Imaging evaluation of osteoporotic vertebral fracture

As the world's population ages, the incidence of osteoporosis defined by decreased bone mass and alteration of microarchitecture has inevitably increased. This results in osteoporosis-associated fracture and leads to debilitating health outcomes and a considerable economic burden on the health care system.1,2 In this issue of the Journal of the Chinese Medical Association, Lin and colleagues have contributed an interesting article entitled Determination of the painful level in osteoporotic vertebral fractures: retrospective comparison between plain film, bone scan, and magnetic resonance imaging.3 The authors studied 52 patients with osteoporotic vertebral fracture (OVF) treated by vertebroplasty in a single institute in Northern Taiwan and found that the pain level of single-level compression vertebral fracture could be identified accurately by either plain film or bone scan; however, the pain level of multiple-level compression vertebral fractures should necessitate the use of magnetic resonance imaging (MRI) to provide an improved and more sensitive diagnosis to localize multiple sites of vertebral fractures.3 In addition, when a vacuum cleft sign appeared on plain film in patients with supposed vertebral fractures, two other diagnostic tools, bone scan and MRI, both showed positive findings.3 Although we applaud the successful publication of this article, there are several controversial issues that require further discussion.

First, what is the aim of this study? In our understanding, the authors would like to localize the fracture sites of the osteoporotic vertebral bones more precisely by comparing the detection accuracy of three commonly used tools: plain film, bone scan, and MRI. However, it is unknown why the authors compared pain score (visual analog scale) of these 52 patients with OVF treated by vertebroplasty, preoperatively and postoperatively. As would be expected, patients after treatment had a significant decline of pain score from 7.6 to 2.8. However, this reduced pain score might in fact represent the benefits or effectiveness of the procedure for Dr. Lin's study.4 Therefore, it would be our suggestion that the method for Dr. Lin's study in this issue should more productively focus on the cost-effectiveness or convenience of these different diagnostic tools.

Second, it remains unknown as to why the authors said that it is difficult to determine the actual painful vertebral level in the evaluation of OVF, especially when there are simultaneous acute and chronic fractures. Has there been an alteration in the treatment of vertebroplasty for acute or chronic OVF? The authors failed to study or discuss this. Son et al5 found that early vertebroplasty might achieve a better immediate surgical result with improved cost-effectiveness, suggesting that accurate localization of new onset of OVF could be of considerable importance. Since the authors commented that MRI was further needed in cases involving multiple OVF, did the authors mean that the use of MRI could clearly distinguish the new and old OVF in these patients? By contrast, Tan et al6 in their prospective study showed that vertebroplasty was effective in patients with chronic painful OVF and pain relief after vertebroplasty was immediate. This might suggest that differential diagnosis between acute and chronic OVF might not have any influence on the therapeutic effects of vertebroplasty.

Third, it is still undetermined as to whether all fracture sites of vertebral bodies of patients with multiple OVF could be simultaneously corrected by vertebroplasty. It is also uncertain whether patients with multiple OVF would benefit by correction of all fracture sites by vertebroplasty at once. Saracen and Kotwica7 found that vertebroplasty significantly diminished the level of pain in 90% of patients with multiple OVF and suggested that this procedure should be seriously considered as an efficacious choice of treatment.

Finally, vertebroplasty is a minimally invasive procedure intended to relieve pain and reduce disability in people with OVF; however, the potential complications and cost-effectiveness of the procedure should always be kept in mind. In addition, double-blinded trials associated with vertebroplasty were shown to have no more benefit than local anaesthesia.8 Therefore, the use of multimodality assessment to provide scientific evidence in vertebroplasty selection and planning is encouraged for all patients, to help obtain cost-effective and accurate results and further reduce the risk of mortality.
Conflicts of interest

The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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