

One-Stage Posterior Only Corpectomy And Fusion In The Treatment Of Metastatic Spinal Disease Without Neurologic Deficit: A Case Presentation

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Abstract

Introduction

The treatment of lumbar metastatic burst fractures without neurologic deficit can be approached using a one-stage posterior-only corpectomy and fusion technique. This technique involves the removal of the affected vertebral body and its replacement with an expandable titanium cage to provide stability and promote fusion.

Case Report

We describe our initial experience with the case of a 36-year-old female who presented with spinal nerve compression symptoms with radiological features of a solitary metastatic disease of the second lumbar vertebrae with a background history of missed unilateral breast tumour. She had a one-staged L2 posterior corpectomy, insertion of an expandable cage and stabilization with pedicle screws and rods. She subsequently did well with no neurological deficit. Subsequently, she had a full assessment for breast cancer which revealed a left breast malignant tumour and had a radical mastectomy done and followed up with chemotherapy.

Discussion

Lumber corpectomy combines a posterior approach for instrumentation with an anterior approach for corpectomy and reconstruction of the anterior column. This combined approach is usually associated with high morbidity, long operative time, more blood loss, long hospital stay, protracted rehabilitation period and an access surgeon. In our case, a single approach was done to achieve posterior rigid stabilization, 360° neural decompression, and anterior column reconstruction without exposing the patient to the morbidity associated with the combined approach or the possible vascular complication of an anterior surgery.

Conclusion

This case shows that a one-stage posterior only corpectomy and fusion can be done safely with good outcome in a poor resource setting.

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I. Introduction

After the lung and liver, the spine is the third most common site for metastatic disease¹. Due to advancements in systemic therapy, modern imaging techniques, and treatments that promote a faster functional recovery, many cancer patients now enjoy longer life expectancies. The number of cases of metastatic spine tumors has increased because of cancer patients living longer^{2,3}. Spinal metastases are common in cancer patients. According to studies, an autopsy reveals that between 30% and 80% of cancer patients had evidence of spinal metastases^{4,5}. The aging of the general population and medical advancements have led to a notable increase in the incidence of metastatic spinal tumors during the past ten years⁶. Thoracic vertebrae are most commonly affected by spine metastases, which affect about 70% of patients with metastatic cancer⁷. The breast, lung, prostate, and kidney are the most common organs from which metastases to the spine arise.^{3,8}

Historically, combined approach or staged anterior and posterior decompression and fusion has been required for lumbar metastatic lesion surgeries^{9,10}. Although the anterior approach has the advantage of providing excellent visualization of the pathological condition and vertebral body, it is a risky approach due to the possibility of iatrogenic morbidity, particularly in critically ill patients¹¹. With transpedicular screw fixation, posterior approaches seem to offer a great method for posterior decompression. At the same time, they enable safe neural element visualization with corpectomy and mesh cage implantation^{10,12,13}.

Our aim is to report our initial experience with posterior alone corpectomy and fusion in a poor resource poor setting.

II. Case Report

She is a 36-year-old woman who presented with Recurrent low back pain of 10 months duration and spinal claudication of 4 months. The Pain was insidious in onset, dull, the pain was severe enough to interfere with routine activities of daily living and radiated to both lower limbs, it is relieved temporarily by analgesics. The last episode was 2 months prior to this presentation. Her walking distance has reduced significantly, which is relieved on stooping forward. No history of trauma, nil history of cough, weight loss or drenching night sweats. No lower limbs weakness, urine or fecal incontinence, nil obvious spine deformities or previous spine surgeries in the past. She had Fine Needle Aspiration Cytology FNAC at a tertiary hospital 8 weeks prior to presentation on account of a suspected lump on the right breast. However, results were never retrieved, nil history of co-morbidities. On examination She was not pale, anicteric, not dehydrated, no pedal oedema. The musculoskeletal system revealed no spinal deformity, no gibbus Tone and reflexes were normal and Sensory function was normal as well. Straight leg raising was greater than 70° bilaterally Global motor power from L2-S1 was 4/5 bilaterally. Right Breast examination revealed Peau de orange around the nipple-areolar complex and adjacent skin and a mass in the upper outer quadrant, firm and poorly defined. The mass was attached to the skin, no lymphadenopathy. The chest was Clinically clear and Abdominal examination revealed Nil significant findings.

An assessment of Metastatic right breast cancer to the spine was made. Plain x rays and thoracolumbar MRI scan revealed Metastatic deposit at L2. Breast USS showed Irregular shaped heterogenous masses but predominantly hypoechoic with spiculated margins No axillary lymphadenopathy

Haematological and biological Investigations were normal. She had a Mammography which revealed An asymmetrical soft tissue density in the sub-areolar duct Lesion is poorly defined, spiculated margins with surrounding architectural distortion and thickening of the overlying skin. She was prepared for and had a Core needle biopsy of the right breast.

