



Staged Management of a Traumatic Lumbar Spine Fracture with PLIF and Delayed Colpectomy: A Case Report

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Abstract

Vertebral fractures are very common pathologies following high-velocity trauma or falls from heights and are frequently associated with spinal cord injury. We present a case of staged management of a spinal fracture with myelopathy and pelvic organ dysfunction. A 33-year-old female fell from the 5th floor of a building 7 months prior and sustained a fractured L1 vertebra with paraplegia and pelvic organ dysfunction. She was initially managed with short segment transpedicular fixation and a decompressive laminectomy and was urinary catheter free 6 months after the surgery. Control Computer Tomography (CT) on the 6th month showed increasing kyphosis. She was admitted for L1 corpectomy and arthrodesis. The operation was performed with the patient in a lateral position with the incision overlying the 12th rib. The rib was preserved and retracted inferiorly. Following the standard transpoas approach to the vertebral column, the L1 body was resected, and a prosthesis was inserted. Her recovery was uneventful with no postoperative complications. The postoperative CT scan was acceptable. By day 10, was ambulating comfortably and was discharged. Lateral transpoas corpectomy expandable cage tandem with posterior spinal decompression and instrumented stabilization can be an effective and safe method of treatment of spinal fractures and correction of kyphosis. This may be performed in 2 stages in cases where the patient is not fit for a single-step surgery or the managing surgeon has limited experience in this field.

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Received Date: 29 Mar 2023

Accepted Date: 13 Apr 2023

Published Date: 18 Apr 2023

Citation:

Musa G, Ndandja DTK, Midov MZ, Hovrin DV, Chmutin GE, Slabov MV. Staged Management of a Traumatic Lumbar Spine Fracture with PLIF and Delayed Colpectomy: A Case Report. *Ann Surg Case Rep.* 2023; 6(2): 1074.

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Keywords: Corpectomy; Lateral lumbar interbody fusion; Posterior lumbar interbody fusion; Spinal trauma; Vertebral fracture; Transpoas

Introduction

Burst fractures are very common fractures associated with high-velocity trauma or falls from height. Retropulsion of fracture fragments is associated with compression of the neural elements and neurological deficits in these patients [1,2]. The need for decompression of the neural elements and fixation of unstable burst fractures is required in these cases as soon as possible [2].

The optimal management of the burst fracture in the lumbar region remains controversial. Some authors have described successful posterior, lateral, and anterior corpectomy with the insertion of a titanium mesh or expandable cage [1,3]. The anterior approach is safe for the lower lumbar region and more challenging for the upper lumbar region due to the presence of major blood vessels. As a result, this approach has been associated with increased hemorrhage [1]. The posterior corpectomy or transpedicular corpectomy has gained popularity in recent years. However, the extensive retraction of neural elements risks postoperative neurological deficits [4]. For a single burst fracture, the use of either a short segment (one level above and below) or a long segment fixation (two levels above and below) has been a point of debate with advantages and disadvantages [5]. Decompression of the canal and fixation and reconstruction of the anterior and middle column are commonly performed in a single sitting as a two-step surgery.

However, a two-step 2 sitting surgery can also be used with good results, especially in cases of an unstable patient or absence of surgical expertise. We present a case of staged management of a spinal fracture with myelopathy and pelvic organ dysfunction.

Case Presentation

A 33-year-old female presented to the hospital six months after a traumatic spinal cord injury

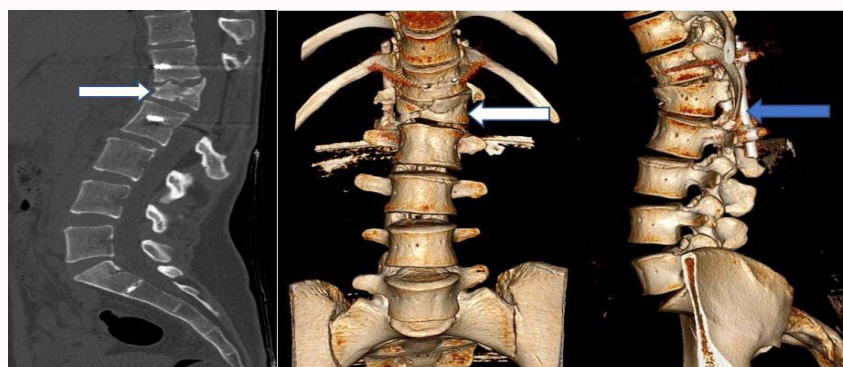


Figure 1: Preoperative sagittal CT and 3D reconstruction showing the fracture and associated kyphotic deformity (white arrows). The posterior transpedicular fixation is seen intact (blue arrow).



