

Consecutive Multi-Level Kyphoplasty Related to Discontinuation of Denosumab

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INTRODUCTION

Vertebral compression fractures are a result of axial or compressive load with biomechanical failure of the bone, frequently compromising the anterior half of the vertebral body. Studies have demonstrated that cement augmentation improves pain relief, quality of life, and functional recovery compared to conservative care. While there is evidence that early kyphoplasty can decrease the risk for adjacent vertebral fractures, there is also evidence that the likelihood of an adjacent level fracture increases within sixty days of the procedure. Therefore it is important that underlying causes of osteoporosis be addressed before or concurrently with the kyphoplasty to avoid adjacent level injury.

PATIENT CASE

A 75F with osteoporosis on denosumab with severe thoracic kyphosis had a CT revealing L1-L3 vertebral compression fractures. She was admitted for a 3 level kyphoplasty that was successfully performed and appreciated significant pain relief, but reported an acute exacerbation of the pain two days later. She returned to the clinic for follow up 2 weeks later and xrays found a new T12 fracture with new use of a wheelchair. Her denosumab had recently been stopped for a dental extraction procedure. She was sent for CT with findings of acute compression fractures of T11, T12, and L4. She then proceeded with a second 3 level kyphoplasty at these levels, totaling a 6 level kyphoplasty.

