



Some radiographically ‘occult’ osteoporotic vertebral fractures can be evidential if we look carefully

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It has been well documented that acute osteoporotic vertebral fractures (OVF) can have no visible deformation of vertebral body, and these OVF are commonly termed as radiographically ‘occult’ (1-4). Magnetic resonance imaging (MRI) can help the diagnosis of these occult OVFs. However, some of these ‘occult’ OVF are actually radiographically evidential if we look carefully.

Though vertebral endplate depression and anterior cortex buckling have been noted as signs of OVF (5-11), their significance may not have been well recognized by all spine radiograph readers (radiologists, orthopedic surgeons, rheumatologists, etc.). OVF is generally considered to be associated with vertebral body height loss; however, it is not always the case, particularly at the early phase. In our recent analysis of radiological reports for spine radiograph referred due to back pain, it was noted that osteoporotic ECF (endplate and/or cortex fracture) without vertebral body height loss was commonly missed (12). On the other hand, no singular moderate/severe OVF (one OVF in one patient) was missed; though OVFs at multiple levels were

often under-reported, i.e., not all OVFs were precisely reported (12).

Hereby we present a few cases of OVFs in the literatures (*Figures 1-3*), which were originally considered to be ‘occult’ OVF. Thus, the prevalence of ‘occult’ OVF may have been over-estimated. These cases illustrate the importance of recognizing ECF. Note the relevance of ECF has been emphasized in Genant’s original paper on OVF semi-quantitative grading (5), as well as many following articles (6-11,13,14). In some cases, acute ECF with minimal vertebral deformity can quickly progress to vertebral collapse (*Figure 4*). For radiograph of elderly female patients with a history of acute back pain in a setting of possible osteoporosis, close attention should be paid to look at vertebral endplate depression and anterior cortex buckling, particularly for vertebral levels with OVF high risk (10,11,15,16). With adequate training, radiologists can play a unique role in correctly interpreting the fine details of spine radiograph, and contribute to the clinical care for patients with OVF (17).

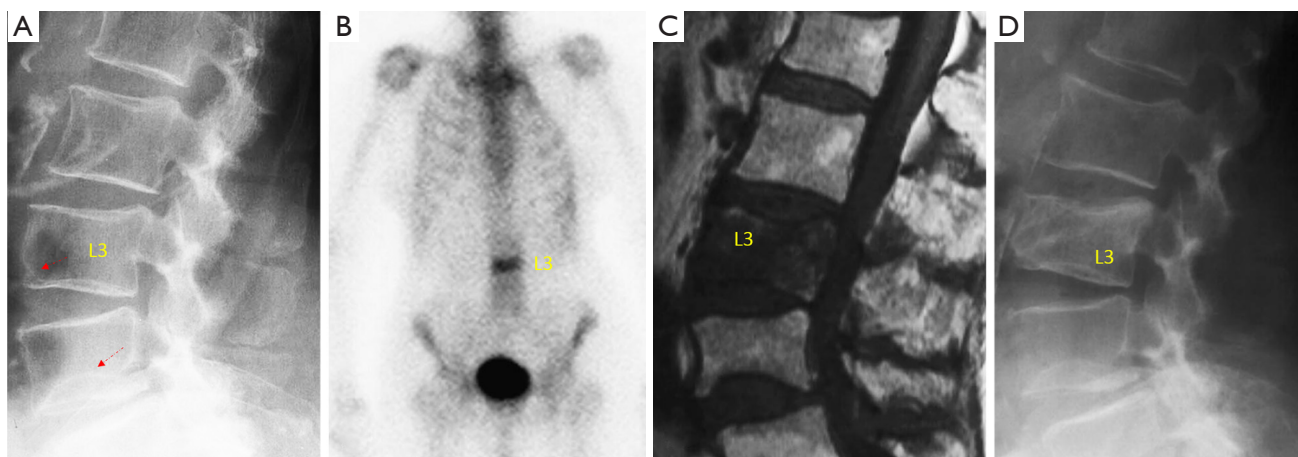


Figure 1 An 88-year-old woman with acute lower back pain after a fall of her own height. (A) Radiograph performed 2 days after the fall shows a previously known L4 lower endplate fracture (dotted arrow, an indicator of osteoporosis). L3 has an anterior cortex buckling (dotted arrow), which was missed in the initial reporting; (B) bone scintigraphy shows a band-like pattern of L3; (C) T1-weighted magnetic resonance imaging performed 3 weeks after initial radiograph. Normal signal in L4 confirms the chronic nature of its fracture. L3 has a reduced signal in most of the body; (D) radiograph taken 4 months after the onset of pain shows L3 deformity. [modified with permission from (2)].

