**Case Report**
Volume 9:4, 2020
DOI: 10.37421/jsp.2020.9.449

**Journal of Spine**

**ISSN: 2165-7939** **Open Access**

# Turning a Challenge into an Advantage: A Technical Report on Kyphoplasty for Multiple Myeloma

**Natan Silver* and Yair Barzilay**

*Department of Medicine, Shaare Zedek Medical Center in Jerusalem, Israel*

## Abstract

Kyphoplasty, a procedure first described in 2001 for the treatment of osteoporotic Vertebral Compression Fractures (VCFs) has since been used successfully for pathological vertebral compression fractures, including those caused by multiple myeloma. Whilst the evidence base for kyphoplasty remains incomplete, there is a general consensus that it is safe and significantly reduces pain in up to 84% of patients in whom non-surgical management has failed.

**Keywords:** Kyphoplasty • Clinical indications • Pathology

## Introduction

Although kyphoplasty has a range of clinical indications, it also has recognised contra-indications [1-9]. The structural integrity of the affected vertebra must be considered in advance in order to enable a successful procedure. Until recently posterior wall defects were considered to be a contra-indication [10], due to the risk of cement travelling posteriorly and occupying the spinal canal, but several studies have proven that kyphoplasty can be performed safely even with posterior wall defects, as long as appropriate technique is used [11-13]. In cases of endplate compromise kyphoplasty can be challenging, as cement leakage into the disk space can occur, increasing the risk of adjacent level fracture. This case report describes the utilization of endplate defects to improve the augmentation of two adjacent vertebrae affected by multiple myeloma lesions.

## Case Presentation

A 78-year-old man presented to the emergency department with intractable upper back pain, including night pain, and inability to mobilize due to pain. He had no significant medical background. On physical examination there was mid-thoracic midline tenderness and inability to change position in bed due to pain. Neurological examination was normal. Complete blood count and coagulation profile were normal, biochemistry revealed a slightly elevated creatinine of 1.22 mg/dL with normal calcium levels. Inflammatory markers were normal. Thoracic spine radiographs (Figure 1) demonstrated a compression fracture of T9. Computed tomography of the thoracolumbar spine (Figure 2) revealed lytic lesions in T8 and 9 with a pathologic compression fracture of T9. Defects of the T8 lower endplate and T9 upper endplate, as well as the T9 posterior wall, were noted. A very small lytic lesion was also observed in T7-not large enough to warrant intervention or cause concern of adjacent level fracture following treatment of T8.

## Discussion

Balloon kyphoplasty of T8 and T9, combined with biopsy, was planned in order to obtain a diagnosis, treat intractable pain, and allow early mobilisation. The patient was operated on under general anaesthesia in the prone position on a spinal operating table (four poster frame). During cementation of T9 under fluoroscopy, the cement was observed to be travelling posteriorly, towards the spinal canal (Figure 3a), therefore cementation of T9 was ceased. Kyphoplasty of T8 was performed with introducers aimed at the lower half of the vertebral body. Taking advantage of the large cortical defects of the inferior T8 endplate and the superior T9 endplate, approximately 6 ml of cement was injected into the bottom of T8 with the cement travelling inferiorly through the endplate defects and into the superior part of T9 (Figures 3b-3d). This enabled cement augmentation of both vertebrae simultaneously with the T8 cement mass resting on the cured cement mass of T9. Stability was demonstrated by post-operative standing radiographs (Figure 4). Post-operatively the patient's pain improved from VAS 9 to VAS 2 and this result was maintained at outpatient follow up. The pathology report demonstrated multiple myeloma and the patient were referred to hematology day care service. A CT performed at 18 months post-operatively (Figure 5) demonstrated bridging bone and no compromise of

