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# Vertebral Body Bruise Resulting in Vertebral Wedging

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**Abstract** The patient was a 77-year-old man whose head and back impacted the ground after falling from a stepladder. On arrival, plain roentgenography and whole body computed tomography failed to depict a responsible spinal lesion. As he could walk, his wound was sutured and he was discharged to home. However, on the following day, he was unable to stand due to severe back pain. Urgent magnetic resonance image (MRI) revealed a high-intensity signal in the 12th thoracic vertebral body without compressive deformity. Follow-up roentgenography at 10 days showed compressive change at the 12th thoracic vertebral body; thus, a corset was applied at the thoracolumbar position. Final lumbar roentgenography at 6 months revealed compression of the thoracic vertebral body. In the present case an elderly patient, who initially showed a bone bruise, showed delayed compressive changes in the thoracic vertebral body. In our super-aging society, further studies are required to investigate the natural history of vertebral body bruises in elderly individuals.

***Keywords:*** *vertebral body, bruise, compressive fracture*

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## 1. Introduction

Bone bruises/contusions, also known as trabecular microfractures, are defined on magnetic resonance imaging (MRI) as band-like or diffuse zones of high signal intensity on T2-weighted sequences or short TI inversion recovery (STIR), and decreased signal intensity on T1-weighted sequences, without associated fracture of the cortex. [1] A histological analysis of bone bruises of the knee showed that microfractures occur in the cancellous bone and trabecular microfractures were observed at autopsy in 67% of thoracic spine specimens retrieved after blunt trauma fatalities. [1] Clinically, spinal MRI often detects additional vertebral bone bruises in blunt trauma patients with negative spinal computed tomography (CT) images. [2,3,4] However, the radiographic sequelae of vertebral bone bruises have not been well described. We present a case of vertebral body contusion that resulted in compressive malunion.

## 2. Case

The patient was a 77-year-old man whose head and back impacted the ground after falling from a stepladder. As he lost his consciousness for a few minutes, he was transported to our hospital by ambulance. His relevant medical history included glaucoma and benign prostate hypertrophy. On arrival, his consciousness was clear and he had hypertension (148/68 mmHg) and bradycardia (heart rate, 48 beats per minute). Physical examination showed a lacerated wound on his head and back; no motor or sensory disturbance of the legs was observed. Plain roentgenography and whole body CT failed to depict a responsible spinal lesion. As he could walk, his wound was sutured and he was discharged to home. However, on the following day he was unable to stand due to severe back pain, and visited our hospital again. Urgent MRI on the same day revealed a high-intensity signal in the 12th thoracic vertebral body without compressive deformity on STIR. He returned home with a prescription for analgesics, without a corset, based on the orthopedist's decision. Follow up roentgenography at 10 days showed compressive change at the 12th thoracic vertebral body; thus a corset was applied at the thoracolumbar spine. Three months later, the corset was removed after the resolution of his back pain. Final lumbar roentgenography at 6 months also revealed a compressed thoracic vertebral body (Figure 1). The anterior wedge angle of the vertebral bone bruise at the 12th thoracic vertebral body changed from 2° to 15° over the 6-month period. [5]

Computed tomography (CT) failed to depict a responsible spinal lesion (left). However, on the following day, MRI revealed a high-intensity signal in the 12th thoracic vertebral body on STIR (middle, arrow). Lumbar roentgenography, which was accidentally performed at 6 months, revealed compression of the thoracic vertebral body (right, arrow). The anterior wedge angle of the vertebral bone bruise at

the 12th thoracic vertebral body changed from 2° to 15° during the 6-month period.

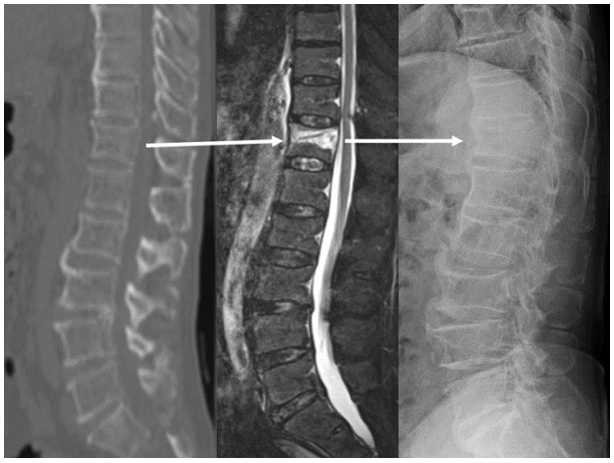

**Figure 1**. The series of radiological studies performed to investigate back pain in the present case

## 3. Discussion

In the present case, an elderly patient with a bone bruise showed delayed compressive changes in the thoracic vertebral body, which has not been previously reported.