FIGURE 1

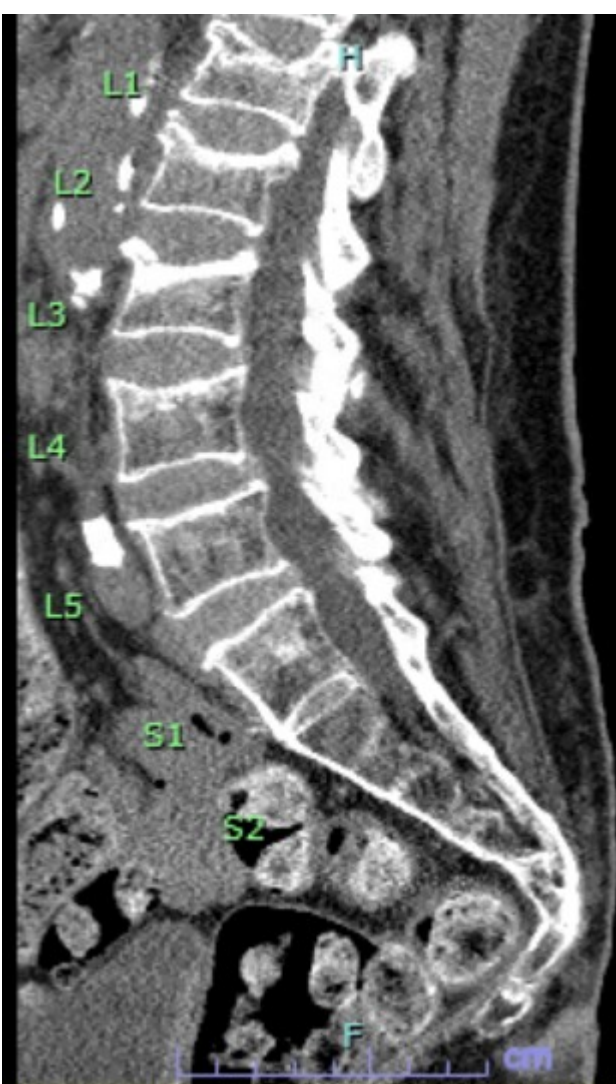


Figure 1. CT showing vertebral compression fractures at L1, L2, and L3

FIGURE 2

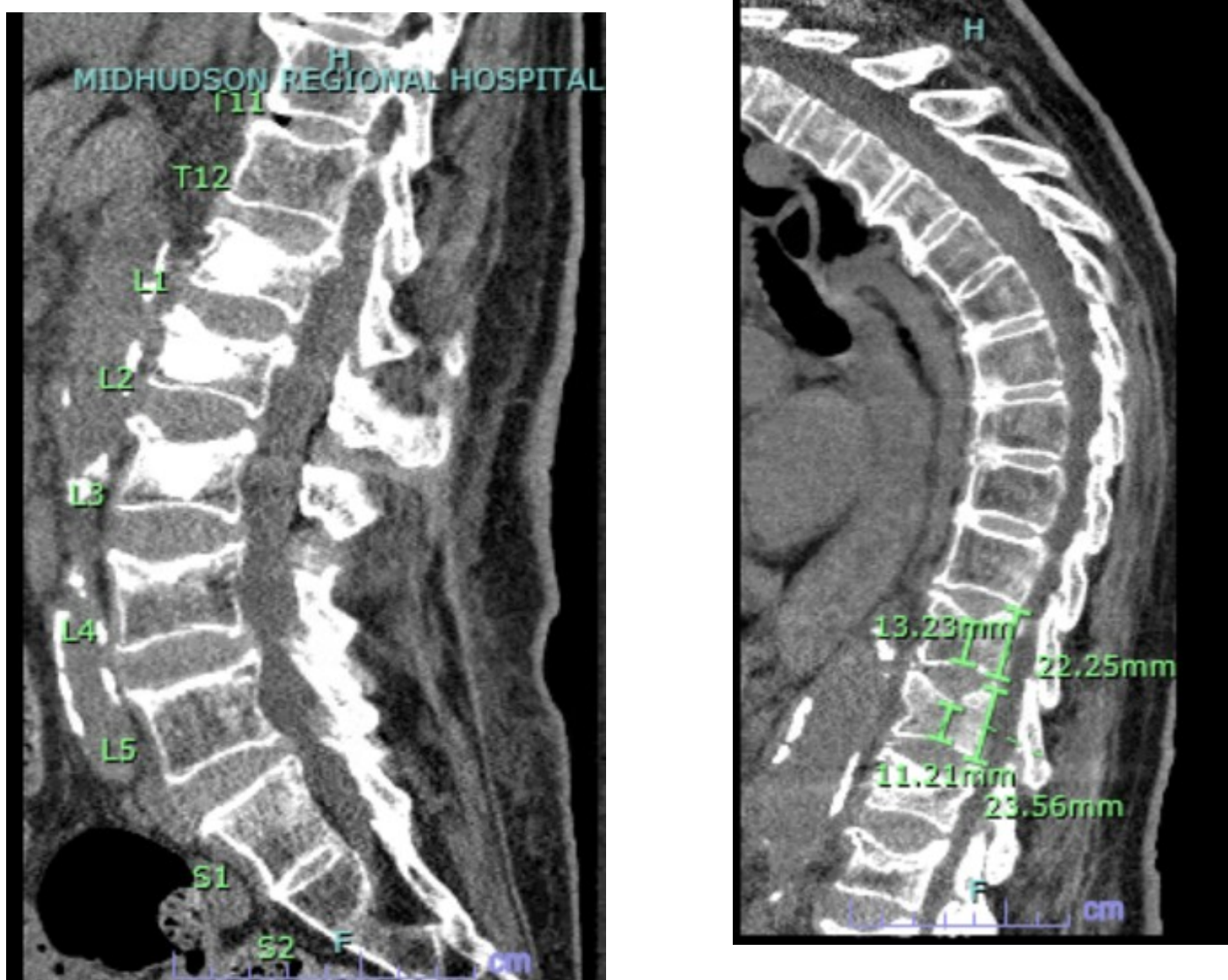


Figure 2A. CT showing L1-3 post kyphoplasty and new compression fracture at L4

Figure 2B. CT showing new compression fractures at T11 and T12

FIGURE 4



Figure 4. Imaging showing all 6 levels of kyphoplasty from T11/L4

FIGURE 3



Figure 3A. Fluoroscopic image of cement placement in L1-L3

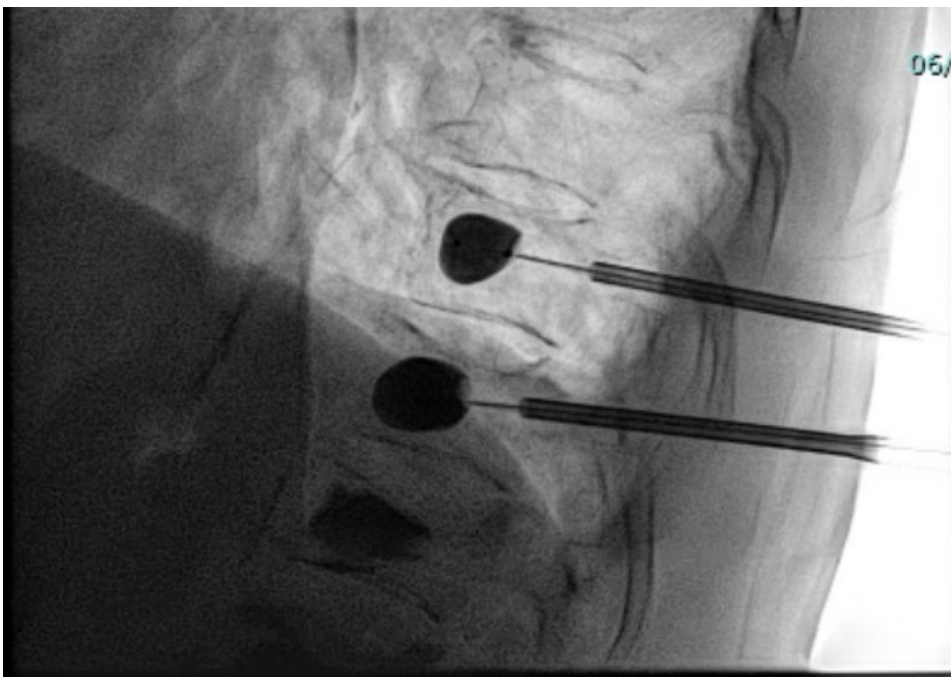


Figure 3B. Fluoroscopic image of balloon deployment at T11 and T12

CONCLUSIONS

Compression fractures are the most common type of osteoporotic fracture, comprising ~1.4 million cases worldwide. Abrupt discontinuation of denosumab is associated with severe rebound osteoporosis and these patients are at increased risk of vertebral compression fractures. In osteoporotic patients with compression fractures it is key that the underlying cause of osteoporosis is addressed or the likelihood of adjacent segment disease is increased

BIBLIOGRAPHY

- 1) Donnelly III CJ, DiPompeo CM, Varacallo M. Vertebral Compression Fractures. [Updated 2023 Aug 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK448171/>
- 2) Anderson PA, Froysheter AB, Tontz WL Jr. Meta-analysis of vertebral augmentation compared with conservative treatment for osteoporotic spinal fractures. J Bone Miner Res. 2013 Feb;28(2):372-82. doi: 10.1002/jbmr.1762. PMID: 22991246.