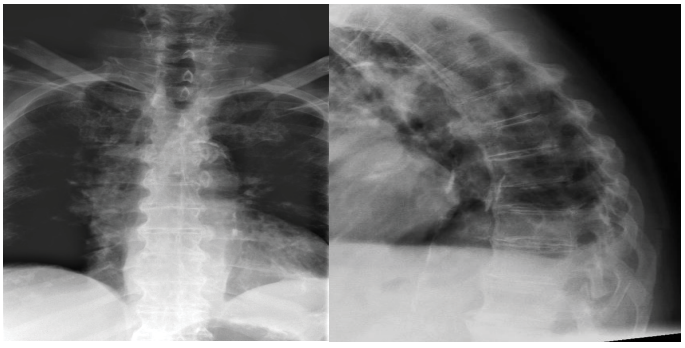

**Figure 1.** Compressed T9 body with suspicion of lytic appearance.

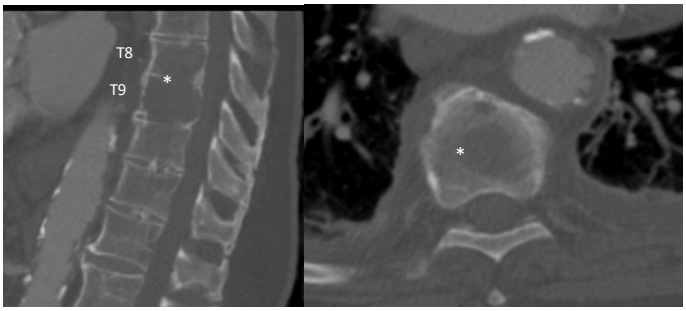


**Figure 2.** Endplate defects creating continuity between T8 and T9 vertebral bodies: Posterior wall defect of T9 also evident.

***Address for Correspondence:** Silver N, Department of Medicine, Shaare Zedek Medical Center in Jerusalem, Israel, E-mail: doctornatan@gmail.com*

***Copyright:** © 2020 Silver N, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.*

**Received** 06 July 2020; **Accepted** 14 July 2020; **Published** 21 July 2020

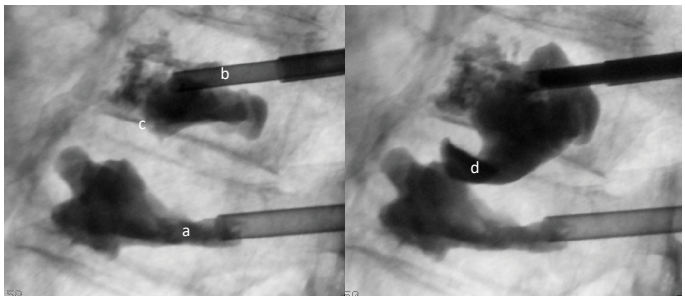


**Figure 3.** (a): Cement from T9 has travelled posteriorly towards the spinal canal-at this point cementation of T9 was ceased. (b): Introducer of T8 directed inferiorly towards the endplate defect. (c): Cement from T8 body begins to move inferiorly and through the endplate defect. (d): Cement passes through both endplate defects, crossing the disc space and coming to rest on the cured cement mass of T9.

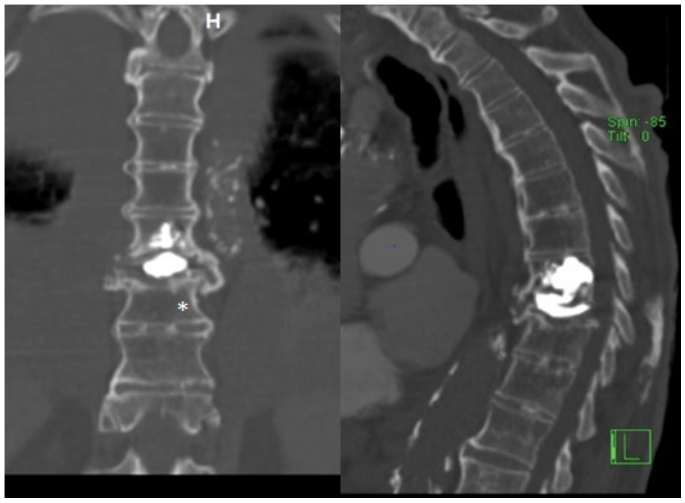


**Figure 4.** Bridging bone (Left).

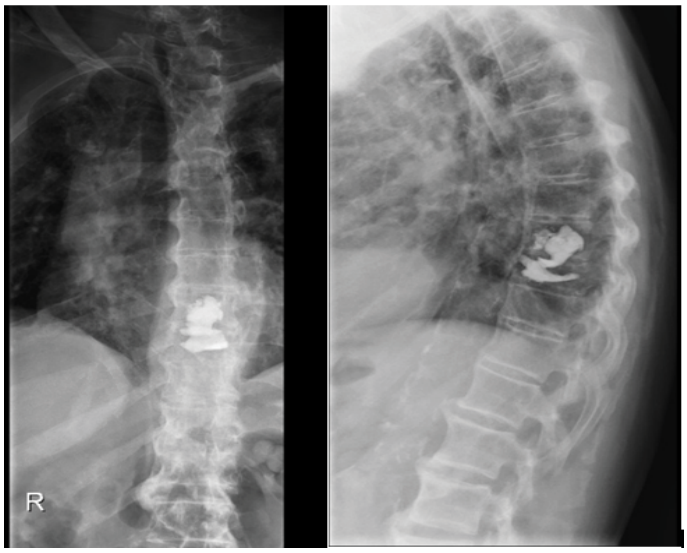


**Figure 5.** Bridging bone (Right).

the cement mass. No progression was seen of the T7 lesion, nor any sign of adjacent level fracture

