

# Potential underdiagnosis of osteoporosis in repeated vertebral augmentation for new vertebral compression fractures

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## Dear editor

We read with great interest the article by Liang et al “Repeated vertebral augmentation for new vertebral compression fractures of postvertebral augmentation patients: a nationwide cohort study”.<sup>1</sup>

In their study, the authors investigated the factors possibly associated with new vertebral compression fractures in patients who previously had vertebral augmentation procedures. They reported that osteoporosis (OP) was not observed as a risk factor for repeat vertebral augmentation. Among multiple chronic diseases, hypertension (HT) was reported as one factor associated with new vertebral fractures. Among the medications used to treat or prevent OP, they reported calcium/vitamin D, bisphosphonates, and calcitonin were associated with not having repeat vertebral augmentation. However, steroids, paracetamol, and nonsteroidal anti-inflammatory drugs were associated with having repeat vertebral augmentation. We would like to comment on their article.

The authors described OP as a bone mineral density (BMD) of 2.5 standard deviations below the mean peak bone mass as measured by dual-energy X-ray absorptiometry. However, the National Osteoporosis Foundation reported the diagnosis of OP as low BMD measurements or the occurrence of adulthood hip or vertebral fracture in the absence of major trauma.<sup>2</sup> Vertebral compression fractures would be the only indicator of OP in patients with normal BMD scores. This might have led to underdiagnosis of OP. Furthermore, both vertebral degenerative changes and fractures may cause misinterpretation of BMD scores as normal when there is significant OP. We suggest that using “low BMD score” would be better than “OP” as nonassociated with new vertebral compression fracture. In line with our comments, Table 2 shows that 34,500 patients have a diagnosis of OP; however, as indicated in Table 3, 57,568 patients are undergoing treatment for OP. This inconsistency could mean that the rate of OP is more than determined in this study. It may also mean that multiple OP medications were used concomitantly by some of the patients. This point should be clarified.

The authors reported that the HT and diabetes mellitus were associated with repeat vertebral augmentation. However, it is not discussed how HT may be related to repeat vertebral augmentation. In the elderly, one of the important factors underlying falls may be overtreatment of HT leading to hypotension and/or orthostatic hypotension and consequent falls.<sup>3,4</sup> Consideration of patients with low blood pressure levels or clinically significant orthostatism on antihypertensive medications would help the authors to interpret this association.

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Another factor that would be associated with having repeat vertebral augmentation is “falls” which could not be estimated in this study database. It would be useful to search “vertigo” or “syncope” as a predisposing risk factor for falling.<sup>5</sup>

Although it is rarely diagnosed on clinical grounds, sarcopenia is prevalent in elderly people (between 3% and 52%).<sup>6</sup> Sarcopenia is commonly seen in patients with dementia, cerebrovascular accidents, and diabetes, and is a strong risk factor for both OP and falls.<sup>2,7</sup> We suggest that sarcopenia which is not included in the discussion, should be considered as an important factor underlying the increased risk of vertebral augmentation in these patients.

Finally, regarding the association between the use of analgesics and repeat vertebral augmentation, the authors discussed that the increase in fracture risk in these patients may stem from changes in postural balance or dizziness (a side effect of nonsteroidal anti-inflammatory drugs). In this regard, dizziness is not a known adverse event associated with paracetamol. Therefore, we suggest that there may be an indirect association between analgesics, in particular paracetamol, and repeat vertebral augmentation: patients having more severe fractures and more severe pain might have used these agents more frequently. It is also possible that subjects having pain more commonly visited their physician

and pain could be a common indication for repeat vertebral augmentation procedures.

We suggest that the findings of the present study should be interpreted in view of aforementioned considerations.

## Disclosure

The authors have no conflicts of interest to disclose.

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## Authors' reply

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## Dear editor

We thank İlhan et al for their interest and comments regarding our article.<sup>1</sup> World Health Organization (WHO) defined osteoporosis as a bone mineral density (BMD) of 2.5 standard deviations or more below the mean peak bone mass (average of young, healthy adults) as measured by dual-energy X-ray absorptiometry.<sup>2</sup> Many physicians in Taiwan use WHO's definition for the diagnosis of osteoporosis in the study period. Osteoporosis is likely to have been underestimated in our population-based database using this definition. In clinical practice, we found multiple vertebral fractures may have falsely elevated the BMD scores in osteoporotic patients, and osteoporosis could be underestimated when using low BMD scores.<sup>3</sup> Sometimes vertebral compression fractures would be the only indicator of osteoporosis in patients with normal BMD scores. Recently, the National Osteoporosis Foundation reported the diagnosis of osteoporosis as low BMD measurements or the occurrence of adulthood hip or vertebral fracture in the absence of major trauma.<sup>4</sup> Low BMD measurements with fragility fractures in spine or hips should be considered osteoporosis. The use of low BMD scores is a good idea; however, the difficulty is the exact BMD scores of each patient were not included in

the data. If we use the International Classification of Diseases, Ninth Revision, Clinical Modification diagnosis code 733.90 for osteopenia (low BMD T scores between -1 and -2.5) perhaps include some patients without true osteoporosis.

The patients undergoing osteoporosis treatment are more than patients with a diagnosis of osteoporosis. It is suggested that physicians would prescribe anti-osteoporotic drugs for some patients with relatively normal BMD scores.

We observed that diabetes mellitus, hypertension, and hyperlipidemia (main components of metabolic syndrome) were significant risk factors associated with repeat vertebral augmentation.<sup>1</sup> One possible explanation is propensity for falls. The metabolic syndrome is a potential risk factor for falls in older adults and should be addressed with regard to prevention of falls.<sup>5</sup>

Falls is a potential risk factor for vertebral compression fractures. Trivial falls could not be estimated in this study database. We agree that it would be useful to search vertigo, dizziness, or syncope as a predisposing risk factor for falls. These valuable opinions could be helpful for future studies.

## Disclosure

The authors have no conflicts of interest to disclose.

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