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CASE REPORT

MODERN SURGICAL APPROACH IN VERTEBRA PLANA: BALLOON KYPHOPLASTY AS AN INNOVATIVE TREATMENT-A CASE REPORT

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ABSTRACT

Vertebra plana is often asymptomatic and typically identified as a radiological finding. It is characterized by a 70% loss in vertebral height without kyphosis. In patients experiencing pain and functional loss, surgery is an option that should be considered. This case aims to share the clinical improvement findings after kyphoplasty surgery in a patient with vertebra plana. A 69-year-old female patient presented to the Department of Neurosurgery clinic due to low back pain while walking. Radiological imaging revealed a lumbar vertebrae 1 compression fracture with approximately 75% loss of vertebral height. The patient underwent balloon kyphoplasty. Vertebral height loss was successfully restored by an estimated 5-8 mm. No perioperative complications were reported. Vertebra plana is usually detected incidentally in asymptomatic patients. However, this case demonstrates that it can cause symptoms such as pain and that balloon kyphoplasty can be a viable treatment option in such situations

Keywords: Kyphoplasty, osteoporosis, spine

INTRODUCTION

Vertebra plana is a radiological finding characterized by a reduction in vertebral body height exceeding 70%, frequently associated with osteoporotic compression fractures (1, 2). It is often identified incidentally in asymptomatic patients (3, 4). However, in certain cases, it may manifest acute or chronic pain, neurological deficits, or kyphotic deformity in the affected segment (4, 5).

Asymptomatic individuals are typically managed conservatively, without the need for surgical intervention. However, in patients presenting with significant symptoms, such as pain or functional impairment, surgery may be considered. Among these, vertebroplasty and kyphoplasty are prominent techniques frequently used in clinical practice (3, 5). These procedures are generally unsuitable for advanced vertebral collapse, such as vertebra plana, as restoring vertebral height poses significant challenges (6).

The primary objectives of surgical intervention are to prevent spinal deformity, restore vertebral body height, alleviate pain, and improve the patient's functional capacity, facilitating early mobilization and enhanced quality of life (3, 4).

This case report highlights the successful treatment of a patient with vertebra plana using kyphoplasty, demonstrating the efficacy of this approach in achieving favorable clinical outcomes.

CASE REPORT

A 69-year-old female patient, weighing 58 kilograms and measuring 155 cm in height, presented to our outpatient clinic with back pain following a fall while walking. Her medical history included menopause at age 55 years, prior fractures of the ankle and heel, and a rib fracture a year later. She also had a history of asthma, for which she used prednisolone 16 mg daily for approximately 20 days per month during exacerbations.

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Upon admission, a physical examination revealed localized pain in the upper lumbar region upon palpation. The neurological examination was intact. Radiological evaluation, including preoperative X-ray and computed tomography (CT) scans (Figures 1 and 2) revealed a lumbar vertebrae 1 (L1) compression fracture with approximately 75% loss of vertebral body height.

Further imaging via incorporating sagittal thoracic vertebrae 1-weighted, T2-weighted, and Short Tau Inversion Recovery sequences (Figure 3), confirmed the presence of an acute fracture (white arrow).

Given the degree of vertebral collapse and the patient's symptomatic presentation, an L1 kyphoplasty procedure was planned under sedation. During the operation, balloon expansion successfully achieved significant vertebral augmentation. Postoperative CT imaging revealed a restoration of vertebral body height of approximately 5-8 mm (Figure 4). The patient tolerated the procedure well, with no perioperative complications.

This case underscores the efficacy of kyphoplasty in treating acute vertebra plana and highlights its role in improving vertebral stability and alleviating pain in patients presenting a significant vertebral body collapse.

DISCUSSION

Vertebra plana represents a severe form of vertebral compression that poses distinct challenges for both diagnosis and management. Traditional conservative approaches remain the cornerstone of treatment for asymptomatic cases or those with minimal functional compromise (3, 4). However, in symptomatic patients, the presence of significant