## Conclusion

Kyphoplasty has been shown to provide pain relief for patients with pathological compression fractures secondary to multiple myeloma. In this patient the myeloma involved adjacent endplates creating a space which was utilized to create continuity of the cement masses. This helped to improve stability, allowing immediate mobilization and better conditions for fracture healing. We conclude that endplate defects, rather than impeding cementation, can potentially be used as a tool for more effective augmentation.

## References

1. Lieberman Hansen, Dudeney Sean and Reinhardt Mary Kay. "Initial Outcome and Efficacy of "Kyphoplasty" in the Treatment of Painful Osteoporotic Vertebral Compression Fractures." *Spine* 26 (2001): 1631-1638.
2. James Berenson, Robert Pflugmacher, Peter Jarzem and Jeff rey Zonder, et al. "Balloon Kyphoplasty *versus* Non-surgical Fracture Management for Treatment of Painful Vertebral Body Compression Fractures in Patients with Cancer: A Multicentre, Randomised Controlled Trial." *Lancet Oncol* 12 (2011): 225-235.
3. Carmen Bouza, Teresa López-Cuadrado, Patricia Cediel and Zuleika Saz-Parkinson, et al. "Balloon Kyphoplasty in Malignant Spinal Fractures: A Systematic Review and Meta-Analysis." *BMC Palliat Care* 8 (2009): 12.
4. Lee Hwan Mo, Park Si Young, Lee Soon Hyuck and Suh Seung Woo, et al. "Comparative Analysis of Clinical Outcomes in Patients with Osteoporotic Vertebral Compression Fractures (OVCFs): Conservative Treatment *versus* Balloon Kyphoplasty." *Spine J* 12 (2012): 998-1005.
5. Cord, Chew. "Safety and Efficacy of Percutaneous Vertebroplasty in Malignancy: A Systematic Review." *Clin Radiol* 66 (2011): 63-72.
6. Ontario, Heal. "Vertebral Augmentation Involving Vertebroplasty or Kyphoplasty for Cancer-related Vertebral Compression Fractures: A Systematic Review." *Ont Health Technol Assess Ser* 16 (2016): 1-202.
7. Omid Hariri, Ariel Takayanagi, Dan E Miulli, Javed Siddiqi, et al. "Minimally Invasive Surgical Techniques for Management of Painful Metastatic and Primary Spinal Tumors." *Cureus* 9 (2017): 1114.
8. Ahmed Saleh and Michael Collins. "Appropriateness Criteria for Treatment of Osteoporotic Vertebral Compression Fractures." *Osteopor Int* 29 (2018): 793-804.
9. Marc Röllinghoff, Kourosh Zarghooni, Klaus Schlüter-Brust and Rolf Sobottke, et al. "Indications and Contraindications for Vertebroplasty and Kyphoplasty." *Arch Orthop Trauma Surg* 130 (2010): 765-774.
10. Nicholas McArthur, Christian Kasperk, Martin Baier and Michael Tanner. "1150 Kyphoplasties over 7 Years: Indications, Techniques, and Intraoperative Complications." *Orthoped* 32 (2009): 90.
11. Sean Molloy, Mathew D. Sewell, Johnson Platinum and Anand Patel, et al. "Is Balloon Kyphoplasty Safe and Effective for Cancer-related Vertebral Compression Fractures with Posterior Vertebral Body Wall Defects?" *J Surg Oncol* 113 (2016): 835-842.
12. Ahmed Shawky Abdelgawaad, Ali Ezzati, Ramachandran Govindasamy and Branko Krajnovic, et al. "Kyphoplasty for Osteoporotic Vertebral Fractures with Posterior Wall Injury." *Spine J* 18 (2018): 1143-1148.
13. Jun Zou, Xin Mei, Minfeng Gan and Huilin Yang. "Kyphoplasty for Spinal Fractures from Multiple Myeloma." *J Surg Oncol* 102 (2010): 43-47.

**How to cite this article:** Natan Silver and Yair Barzilay. "Turning a Challenge into an Advantage: A Technical Note on Kyphoplasty for Multiple Myeloma." J Spine 9 (2020): 449. DOI: 10.37421/jsp.2020.9.449