs resulted in a bony union rate of 79%, with surgery only required in 11 patients<sup>2</sup>. They also showed that confined high intensity area of vertebral body on T2-weighted imaging of MRI and having a vertebral instability of more than 5° on dynamic X-ray at three weeks after initial visit are considered risk factors for delayed union. Matsumoto et al. conducted a prospective study to evaluate the factors related to the reduction of the activities of daily living following an OVF in 310 patients treated conservatively, and they showed that the presence of a middle column injury in the vertebral body and lack of regular exercise before fracture are prognostic factors<sup>3</sup>. In this study, only five patients required surgery. The institutes of the authors of these manuscripts participated in our current multicenter study, suggesting that initial conservative treatment while paying attention to these risk factors is the common method for management for orthopedic surgeons in our country.

In our study, the mean duration between injury and surgery was  $0.54 \pm 0.81$  years in patients whose date of injury was identifiable (unpublished data). This suggests that spinal fusion surgery was not performed as an initial treatment for OVF and that other conservative treatments were already performed. As we have mentioned in the Materials and Methods in our article, we included patients with OVFs who had neurological deficits due to vertebral collapse or nonunion, who have failed to respond to conservative treatment, or patients who did not have a chance to receive any medical

treatment until their symptoms progressed and became severe.

In case we consider surgery for patients with OVF who failed to respond to conservative treatment, we try to manage these cases with less invasive techniques, such as vertebroplasty, including BKP. However, we excluded these patients from our current study as we assumed that the pathology of patients undergoing BKP is different from that of patients requiring fusion surgery. Patients who have neurological deficits or apparent posterior wall injury of the affected vertebral body are not candidates for BKP, but rather for fusion surgery.

As the authors of the letter pointed out that spinal fusion surgery is invasive and is associated with increasing complications, spine surgeons may wonder whether they should indicate spinal fusion to their patients with OVF, especially for the elderly population.

**Conflicts of Interest:** The authors declare that there are no relevant conflicts of interest.

## References

1. Hosogane N, Nojiri K, Suzuki S, et al. Surgical treatment of osteoporotic vertebral fracture with neurological deficit—a nationwide multicenter study in Japan—. *Spine Surg Relat Res.* 2019;3(4):361-7.
2. Abe T, Shibao Y, Takeuchi Y, et al. Initial hospitalization with rigorous bed rest followed by bracing and rehabilitation as an option of conservative treatment for osteoporotic vertebral fractures in elderly patients: a pilot one arm safety and feasibility study. *Arch Osteoporos.* 2018;13(1):134.
3. Matsumoto T, Hoshino M, Tsujio T, et al. Prognostic factors for reduction of activities of daily living following osteoporotic vertebral fractures. *Spine.* 2012;37(13):1115-21.

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