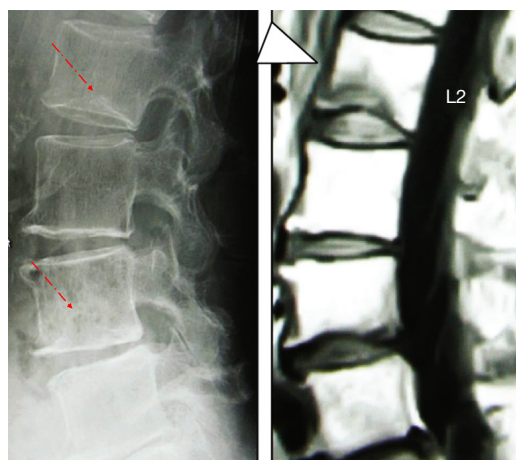


Figure 2 A 71-year-old woman with osteoporosis and no history of falls/injuries. Plain lumbar radiograph (left) shows L2 and L4 lower endplate depressions (dotted arrows). T1-weighted magnetic resonance imaging (right) shows L2 endplate fracture and associated lower marrow signal, suggesting acute nature of this fracture. Bone marrow signal is normal at L4 level, suggesting L4 fracture is likely old. This case was referred as radiographically ‘occult’ osteoporotic vertebral fracture in the initial reporting. [modified with permission from (3)].

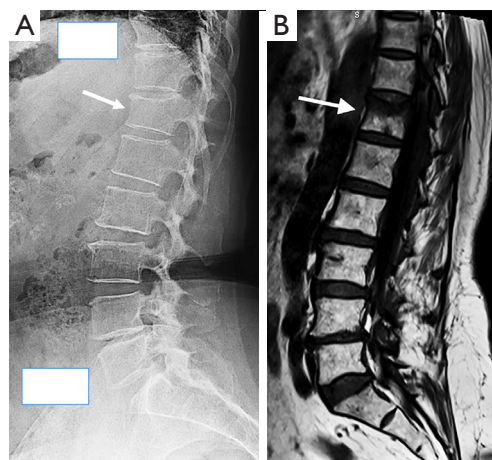


Figure 3 A 68-year-old woman with osteoporotic vertebral fracture. (A) Radiograph shows T12 vertebra mild wedging and upper endplate depression (fracture) which was missed in the initial reporting; (B) T1-weighted magnetic resonance imaging shows acute fracture of upper part of T12 vertebra. [modified with permission from (4)].

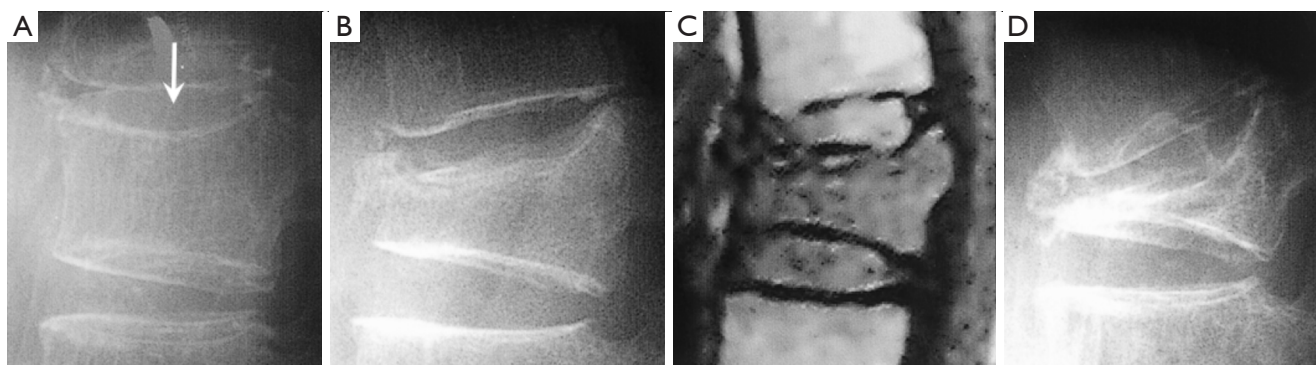


Figure 4 A 71-year-old woman with osteoporotic vertebral fracture. (A) Radiograph taken two days after the onset of acute pain, arrow indicates an upper endplate fracture; (B) radiograph and (C) magnetic resonance imaging, were taken 3 weeks after the incident, showing severe vertebral deformity; (D) radiograph taken 5 months after the incident, the vertebral deformity progressed to collapse. [reproduced with permission from (5)].

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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