Figure 2: Showing the incision site and the skeletonized and preserved 12th rib (blue arrow).



Figure 3: Intraoperative X-ray showing the position of the prosthesis.

resulting from compression by a fractured L1 vertebral body. The details of her previous treatment were that she fell from the 5th floor of a building. She presented with paraplegia and urinary bowel dysfunction. Following stabilization, short segment transpedicular fixation stabilization was performed with decompressive laminectomy. She remained on a urinary catheter for about 5 months due to urinary retention. She was catheter free after 6 months. On follow-up CT, she had progressive kyphosis (Figure 1). A decision was made to perform a corpectomy of the fractured L1 vertebral body and insert an expandable cage for interbody fusion.

Operative Technique

The patient was placed in a right lateral position with padding of all pressure points. With the help of an intraoperative X-ray, the incision site was identified to correspond with the region over the 12th rib. The 6 cm oblique incision was made over the 12th rib which was skeletonized and preserved by retraction inferiorly (Figure 2). Through blunt dissection, the vertebral column was approached through the psoas muscle. The fractured L1 body was identified. Following resection of the disc above and below, corpectomy was performed using various sizes of rongeurs and other instruments. A premeasured titanium expandable cage was inserted. The position was confirmed by intraoperative X-ray (Figure 3). The closure was standard with the approximation of the abdominal wall muscles and skin closure. Postoperatively, there was no neurological deficit. She recovered very well with no complications. Early postoperative CT

was acceptable (Figure 4).

Discussion

The lateral transpsoas approach to the lumbar spine provides a safe approach for decompression of the neural elements, correction of the kyphosis, corpectomy, restoration of vertebral body height, and reconstruction of the anterior column (interbody fusion) using an expandable cage with the preservation the nerve root, anterior and posterior longitudinal ligaments, and facet joints [6-8]. The approach is relatively less traumatic with blunt muscle dissection with no need for retraction of retroperitoneal vessels and abdominal content as compared to ALIF, less soft tissue trauma, intraoperative blood loss, and postoperative pain, along with faster mobilization, shorter hospital length of stay. Potential risks include injury to the exiting nerve roots and pleural. Nevertheless, lateral lumbar corpectomies may be performed safely with the use of intraoperative monitoring such as fluoroscopy and EMG [9-11].

Ozgun et al. first describe bed minimal invasive lateral approach for interbody fusion which is applied for corpectomy [7]. Srikantha et al. discussed 2 cases of patients with lumbar spine fractures who underwent minimally invasive lateral transpsoas corpectomy using an interbody expandable cage concluding the efficacy of the technique [12]. Chou et al. described a posterior-only transpedicular corpectomy treatment case of L1 fracture with correction of the kyphosis with a direct cantilever technique [4].

In comparison with our approach, the posterior approach has the advantage of being a familiar and less morbid approach, but it usually

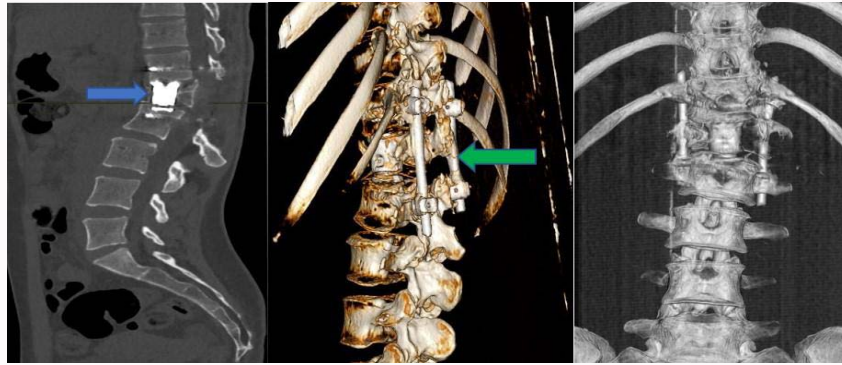


Figure 4: Postoperative CT scan sagittal cut and CT 3D reconstruction showing the interbody prosthesis (blue arrow) and the posterior Transpedicular fixation (green arrow). It should be noted that the 12th rib was not sacrificed intraoperatively.

requires fusing more levels, relies on an indirect decompression such as ligamentotaxis, and it may not restore height or correct kyphosis as well as the anterior approach [4,13,14]. Moreover, for large burst-fracture fragments and significant canal compromise, posterior manual tamping of fragments ventrally may be ineffective. Also, the window through which an expandable cage can be placed is restricted because of the inability to sacrifice the nerve roots. Maximum retraction of the thecal sac is sometimes required for visualization during fixation of the expandable cage increasing the risk to the nervous tissue [4,14,15].