Most previous reports concerning spinal body bruises involved the comparison of CT and MRI of spinal traumatic lesions. Based on these reports, only MRI could detect vertebral bone bruises; however, none of the studies investigated the final outcome of vertebral bone bruises. 2-4 In contrast to these studies, Teli et al. performed a retrospective study that described the plain radiographic outcomes of MRI-defined vertebral bone bruises associated with thoracic and lumbar spine fracture in adults, and assessed whether the vertebral bone bruises caused abnormalities of the bone-implant interface at instrumented levels. [1] The levels of the vertebral bone bruises in a consecutive series of adult patients who were admitted to a spinal injuries unit for thoracic and lumbar spine fractures were identified through an analysis of full spine MRI. As a result, 30 vertebral bone bruises were identified in 18 adult patients (male, n=15; female, n=3; average age, 38 years [range, 19–75 years]). After an average follow-up period of 19 months, the mean anterior wedge angle of the vertebral bone bruise at the time of injury and at the most recent follow-up examination was 3.5° and 3.8°, respectively, and did not differ to a statistically significant extent. A total of 12 bruise levels were instrumented, and no bond or implant interface failure was observed at these levels. They concluded that the vertebral bone bruises associated with thoracic and lumbar vertebral fracture in adult patients did not appear to cause significant progressive vertebral deformity or bone and implant interface failure. The difference between the study by Teli et al. and our case might be age. Elderly individuals tend to have osteoporosis, which is an important risk factor for compressive fracture. [6] The old age of the present case might have been the reason for the difference between the two reports.

## 4. Conclusion

In the present case, an elderly patient showed delayed compressive changes in the thoracic vertebral body after initially showing a bone bruise. In our super-aging society, further studies are required to investigate the natural history of vertebral body bruises in elderly individuals.

## Conflict of Interest

The authors declare no conflicts of interest in association with the present study.

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## List of Abbreviations

CT, computed tomography;
MRI, magnetic resonance image;
STIR, short TI inversion recovery

## References

[1] Teli, M., Roeck, N.D., Horowitz, M.D., Saifuddin, A., Green, R. and Noordeen, H. “Radiographic outcome of vertebral bone bruise associated with fracture of the thoracic and lumbar spine in adults” Eur Spine J, 14(6). 541-5. Aug. 2005.

[2] Onoue, K., Farris, C., Burley, H., Sung, E., Clement, M., Abdalkader, M. and Mian, A. “Role of cervical spine MRI in the setting of negative cervical spine CT in blunt trauma: Critical additional information in the setting of clinical findings suggestive of occult injury”. J Neuroradiol, S0150. 9861(19)30190.7. May, 2019.

[3] Atsina, K.B., Rozenberg, A. and Selvarajan, S.K. “The utility of whole spine survey MRI in blunt trauma patients sustaining single level or contiguous spinal fractures” Emerg Radiol, 26(5). 493-500. Oct. 2019.

[4] Khurana, B., Karim, S.M., Zampini, J.M., Jimale, H., Cho, C.H., Harris, M.B., Sodickson, A.D. and Bono, C.M. “Is focused magnetic resonance imaging adequate for treatment decision making in acute traumatic thoracic and lumbar spine fractures seen on whole spine computed tomography?”. Spine J, 19(3).403-10. Mar. 2019.

[5] Newell, N., Grant, C.A., Keenan, B.E., Izatt, M.T., Pearcy, M.J. and Adam, C.J. “A comparison of four techniques to measure anterior and posterior vertebral body heights and sagittal plane wedge angles in adolescent idiopathic scoliosis” Med Biol Eng Comput, 55(4). 561-72. Apr. 2017.

[6] Tsuda, T. “Epidemiology of fragility fractures and fall prevention in the elderly: a systematic review of the literature” Curr Orthop Pract, 28(6).580-5, Nov. 2017.