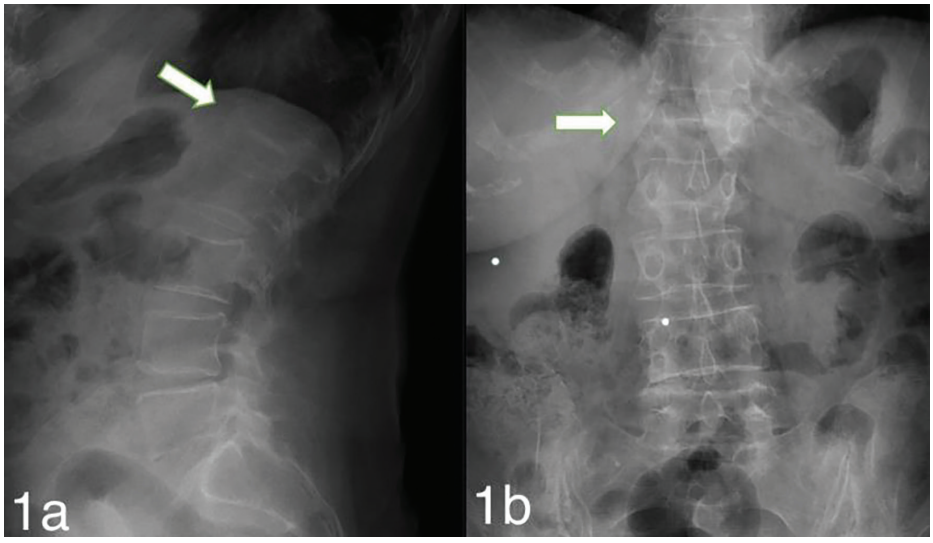

Figure 1: a) Preoperative lateral X-ray, b) Preoperative anteroposterior X-ray.

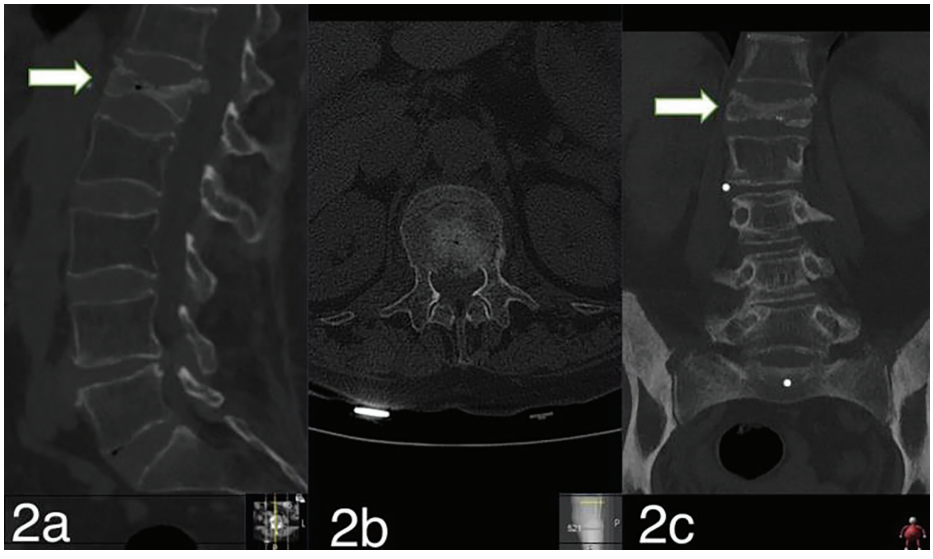

Figure 2: a) Preoperative sagittal computed tomography, b) Preoperative axial CT, c) Preoperative coronal CT.
CT: Computed tomography

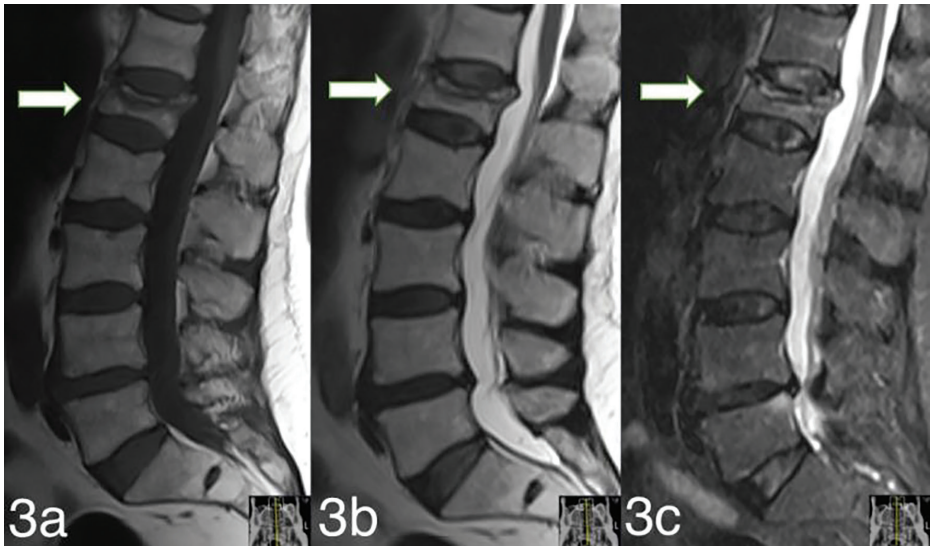

Figure 3: a) Preoperative sagittal MRI T1-weighted, b) Preoperative sagittal MRI T2-weighted, c) STIR sequences.
MRI: Magnetic resonance imaging, STIR: Short Tau Inversion Recovery, T1: Thoracic vertebrae 1, T2: Thoracic vertebrae 2