Conclusion

Lateral transposas corpectomy expandable cage tandem with posterior spinal decompression and instrumented stabilization can be an effective and safe method of treatment of spinal fractures and correction of kyphosis. This may be performed in 2 stages in cases where the patient is not fit for a single-step surgery or the operating surgeon has limited experience in the field.

Acknowledgement

The publication was carried out with the support of the Peoples Friendship University of Russia (RUDN) Strategic Academic Leadership Program.

References

- Podet AG, Morrow KD, Robichaux JM, Shields JA, DiGiorgio AM, Tender GC, et al. Minimally invasive lateral corpectomy for thoracolumbar traumatic burst fractures. *Neurosurg Focus*. 2020;49(3):E12.
- Sasani M, Özer AF. Single-stage posterior corpectomy and expandable cage placement for treatment of thoracic or lumbar burst fractures. *Spine*. 2009;34(1):E33-E40.
- Hammad WA, Barania MA, Alaghory IM, El Sherif AM. Anterolateral approach for unstable lumbar burst fracture with anterior compression. *Open J Modern Neurosurg*. 2018;8(02):201.
- Chou D, Wang VY, Gupta N. Transpedicular corpectomy with posterior expandable cage placement for L1 burst fracture. *J Clin Neurosci*. 2009;16(8):1069-72.
- Sharif S, Shaikh Y, Yaman O, Zileli M. Surgical techniques for thoracolumbar spine fractures: WFNS spine committee recommendations. *Neurospine*. 2021;18(4):667-80.
- Boschert EN, Hagan DP, Christ AS, Decker RC, editors. *Transposas lateral lumbar interbody fusion technique and indications*. Semin Spine Surg. 2022: Elsevier.
- Ozgur BM, Agarwal V, Nail E, Pimenta L. Two-year clinical and radiographic success of minimally invasive lateral transposas approach for the treatment of degenerative lumbar conditions. *SAS J*. 2010;4(2):41-6.
- Pimenta L, Taylor WR, Stone LE, Wali AR, Santiago-Dieppa DR. Prone transposas technique for simultaneous single-position access to the anterior and posterior lumbar spine. *Oper Neurosurg (Hagerstown)*. 2020;20(1):E5-E12.
- Arnold PM, Anderson KK, McGuire Jr RA. The lateral transposas approach to the lumbar and thoracic spine: A review. *Surg Neurol Int*. 2012;3:198-215.
- Jacob KC, Patel MR, Collins AP, Singh K. Complications of lateral lumbar interbody fusion. *Semin Spine Surg*. 2022: Elsevier.
- Piche JD, Butt B, Ahmady A, Park P, Patel R, Nassr A, et al. Lateral lumbar corpectomy: Indications and surgical technique with review of the literature. *Semin Spine Surg*. 2022: Elsevier.
- Srikantha U, Lokanath YK, Hari A, Nirmala S, Varma RG. Minimally invasive lateral transposas approach for lumbar corpectomy and stabilization. *Surg Neurol Int*. 2019;10:153.
- Farber SH, Naeem K, Bhargava M, Porter RW. Single-position prone lateral transposas approach: Early experience and outcomes. *J Neurosurg Spine*. 2021;1-8.
- Maciejczak A, Barnaś P, Dudziak P, Bajer BJ, Litwora B. Minimally invasive posterior corpectomy of the lumbar spine with transpedicular fixation. *Neurol Neurochir Pol*. 2004;38(6):511-6; discussion 517.
- Jo DJ, Kim KT, Kim SM, Cho MG, Seo EM. Single-stage posterior subtotal corpectomy and circumferential reconstruction for the treatment of unstable thoracolumbar burst fractures. *J Korean Neurosurg Soc*. 2016;59(2):122-8.