- 3) Takano H, Nojiri H, Shimura A, Teramoto J, Sugawara Y, Ishijima M. Early Balloon Kyphoplasty Treatment for Osteoporotic Vertebral Fracture Reduces Adjacent Vertebral Fractures. Medicina (Kaunas). 2024 Jul 4;60(7):1097. doi: 10.3390/medicina60071097. PMID: 39064526; PMCID: PMC11278625.
- 4) Fribourg D., Tang C., Sra P., Delamarter R., and Bae H., Incidence of subsequent vertebral fracture after kyphoplasty. Spine. (2004) 29, no. 20, 2270-2276, <https://doi.org/10.1097/01.brs.0000142469.41565.2a>, 2-52.0-14944341603.
- 5) Parreira PCS, Maher CG, Megale RZ, March L, Ferreira ML. An overview of clinical guidelines for the management of vertebral compression fracture: a systematic review. Spine J. 2017 Dec;17(12):1932-1938. doi: 10.1016/j.spinee.2017.07.174. Epub 2017 Jul 21. PMID: 28739478.
- 6) Elena Tsozouli, M Carola Zillikens, Christian Meier, Jean-Jacques Body, Elena Gonzalez Rodriguez, Athanasios D Anastasiakis, Bo Abrahamsen, Eugene McCloskey, Lorenz C Hofbauer, Nuria Guadalupe, Barbara Obermayer-Pietsch, Stuart H Ralston, Richard Eastell, Jessica Pepe, Andrea Palermo, Bente Langdahl. Fracture Risk and Management of Discontinuation of Denosumab Therapy: A Systematic Review and Position Statement by ECTS, The Journal of Clinical Endocrinology & Metabolism, Volume 106, Issue 1, January 2021, Pages 264-281, <https://doi.org/10.1210/clinem/dgaa756>