She was worked and had an L2 corpectomy, insertion of an expandable cage and stabilization with rods and pedicle screws. The body of L2 vertebrae was subsequently sent for histology and the result revealed metastatic mucinous adenocarcinoma. She was commenced on neo-adjuvant chemotherapy which consist of Docetaxel, cyclophosphamide and Adriamycin She had 4 courses and Subsequently had a modified radical mastectomy 4 months after spine surgery She had further 3 courses of adjuvant chemotherapy (same regimen) with Good clinical response as evidence by both clinical and biochemical parameters

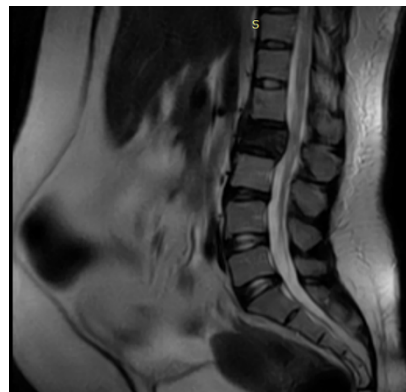


Figure 1 T2W sagittal MRI of the Lumbosacral spine showing collapsed L2 vertebra



Figure 2 Intra operative image showing Expandable cage at L2

III. Discussion

In this case report, we report the feasibility, safety, and efficacy of a single-level posterior alone corpectomy for second lumbar vertebrae in a patient with metastatic burst fractures in a resource poor setting. We report that this technique provides adequate decompression of the spinal canal, stabilization of the vertebral column, and restoration of the sagittal alignment. The preoperative and postoperative visual analog scale (VAS) score for back pain was 8 and 1, respectively. The preoperative and postoperative Oswestry Disability Index (ODI) scores were 60 and 20, respectively. There were no neurological deficits post-operatively. Our case report is the first to report the outcomes of a single-level posterior alone corpectomy for the second lumbar vertebrae in patients with metastatic burst fractures in our facility. Previous studies have mainly focused on the thoracic spine, where the lateral approach is more commonly used¹⁴. The lateral approach has several advantages, such as avoiding the manipulation of the spinal cord, preserving the posterior tension band, and allowing for a larger implant size. However, the lateral approach also has some drawbacks, such as the need for a second surgical team, the risk of injury to the major vessels and the sympathetic chain, the difficulty of accessing the lower lumbar spine, and the requirement of intraoperative neuromonitoring. The posterior approach, on the other hand, has the benefits of being familiar to most spine surgeons, requiring only one surgical team, providing direct visualization of the spinal canal, and facilitating the posterior instrumentation. The posterior approach also has some limitations, such as the risk of dural tear, nerve root injury, cerebrospinal fluid (CSF) leakage, the difficulty of achieving adequate anterior column support, and the possibility of implant subsidence or migration^{5,10,14}. The single-level posterior corpectomy for lumbar 2 is a novel technique that combines the advantages of both the lateral and the posterior approaches. It allows for a complete removal of the fractured or diseased vertebral body and the intervertebral disc, as well as the placement of an expandable cage that can restore the disc height and the vertebral body height¹⁵. The expandable cage also provides anterior column support and prevents implant subsidence or migration. The posterior approach enables a direct decompression of the spinal canal and a fixation of the adjacent vertebrae with pedicle screws and rods. The procedure can be performed in a single stage, without the need for patient repositioning, intraoperative neuromonitoring, or a second surgical team. The procedure also reduces the operative time, blood loss, and complications, compared to the traditional open corpectomy or the lateral corpectomy. The single-level posterior corpectomy for lumbar 2 has several clinical applications and implications. It can be used for patients with traumatic burst fractures of the lumbar spine, especially those with significant canal compromise, neurological deficits, or kyphotic deformity^{16,17}. It can also be used for patients with degenerative or neoplastic conditions of the lumbar spine, such as spondylolisthesis, spinal stenosis, or spinal tumors. In this case, our patient had a metastatic spine lesion. The procedure can improve the patient's pain, function, and quality of life, as well as prevent the progression of spinal instability, deformity, or cord compression. The procedure can also reduce the hospital stay, the cost, and the morbidity associated with the surgery. However, the procedure also has some potential challenges and risks. It requires a high level of surgical skill and experience, as well as careful patient selection and preparation. It also requires a specialized instrumentation and implant system, which may not be widely available or affordable. The procedure may not be suitable for patients with severe osteoporosis, infection, or inflammation of the spine, or for patients with multiple-level involvement or previous spinal surgery^{5,10,11}.

IV. Conclusion

In conclusion, the single-level posterior alone corpectomy for second lumbar is a feasible, safe, and effective technique for the treatment of patients with metastatic burst fractures of the lumbar spine. It provides adequate decompression, stabilization, and restoration of the spine while minimizing complications. It also improves the patient's pain, function, and quality of life. It is a promising alternative to the traditional open corpectomy or the lateral corpectomy, especially for patients with significant canal compromise, neurological deficits, or kyphotic deformity. However, further research and development are needed to validate and optimize the technique, as well as to expand its indications and applications.