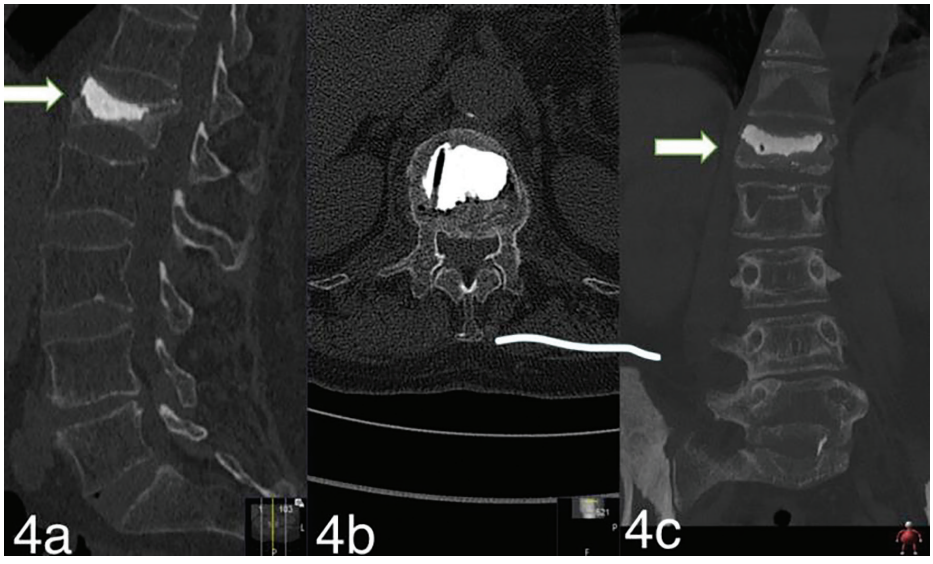

Figure 4: a) Sagittal CT, b) Axial CT, c) Coronal CT.
CT: Computed tomography

pain and deformity necessitates surgical intervention to achieve therapeutic objectives, including pain relief, vertebral stabilization, and prevention of kyphotic deformity (3-5).

Kyphoplasty, although not typically applied, can provide significant benefits when performed by experienced surgeons using the correct surgical technique in cases of severe osteoporotic vertebral compression fractures such as vertebra plana. This technique enables vertebral height restoration and stabilization while minimizing perioperative risks. In this patient, a height restoration of 5-8 mm was achieved, highlighting the potential of kyphoplasty to mitigate complications associated with severe vertebral collapse (6). Balloon-assisted augmentation involves inflating a balloon within the vertebra to compress and strengthen the vertebral wall, thereby facilitating the restoration of vertebral height. This method allows for more controlled and symmetrical restoration, contributing to improved clinical outcomes (6).

The impact of long-term corticosteroid use on the pathogenesis of vertebral fractures cannot be overlooked. Chronic prednisolone therapy, as seen in this case, is known to exacerbate bone density loss, increasing the risk of fractures (2). This underscores the importance of comprehensive management strategies, including osteoporosis prophylaxis and fracture risk assessment in such patients (4). This patient's history of prior fractures further illustrates the cumulative impact of comorbidities and chronic medication use on skeletal health.

Despite the promising results achieved with kyphoplasty, the potential for complications, such as cement leakage or insufficient height restoration, warrants careful preoperative evaluation and meticulous intraoperative technique (3, 5). Moreover, patient selection remains pivotal, as advanced vertebra plana cases with concurrent osteonecrosis may exhibit suboptimal outcomes with this approach (6).

CONCLUSION

In conclusion, kyphoplasty is a valuable intervention for patients with acute vertebral plana, offering significant improvements in vertebral height, pain relief, and functional outcomes. This case emphasizes the necessity for an individualized approach in managing vertebral compression fractures, considering the severity of the collapse, patient comorbidities, and potential surgical risks to achieve optimal therapeutic results.

Ethics

Informed Consent: *Written informed consent was obtained from the patient for this study.*

Footnotes

Conflict of Interest: *The authors declared no conflict of interest.*

Author Contributions: *Concept: K.A., Y.K., M.C.E., A.T.A., Design: K.A., Y.K., Data Collection or Processing: K.A., M.C.E., Analysis and/or Interpretation: K.A., Y.K., M.C.E., Literature Search: K.A., Y.K., A.T.A., Writing: K.A., Y.K., M.C.E., A.T.A.*

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